

**THE DEVELOPMENT OF A COMMUNITY BASED  
PREVENTION MODEL FOR UNDER NUTRITIONAL STATUS  
AMONG PREGNANT WOMEN IN SOUTHERN ETHIOPIA**

**by**

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## DECLARATION

I declare that the above thesis is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

I further declare that I submitted the thesis to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at UNISA for another qualification or at any other higher education institution.



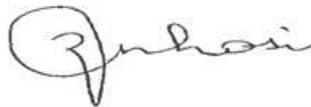
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## DEDICATION

I dedicate this **doctoral thesis** to my parents, especially to my father and **mother**, for their lovely care and encouragement.

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## **ABSTRACT**

**PURPOSE:** The purpose of this study was to develop a community based prevention model for under nutritional status among pregnant women in southern Ethiopia.

**METHODS:** The investigation utilised an explanatory sequential mixed methods design in which a quantitative phase was followed by qualitative enquiry. The investigation was organized in three stages, beginning with a stage, 511 pregnant women were selected by using multistage stratified sampling technique, in which a quantitative questionnaire was used to elicit data from pregnant mothers to determine factors contributed for under nutritional status. During quantitative phase haemoglobin level was measured by using haemocue lab kit. The second stage of the investigation utilised a combination of in-depth interviews (18 participants interviewed) and focus group discussions (53 participants) to gain explanatory insights into factors related to under nutritional status. Finally, the third stage of the study related to model development in which a combination of secondary literature and the primary research findings were used to develop prevention model using the steps of theory generation by Chinn and Kramer.

## **RESULTS**

The general prevalence of food insecurity was found to be 88% among the study population. Agro-ecology in lowlands, living within pastoralist communities, absence of food support during most recent years and material deprivation showed a statistically substantial relationship with food insecurity at household level. Moreover, prevalence of under nutrition was 54.2% among poor family units, those living in lowlands & pastoralist settings, those relying on self-production as a nourishment source, having less than one meal per day. Average nutrition practices were positively or negatively significant with regard to under nutrition.

The general prevalence of anaemia was 39.9% and not taking or using iron sulphate, ANC visit, extreme under nutrition and moderate household food insecurity were statistically significant with anaemia.

### **Qualitative FINDINGS**

Key informant interviews and FGD participants discovered that variables like, the dry season, rain shortages, climate change, living within a food aid community, poor soil fertility, conflicts between ethnic group and population increases were the main contributing factors for household food insecurity. Poor awareness about nutrition, poverty, and pregnant women's workloads, cultural food priority being given initially to husbands, and inhibited animal sources of food like milk, eggs and meat, were all important contributing factors to under nutrition.

In model development process the researcher utilized the quantitative research results, qualitative research findings and previous literature of key elements for model development such as agent, recipient, context, outcome, procedure, and dynamics stated by Dick off, James and Wiedenbach.

### **CONCLUSION**

Food insecurity, under nutrition and nutrition-related anaemia were general public health issues in pastoralist compared with agrarian communities. As such, community based a prevention model was developed based on the current findings, that was necessary to minimise food insecurity, under nutrition and anaemia among pregnant women in Ethiopia.

**Keywords:** Anaemia, Community based prevention model, food insecurity, under nutritional status, pregnant women

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## LIST OF ABBREVIATIONS

ANC	Ante Natal Care
AOR	Adjusted odds Ratio
AU	African Union
BMI	Body Mass Index
CBN	Community Based Nutrition Program
COR	Crud odd Ratio
CSA	Central Statistical Agency
DALYS	Disability Adjusted Lost Year
DDS	Dietary Diversity Score
EDHS	Ethiopia Demographic and Health Survey
EPHI	Ethiopian Public Health Institute
FAO	Food and Agriculture Organization of United Nation
FANTA	Food and Nutrition Technical Assistance
FDMOH	Federal Democratic Ministry of Health
FDRE	Federal Democratic and Republic of Ethiopia
FGD	Focus Group Discussion
GDP	Gross domestic Product
HDD	High dietary diversity
HEW	Health extension worker
HF	Health Facility
Hgb	Haemoglobin
HO	Health Officer
HSDP	Health Sector Development Program
HSTP	Health Sector Transformation Plan
ICC	Intersectorial Collaboration and Coordination
IDA	Iron Deficiency Anaemia
IFAD	International fund for Agricultural development
IFAS	Iron Folic Acid Supplementation
IFPRI	International Food Policy Research Institute

ITN	Insecticide treated Bed Net
KII	Key Informat Interview
LMIC	Low- and Middle-income country
LDD	Low dietary diversity
LMP	Last menstrual period
MD	Medical doctor
MDD	Medium dietary diversity
MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
MUAC	Mid-Upper Arm Circumference
NGO	Non-Government
NNP	National Nutrition Program
NNTC	National Nutrition Technical Committee
OR	Odds Ratio
PCA	principal component analysis
RHB	Regional Health Bureau
SEM	Social Ecological Model
SNNPR	Southern Nation Nationality People Region
SDG	Sustainable Development Goal
SPSS	Statistical Package for the Social Sciences
SRS	Random Sampling (Simple)
SS	Stratified Sampling
SUN	Scaling up nutrition
TFR	Total Fertility Rate
UN	United Nations
UNISA	University of South Africa
UNICEF	United Nations Children's Fund
WDDS	Women Dietary Diversity
WHA	World Health Assembly
WFP	World Food Program
WRA	Women of reproductive age

WB World Bank  
WHO World Health Organization  
ZHD Zonal Health Department

## CHAPTER 1: INTRODUCTION AND BACKGROUND OF THE STUDY

### 1.1 INTRODUCTION

Pregnancy is a critical period from which the women misses her menstrual cycle or the uterus can be visible or touch before the onset of labor or abortion (WHO, UNFPA, & UNICE, 2015:180). Tuncalp et al (2017:860) stated positive pregnancy experience. Pregnancy is the time from conception until delivery (Taranikanti, 2018:62). In this study, the researcher considered confirmed and visible pregnancy for the investigation of under nutritional status.

During pregnancy, normal physiological changes occurs, these changes lead to decrease of haemoglobin concentration and nutrient intake (Sun et al, 2017:736; Soma-Pillay et al, 2016:89; Motosko et al, 2017:6), also it is a high-risk period in the lifecycle of a woman, as the results, micronutrient, macro nutrient and energy needs increased during this period. So, pregnant women are advised to follow a more diversified diet group during this period (Hailu, Kassa, Abera, Mulu, & Genanew, 2019:5; Kominiarek, & Rajan, 2016:1200).

Pregnancy causes an increase requirement of iron, vitamins and nutrients (Soma-Pillay et al, 2016:89). Forbes, Graham, Berglund, and Bell (2018:7) carried out study in Canada, on dietary change during pregnancy and women's reason for dietary change; women decreased the food intake that also affects their pregnancy outcome. Chen, Zhao, Mao, Xia, Baker, and Zhang (2016:20) reviewed articles in China, as reported that, pregnant women feeding status affect the outcomes of new-born and the women.

Globally, under nutrition is a public health challenge that affects low and middle income nations (Ngo, Ortiz-Anrellucchi, & Serra-Majem, 2016:613), it is common in resources limited settings, in developing countries; particularly, in Ethiopia(CSA,2016:31), the burden is unacceptably high(Development Initiatives, 2018:11). Therefore, crucial

nutrition interventions and health service integration is a key to reduce this mortality and morbidity burden (Kung'u et al, 2018:2). Moreover, the evidences have shown that under nutrition and anaemia are the common contributors for maternal mortality (Bailey, West, & Black, 2015:24). Therefore, nutrition is the utmost important engine of sustainable development (IFPR, 2015:3).

In 2018, about 821.6 million peoples were under nourished in worldwide; 256.1 million peoples were from Africa. So, intensified efforts and multi sectorial interventions are very important to tackle hunger (FAO, IFAD, UNICEF, WFP, & WHO, 2019:9). Malnutrition burden is increasing in almost all sub regions of Africa, the region with the highest prevalence of under nourishment, at almost 20% (FAO, 2019:3). The recent evidences have shown that, globally, under nutrition continues as an extremely high level. In spite of some progresses reported in selected nutrition measurements, improvement is insufficient to meet the 2025 global nutrition targets. Thus, strong efforts and actions are required to meet each of those targets (Development Initiatives, 2020:37).

The Global Nutrition Report indicated that, “no country is on course” to reach all 8 global nutritional target being traced and just 8 countries are on course to meet 4 targets, similarly, no country is “on course” to reach the anaemia target (Development Initiatives, 2020:38). The trends in food insecurity and malnutrition contribute significant challenge to achieve SDG2.

Research studies have shown that different risk factors associated with under nutrition such as: seasonality among the rural communities (IFPRI, 2015:78), Food insecurity, inadequate intake of nutrient, lack of sanitation, and lack of access for health and nutrition services (Vaivada, Gaffey, Das, & Bhutta, 2017: 205; Bhautta et al, 2013 ), poverty (Bailey, West, & Black, 2015:24) and others.

Globally, Anaemia is the most common public health problem during pregnancy. It affects developing and developed countries (WHO, 2015:1; WHO, 2014, De Benoist et al, 2008:1; Sun et al, 2017:730; Roy, & Pavord, 2018:114). Worldwide, anaemia affected 613.2 million of reproductive age women, 35.3 million of whom were pregnant, in 2016 (Development Initiatives, 2020:35; WHO, 2017:10).

Furthermore, anaemia during pregnancy related with LBW, prematurity, maternal and perinatal mortality and other adverse pregnancy outcomes (WHO, 2017:5; WHO, 2015:1; Sun et al, 2017:730).

In Ethiopia, The burden of anaemia in children under-5 and women of reproductive age (WRA) (15-49 year) were fifty seven per cent and twenty four per cent, respectively. Furthermore, twenty two per cent of women aged 15-49 are classified as “thin” (CSA, 2016:34). Healthcare coverage is extremely low and ninety five per cent of women and ninety four per cent of men are not covered. However, sixty two per cent of WRA receive antenatal care from a trained health worker and twenty six per cent of deliveries occur in facility. The under-5 death rate is 67 /1,000 live births and the neonatal mortality rate is forty eight per one thousand live births. The maternal mortality ratio (MMR) was 412 / 100,000 live births(CSA,2016:46).

Studies on under nutrition in pregnant women in Ethiopia are limited to the central parts and urban communities and there is little evidence from the most remote and pastoral communities such as the Southern Omo Zone. There is also no evidence of an existing community-based model for the prevention of under nutrition and food insecurity in pregnant women, despite the necessity for this intervention, given less attention for the high burden of disease.

## 1.2 BACKGROUND TO THE RESEARCH PROBLEM

Adequate nutritional status is crucial for the survival and wellbeing of both mother and foetus (Berti, Cetin, Agostoni, Desoye, Devlieger, Emmett, & Koletzko, 2016:82; Nnam,2015:457; Black et al, 2013:17). During pregnancy, the physiological alternation occurs due to this, pregnant women require 66 per cent more iron to sustain adequate haemoglobin levels for the baby and for the generation of specific catalysts. Pregnant women requires a 50 per cent increase in iron sulphate /folate, and a twofold increase in the B12 nutrient (Soma-Pillaly, Nelson-Piercy, Tolppanen & Mebazaa, 2016:89). Good nutrition and a healthy diet during pregnancy is fundamental to the health of the mother and her newborn child (WHO,2016:14;WHO, 2017). The periods of pregnancy and lactation require an increase in energy, and macro-, and micronutrients (Kominiarek & Rajan, 2016:1200).

Under nutrition is a significant public health problem in developing countries(Ngo, Ortiz-Anrellucchi, & Serra-Majem, 2016:613). A lack of protein-energy, inadequate nutrition and micronutrient deficiencies are the most significant risk factors for morbidity and mortality in developing countries. Hundreds of millions of pregnant women and children do not have adequate nutrition (Yasmin, 2016:33).

Globally, and across nations, under nutrition remains a significant challenge with one in every three individuals lacking healthy nutrition. About two billion people have deficiencies related to key micronutrients like iron and vitamin A (Development initiatives, 2017:10). A lack of healthy nutrition influences about one in five pregnant women, indicating the need for interventions in this area (Kedir, Berhane & Worku, and 2014:61).

The Global Nutrition Report (2017) indicates that six nations namely, Nigeria, Ethiopia, Yemen, Somalia, Kenya, and South Sudan, a total of thirty-eight million people are severely food insecure; one thousand seven hundred and ninety-six million children under five are wasted and four thousand nine hundred and sixty million people are moderately under nourished. Starvation is a risk factor for under nutrition among a great number of people worldwide (Development initiatives, 2017:9).

The global Nutrition Report and other study indicated, under nutrition is a leading factor for mortality among under -5 children in developing nations (Development Initiatives, 2018:21; Black et al, 2013:18). The deaths of more than thirty-three per cent of all children under-5 are attributed to under nutrition from developing country( LMC), particularly in Sub-Saharan Africa, and have not accomplished the necessary decline in the number of people being under weight, stunted or vitamin and mineral deficient (WHO, 2013:14). Furthermore, pregnant women under nutrition status can increase the risk of miscarriage, anemia, fetal death, pre-term birth and maternal death (Salem, Eshra, & Saleem, 2016:79).

Under nutrition associated with micronutrient deficiencies of Iodine, Vitamin A and Iron are globally the most critical element for general wellbeing. Micronutrient deficiency threatens the wellbeing and development of populations around the world, particularly as it relates to pregnant women and under-5 kids in developing nations (WHO, 2018). According to a WHO fact sheet (2018), in low- and middle-income countries (LMIC), around four hundred and sixty-two million adults are underweight, while one hundred and fifty-five million children under five are wasted. Forty- five per cent of deaths among children under five are as a result of under nutrition. Women, children and youth are especially vulnerable to under nutrition.

The nutrition of pregnant women is a primary determinant for the future wellbeing of both the mother and her developing embryo. An inadequate diet in pregnancy may increase the likelihood of stillbirths, premature births, low birth weight infants, and maternal deaths (Nana & Zema, 2018:5; WHO, 20117:10). A study conducted on micronutrients in LMIC found that two billion people risk micronutrient deficiencies including pregnant women further substantiating the need for effective interventions (Darnton, Hill, & Mkparu, 2015:1746).

Internationally, anaemia affects around two billion people, or twenty five per cent of the population. Anaemia is most prevalent in preschool children (forty seven per cent), and the least prevalent in men (twelve per cent). A proportion of thirty two percent of non pregnant women and forty two percent of pregnant women are iron deficient. Anaemia is prevalent worldwide in one of three preschool children, pregnant and non-pregnant women (WHO, 2017:8; WHO, 2015:1; WHO, 2008:7). The WHO has asserts that iron deficiency rates among the top ten most prevalent medical conditions in the developed world, while one out of every two pregnant women in developing countries is anaemic (WHO, 2018).

The prevalence of anaemia is high and affected 27 per cent of the total population, close to two billion people, in 2013. Developing nations carry 89 per cent of the burden of disease. Preschool children and women of reproductive age are proportionally more affected. Iron deficiency is the main cause (sixty per cent) of anaemia in many populations and also worldwide (Kassebaum, 2016:247). According to Branca, Mahya, and Mustafa (2014:231) globally, the burden of iron deficiency anaemia particularly among pregnant women are high, thus, demanding targeted interventions in this population.

In 2017, and 2015, WHO stated iron deficiency during pregnancy was identified as the most significant general medical issue (WHO, 2017:8; WHO, 2015:1). The outcome of anaemia in pregnancy increases the risk of low birthweight, preterm birth, perinatal and maternal mortality (Young, 2018:479; WHO, 2017:10; Black et al, 2013: 4). A study conducted by Kassebaum et al (2016:252) in one hundred and 88 countries between 1990 to 2013 assessed the prevalence and severity of iron deficiency using the methodology of the Global burden of Diseases, injuries and risk factors study, 2013 and found a very high prevalence of Iron deficiency (27% of world population). Developing nations carries 89 per cent of all anaemia related disability and iron deficiency remains the main source of disability. There is a lack of understanding of the seriousness and pervasiveness of this issue which is further underpinned by the fact that iron

supplementation programs have been implemented intermittently at health facility levels in the absence of national convention (FDRE, 2004:16).

Nutrition related anaemia remains endemic and is a growing disease in developing nations, indicative of the inadequacy of current interventions to address the problem (WHO, 2017:7; Balarajan et al, 2011). Anaemia is a worldwide health problem affecting both emerging and industrialised nations with significant consequences for human wellbeing and social and economic improvement (WHO, 2017:2, WHO, 2015:1; WHO, 2008:11). In addition, the poor health outcomes associated with anaemia, namely maternal and perinatal mortality and poor psychological and motor development negatively affect productivity and economic growth (Balarajan et al 2011 & Daru, 2018:549). Daru et al. (2018:553) conducted a multilevel investigation in twenty-nine nations in LMICs (Latin America, Africa, Pacific, Eastern Mediterranean, and South East Asia) on the risk of maternal mortality in women with severe anaemia during pregnancy and in the post-partum period.

### 1.3 RESEARCH PROBLEM STATEMENT

A problem statement identifies a knowledge gap in a particular area. It follows on a general summary of the problem and is introduced by a sentence that identifies the research gap (Gray, Grove, & Sutherland, 2017:76).

Maternal and neonatal mortality rates in developing nations are much greater than in developed nations (Black et al, 2013:3; Bailey et al, 2015:24). Studies have shown that interventions in basic nutrition contribute to a decrease in morbidity and mortality, despite the fact that nutrition is inadequately integrated in wellbeing frameworks (Kung'u, Ndiaye, Ndedda, Mamo, Ndiaye, Pendame & De-Regil, 2018:11). Maternal under nutrition further contributes to eight hundred thousand neonatal deaths annually (Bhutta, Das, Rizvi, Gaffey, Walker, Horton, & Black, 2013:452). A study reports indicated that, kids and maternal under nutrition contribute substantially toward the burden of low birth weight and maternal mortality in LMICs (Black et al, 2013:3).

Under nutrition is a worldwide challenge that has various forms. It touches utmost of the globe's residents at some point in their lifespan, from early stages to old age. No country is uninjured. It affects all age groups, poor and rich people, all sexes, and all geographies (Development Initiatives, 2018:21).

Even though significant improvement has been made over the past few years in decreasing degrees of life-threatening poverty, addressing under nutrition remains a critical concern for low and middle-income countries, particularly Ethiopia (Vaivada, Gaffey, Das, & Bhutta, 2017:204). Moreover, WHO assistant general stated, maternal under nutrition has received insufficient attention (WHO, 2013:8). Thus, Improvement to tackle all forms of under nutrition remains unacceptable slow (Development Initiatives, 2018:29).

In Ethiopia, much attention is being given to improve maternal health. There is, however, little emphasis on the nutrition of pregnant women despite their increased vulnerability to disease. The nutritional needs of pregnant women remain a neglected area, and under nutrition associated with inadequate diets in pregnant women are unaddressed. Furthermore, the vast majority of the current investigations are facility-based while this study is community-based.

Under nutrition is the most prevalent health problem in developing nations (Ngo et al, 2016:613; Kung'u et al, 2018:2), particularly in Ethiopia (CSA, 2016:34). In spite of wide support for agrarian and urban communities to address under nutrition, there is limited evidence of its effectiveness on the determinants of under nutrition in pastoralist and rural communities.

Much evidence in developing countries (including Ethiopia), however, suggest that under nutrition is still unattained. Although several studies have been conducted in

central and agrarian communities, there is little evidence of studies on pregnant women under nutrition in the most remote communities like Southern Omo. There is also little evidence on interventions to successfully address this issue. The proposed study assessed the prevalence and contributing factors related to under nutrition further explored these issues in greater depth using both quantitative and qualitative methods. The researcher developed a community-based model for prevention of under nutritional status among pregnant women in Southern Ethiopia, based on the study findings.

There is no evidence of community-based research among pregnant women in Ethiopia, particularly in the Southern Nation Nationality People Regional State and the South Omo Zone, where nearly all pastoralist households are living in arid and desert areas. There is also no evidence of a community-based prevention model developed for LMICs, to address under nutrition, in either Africa or Ethiopia.

Under nutrition is an extreme challenge in the pastoralist community. Therefore, the development of a community-based prevention model is an appropriate approach to improve nutritional status of pregnant women in Ethiopia and other LMICs.

#### 1.4 RESEARCH PURPOSE

The research purpose, the most significant articulation of the study, is the expressed purpose of an investigation (Gray, Grove, & Sutherland, 2017:76) and an explicit proclamation that refers to the expectations of the research study (Creswell & Creswell, 2018:117). The purpose of this study is the development of a community-based model for the prevention of under nutrition among pregnant women in Southern Ethiopia.

#### 1.5 RESEARCH OBJECTIVES

The current research objectives are:

- Determine the prevalence of food insecurity at household level in Southern Ethiopia.
- Identify factors contributing to food insecurity at household level in Southern Ethiopia.
- Examine the magnitude of under nutrition among pregnant women in Southern Ethiopia.
- Determine factors contributing to under nutritional status among pregnant women in Southern Ethiopia
- Assess the prevalence of anaemia among pregnant women in Southern Ethiopia.
- Determine causative factors contributing to anaemia among pregnant women in Southern Ethiopia.
- Develop a community-based prevention model for under nutritional status among pregnant women.

## 1.6 RESEARCH QUESTIONS

The study's research questions are:

- What is the prevalence of food insecurity at household level in SNNPR, Ethiopia?
- What are the main factors that affect food security among households in SNNPR, Ethiopia?
- What is the magnitude of the under nutritional status of pregnant women in SNNPR, Ethiopia?
- What are the main factors contributing to under nutritional status of pregnant women in SNNPR, Ethiopia?
- What is the prevalence of nutritional anaemia among pregnant women in SNNPR Ethiopia?

- What are the causative factors of nutritional anaemia among pregnant women in SNNPR, Ethiopia?
- What should be done for prevention of under nutrition of pregnant women in SNNPR, Ethiopia?

## 1.7 SIGNIFICANCE OF THE STUDY

The findings of this study will inform policy makers, nutrition program implementors, health care providers and partners working in maternal nutrition of the variables associated with under nutrition in pregnant women, household food insecurity, and anaemia and how to address these through a community-based prevention model. This study will further address the knowledge gap in both the pastoralist and agrarian settings. The development of a community-based model to prevent under nutritional status of pregnant women is dependent on the outcomes of the current study and may validate future research.

Even in the face of the government's efforts exerted on food insecurity, anaemia, and under nutrition reduction, gaps continue, for example, a large proportion of households suffer from food insecurity, meantime, significant per cent of pregnant women were affected with anaemia and under nutrition. This figure might be alarming for policy makers and nutrition program managers to intervene. The proposed community-based model for prevention of under nutritional status among pregnant women in SNNPR will contribute to the assortment of evidence in maternal nutrition programs, which helps to address the contributing elements in food insecurity, under nutrition and anaemia.

This study is unique and very valuable for nutrition program stakeholders and food security decision makers. Even though the study was done at a local level, and was a pastoralist and agro pastoralist based study; it tried to address all the nutrition-related components.

## 1.8 DEFINITIONS OF KEY TERMS

### **Attitudes**

Attitude is a “*feeling or way of thinking that affects a person’s behaviour*”( Albarracin et al ,2018:12, Altmann,2008:145). A person's motivation or eating behaviours are impacted by their feelings, inspirations, recognitions and considerations (Maci’as & Glasuer /FAO, 2014:10). In this investigation, the attitude is that pregnant women felling or thinking about their nutritional status.

### **Dietary Diversity (DD)**

DD is defined as the number of different foods or food groups consumed over a given reference period. DD indicators use simple counts of foods or food groups. A number of food or food group classification systems are used with different reference periods, scoring systems and cut-off points to characterize low and high diversity (Yimer, & Tadesse, 2015:5). In the present investigation, the dietary consumption of pregnant mother was assessed on 9 diet categories in a 24- hour reference period.

### **Food security**

Food security is accomplished if sufficient nourishment (healthy, quality, quantity, socio-culture acceptable) is “accessible and available” for and “acceptably” used by all people consistently to carry on with a sound and joyful life" (WHO, 2013:12). Food security experts question the interchangeable use of the accompanying three primary components: “accessibility”, “availability”, use and strength (WFP, 2019). Access to nourishment is satisfactory with consideration to both quality and amount (FAO, IFAD, UNICEF,WFP, & WHO, 2019:5). In current investigation, food security implies the accessibility, use and availability of food estimated based on credible criteria.

### **Household**

A household is defined as an individual or gathering of related or non-related people who live and share something in a similar (Casimir, & Tobi, 2011:499). In household expected to have one responsible adult male or adult female as the headed of the family. In short, a household consists of the people in a family or other group that live together in one house and share food, shelter in common and other essential (United Nations, Department of Economic and Social Affairs, & Population Division, 2017:2). In this study, a household also refers to a social unit composed of peoples living together in the same dwelling and share common things and lead by adult male or female.

### **Knowledge**

Knowledge is the comprehension of some random theme. In this particular study, knowledge alludes to a person's comprehension of nourishment, comprising the logical capacity to recall, remember nourishment plus sustenance linked terms; explicit pieces of data (Maci'as & Glasuer /FAO, 2014:8). In the current investigation, knowledge refers to the awareness of pregnant women regarding their nutrition and health.

### **Under nutrition**

Under nutrition refers to inadequacies, abundances, or uneven characters in an individual's consumption of foods, it consist of three general conditions namely, under nutrition, micronutrient-related hunger and overweight/weight (WHO, 2018). Under nutrition is the consequence of the absence of adequate food, occurred because of under nourishment, an unequal eating or poor digestion or poor absorption of nutrients (Development Initiatives, 2018:22; Ngo, Ortiz-Anrellucchi, & Serra-Majeru, 2016:611; WHO, 2013:13). Under nutrition is a food related condition consequential from inadequate food consumption to meet requirement for nutrients and calories (Development initiatives/Global nutrition report, 2020:161; Cederholm et al, 2017:51). In this study, under nutrition refer to inadequate intake of nutrients by pregnant women, which might occur due to reated infections or other reasons.

## **Model**

Modell is a representation of all or part of a framework that is developed to examine that framework. While a hypothesis attempts to clarify a phenomenon, a model attempts to speak to a wonder (Bhattacharjee, 2012:14). A model is an illustrative depiction of an empiric involvement with a type of words, pictorial or realistic graph, mathematic documentations, or physical material (Chinn & Kramer, 2011:157). In the present investigation, model represents the out come of developed structure by graphs, and pictures.

## **Moderate food insecurity**

Individuals who are moderately food insecure face vulnerabilities regarding their capacity to acquire nourishment and are required to settle on the quality as well as amount of the nourishment them available (FAO, IFAD, UNICEF, WFP & WHO, 2019:5). FAO defined moderate food insecurity is a condition in which peoples dietary practices decreased on diet quality and or quantity of their food and are unreliable to get food due to shortage of resources like money and other(fao.org/hunger/en). In this investigation, moderate food insecurity is a situation in which household experience lack of food by quantity or quality, even uncertain due to lack of of money in the household.

## **Mid-Upper Arm Circumference (MUAC)**

MUAC is a tool for measurement of the left upper arm, estimated at the mid-point between the tip of the shoulder and the tip of the elbow and is utilised for the evaluation of nourishing status (MCH& Education trust, 2019). Estimating tapes are predominately used to quantify the upper arm outline of children and pregnant women, to determine a possible under nutrition (UNICEF.org). MUAC gives a fast way of detecting possible under nutrition of children and pregnant women (Bateman, Sargeant & McAdam, 2006:155). MUAC provides an intermediary proportion of supplements saved in muscle tissue and fat that are not affected by pregnancy and it is an important tool to measure nutritional status of pregnant women or women up to 6 months postpartum (Tumilowicz,

2010:7). In this investigation, MUAC is a tool utilised to determine the nutritional status of pregnant women.

### **Nutritional anaemia**

It is a situation where the haemoglobin substance in the plasma is suboptimal, because of a lack of fundamental supplements, no matter the reason for such insufficiency (WHO, 2017:2). Nutritional anaemia defined as a decrease in haemoglobin level below the standard for the people, due to an insufficient intake of haernopoietic nutrients (Ifeanyi, 2018:14). In this study, nutritional anaemia is associated with an inadequate intake of nutrients, and or physiological needs during pregnancy, as the results haemoglobin levels reduced in pregnant women.

### **Nutritional status**

Nutritional status is the situation of the individual physical, nutritional needs resulting from the nutrient content of nourishment we consume in relative to our dietary requirements, and from the capacity of our bodies to digest, absorb and use those nutrients (fao.org/3/i3261e/i326e03). In this study, the nutritional status is a condition in which pregnant women nutrient intake as required and measured nutritional level by MUAC of the left arm.

### **Severe food insecurity**

Severe food insecurity or extreme nourishment insecurity is present when a day or a few days have passed without a person eating (FAO, IFAD, UNICEF, WFP, & WHO, 2019:5). In this study, severe food insecurity is a condition in which absence of or run of food in the household due to this, individuals lays down without nourishment or day and night without nourishment.

### **Anaemia in pregnant women**

The World Health Organization (WHO) uses haemoglobin levels to characterise the health status of pregnant women: a haemoglobin level under 11g/dl is associated with mild illness, a haemoglobin level between 7-10g/dl with moderate illness, and a haemoglobin level greater than 7 g/dl with severe illness (WHO,2017:7; De Benoist et al,2008:4; WHO, 2015). In this investigation, the haemoglobin level of pregnant women is estimated by using haemocue 301, haemoglobin cut off < 11 g/dal to indicate mild anaemia and haemoglobin < 7g/dl for severe anaemia in pregnant women.

### **The public health significance of anaemia**

The severity of anaemia as a general medical issue is classified as follows: <5% indicates no medical issue; 5–19.9% indicates a mild general medical issue; 20–39.9% is indicative of a moderate general medical issue; and ≥40% indicates a serious general medical issue (WHO, 2017; 11; WHO 2011:5, & WHO, 2015).

### **Attitude level**

The attitude of pregnant women is evaluated using validated surveys on dietary status. The negative dominator score is 0 and the positive attitude score is 1. The minimum score is 0 and the maximum score 10. A score smaller or equal to 3 indicates a negative attitude, a score of 4-6 indicates an average attitude, and a score between 7 and 10 a positive attitude.

### **Dietary diversity**

A dietary diversity is characterised by the number of nourishments groups consumed as assessed in the first day of the study (Kennedy, Ballard, & Dop/FAO, 2013: 24: FAO& FHI 360, 2016:25). A dietary variety consisting of fewer than three nutritional categories/groups demonstrates minimum dietary diversity, a diet with between four and five nutritional groups comply with medium dietary diversity, while a variety of six or more nutritional categories demonstrates high dietary diversity. In this study, the dietary

score of pregnant women is dependent on 24-hour consumption, scored with a SPSS composite and arranged as low, medium or high dietary diversity.

### **Household food insecurity**

Coates, Swindale and Bilinsky (2007:16) categorise household food insecurity in four categories: 1) food secure, 2) mild food insecure, 3) moderate food insecure and 4) severe food insecure. Food insecurity is measured using the FANTA food access scale and is classified as (0) food secure or (1) food insecure (rarely, sometimes, & often). In the current study, household food insecurity was measured according to FANTA food access scale.

### **Knowledge level**

In this investigation, the knowledge score of pregnant women surveyed is determined by measuring their health status. An inappropriate reaction scores 0 and a correct response scores 1. The minimum score is 0 and the maximum score is 10. A score smaller or equal to 3 indicates poor knowledge, a score of 4-6 average knowledge, and a score between 7 and 10 good knowledge of nutrition.

### **MUAC cut-off points**

The SPHERE Project (2011: 222) proposes the following cut-off scores for MUAC: a measurement under 23cm demonstrates moderate lack of healthy sustenance, MUAC under 21 cm indicates risk and a MUAC under 20.7 cm indicates high risk. Tumilowicz (2010:7) also proposes a MUAC cut off point for classifying the health status of pregnant women. A MUAC under 19 cm demonstrates extreme under nutrition; in the range of 19 to 22cm a moderate under nutrition, in the range of 22 to 23 cm a mild under nutrition, and higher than 23cm a good dietary status. Ververs, Antierens, Sackly, Staderini, and Captier (2013 proposes a MUAC indicative of under nutrition in pregnant women as a cut-off estimation of <23 cm. In present investigation, researcher

considered mid upper arm circumference, a point of start from <23cm as a measurement for nutritional assessment.

## **Dietary Practice**

In this study, the dietary practice of pregnant women was determined through organized polls. The best dietary practice is scored with a 1(one) and the worst with a 0 (zero). Responses were scored on a scale of 0 to 10 with 0 being the minimum score and 10 being the maximum score. A score of less than 3 indicates poor dietary practice, a score of 4-6 middle-of-the-road practices, and good dietary practice is indicated by a score of 7-10.

### 1.9 STRUCTURE OF THE THESIS

The thesis is divided into eighth chapters:

Chapter 1: Outline the introduction of the elements of this investigation including background to the research problem, research problem statement, research purpose, research objectives and questions, significance of the study and definition of the key terms.

Chapter 2: Discusses the literature review and theoretical framework guiding this study, that includes literature search strategy, the nutritional status of pregnant women, dietary intake and dietary diversity, dietary practices of pregnant women, assessments of nutritional status, overview of under nutrition, global nutrition status and the burden of under nutrition, the global nutrition movement, declarations, policies and other initiatives on nutrition, pregnant women anaemia, a vulnerable group to iron deficiency, burden of anaemia, risk factors associated with anaemia, assessment of iron status, food insecurity includes, food security at household level, burden of food insecurity, causes of food insecurity, household food insecurity measurements, and theoretical framework.

Chapter 3: Discusses the research methodology, that includes research paradigm, research design, phase1: Empirical quantitative phase, research study setting,

population, sampling methods and sample size, quantitative data collection process, household wealth index, validity and reliability of data collection instruments, pilot study, quantitative data analysis, phase 2: qualitative phase, sampling method and sample size, qualitative data collection process, qualitative data analysis, academic rigor of qualitative data, phase 3: Model development process, research ethics considerations, data management and limitations of the study.

Chapter 4: Presentation of the methods of descriptive measures and quantitative phase results, that includes demographic characteristics of research respondents, economic characteristics, obstetrics and health service –related characteristics, workload comparison, women’s dietary diversity, food frequency, prevalence of household food insecurity, causes of food absence, factors related with food insecurity, prevalence of under nutrition, predictor associated with under nutrition, anaemia prevalence, nutritional knowledge Score, nutritional attitude score, nutritional practice score, The main reason for not taking or not utilizing iron sulfate, and predictors associated with anaemia.

Chapter 5: Presentation and interpretation of the qualitative phase findings that includes qualitative data collection process, demographic characteristics of key informants of in-depth interviews, part one: in-depth interview findings includes: theme 1: food insecurity burden, factors and strategies to address household food insecurity, theme 2: reasons for under nutrition in pregnant women, theme 3: community-based solutions to mitigate under nutrition, theme 4: challenges in the implementation of nutrition programmes, theme 5: burden of anemia in pregnant women, consequences and strategies for prevention, also part ii: focus group findings includes, theme 1: factors that affect the nutritional status in pregnant women, theme 2: perceived causes of anaemia in pregnant women, and theme 3: measures of anaemia.

Chapter 6: Discussion of main quantitative results and qualitative findings, that discusses the prevalence and burden of household food insecurity, factors for food insecurity, suggestion to mitigating food insecurity, collaboration and coordination of

sectors, under nutrition section includes prevalence of under nutrition, factors that affect pregnant women nutritional status, challenge for nutrition program implementation local context, nutritional related guidelines, community based mitigating solutions for undernutrition, anaemia among pregnant women includes anaemia burden among pregnant women, predictors associated with anaemia, food insecurity, under nutrition, and dietary diversity, ferrous sulfate supplementation, major reason and aggravating factor for anaemia, consequence of nutritional anaemia, and suggested local mitigating solutions.

Chapter 7: Conceptualization and development of a community based prevention model that discusses major quantitative phase results of this research study, main qualitative phase findings of this research study, concept analysis, assumptions of the model, reason for model development, model development process, panel expert's opinion and critical reflection on community based prevention model.

Chapter 8: Discussion of the conclusions and recommendations of the research study that including research methodology, conclusions, recommendations, and future research.

## 1.10 CNCLUSION

The motivation behind this study was to develop a community-based prevention model for under nutritional status in pregnant women in Southern Ethiopia. In order to address the research question and objectives, the researcher applied a mixed-method study design, using both quantitative and qualitative methods to investigate the factors associated with the under nutrition status of pregnant women. The findings were used to develop a community-based model.

This chapter introduced the study, provided some background to the study, introduced the research problem, purpose, objectives, and questions, and described the significance of the study. Key concepts were defined and structure of the thesis was outlined. The next chapter presents a review of local and global related work.

## CHAPTER 2: LITERATURE REVIEW

### 2.1 INTRODUCTION

The literature review provides a synopsis and evaluation of the body of scientific knowledge on a specific theme and is organised to demonstrate the relationships between different studies, and its contribution to the subject (Polit, & Beck, 2018:170; Adelphi University, 2015). Also, a literature review dissects and condenses the distributed research writing about an unequivocal title (University of North Carolina, 2018). The primary motivation behind a literature review is to abridge proof, assess, interpret and blend the sources, and summarise what is known and what isn't known (Polit, & Beck, 2018:171; Burns, & Grove's, 2017:207).

The literature review further facilitates the selection of a theme of scientific value and offers an understanding into ways by which the scientist can restrict the degree to a required territory of request (Creswell, 2009:25). Writing published in authentic journals is included in the literature review, as they have been peer reviewed for quality (Beins, & McCarthy, 2012:69). The literature review articulates the crucial assumptions behind the investigation queries and demonstrates the knowledge of the researcher about related study and scholastic traditions to support the investigation. The researcher identifies research gaps in the existing literature and demonstrates how the investigation will address these gaps. In conclusion, the literature review improves and reclassifies the exploration inquiries by instilling those inquiries in more prominent experimental foundations.

Brink, Vander Walt, & Rensburg (2018:58); Adelphi University (2015); and University of North Carolina (2018) articulate the purpose of a literature as the following:

- Assists the researcher to familiarise him/her with significant writings in an area of study

- Establishes connections among the previous research;
- Informs the researcher about seminal and current contributions;
- Identifies disparities and gaps in the research;
- Defines key ideas under examination;
- Assists the researcher to identify the exploration issue and increase investigation inquiries.
- Assists the researcher to contrast the present investigation discoveries with past examination.
- Exposes the researcher to information about the research approach and instruments.

## 2.2 LITERATURE SEARCH STRATEGY

A literature review includes writing on a topic from various sources, including electronic papers, printed and meeting papers, reading material, reference books, logical diaries, books, clinical diaries, expositions, websites and reports built up by offices and associations (Burns, & Grove's, 2017:208).

The electronic literature search was conducted using different computer databases and websites, including the UNISA library, UNISA web sites, Pub Med, Med Line, Lippencott Nursing, Africa wide information, CINAHL, Elsevier, Lancet Global Health, BMC Nutrition Journal, PLOS Journal, Advance in Public Health journal, Nutrient Journal, Google Scholar, Web of science, Cochrane journal, and also searched research book from Taylor and Francis eBooks, SAGE Knowledge and hand book, Oxford Scholarship-Public Health and Epidemiology, and Springer-Social Sciences

Moreover, international internate sites such as: World Health Organization website, UNICEF website, FAO websites, GOV data bases, World Bank and FMOH Ethiopia. The search was done to identify critical and relevant literature through full text and abstract reviews, peer reviewed journals, books, and scientific articles. The key words and terms used for the search include “pregnant women”, “nutritional status”, “Nutrient”

, "Micronutrient" "women dietary diversity", "anaemia", "haemoglobin", "food insecurity", "Malnutrition" and "under nutrition", and "Nutritional status of pregnant women".

## 2.3 THE NUTRITIONAL STATUS OF PREGNANT WOMEN

Pregnancy is a high-risk period in the life cycle of a woman that demands targeted interventions. The nutritional status of a woman at conception and during pregnancy is essential for foetal development (Black et al., & Uauy, 2013:17). Maternal nutrition interventions have shown significantly positive outcomes on the wellbeing of mother and child. Insufficient quality and quantity of sustenance during pregnancy can negatively affect the wellbeing of both mother and new-born.

A study conducted using mid upper arm circumference (MUAC) measurements and testing Haemoglobin levels in pregnant women has shown that 19 per cent and 17 per cent of the respondents respectively were under nourished (Willy, Judith, & Peter 2016:6). Another study among pregnant women found shortages of micronutrients are critical for pregnancy, including iron, folic acid, and vitamin D (Kocyłowski et al., 2018:1438).

Research evidence from Ethiopia, conducted by Moges, Worku, and Loha (2015) indicated that high percentage of under nutrition (35%) pregnant women exposed to anaemia when it compared to other local studies. Similarly, an epidemiological study conducted in Ethiopia, by Mariyam, and Dibaba, (2018:7) have shown that nearly 32% of pregnant women had under nutrition and significantly associated with anaemia.

### 2.3.1 Dietary intake and dietary diversity

It is well documented that a dietary variety that includes micronutrients, phytochemicals and fibre is an indispensable component of a quality diet. However, in resource poor settings with limited dietary variety, weight control plans of mainly staple food sources,

such as maize neglect to meet numerous micronutrient needs (Martin-Prévela et al, 2015:17). Nnam (2015:457) recommended that diversified diets and increased nutrient consumptions are very vital to cope with extra requirements throughout pregnancy.

Globally, a limited dietary variety in pregnant women from poor families is well documented. A study by Chakona and Shackleton (2017:11) have shown that up to 75 per cent of pregnant women does not have sufficient diversity in their diets and are susceptible to under nutrition because of micronutrient deficiency. Study results from rural Bangladesh indicated that approximately 70 per cent of pregnant women lacked dietary variety or were consuming fewer than five of the ten nutrition types (Sinharoy, Waid, Haardörfer, Wendt, Gabrysch, & Yount, 2018:4). Similar, research study among pregnant women in Kenya showed a low mean dietary variety score of  $6.84 \pm$  with a 1.46 SD (Willy, Judith & Peter, 2016:6).

### 2.3.2 Dietary practices of pregnant women

Studies on dietary practices in Africa indicate poor dietary diversity in individuals and the population on the continent. Social beliefs and cultural norms are associated with dietary practices and poor nourishment is associated with the consumption of low quantities of food, poor quality food, poor information on nutrition, skipping meals, and poverty (Gissing, Pradeilles, Osei-Kwasi, Cohen, & Worth, 2017:211). It is to be noted that the geographical area in which the study was conducted holds strong social and cultural beliefs that might impact the dietary practice of pregnant women.

### 2.3.3 Assessments of nutritional status

There is currently no agreement on the criteria for identifying severely malnourished pregnant women or at what stage they should be enrolled in nutrition programmes (Tumilowicz, 2010:7). Anthropometric appraisal of the health status of pregnant women between conception and birth is commonly used (Tang et al, 2013:10). It was globally agreed to use Mid-Upper Arm circumference (MUAC) to determine under nutrition in

pregnant women (Tang, Chung, Dong, Terrin, Edmonds, Assefa, Chetty, Ramlal, Christian, West, Janjua, Wanke, Deitchler, & Maalouf-Manasseh, 2016:10).

MUAC was proposed as the preferred method as a result of its strong relationship with low birthweight (LBW)( Tang et al, 2013:10), the limited scope of cut-off values, the ease of estimation and the fact it doesn't require past information on gestational age. The MUAC cut-off of less than 23 cm is proposed for pregnant women at high risk of LBW babies in African and Asian settings (Vervrs, Antieens, Sackl, Staderini & Captier, 2013: 2).

Pregnant women are at higher risk than other groupings in the population and MUAC shows no variance through pregnancy. Pregnant women with MUAC <20.7cm and <23cm are at risk of impeding the development of the embryo. MUAC measurement is also appropriate in asset restricted settings (SPHERE, 2011:222). The UN High Commissioner for Refugees (UNHCR) prescribes MUAC as an appropriate method to measure the nutritional status of pregnant women and further suggests a MUAC <23 cm cut-off as criteria for enrolling pregnant women in nutrition programmes (UNHCR, 2011:15). In summary, MUAC can be estimated rapidly and effectively, and can be used as screening instrument in large cohorts of pregnant women, children and adults (Open University, 2018).

#### 2.3.4 Under nutrition

A lack of healthy sustenance is the result of poor eating practices or insufficient nourishment (Development Initiatives, 2018:22). Under nutrition occurs when the consumption of supplements is excessively high, excessively low, or ineffectively adjusted. Under nutrition is the result of the absence or misuse of supplements, micronutrient insufficiencies or an absence of significant nutrients and minerals (WHO, 2016). Additionally, under nutrition is a condition in which the physical needs are not met, as the result of inadequate intake of nutrients, or reduced absorption. It is normally

refers to a lack of carbohydrates or protein, and it may appear as acute or chronic due to inadequate consumption of nutrients (WHO, 2013:13).

### 2.3.5 Global nutrition status and the burden of under nutrition

A lack of healthy nutrition is the main driver behind the global burden of disease and results in the economic loss in developing countries, because of low birth weight; poor childhood development; and micronutrient deficiencies (IFPRI, 2016:20). The Global Nutrition Report indicates a degree of under nutrition in all nations putting general wellbeing at risk. An estimate of 2 to 3 billion people is malnourished and experience some type of under nutrition, be that obesity or micronutrient deficiencies (IFPRI, 2014:19).

Moreover, WHO study in nine (9) Africa countries, including Ethiopia, has recorded malnutrition prevalence rates of > 15 per cent, and prevalence rates of maternal malnutrition of as more than 20% per cent were recorded in Ethiopia (WHO, 2017:13).

Similarly, two (2) billion out of every seven (7) billion have micronutrient deficiencies and under nutrition (IFPRI, 2016:2). The 2017 Global Report states that the world is facing a crisis of under nutrition with two (2) billion people in need of key micronutrients such as Iron and Vitamin A, one hundred and fifty-five million children stunted, and fifty-two million children wasted. A proportion of 88 per cent of all countries carry a burden of two or three types of under nourishment. Hunger has a high financial cost and cost to wellbeing (Development Activities, 2017:20).

Adding to this burden of under nutrition are the five hundred and twenty-eight million pregnant women or 29 percent of pregnant women of reproductive age with a need for iron sulphate supplementation (WHO, 2016). The global trend shows an increase in under nutrition and around eight hundred and five million people were estimated to be repetitively under nourished between 2012 and 2014. One (1) in each nine (9) people is

under nourished and the majority of under nourished people live in developing nations (FAO, IFAD & WFP, 2014:8).

An estimated 22 per cent of the population in Sub-Saharan Africa was under nourished between 2014-2016, and around 29 per cent or twenty-nine million in Ethiopia were under nourished in the same period. A proportion of 31 per cent of the Ethiopian population are malnourished (FAO, 2017). A Lancet study on maternal and child nutrition found that 34 countries contribute 90 per cent of the worldwide burden of under nutrition (Bhutta et al, 2013:468). Ethiopia is one of the countries with the highest burden of under nutrition (CSA, 2016:198).

#### 2.3.6 The global nutrition movement, declarations, policies and other initiatives on nutrition

The World Health Assembly (WHA) adopted an implementation plan on maternal, newborn and child health and improvement is measured against six, interlinked, global nutritional focus areas for 2025 (WHO, 2014:1). Ministers and agents of the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO), gathered at the Second International Conference on Nutrition in Rome and ratified an agreement to eradicate hunger, under nourishment, micronutrient deficiencies and anaemia in women and children (FAO/UN,&WHO, 2014:3).

Third world of countries and poverty-stricken areas are exposed to a high burden of under nutrition. Multi-stakeholder and inter-sectorial collaboration are needed to address the high burden of under nutrition, micronutrient deficiencies and disease. Poor areas are in need of various micronutrients, dietary diversification, and fortification (Thompson & Amoroso, 2014:298).

The African Leaders for Nutrition (ALN), an initiative of the African Development Bank and the African Union Commission in Addis Ababa, consented to raise the profile of nutrition as a driver for economic development (SUN, 2018). About 30 per cent of the

population of Africa is severely under nourished. In response, participants of the African Union (AU) convened in Maputo for the second convention between 10 and 12 July in 2003 to announce agribusiness and food security in Africa (AU, 2003).

The Government of Ethiopia launched the 'Seqota' Declaration to end hunger and under nutrition and a lack of healthy nutrition by 2030 (FDRE, 2016:7). Ethiopia also ratified and adopted the National Nutrition Program (NNP I, FDRE, 2008–2015), that was centred around the coordination of nutrition interventions. The Administration of Ethiopia further introduced the National Nutrition Coordinating structure and the National Nourishment Specialized Council (NNTC). Yet, multi-sectoral coordination and collaboration were not successful in improving nutrition outcomes (FDRE, 2013:29).

The NNP II intended to address five priority target populations including mothers, women of reproductive age, young women, and children and to reinforce the implementation of nutritional interventions across the population. The NNP II focuses on multi-sectoral coordination, integration, and nutrition administration to effectively track under nutrition (FDRE, 2016:46).

The Health Sector Development Platform (HSDP) IV (2010/11-2014/15) has incorporated nutrition in the health extension program to improve the dietary status of mothers and children through an improved outreach programme (EOS), community-based nutrition program (CBN), health administration, micronutrient interventions and basic nutrition activities (FDRE, 2010:54). The Government of Ethiopia is advancing the health segment change plan (HSTP 2015/16-2019/20) and nutrition programmes are prioritise to address under nutrition, for example, scaling up community-based nutrition (CBN) programmes and the initial 1000 days' drive, and executing the “Seqota” assertion of consummation under sustenance (FDRE, 2016:102).

Ethiopia is aiming to improve the nutritional status of women of reproductive age through extensive and regular nutritional evaluation and advice services. Other interventions include Social and Behavioural Change Communication (SBCC) to

improve maternal nutrition; improving access to nutritional benefits in pastoral communities, providing free Insecticide Treated Bed Nets (ITNs) for pregnant women and other vulnerable groups in malaria endemic regions and districts, and improving access to sexual and reproductive health services (FDRE, 2016:30).

#### 2.3.6.1 Sustainable Development Goals (SDG)

In 2015, UN assembles launched new agenda for world transformation and sustainable development. These new global change plans consisted of 17 sustainable development goals (SDG) and 169 targets that will implement for 15years. Out of the 17 SDG, goal 2(end hunger, and improved nutrition and promote sustainable agriculture) and goal 3(ensure healthy lives and promote well-being for all at all ages) are basically related to pregnant mother nutrition status, in preparation for achievement of these SDGs in the year, 2030 (UN, 2015:18). Nutritional health is foundational to the achievement of twelve (12) of the seventeen (17) SDGs(IFPRI, 2016:2).

The government of Ethiopia ratified the 2030 Plan for Sustainable Development by the “House of People Representatives” with complete voice of countrywide possession to implement the SDGs as an central portion of its nationwide development structure, integrated with the second five year growth and transformation plan (GTP II)(FDRE,2017:2).

#### 2.3.6.2 Progres of Sustainable Development Goals

Globally, despite of remarkable progress has been made, still huge number of people suffering from hungry, has raised since 2014 a troublesome fashion. Nearly, 821 million people were under nourished in 2017, the same number as in 2010. The burden of under nutrition has remained almost unchanged in the past 3years. As result, small scale food producers are strongly recommended as a way out to global hunger (UN, 2019: 24).

In 2017, Ethiopia National Plan Commission (NNC) conducted voluntary national reviewed on SDG progress on the implementation of the last 15 years. The NNC report showed as, there were promising outcomes in goal 2 obtained from FY 2014/15 with concern to enhancing the produces and productivity of the agricultural sector, actually these performances found in spite of the serious adverse impacts caused by the drought that arisen in Ethiopia during the 2015/16. To ensure food security at various levels, the government of Ethiopia needs to advance agricultural productivity through drought resilient farming as a solution (FDRE, 2017:25).

Globally, substantial progress has been made in maternal health, in 2017; however, approximately 300,000 women died from pregnancy related complications. Above ninety percent of mothers lived in developing contries (LMC). So, sustained efforts in maternal health, particularly in affected regions are needed to meet the universal target (UN, 2019: 26).

In Ethiopia, remarkable improvement has been made on maternal and children health, to mention some of the progress like child health and maternal death dramatically decreased and also the incidences and spread of communicable diseases have been decreased (FDRE, 2017:26).

## 2.4 PREGNANT WOMEN ANAEMIA

### 2.4.1 Pregnant women are a vulnerable group to iron deficiency

Pregnant women are vulnerable to illness, iron deficiency and nutrient deficiency. The drivers include bleeding associated with menses, and specific periods of developing during the lifecycle of women such as puberty and pregnancy which require an increase in micronutrient and specifically Iron. Iron is critical for the grown of the embryo, placenta and in case of prolonged parental plasma measurements in gestation (WHO, 2017:14).

It has already been established that people in developing nations like Ethiopia have a shortage of micronutrients. Pregnant women, lactating women and small children are susceptible to micronutrient inefficiencies, since they have a higher requirement for nutrients and minerals and are increasingly at risk of negative outcomes because of deficiencies (WHO, 2015:1; WHO, WFP & UNICEF, 2007). In addition, young pregnant women are particularly vulnerable to iron deficiency as their required intake doubles with both their own developmental needs as well as the needs of the developing foetus. Specific attention should be given to this group at antenatal visits given their vulnerable (WHO, 2014). In the first time, pregnant women are more susceptible to iron deficiency than pregnant women who are multiparous (WHO, 2014).

#### 2.4.2 Burden of anaemia

Iron insufficiency is the biggest and most common dietary issue in the world, affecting high numbers of women and children the developing world (WHO, 2015:1). Two billion people or more than 30 per cent of the total population are affected by anaemia. The prevalence is exceptionally high in resource constrained setting (WHO, 2018). Globally, according to the most recent evaluation of 2016, iron deficiency influences 30 per cent or six hundred and thirteen million women of reproductive age (15-49 years). The incidence of anaemia in pregnant women has increased marginally between 2005 and 2016 (FAO, IFAD, UNICEF, WFP & WHO, 2017:33).

Overall, assessments of the prevalence of iron deficiency in women of reproductive age indicate higher numbers of pregnant women (38.2 per cent) with deficiencies than all women of reproductive age (29.4 per cent). Severe Iron deficiency is associated with higher mortality and morbidity. No nations are exempt from anaemia as a medical issue (WHO, 2015:4). Another study that determined prevalence rates of anaemia between 1995 and 2011 indicated a rate of 30 per cent (four hundred and ninety-six million) in non-pregnant women, 38 per cent in pregnant women (thirty two million), and 43 per

cent (two hundred and seventy three million) in children (Stevens, Finucane, De-Regil, Paciorek, Flaxman, Branca & Ezzati, 2013:22).

Six hundred and thirteen million women aged 15 to 49 years are affected by anaemia. Out of these, about 91.2 million women of reproductive age in Sub-Saharan Africa are iron deficient. The most severe cases of anaemia are found in women of reproductive age in West and Middle Africa where between 47 per cent and 44 per cent are affected, respectively (IFPRI, 2015). In Africa and Asia, the burden of iron deficiency is over 35 per cent while it is minimal in Northern America, Europe, and Oceania (below 20 per cent) (FAO, IFAD, UNICEF, WFP & WHO, 2017:33). Iron deficiency in women is a persistent health problem with 40 per cent of women affected in Asia and Africa. Twenty-five per cent of women in South America and the Caribbean are anaemic. The estimation of anaemia prevalence is the highest in African countries (De Benoist et al, 2008:7).

A study conducted between 2005 and 2015 in four African countries, namely Ethiopia, Kenya, Nigeria and South Africa, found a decrease in iron deficiency in non-pregnant women, from 18 per cent to 15 per cent and an almost 100 per cent increase in pregnant women from 32 per cent to 62 per cent (Harika, Faber, Samuel, Kimiywe, Mulugeta, & Eilander, 2017:14). In another study the prevalence of anaemia in women of reproductive age was moderate, between 17 and 18 per cent and just 1.2 per cent had severe anaemia which was the most prevalent in rural women (EPHI, 2016:31). The burden of iron deficiency among pregnant women in Uganda was 29 per cent (Baingana et al, 2014:1429).

A regional investigation in Ethiopia indicated that thirty two per cent of women of reproductive age were anaemic (Gebremedhin, Enquesselassie & Umeta, 2014:44). In another study in Tigray, the prevalence of anaemia in pregnant women was 36 per cent (Gebre & Mulugeta, 2015:1). The DHS in Ethiopia indicates that twenty seven per cent of women 15-49 years are malnourished while 17 per cent have anaemia (CSA,

2012:184). There is also a high prevalence of iron deficiency in the country and around one-fourth of women aged 15-49 years (23 per cent) are anaemic (CSA, 2016:34).

### 2.4.3 Factors related with anaemia

Anaemia is associated with malaria in pregnant women in moderate and high transmission contexts (WHO, 2014). Fever related infections such as malaria and H. pylori contamination increased the risk of iron deficiency in pregnant mother (Baingana et al, 2014:1432). Adherence rates to iron folic acid supplementation (IFAS) during pregnancy are very low in Ethiopia (Gebreamlak et al, 2017:6).

The study conducted in India by Taranikanti (2018), on physiological change that occur during pregnancy, as the evidence indicated, there is substantial expansion of the blood volume especially on the 1<sup>st</sup> trimester and gradually later on, the plasma volume rises by forty percent along with rise in erythropoiesis. As the result, hemodilution developed, and then physiological anaemia occur due to insignificant rise in plasma volume above the red cell mass (2018:65). Moreover, systematic review meta-analysis of longitudinal studies conducted by Aguree et al (2019) among normal pregnancies, the report showed that, plasma volume starts to expand in the 1<sup>st</sup> trimester, sharp increase in the second and lately in the third has been related to adverse pregnancy outcomes (Aguree & Gernand, 2019:9). A study report from Canada by Rodger, Sheppard, Gandara, and Tinmouth (2015:1), similar literature from UK reported by Mockridge, and MacInnan (2019:398), and another study from Africa conducted by Soma-Pillay et al, (2016:89) indicated that, physiologic changes occur during pregnancy that affect normal haematologic values and impact the diagnosis and management of haematologic disease in pregnancy.

Deliberate feeding of non-food substances, is common among various people, particularly during pregnancy (Sun et al, 2017:731), Pica is well known, harmful practice during pregnancy occurred among Mexican women's (Lin et al, 2015:555). Research

study from Ghana, conducted by Konlan, Abdulai, Konlan, Amoah, and Doat, (2020:7) reported that, pregnant women's perception of pica as nutritious is likely to affect the food consumptions, and lead for harmful effect on pregnant women as well as foetus, so education of pregnant women on source of nutrition is very important.

In developing countries, due to food taboo pregnant women are nutritionally vulnerable, consequently develops negative pregnancy outcomes (Chakona, & Shackleton, 2019:15). Studies have shown that, cultural factors related with food taboos are the risks for under nutrition during pregnancy, in Ethiopia (Vasilevski, & Carolan-Olah, 2016:5). Moreover, in 2015, Otoo, Habib, and Ankomah conducted a study on food prohibitions and other traditional practices among pregnancy women in Ghana. The evidence showed that food taboos could cause pregnant women under nutrition, as a result, that might lead to anaemia, postpartum and low birth weight (Otoo, Habib, & Ankomah, 2015:48). Moreover, research study conducted by Riang'a, Broerse, and Nangulu (2017:14) in Kenya, similar evidence reported from rural pregnant women. Also, the evidence from Ghanaian district confirmed presence of food taboos and traditional beliefs among pregnant women that restrict from consuming different foods (Arzoaqui, Essuman, Gbagbo, Tenkorang, Soyiri, & Laar, 2015:8).

Furthermore, a research study conducted in Addis Ababa, Ethiopia by Zerfu, Umeta and Baye (2016:6) revealed that pregnant women do not consume animal sources foods such as organic products and vegetables. The study also showed that nourishment prohibitions and misunderstanding towards weight increase during pregnancy could prompt unfavourable pregnancy result. A similar study conducted by Getnet, Aycheh and Tessema (2018:4) also depicted that pregnant women tend to avoid protein-rich diets because they believe that causes different health complications to them and their infants. Another research study from Ethiopia reported by Mohammed, Taye, Larijani and Esmailzadeh on food taboo among pregnant women. The result has shown that, pregnant women avoided food items like dark green leafy vegetable, organ meat and other food items. Thus, pregnancy related food taboo was associated with anaemia (Mohammed et al, 2019:6).

In developing countries, particularly sub-Saharan Africa like Ethiopia, food insecurity, malnutrition, and poverty are the common causes of anaemia among pregnant women and children (Longo, & Camaschella, 2015: 1836). Women with Heavy Menstrual Bleeding (HMB) are at greater risk of ID and IDA (Percy, Mansour, & Fraser, 2016: 24).

Research evidence from Ethiopia, conducted by Moges, Worku, and Loha (2015) indicated that high percentage of malnourished (35%) pregnant women exposed to anaemia when it compared to other local studies. Similar research study from Ethiopia reported by Mariyam, and Dibaba, (2018:7) have shown that nearly 32% of pregnant women had under nutrition and significantly associated with anaemia. Additionally, WHO reported various anaemia determinants like inadequate nutrient intake, impaired absorption, excess consumption of anti-nutrients and other factors (WHO, 2017:14).

#### 2.4.4 Assessment of iron status

The measurement of haemoglobin concentration is an important routine procedure in developing countries, but not much attention has been given to the most appropriate methods for screening for iron deficiency in resource-poor settings. These methods ought to be reliable, cost-effective, and simple to use and should not be dependent on an electrical power source (Lerberghe, 1983: 960).

A study by Nkrumah, Nguah, Sarpong, Dekker, Idriss, May, and Adu-Sarkodie to measure haemoglobin levels using the haemocue convenient haemoglobin photometer, which is the recommended device for the measurement of haemoglobin levels in resource-poor settings (Nkrumah, Nguah, Sarpong, Dekker, Idriss, May & Adu-Sarkodie, 2011:5). The haemocue is can be used to increase coverage in remote regions where adequate research centres are not available. The haemocue is simple and easy to use in the field as it uses a battery and is highly reliable (Sari, De Pee, Martin, Herman, Sugiatni, Bloem, & Yip, 2001:509). Anaemia is usually determined at a population level through an estimation of haemoglobin levels. Haemoglobin levels

fluctuate with age, sex, and smoking habits similar as well as physiological status such as pregnancy. Subsequently, a haemoglobin level beneath ordinary sex-, age-, and pregnancy cut-off is a risk factor for anaemia (WHO, 2017:17).

The WHO recommends a haemoglobin cut-off of 110 g/l for pregnant women. Haemoglobin levels decrease during the first trimester, is recorded at its lowest in the second trimester, and increases again over the third trimester. Although there are no WHO recommendations on the utilisation of different haemoglobin cut-off rates for anaemia by trimester, the second trimester is the highest risk period in pregnancy when haemoglobin concentrations decrease by almost five g/l(WHO, 2011:3).

Table 2.1: Haemoglobin levels (g/dl) to diagnose anaemia at sea level

Group	Normal	Mild	Moderate	Severe
Non-pregnant women, 15 years and beyond	≥12.0	11.0–11.9	8.0–10.9	<8.0
Pregnant women	≥11.0	10.0–10.9	7.0–9.9	<7.0

Source: (WHO, 2017:7;WHO 2011:3)

## 2.5 FOOD INSECURITY

Food security is ensured if sufficient nourishment (healthy, quality, quantity, socio-culture acceptable) is “accessible and available for and acceptably used by all people consistently to carry on with a sound and joyful life” (WHO, 2013:13; Gross, Schoeneberger, Pfeifer,& Hans-Joachim, 2000:4). Food insecurity is a basic general wellbeing nutrition problem in LMICs (Pereira, & Hodge, 2015). Food insecurity is happened due to a lack of access to adequate, safe and nutritious food for development, physical growth and healthy life. The reason for this might be absence of food, and shortage of resources. It refers to inadequate, uncertain or unacceptable availability, access, or utilization of food. It is practiced along with some thoroughly

linked consequences of it (FAO, website). The World Food Summit of 1996 defines food security in terms of a time "when all individuals consistently approach adequate, safe, nutritious food to keep up a sound and dynamic life" (FAO/GAO, 1996:1).

#### 2.5.1 Food security at household level

Food security is the consistent access of all individuals to enough nourishment for a functioning, sustainable life (FAO, 1996:1). Household ensured food security when they have sufficient access, availability in quantity, quality of diets for family members in all time through the year round, and utilizes for healthy lives. At the household level, food security refers to the capacity of the household to secure, either from its own production or through purchases, sufficient food for meeting the dietary needs of all members of the household(FAO, 2010:1).

#### 2.5.2 Burden of food insecurity

The Global Nutrition program report indicates an overall risk of under nutrition in vulnerable countries where around 8 million individuals are in emergency or crisis. Ethiopia and South Sudan carries the highest risk with three million people in crisis, followed by Kenya (two million people), Somalia (seven hundred and thirty-one thousand) and Uganda (one hundred and eighty thousand) (WFP, 2015:2).

Ethiopia is one of the countries in Sub-Saharan Africa, which has experienced food insecurity over long periods of time and which has one of the highest prevalence rates of under nutrition globally with more than 35 per cent of the general population consistently under nourished. Around 30,000,000 individuals in Ethiopia are showing to under nourishment and food uncertainty (Endale, Alemu, & Bizuayehu, 2015:9).

Fifty-one per cent of rural families in Ethiopia are food insecure, and livestock proprietorship and family size are positively related to food insecurity (Abafitas & Kim, 2014:23). An estimated 10 per cent of Ethiopian residents are consistently food

insecure, and this number increases to 15 per cent in dry seasons. In 2014 an estimated three million individuals required crisis food interventions (Endale, Mucbe, & Tadesse, 2015:1).

As indicated by Mohamed (2017:94), Ethiopia is confronting a dry season and food insecurity. Ethiopians face dry seasons, repeated food insecurity/hunger and starvation. Climate change and dry seasons are the primary drivers of food insecurity in Ethiopia. A large proportion of the populations have been affected by extended and/or short periods of food insecurity. In Ethiopia, greater than forty one per cent of the population live under the breadline and more than thirty-one million people are under nourished.

### 2.5.3 Causes of food insecurity

Ethiopia is exposed to environmental shocks such as a high population development rate, extreme ecological erosion and repetitive dry spells. A study conducted in Ethiopia demonstrated that dry seasons, unpredictable rainfall, population pressures, traditional agriculture, unexpected illness, catastrophic events, land deprivation, and a low degree of innovation are central to food insecurity (Endale, Alemu, & Bizuayehu, 2015:9). Investigations from nearby countries revealed that a deficiency of farm land, absence of bulls or cattle, dry seasons, population pressure, poor soil quality, poor cultivating practices, plant and animal infections, lack of support, high work wastage, poor infrastructure and pre- and post-crop misfortunes were associated with food insecurity in Ethiopia (Endalew, Mucbe & Tadesse, 2015:1).

### 2.5.4 Food insecurity measurements

In present investigation, the researcher used a household food insecurity scale (HFIAS) estimation instrument adjusted from the FANTA III device (Coates, Swindale, & Bilinsky, 2007:9). The instrument consists of nine questions that ask whether a particular event/condition is related to the experience of food insecurity at any point during the past a month (30 days) or not. The body of the inquiry has two reaction alternatives (0 =

no, 1 = yes) and has three response choices speaking to a scope of frequencies (1 = rarely in a while, 2 = sometimes and again, 3 = often).

The Household Food Insecurity Access Prevalence (HFIAP) marker classifies family units into four degrees of household food security (access): food secure, mildly food insecure, moderately food insecure and severely food insecure. Family units are ranked as progressively food insecure when they are exposed to increasingly extreme conditions or potentially experience those conditions more frequently (Coates, Swindale, & Bilinsky, 2007:18).

## 2.6 THEORETICAL FRAMEWORK

Chinn and Kramer (2011:155) describe a theory as an imaginative and thorough organisation of thoughts that ventures a speculative, deliberate, and efficient perspective on marvels. A theory is grounded in assumptions, is both inventive and innovative and applies structure to reason (Dick off, James & Wiedenbach, 1968:418). The hypothetical structure frames the study, guides the investigation and provides a structure for a systematic (methodological), evidence-based (scientific) and epistemological approach (Grant, & Osanloo, 2014:4).

A theoretical framework is a combination of many interconnected methodological ideas employed to explain a phenomenon within limited conditions and presuppositions (Bhattacharjee, 2012:14). The researcher has adopted a socio-ecological model (SEM), advanced by Mcleroy, Bibeau, Steckler and Glanz (1988:355) for the development of a community-based model for prevention of under nutritional status among pregnant women. A socio-ecological model takes account of different factors, namely intrapersonal factors/individual factors, interpersonal factors, institutional factors, community factors, and public policy (Mcleroy, Bibeau, Steckler, & Glanz, 1988:355). These factors are explained in more detail below.

### 2.6.1 Individual Factors

A principal attribute of the SEM is the impact of individuals to effect change through information, dispositions, conduct, and expertise. In this study the “individual” refers to pregnant women who reside in rural areas and their interaction with their home and community (environment). The woman’s age, educational status, economic position, religious beliefs, cultural values, and ethnic orientation all affect their nutritional status.

### 2.6.2 Interpersonal Factors

Interpersonal factors include formal and informal organizations and social emotionally supportive networks that impact family, kinship, friends, and work. In this study, interpersonal factors relate to the interaction with household and community participants, health facilities and other organisations. Household, religious networks, traditions, co-workers and peers may all affect food security and nutritional status.

### 2.6.3 Organisational Factors

Organisational factors such as rules and guidelines impact on individuals. In this study the organisation refer to health care facilities, agricultural organisations and other organisations involved in nutritional policy and programs, health care legislation that can affect nutrition and food security service provision for pregnant women or households.

### 2.6.4 Community Factors

Community factors refer to connections among associations, foundations and casual systems. “Community” in this study refers to individuals who live in a specific topographical territory. The nutritional status of pregnant women and household security are affected by the community and its players such as community and religious leaders.

### 2.6.5 Policy/Enabling Environment

Public policy on all levels (local, state and national) creates an enabling environment for positive nutritional outcomes of pregnant women and for household security. In this study, an enabling environment refers specifically to nutrition policies and guidelines (WHO/FAO) and the allocation of resources for maternal nutrition and access to health care that may affect household food security and nutritional status.

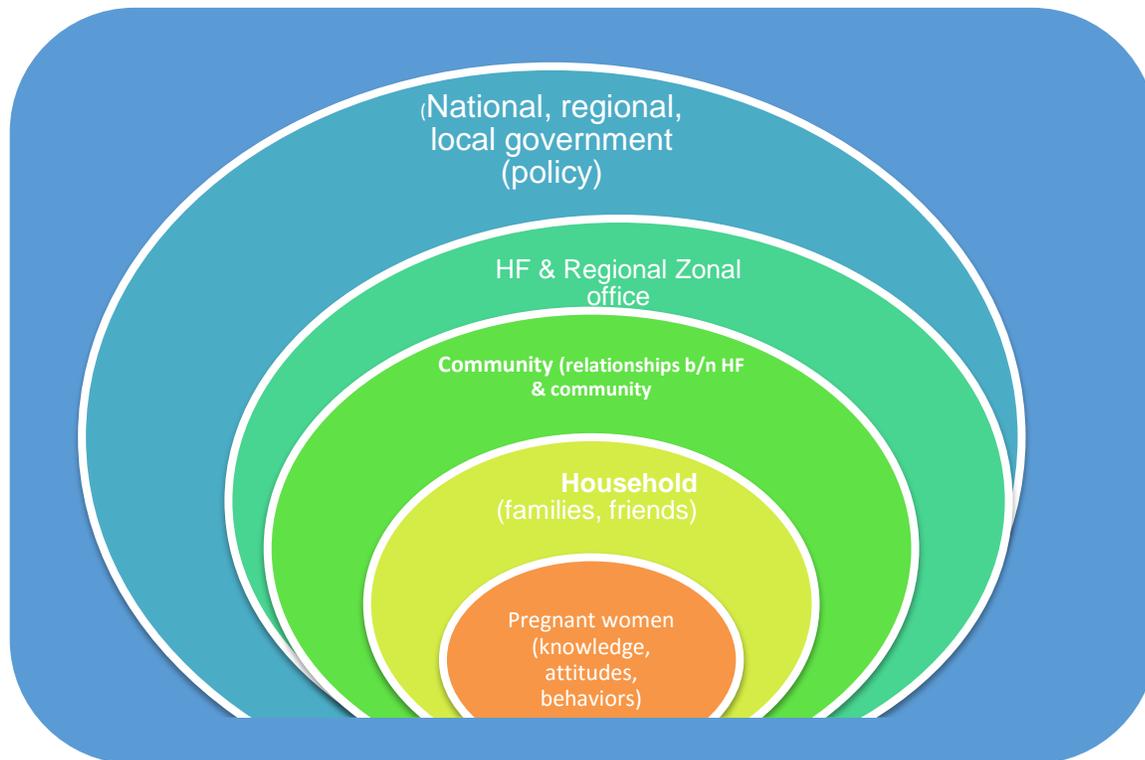


Figure 2.1: The Social Ecological Model

Source: adapted from Mcleroy, Bibeau, Steckler and Glanz (1988:355)

The socio-ecological model articulated provides a framework for identifying individual, household, community, and organisational factors as well as policies to address under nutritional status and household food insecurity of pregnant women.

The researcher made reference to a further six concepts (recipient, agent, context, procedure, dynamics, and terminus) in the development of the theoretical model (Dick off, James & Wiedenbach, 1968:422). Besides, considered the eight steps method recommended by (Walker, & Avant, 2013: 165) was used in the concept analysis.

The concepts were identified, categorised, and related to each other to conceptualise a community-based prevention model for under nutritional status in Southern Ethiopia.

## 2.7 CONCLUSION

The motivation for this investigation is the development of a community-based model for the prevention of under nutrition in pregnant women in Southern Ethiopia. This section reviewed literature on nutritional status, iron deficiency anaemia and food security from in the global, regional and local context. The research methodology and plan will be explored in the next chapter more in detail.

## CHAPTER 3: RESEARCH METHODOLOGY

### 3.1 INTRODUCTION

This chapter presents the research methodology of the study in detail, including research paradigm, research design, the three different study phases; Phase 1: Quantitative phase, the research study setting, population, sampling method and sample size, quantitative data collection process, household wealth index, validity and reliability of data collection instruments, pilot study, quantitative data analysis; Phase 2: Qualitative phase, qualitative sampling method and sample size, qualitative data collection process, qualitative data analysis, academic rigor and trustworthiness of qualitative data; Phase 3: Model development process, research ethics considerations. This chapter also includes data management and limitations of the study.

Research methods as the procedure's researcher's use to structure for an investigation and to collect and analysis applicable data (Polit, & Beck, 2017:41). The methodology refers to the kind of the exploration chosen to respond to the research question and can be quantitative /post-positivist, qualitative/constructivist, or mixed method research (Burns, & Grove's, 2017:85). The research methodology includes perceptions about the real world and information, qualities, hypothesis and research practice relating to a specific them (Kawulich, & Chilisa, 2015:3). The research methods describe how the study will be conducted. It informs the hypothetical examination of the strategies utilised in the investigation (Igwenagu, 2016:4).

Research strategy alludes to the practices and systems used to gather process and dissect the information (Bowling, 2014:166). Research method allude to the techniques that the researcher use in performing research activities, also research method is an approach to methodically comprehend the research problem (Kothari, & Garg, 2019: 6) & Kothari (2004:7).

In summary, a research strategy is the practices and methods used to collect and analyse data (Bowling, 2014:166); research methods are the strategies that the principal investigator use in performing research tasks.

The researcher used a mixed-method approach, consisting of quantitative and qualitative methods to answer the research question. A mixed strategy (MM) is used to maintain a strategic distance from the limitations of a single approach and to draw data from numerous sources for rich information (Polit, & Beck, 2018:309). Mixed methods are appropriate to investigate and explore the context-based characteristics of under nutritional status among pregnant women in Southern Ethiopia.

In this study, the researcher selected a mixed-method design to address the research purpose and objectives. This design was selected to avoid the limitations of a single approach and to create multiple and complementary types of data source to enhance the confidence of the researcher about inferences made (Polit, & Beck, 2018:309). The design was also chosen to explain, explore, and described characteristics of pregnant women in specific settings such as the household and community. In the next subsection, the researcher addressed study settings, study population, sampling technique, sampling frame, and ethical issues. This section provided a detailed outline of the research plan for the investigation of under nutritional status, food insecurity and anaemia among pregnant women.

The purpose of this study was to develop a community-based model for the prevention of under nutrition among pregnant women in Southern Ethiopia.

### 3.2 RESEARCH PARADIGM

A research paradigm/worldview is a perspective through which an investigator views the world or a philosophical supposition of the world (Creswell, & Plano Clark, 2018:66; Creamer, 2017:94; Kivunja, & Kuyini, 2017: 1). A worldview is framework of conviction or a general perspective of the world that underpins research and practice (Polit, &

Beck, 2018:39, Ross-Man,& Rallis, 2017:88; Willis, 2007: 8). Guba and Lincoln (1994:107) describes ideal models as a combination of many fundamental conviction frameworks that are dependent on ontological, epistemological, and methodological suppositions and that determines ultimate standards. The research question departs from the research paradigm (Bowling, 2014:132).

Creswell and Creswell (2018:44) stated four philosophical world views

### 3.2.1 Postpositivist

The assumptions were mainly characterized by traditional form of investigation, this emphasis extra weight for quantitative study than qualitative research (Creswell & Creswell 2018:44). The postpositivist paradigm assumes that, there was one reality exists, focus objectivity and quantifiable. In this paradigm the inquirer is projected to be independent of the things being researched. It also highlights representative sample, statistical analysis and conclusions based on sample studied (Beck, Polit 2018:32).

### 3.2.2 Constructivist Worldview (Naturalistic paradigm)

Constructivism is combined with interpretivism such a viewpoint, and focus on qualitative research (Creswell, & Creswell, 2018:45). In contrast with postpositivist, the constructivist paradigm assumes that realities are multiple and subjective meanings of experiences, mentally constructed by individuals, not cause and effect. This paradigm mainly focus on subjectivity, non-quantifiable, small, information rich samples, qualitative analysis, and in-depth understanding of individual experience(Beck,& Polit 2017:33;Creswell, 2014:36).

### 3.2.3 Transformative Worldview

This philosophical worldview emphasis on the requirements of groups and people in our community might be marginalized. The investigation in this philosophical worldview

connected to community activity and political to these inequities (Creswell, 2014:38). In studying these different teams, the investigation centers on disparity based on sex, race, ethnicity, disability, sexual introduction, and socio-economic class that result in deviated power relationships (Creswell, & Creswell, 2018:46).

#### 3.2.4 Pragmatic Worldview

Pragmatism is a research paradigm that emphasises shared significance making. The research question dictates the plan of the inquiry (Polit, & Beck, 2018:309). Embedded in practice, this paradigm has no preference for either subjectivity or objectivity (Shannon-Baker, 2015:13). Pragmatism and its permutations are therefore associated with mixed method research (Creamer, 2018:96). In pragmatism any methodological issues that arises from combining quantitative and qualitative approaches, are only addressed after the research has been completed (Morgan, 2007:49).

Pragmatism is not dedicated to one structure of viewpoint and truth. These relates to mixed methods design in that inquirers draw freely from combination of quantitative and qualitative assumptions (Creswell, 2014:39). Besides, in pragmatic worldview, the researcher bases the inquiry on the assumption that collecting multiple sources of information best delivers a more complete knowledge of an investigation gap than any qualitative or quantitative data alone (Creswell, 2018:54).

Therefore, pragmatism creates the access for multiple data sources for mixed methods researcher, diverse worldviews, and various assumptions, and various forms of information gathering and analysis (Creswell, & Creswell, 2018:48). As most of scholar agreed, all paradigms have their own weakness and strength, for instance postpositivist paradigm emphasis to generalize results to a population. In a second phase, focuses on qualitative, constructivist paradigms seek in-depth understanding of individual's experience by open-ended interviews. Certainly, there is no single worldview that could describe and explain the research question because of the complex nature of the study.

In this study, the researcher utilized pragmatism paradigm in mixed method design. Thus, in the first phase of this mixed methods study, researcher conducted quantitative research study to determine prevalence and contributing factors for under nutrition among pregnant women. Besides, the experience of health centre directors, chief executive officers, district health managers views took during in-depth interview and also pregnant women opinions and views took during focus group discussion(FGD), with regards to identify contributing factors for under nutrition and food insecurity in southern Ethiopia.

### 3.3 RESEARCH DESIGN

It is the general structure or design of the study (Bowling, 2014:166; Kothari, 2004:31). Research design refers to qualitative, quantitative, and mixed method strategies used in research (Creswell, 2014:41). A research design directs research activities in time and place and ensures effective data collection without unnecessary exertion or wastage of time and cash (Kothari, & Garg, 2019:30).

The research plan encompasses the procedures used by investigator to address their inquiries and test the research hypotheses (Polit, & Beck, 2018:210). This study used a mixed method design with both quantitative and qualitative methods to determine and explore variables associated with the under nutritional status of pregnant women and to inform the development of a model (Creswell, & Creswell, 2018:14; Jason, & Glenwick, 2016:233; Creswell, & Plano Clark, 2018:34; & Bowling, 2014:419).

Research design is a system, blueprint, or plan for a investigation to guide the collection and analysis of data (Johnson ,& Christensen ,2014: 455); Kothari, & Garg ,2019:30); Burns, & Grove's ,2017:107); Pandey, & Pandey, 2015:18). The choice of a research design assists researchers with the research process, including the number of study subjects, strategies for test choice and test size, the setting, length of the study period,

strategy and methods for data collection, measurement instruments, conclusions from the investigation results, and further recommendations (Burns, & Grove's, 2017:107). Chinn and Kramer (2011:224) described a research plan as significant for formulating hypotheses.

A research process can be carried out in different phases. Brink, Van der Walt, and Van Rensburg (2018:41) make reference to four interactive phases; Creswell and Creswell (2018:218) depict a two-phase research design; and Polit and Beck (2018:97-100) discuss five phases. For this study, the researcher implemented the project in three distinctive phases to answer research objectives and questions of the study, namely Phase 1: Empirical /Quantitative, Phase 2: Qualitative, and Phases 3: Model development.

The researcher employed an explanatory, sequential, descriptive and contextual research, with mixed method design to develop a community-based model for the prevention of under nutritional status for pregnant women in Southern Ethiopia.

The researcher used a mixed method design with, community-based, cross-sectional study with both quantitative and qualitative elements to investigate the variables contributed with the under nutritional status of pregnant women, food insecurity and iron deficiency. This investigation laid the foundation for model development (Creswell & Creswell, 2018:14; Jason, & Glenwick, 2016:233; Creswell & Plano Clark, 2018:34 & Bowling, 2014:419). Mixed method designs are used for the integration of quantitative data and qualitative information to supplement and strengthen the exploration study and to respond to the study questions (Creswell, 2014:43).

Chinn and Kramer (2011:185) reflect on hypothesis generation, assumptions behind the hypothesis, and association with theory, structure, suppositions, and basic reflection. The principal investigator utilises the sequential mixed method design with a three-phased approach (Figure 3.1) to answer the research questions related to this explanatory sequential, descriptive and community-based research design. Quantitative

data were collected, analysed, and interpreted, and quantitative research results was informed the development of a qualitative instrument. More weight gives at phase one to address research objectives. Subsequently, the principal investigator considered the phase one, phase two research findings, reviewed an important literature and incorporated panel expert’s opinions to develop a community-based model for the prevention of under nutritional status among pregnant women in Southern Ethiopia.

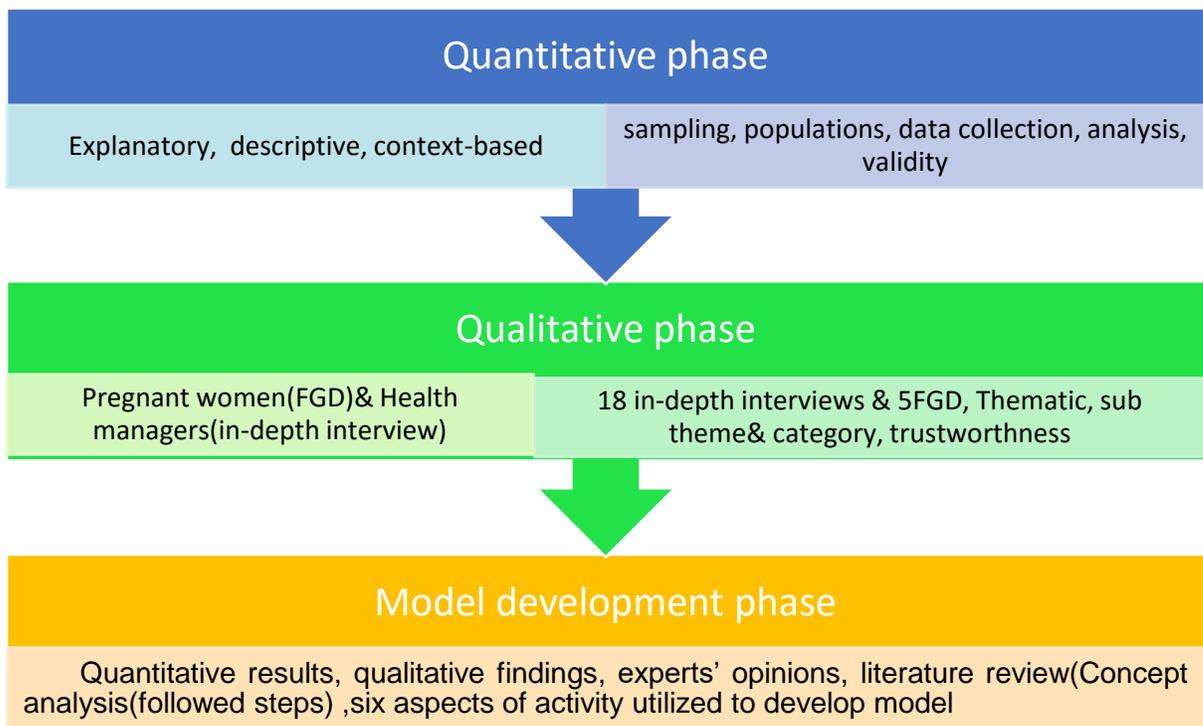


Figure 3.1: Research phases of the study

### 3.4 PHASE 1: EMPIRICAL /QUANTITATIVE PHASE

The quantitative phase in this study is also the primary stage and carries more weight than the qualitative phase (Creswell, & Plano Clark, 2018: 91; Creswell & Creswell, 2018:221). In this stage, quantitative information was collected from a randomly chosen sample of household who had pregnant women in a rural community using a structured questionnaire.

Quantitative structures reflect post-positivist philosophical suppositions (Creswell, 2014 : 200). A quantitative investigation refers to a scientific data collection process and the use of formal instruments to collect quantitative or numeric data which can be measured (Polit, & Beck, 2018:41 & Apuke, 2017:46). According to Creswell (2014:32) quantitative data can be measured with instruments.

Polit and Beck (2017:91), and Creswell (2014:200) alludes to the fact that quantitative research is necessary for testing hypotheses by looking at the connection between the autonomous and ward factors. In the first phase quantitative data were collected after pretested, with structured questionnaires and analysed with statistical software to determine the prevalence and contributing factors for under nutritional status, and food insecurity in pregnant women. This phase was informing the development of a qualitative instrument.

#### 3.4.1 Explanatory research design

An explanatory enquiry seeks to understand the fundamental causes of a problem. In quantitative research, investigator is utilised deductively to produce estimated clarifications that are tried factually (Polit, & Beck, 2018:47). It seeks clarification (Babbie, 2016:91). In the current investigation, investigator used to explain the causes of under nutrition, food insecurity and iron deficiency.

#### 3.4.2 Descriptive research design

Descriptive research is used to tally, depict, and group topics (Polit & Beck, 2018:46). Descriptive study respond to inquiries of what, where, when, and how circumstances and occasions happened (Babbie, 2016:91). In this investigation, the researcher described issues related to under nutritional status and household food insecurity.

### 3.5 RESEARCH STUDY SETTING

Ethiopia is one of the developing countries situated in the horn of Africa. The administrative structure consists of nine regional states and two city organisations and the local states and city organisations are divided into districts and “Kebeles” (lowest structure) (FDRE, 2015:18). An estimated population size of Ethiopia is 109 million in 2019 (FDRE, 2020:3; CSA, 2019), and eighty four per cent live in rural areas (FDRE, 2018). The total fertility rate (TFR) in the nation averages five children per woman and is more than double in rural areas (five) compared to urban areas (two) (CSA, 2016:16). The average family unit size in Ethiopia is five persons per households. Urban families (four people) are slightly smaller than rural families (five people) (CSA, 2016). The average life expectancy in Ethiopia is 67 years (WHO, 2016).

This study was conducted in the South Omo Zone, one of 15 zones in the Southern Nations, Nationalities and People’s Region (SNNPR) of Ethiopia. The zone is divided into ten districts and 1 city administration and the Zone consists of 205 rural and 60 urban “kebeles” (smallest administration structure). The zone capital is Jinka, a city in the Southern part of the SNNPR; 480 km from the regional capital of SNNPR, Hawassa; and 850 km from Addis Ababa, the capital of Ethiopia. The Central statistical agency (CSA), 2007 estimates a population of 749,214 in the South Omo Zone accounting for nearly 4 per cent of the total population of the region, of whom 359,623 are males and 389,591 are women. An estimated 26,531 of the population is pregnant women and 11,487 pregnant women in the study districts (5 districts) are women of reproductive age (South Omo Zone Health department annual report, 2019:4).

The Zone is bordered in the south by the Oromia Locale, Kenya and South Sudan, on the north by the Gamo Gofa Zone, on the east by the Segene zone, and on the West by Bech Maji and South Sudan (South Omo Zone Health Department Report, 2019:5). The average population density of the zone is 31.7 persons per sq.km (South Omo Finance report, 2017:2). According to a South Omo Zone health department report there are two hundred and sixty eight “kebele” (268) in the Zone of which twenty two (22) are urban

kebeles(South Omo Zone Health department annual report,2019:5). There are 16 (sixteen) ethnic groups in the South Omo Zone. These groups have their own area residence (district), topographical area, language, culture, and social identities (South Omo Finance Sector Report, 2017:10).

As indicated by study Zone Annual Report, the Zone has a diverse agro-ecology ranging from hot arid to tropical humid. Dega (high land) constitutes 0.5 per cent of the Zone, weynadega (midland) 5.1 per cent, semi-kola 60 per cent, and kola (low land) 34.4 per cent (South Omo Finance Sector Report, 2017:3). The southern extreme point of the zone, near lake Rudolf is at the lowest altitude, about 376 meters above sea level, and the highest peak, about 3,418 meters above sea level is the Shengama mountain, located in South Ari woreda, in the north eastern part of the zone (South Omo Finance Sector Report, 2017:2). The rainfall varies significantly in the Zone with a lower rainfall towards the North East of the Zone. The mean annual rainfall of the Zone ranges between 400mm and 1,600mm (South Omo Finance Sector Report, 2017:3). Furthermore, agriculture is the predominant economic activity in the zone and the country and is the prominent source of livelihood. Agriculture is mainly subsistence farming for personal consumption.

The main nourishment harvests produced in the Zone are maize, sorghum, “teff”, coffee, vegetables, root crops, pulses and oil seeds. The communities in the Zone are mainly agro-pastoralist and their livestock include cattle, goat, sheep, horse, mule and others (South Omo Finance Sector Report, 2017:25). The Zone has 1 general hospital, 2 primary hospitals, 40 health centres, 228 health posts, 25 mediums and 83 primary, private clinics, 81 drug stores and 10 non-governmental organisation (NGO) clinics that deliver health care service to the community. The community is served by 13 general and 2 specialized doctors, 374 all type nurses, 42 BSC nurses, 100 midwives, 82 health officers, 64 pharmacy technicians, 60 laboratory technicians,3 radiologists, 6 anaesthetists and 256 rural health extension workers are (South Omo Zone Health Department Report, 2019:3). Data were collected from five districts: Dasench, Hammer, Benytsemay, Malle, and South Ari.

A number of Kebele were randomly selected from each district, and pregnant women were selected proportional to the population sample size. This investigation was directed in SNNPR, which is one of nine regions in Ethiopia. Rural pregnant women in randomly selected rural Kebele in 5 districts were assessed depending on their ecological zones. Pregnant women from rural were selected to measure the burden and risk factors of nutritional status and food insecurity.

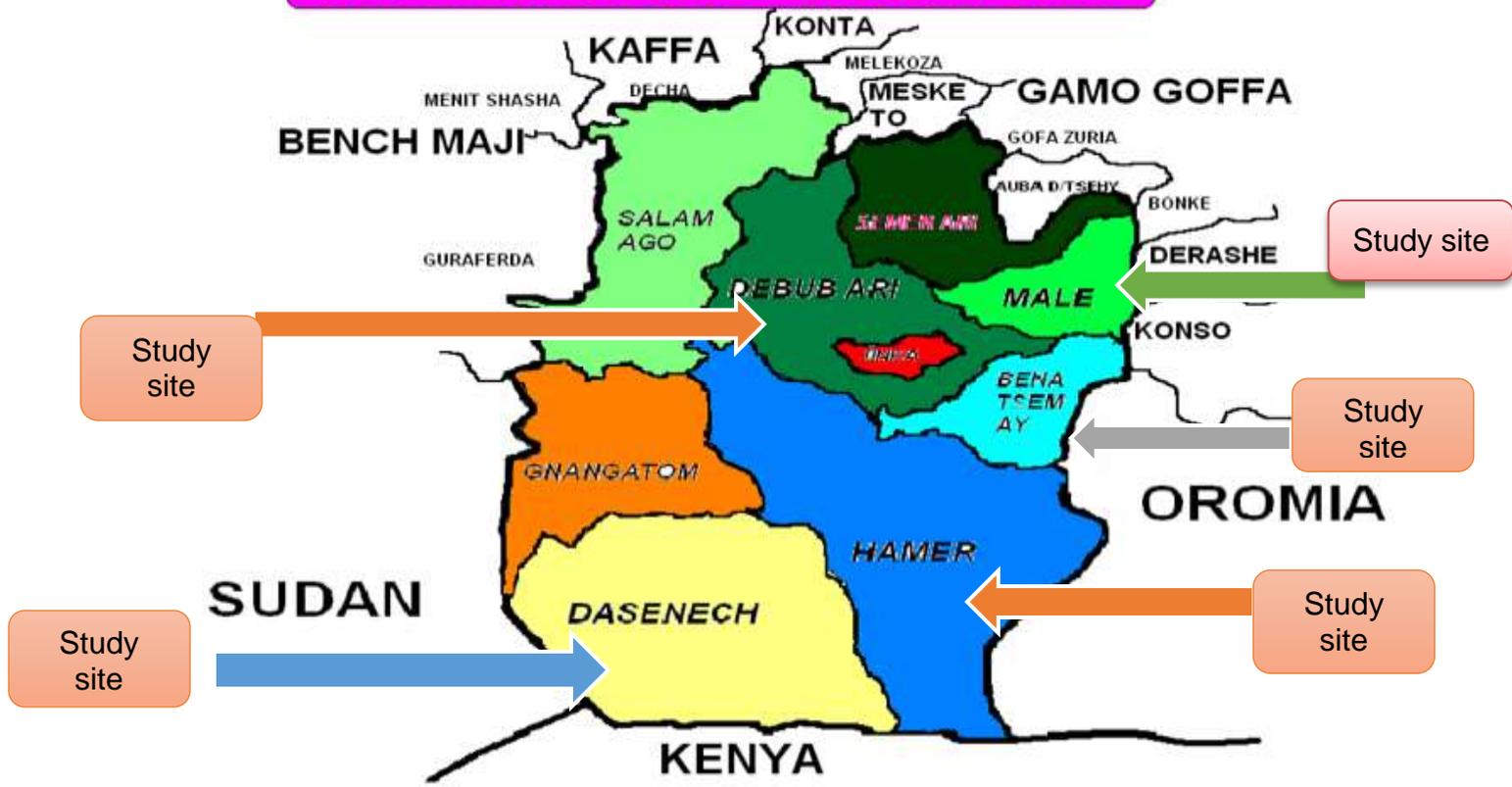
Table 3.1: Distribution of randomly selected study districts in the South Omo Zone in SNNPR, 2019

SN	District name	Total area in sq.km	Mean annual temperature in (Oc)	Elevation
1	Dasnech	2,225.90	25.1-27.5	<500-1,000
2	Hammer	5,989.80	17.6-27.5	<500-2000
3	B/Tsemaye	2,922.80	17.6-27.5	<500-2,500
4	Malle	1,432	12.6-27.5	501-3,000
5	South Ari	1,520	10.1-27.5	<500-3,500
	Zone	2,835.80	10.1-27.5	376-3,500

Source: (South Omo Finance Sector Report, 2017:6)

\*SOF SR= South Omo Finance Sector Report

## SOUTH OMO ZONE PHYSICAL MAP



(Source: South Omo Zone Health Department Report, 2019:3)

Figure 3.2: South omo zone catchment area Map

### 3.6 POPULATION

Burns and Grove's (2017:516); Brink, Van der Walt and Rensburg (2018:116); Pandey and Pandey(2015:40); Bhattacharjee (2012:65) and Salkind (2016:85) defines a population as all the individuals or a specific gathering of persons or items with similar qualities (Polit, & Beck , 2017: 365) and Beins, and McCarthy (2012:93).

The target population refers to all the people that meet the investigation criteria, namely women who have been exposed to under nutrition in the previous year. Target population is the segment of the populace to which the investigator has rational access

(Burns, & Groves, 2017: 516). The population in this study consists of pregnant women residing in selected districts.

A population of pregnant women and health sector chiefs were considered in this investigation. Pregnant women aged 15-49 years were randomly selected in order to investigate their under nutritional status.

### 3.6.1 Source Population and Study Population

#### Source Population

- Pregnant women aged 15-49 years who reside in the South Omo Zone.

#### Study Population

- Pregnant women aged 15-49 years who have been exposed to under nutrition in the previous year reside in randomly selected rural “kebeles” in the districts.

### 3.6.2 Inclusion and exclusion criteria

#### 3.6.2.1 Inclusion Criteria

Inclusion criteria are the attributes that a person needs to have to be a member of the objective population (Burns, & Grove, 2017:518).

- Pregnant women aged 15-49 years who exposed to under nutrition in the previous year

#### 3.6.2.2 Exclusion Criteria

Exclusion criteria refer to attributes against which a selected individual or component are rejected or omitted from the objective population (Burns,& Grove’s, 2017:518)

- Pregnant women who were unable to respond or communicate due to critically illness during the data collection period.
- Pregnant women, who were unwilling to consent to blood testing
- Pregnant women who could not be found at home after three repeated visits

### 3.7 SAMPLING METHOD

Sampling refers to the method of selecting participants or respondents from an entire population to permit inferences about the population (Polit, & Beck, 2017:367). As indicated by the definition of Burns and Grove's (2017:515), sampling includes selecting a collection of individuals with similar characteristics. Creswell and Plano Clark (2018:181) explain sampling as the selection of people from a population of importance such as a subsection of a population that is fundamental to the data to be collected (Polit, & Beck, 2017:367). In existing quantitative phase planned to be descriptive of the target population, carefully chosen samples, which enabled the investigator to accomplish factual end.

#### 3.7.1 Sample Size

Kothari and Garg (2019:53); Salkind (2016:92); Brink, Vander Walt and Rensburg (2018: 128) suggested that, the sample size should be neither unreasonably big, nor excessively small. An ideal sample is one which satisfies the prerequisite of proficiency, representativeness, consistent quality and adaptability. Brink, Van der Walt and Rensburg (2018: 128) recommended a test size estimation to consider factors such as reason, structure and kind of test. The bigger the sample, the higher the number of the population included in the study. Polit and Beck (2017: 378); and Burns and Grove (2017:542) noted that a sufficient sample size is imperative to guarantee generalisability of the investigation results.

The sample size is determined with a mathematical formula using software such as Raosoft. An ordinary sampling procedure was used a 95% confidence interval and a 3% margin of error (Cohen, Manion, & Morriso, 2007:103-204).

The researcher used the Raosoft formula (Raosoft, 2004) for the sample size calculation with a 95.6% confidence interval and a 4.4% margin of error.

The population size (PW) was 20,264 and the response distribution 50%. The minimum recommended sample size was  $n=511$ .

To determine the absolute sample size of pregnant women a stratified sampling strategy used. The assumption was to share the number of pregnant women by agro-ecologic zones to select a sample size ( $n$ ) of 511 from the complete population ( $N$ ) 20,264 ( $n = 511$ ) in the various strata. The investigator used a proportional to population allocation system (PPS). The different samples were selected independently from every stratum by using random sampling.

Table 3.2: Proportional allocation of pregnant women determined sample size for study in the South Omo Zone, SNNPR, 2019.

District Name	Number of “kebele” randomly selected	Number of respondents
Hammer	6	130
Dasnech	5	112
Benytsemay	5	122
Malle	6	116

S/Ari	2	31
Total	24	511

### 3.7.2 Sample Technique

Random sampling as a sample illustrative of the population where all components in the population have an equivalent possibility or more prominent than zero chance to be selected or being remembered (Burns, & Grove's, 2017:528); Beins & McCarthy, 2012:97); and Polit & Beck, 2018:246), random sampling assists to evaluate the inspecting blunder, decrease predisposition in the sample and encourage the correct use of inferential measurements (Brink, Walt & Rensburg, 2018:119). In this study, study respondents were all given an equal opportunity to be selected and random sampling was used.

Stratified sampling where by the population is isolated in to strata, so that every component of the population has a place in only one stratum (Brink, Van der Walt & Rensburg, 2018:122); Salkind, 2016:86-90; and Beins & McCarthy, 2012:98). A stratified sampling strategy is commonly used if a population does not comprise a homogeneous population (Kothari, & Garg, 2019:59). The sampling strategy supports generalising results from the sample to a population.

In this investigation, the researcher applied a multi-stage stratified sampling method to stratify the ecological zones and then applied simple random method to select respondents that are pregnant women aged 15-49 years old. Initially, all districts in the Zone was listed and stratified into 3 ecological zones: dega (highland), weyena dega (midland) and Kolla (lowland). For each stratum districts were selected randomly and Kebeles were selected through simple random sampling in each district. The sample size was then allocated to the strata proportional to the population size (as table 3.2 depicted).

### 3.7.3 Sampling Frame

Brink, Van der Walt and Rensburg (2018:117); Polit and Beck (2018: 246); Burns and Groves (2017:526); Babbie (2013:144) and Bhattacharjee (2012:66) discussed about sampling frame. The study sample is drawn randomly from the population. The sampling frame included all listed pregnant women in the sampled kebele.

Pregnant women are registered in the kebele through a community-based health information system where health extension workers register the women. Simple random sampling was used to select pregnant women, 15-49 years old, from the sample frame.

## 3.8 QUANTITATIVE DATA COLLECTION

In this study, the researcher applied a mixed method design (MM) by combination of quantitative methods and qualitative methods (pregnant women participated in FGD & Health program managers participated in in-depth interview).

The quantitative investigation is centred on the collection and investigation of numeric data to respond to the exploration inquiry and to test theories (Terrell, 2016:77). Data collection is a social affair of collecting data through structure surveys. Information can be accumulated by an investigator through an assortment of techniques (Goodman, & Thompson, 2018:181). Brink, Van der Walt and Rensburg (2018:134) suggest that the researcher plans for the data collection process.

The primary motivation behind data collection is to address research questions. In current investigation, the investigator used various data gathering tools to collect data to measure the factors that contributed for under nutrition, food insecurity among pregnant women. Initially, the questionnaires were developed in English and were later translated into the local language (Dasenech, Hammer, Beny, Tsemay, Malle, Ari & Amharic). The

questionnaires were then again translated back in to English for language editing by experts.

For this particular investigation, a structured questionnaire was administered face-to-face to collect data from respondents (Bowling, 2014:278). Pretested questionnaires were used to collect data. Questions in the questionnaire were adopted and adapted from the literature.

The socio-demographic aspect of the questionnaire was adapted from DHS (CSA, 2016) and the dietary survey/food frequency component was prepared from existing literature. Women's dietary diversity (WDD) was measured by using the Food and Agricultural Organisation Tool (FAO, & IFH, 2016; Kennedy et al, 2013) that asks questions about consumption pattern of nine categories of food within a 24-hour period.

The researcher considered the work of Coates, Swindale, & Bilinsky (2007:18) to develop an instrument to measure food security. The instrument consists of nine questions enquiring as to whether a specific condition associated with the experience of food insecurity ever occurred during the previous four weeks (30 days). The question has two response options (0 = no, 1 = yes). A second question offers three response options representing a range of frequencies (1 = rarely, 2 = sometimes, 3 = often). Food insecurity was also assessed by using a hunger scale, and food and nutritional technical assistance (Ballard & Coates, 2011). A knowledge and attitude questionnaire were developed using the FAO guideline (Maci'as & Glasuer /FAO, 2014).

A haemoglobin concentration test was used to screen for iron deficiency anaemia, and it identifies the later phase of iron deficiency and also helps to measure in the field (WHO, 2017:7). In this study, a Haemocue was used to measure blood haemoglobin levels. Blood was taken from the fingertips of respondents using micro cuvettes and inserted into the Haemocue. The measure was then recorded. The sample was taken, and the test was carried out an experienced laboratory technician. Basic safety measures were taken during the collection of the blood samples.

The SPHERE guidelines and WHO suggest a screening instrument to determine maternal nutrition in pregnant women through a mid-upper arm circumference (MUAC) measurement (Sphere, 2011). Currently, there is no consensus on the MUAC cut off point for pregnant women. The researcher used the suggestions of Tumilowicz (2010:7) on MUAC for the classification of nutritional status in pregnant women.

The researcher created a structured questionnaire to measure the nutritional status in pregnant women. The questionnaire is divided into the following sections (Annex G):

- I. Socio-demographic characteristics
- II. Household economic status
- III. Obstetrics and health service related characteristics
- IV. Women dietary diversity scores (WDD)
- V. Food frequency questionnaires and dietary source
- VI. Household food security status
- VII. An assessment of pregnant women's knowledge on nutrition status
- VIII. Attitudes towards a health or nutrition-related problems
- IX. Practice towards a health or nutrition-related problems
- X. Haemoglobin level and anthropometric measurement
- XI. Adherence to Iron folic Acid supplementation(IFAS)

### 3.9 HOUSEHOLD WEALTH INDEX

The division of wealth are important for the delivery of justice and the distribution of equitable health services and is a more consistent measurement than either salary/income or utilization/consumption. Wealth is all the more effectively estimated, with just a single respondent required as a rule. There are 3 head markers of income status, namely household income, household consumption utilisation, and household income. For this study, the researcher determined household wealth by scores related to the 29 household properties that relate to living conditions such as the toilet facility,

water source, housing roof, flooring and other. Household wealth was also measured through determining the ownership of cows, oxen, donkeys/horses, goats chickens, electricity, television, refrigerator, bed, sponge, chair, table, mattress, kerosene, kerosene stove, mobile telephone, radio, clock, non-mobile telephone, pressure lamp, gun, kitchen, bicycle, motorcycle or motor scooter/Bajaj, animal-drawn cart, car or truck, fuel, house, roof, wall, bank/microfinance saving account, and the possession of farming land.

To determining a composite score, the investigator considered principal component analysis (PCA). Zonal wealth quintiles were determined by appointing a family unit score to each family unit, positioning every individual in the family population by her or his score, and then dividing the delivery into 5 equivalent groups, each containing 20 per cent of the population.

### 3.10 VALIDITY AND RELIABILITY OF DATA COLLECTION INSTRUMENTS

#### 3.10.1 Validity of Data Collection Instruments

Validity is an evaluation of whether an instrument estimates what it expects to measure (Bowling, 2014:170; Brink, Van der Walt & Rensburg, 2018:151). The validity of an investigation is generally equivalent to truthfulness (Burns,& Grove's, 2017:330). It is the capacity of a tool to quantify which is intended to be quantified. The researcher considered a few methodologies to ensure the validity of an instrument. He established that there is a correlation between the purpose of the investigation and the questions in the instrument, as well as the statistical analysis to show associations (Kumar, 2011:166).

The researcher also applied the accepted validity questions as to whether the instruments measure what the study set out to quantify and whether the outcomes were associated with other outcomes (Creswell, & Creswell, 2018:153). As to guarantee face

validity, the researcher evaluated and affirmed the presentation of the instrument; and the importance, clarity and unambiguous use of questions.

Content validity is defined as an evaluation of how an instrument speaks to all segments of the variable to be estimated and must be determined before data collection (Brink, Van der Walt, & Rensburg, 2018:152). To ensure content validity, the principal instigator sent the instruments to four specialists in the field of nutrition to evaluate, including an academic with a PhD in nutrition, a nutritionist with a Master's degree, a medical doctor with a first degree working in nutrition, a statistician with a PhD and the supervisor of the researcher. The researcher revised the comments of the experts and incorporated them into the questionnaire prior to pilot testing and actual data collection.

### 3.10.2 External validity

External validity is an important aspect to incorporate in an investigation (Burns, & Grove's, 2017:333). The findings should not be exclusive to the study population but should be applicable to a broader population, or ability to draw generalization (Rosenstein, 2019:37). To ensure external validity, the researcher selected an adequate number of study subjects. He also applied scientific research methods to determine the sample size, in this case random sampling. The principal investigator used multivariate analysis to reduce the confounding effect. The findings can therefore be generalised to the population of South Ethiopia as this area has similar socio-economic characteristics to the study area.

### 3.10.3 Reliability

Reliability refers to the reproducibility and consistency of the research tool. It alludes to the degree to which the tool is free from error (Bowling, 2014:170) and is a technique that if applied more than once to a similar goal, yields the same outcomes every time.

It also alludes to the exactness and reliability of data collected in a study (Babi, 2016:146; Polit & Beck, 2018:121). Reliability refers to how often an instrument can yield predictable outcomes when used at a different time on a similar individual (Brink, Walt & Rensburg, 2018:155). The reliability of a research instrument relates to its consistency over time. Reliability can be estimated by administering the same instrument to similar people on two different occasions and measuring the similarity in their responses (Brink, Van der Walt, & Rensburg, 2018:156).

Internal consistency refers to a measure of similar characteristics between different items using the same test (Brink, Van der Walt & Rensburg, 2018:156). Inner consistency for surveys are measured using Cronbach's alpha ( $\alpha$ ) coefficient, with values somewhere in the range of 0 to 1, and ideal values in the range of 0.7-0.9 (Creswell, & Creswell, 2018:154).

In the existing investigation, internal consistency was measured with Cronbach's  $\alpha$  value and a value of 0.87 was determined (mean: 4.6, & standard deviation: 2.9). In addition to this, the researcher ensured internal consistency through a pilot study to provide an initial evaluation of the inner consistency of items and to allow an opportunity to improve the question and the instructions.

In addition to this, the research tools were adopted from reliable sources and guidelines such as the Food Agricultural Organisation and the United Nations (FAO), the Central Statistics Agency (CSA) for socio-demographic characteristics (CSA, 2016:380), and the Household Nutrition Insecurity Scale (HFIAS) adopted from the FANTA III tool (Coates, Swindale, & Bilinsky, 2007:9). Knowledge, attitude and practices toward nutrition were assessed with the FAO tool (FAO, 2014: 107).

The dietary diversity assessment tool for pregnant women were adapted from the FAO (FAO, 2013;& FAO, 2016). The instrument was piloted in a neighbourhood setting and data collectors were recruited based on their experience. Data collectors were trained both for data collection and as supervisors.

The research assistants were strictly supervised and participated through daily reflection and briefing sessions. During the data collection period, the principal investigator and supervisors reviewed questionnaires toward the end of each day to ensure that the questionnaires were completed.

#### 3.10.4 Research Assistants and Supervisors

A total of 15 research assistants consisting of 5 nurses (data collectors), 5 laboratory technologists (data collectors and interpreters), and 5 supervisors were recruited to collect data in the field. The research assistants were carefully selected to ensure data quality, that were collected at field. The researcher used the following criteria for recruitment:

- Prior experience and participation in data collection and supervision in a similar study
- Proficiency in speaking and writing in the local language
- Familiarity with the community culture
- Prepared to voluntarily collect data from house to house
- Qualification of at least a first degree

#### 3.10.5 Training of Research Assistants (Data Collectors and Supervisors)

After the research assistants were recruited, the principal investigator organised training first for the data collectors and there after for the supervisors. The training curriculum was three days long and research assistants were trained on research methodology and data collection methods. The purpose of the study and the research objectives were presented and discussed, and the assistants had an opportunity to participate in a question and answer session. The training also included practical sessions and role play on data collection and interaction with the subjects to minimise any harm during the data collection process.

### 3.11 THE PILOT STUDY

A pilot study is an investigation in a small area with a predetermined number of subjects that precedes the main investigation (Brink, Van der Walt & Rensburg, 2018:161; Burns, & Grove's, 2017: 109). The reason for the pilot study is to evaluate whether the proposed techniques and research methods are viable in finding subjects to consent, and in the effective collection of data. Furthermore, the pilot study is used to assess whether the project is achievable, or subjects will indeed consent to participate in the study, what number of subjects are accessible, how much time is required to collect data from one subject, and how well the data tools work (Burns, & Grove's, 2017:109). The pilot for this study was carried out in the nearby Bakadewela district in a population with comparable socio-demographic attributes to the study population. The pilot study was conducted with fifty-two pregnant women or ten per cent of the sampled population (study respondents). The Bakadewela district was excluded from the main study. The data collectors and supervisors conducted the pilot study house-to-house. A debriefing and reflection session was conducted at Jinka town each day after fieldwork. Challenges experienced by the fieldworkers in administering the questionnaire were discussed during these sessions, including skipping patterns, vague instructions, and inadequate time allocation per respondent. The questionnaire was revised, and adjustments were made based on the lesson learnt from the field work. The data collection for the after pilot study lasted one month. Data collection was conducted in five teams, and each team comprised 1 nurse, 1 laboratory technologist and 1 supervisor with experience in fieldwork. The principal investigator manually checked the data completeness after each day.

### 3.12 QUANTITATIVE DATA ANALYSIS

In quantitative studies, data analysis refers to the decrease, association, and measurable testing of data acquired in the data collection phase (Burns, & Grove's, 2017:111).

Similarly, quantitative analysis alludes to the methods by which researchers convert information to a numerical structure and subject them to factual analysis (Babbie, 2016: 412). Data analysis intends to respond to the research inquiries (Brink, Van der Walt & Rensburg, 2018: 165 ; Creswell & Plano Clark, 2018: 214). In this phase, data analysis was conducted using statistical software namely SPSS version 25.0. Numeric information collected in the study were analysed quantitatively with descriptive and inferential analysis (Creswell, & Creswell, 2018:156, Kothari, & Garg, 2019: 126; Creswell, & Plano Clark, 2018, Bhattacharjee, 2012:119).

The researcher assessed the data manually for comprehensiveness and reliability. The data were entered on two computers and were cleaned by the principal investigator. Data were described using descriptive statistics (Brink, Van der Walt & Rensburg, 2018:167). The researcher used statistical package software to analyse quantitative data such as SPSS version 25.0 i.e: frequency distribution, central tendency, and dispersion. Inferential statistics in the form of an independent t-test, one-way analysis of variance (ANOVA), chi-square test, and bivariate analysis were applied to examine whether the two variables were associated to each other. Multivariate logistic regression was further applied to assess the association of independent variables such as socio-demographic, and health related variables with dependent variables of under nutritional status and household food security (Brink, Van der Walt, & Rensburg, 2018:77, and Kothari, & Garg, 2019:237).

In the existing investigation, the results of the logistic regression were depicted as crude odds ratio (COR), and adjusted odds ratio (AOR) with their respective confidence intervals. A *p-value* < 0.25 was used to export variables to the multivariate model. Variables with a *p-value* < 0.05 were used to determine a statistically significant association (Kothari, & Garg, 2019:182). A *p-value* under  $\alpha=0.05$  demonstrates statistical evidence to discard the hypothesis (null), and by implication acknowledge the alternative hypothesis.

### 3.13 PHASE 2: QUALITATIVE RESEARCH PHASE

The second phase of this study was qualitative or exploratory. Qualitative research use words rather than statistics to explore perceptions. This is a more unstructured method Bowling (2014: 364). Qualitative methods facilitate a deep comprehension of social issues different to quantitative information that aims to determine associations and causality (Silverman, 2013:125). Qualitative research comprises of naturalistic, an interpretive, way to deal with the globe (Denzin, & Lincon, 2018:45). Qualitative investigators examine phenomena, experience in their natural context to comprehend or decipher meaning (Rossman,& Rallis, 2017:44; Merriam, & Tisdell, 2016:23). The purpose of qualitative investigation is to explore meaning and topics (Polit, & Beck, 2017:693). Qualitative research approaches are used to study individuals in their regular social settings and to collect data on the lived lives of individuals and groups.

Qualitative data to explore historic experiences of individuals, amongst other, can be collected through discussions and interviews with participants (Merriam, & Tisdell, 2016:23; Rossman, & Rallis, 2017:44). Qualitative research facilitates the collection of in-depth data on the lives of individuals in naturalistic settings (Polit, & Beck, 2017:90). This methodology is an appropriate to investigate and to understand the significance of people or human issues, to conduct data analysis, and to structure and present data (Creswell, 2014:32; Kalu & Bwalya, 2017:51 and Polit & Beck, 2017:93).

The advantage of qualitative research over quantitative strategies is its subjectivity and usefulness to explore and unearth information where little previous information exists. Qualitative research approaches are also used to explore sensitive issues and to open the door to further investigations and the development of inductive theory (Bowling, 2014:364). In this study, qualitative research approaches were used to investigate the research setting and to explore factors that contribute to under nutrition and food insecurity in pregnant women. Qualitative data was collected from pregnant women using focus group discussion (FGD) and key informant interviews with health centre

directors, district health office managers, chief executive officers and zonal level experts.

### 3.13.1 Exploratory Research Design

Qualitative methodology helps a researcher to explore one research participant; it is comparatively original and also suitable for more persistent phenomena (Babbie, 2016:90). Exploratory research starts with a wonder of concern, but instead of only depicting it, the researcher explores the phenomena, considers how the information was shared as well as the different components of the phenomena (Polit, & Beck, 2018:46). In the present study, the principal investigator further explores the different factors contributed with under nutrition and household food insecurity.

Qualitative methodology is used to explore the nature of poorly understood phenomena and to reveal insights into the manner in which phenomena is conveyed (Polit, & Beck, 2018:46).

### 3.13.2 Descriptive research design

Polit and Beck (2017:304); Burns and Grove's (2017:86) stated the main purpose of a descriptive investigation is to discover and depict thoughts in actual circumstances (Polit, & Beck, 2017:304, and Burns, & Grove's, 2017:86). Qualitative scholars portray the nature, extent, and remarkable quality of phenomena (Polit, & Beck, 2018:46). In the present study, the findings and model development process are described in detail.

### 3.13.3 Explanatory research design

Qualitative scholars seek clarification about the reason why a phenomenon exists or its implications to formulate a hypothesis that is grounded in rich, in-depth, empirical evidence (Polit, & Beck, 2018:47). In the present investigation, the investigator utilized a qualitative methods to explain the concept analysis that formed the base for model

development and also explains why the food insecurity and under nutrition occur in the study regions.

### 3.14 POPULATION

In this qualitative study phase, health centre directors, district health managers, chief executive officers (CEO), zonal program experts were included for indepth interview; furthermore, pregnant women were included in focus group discussions (FGD).

### 3.15 SAMPLING METHOD

The sampling method in qualitative research approach is to select cases that will most advantage the study (Polit, & Beck, 2017: 696). Creswell and Creswell (2018:185) reveal qualitative sampling as intentionally selecting study subjects that will help the investigator best in understanding the issue and the investigation enquiry.

The present study used a non-random sampling method. A purposive sampling method was used to select health centre directors, district health managers, chief executive officers (CEO), zonal level experts and pregnant women.

#### 3.15.1 Sample size

There are no particular guidelines or criteria for calculating sample size in qualitative research. Sample size is based on informational needs as demonstrated earlier on. Participants are sampled until the data are saturated and no new information is revealed (Polit, & Beck, 2017:702). A total of 18 study participants par took in-depth interviews and 53 pregnant women participated in 5 focus group discussions - an average of 9-12 participants per group. The indepth interview and the focus group discussions raised different opinions and made suggestion on food security, nutritional status and anaemia.

The critical view and recommendations of the research participants supported model development in phase three.

### 3.16 QUALITATIVE DATA COLLECTION PROCESS

Two qualitative research approach namely in-depth interviews and focus group discussions (FGD) were used to collect qualitative data for this study.

#### 3.16.1 Data collection guide

Qualitative data were collected using focus group discussion (FGD) guide and open-ended questionnaires. In-depth interviews were conducted using interview guides (Annex I) and focus groups discussions were conducted with focus group interview guides (Annex H).

#### 3.16.2 Data collection method

The principal investigator and 1(one) research assistant were responsible for the qualitative data collection. The key informant in-depth interviews took approximately 45 minutes to 1 hour each and the focus group discussion lasted 30-45 long.

All focus group discussions were conducted in the local language (Dasenech, Hammer, Beny, Tsemay, Malle, Ari & Amharic). The researcher conducted In-depth interviews with health program managers in Amharic, the official working language of South Omo Zone as well as, Ethiopia. Focus group discussions and in-depth interviews were recorded, and field notes were taken on the discussions. The recorded interviews were transcribed at the end of each day of research.

#### 3.16.3 Key informant interviews

Key informant interviews were used to collect in-depth data and to identify new topics of investigation. Eighteen (18) study participants, including health programme managers,

health centre directors, hospital chief executive officers and zonal experts were purposefully selected to collect qualitative information.

#### 3.16.4 Focus group discussion (FGD)

Focus group discussions (FGD) guide was used to collect qualitative data. The FGD guide (Annexure H written in page 326) was developed based on the literature review. Focus group discussions were conducted in 5 districts among 53 purposefully selected pregnant women. Focus group discussions were divided based on the pregnancy trimester (1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> trimester) for each selected site. The purpose of the focus group discussions was to explore participants' views, attitudes and the factors associated with under nutritional status and food insecurity.

Focus group discussions were conducted in a quit atmosphere to allow participants to express themselves without any personal refrain, and the discussion was facilitated by researcher who took notes and arranges tape recording. In this research each session of FGD took 30-45 minutes in average. The researcher led and guided the discussions, encouraged participation, established rapport, ensured the discussions flowed, and controlled the time allocated for each FGD session.

In the first stage of the focus group discussion process, the researcher introduced the participants, established the group norms, and created a friendly environment. The principal investigator (PI) described the general objective of the discussion, encouraged participants to speak freely, established neutrality, clarified the reason for the recording, and obtained verbal consent from the participants. Confidentiality issues were also addressed. The researcher put the participants at ease and made them feel comfortable. He took a non-expert position, built rapport, encouraged participants to think more about issues, and probed to clarify responses. At the end of the session, he would summarise and recap the group themes for 10 minutes. Participants were also given opportunity to add any remaining ideas and relevant comments before the researcher closed the session.

### 3.17 QUALITATIVE DATA ANALYSIS

Qualitative data analysis includes organising, thematizing and coding the data, and framing the interpreting the data (Creswell, & Poth, 2018:248). The main reason for data analysis is to sort out, give structure to, and draw meaning from data. In a qualitative study, data collection and data analysis often occur simultaneously which is different from the process of quantitative data analysis. The analysis of a topic, idea or theme starts from the inception of the data collection (Polit, & Beck, 2017:748). Qualitative data include perceptions, transcripts from accounts or meetings, the researcher's notes of different elements of the research process and notes taken while perusing and contemplating records (Burns, & Grove's, 2017:427).

In this study, the researcher and research assistant reviewed the data to identify underlying concepts and clusters of concepts. Qualitative data analysis is a reductionist process where by information is reduced through a coding process into identifiable units of meaning (Polit, & Beck, 2017:749).

In this study, qualitative data analysis started with data collection, field notes, voice recordings and debriefing. The transcription of verbal information into written data is characteristic of qualitative data analysis (Burns, & Grove's, 2017:427) and the verbatim transcription of recordings is a basic step in preparing for research analysis (Polit, & Beck, 2017:749), The researcher and research assistant carefully transcribed the data to ensure data quality. Coding is a method of naming, marking or labelling, and an arrangement of data components, which enables the researcher to discover themes and patterns (Burns, & Grove's, 2017: 431).

The process of research analysis is described by Creswell and Creswell (2018:194) as crude data collection (transcript, field notes), the organisation of data, reading through the data and creating data codes, conceptualising themes and portraying the significance of the themes. In this study, data analysis included preparing and sorting

through data, reducing the data to different themes coding, reducing the number of codes and finally displaying the data in tables and in detail (Creswell, & Poth, 2018:251).

The principal investigator employed the Tesch open thematic analysis method (cited by Creswell, & Creswell, 2018:196) which articulates the 8 steps in the coding process as follows:

1. Read through the data carefully.
2. Select one document that stands out, is it the shortest, and is it on the top of the pile and ask, "What is this about"? And write topics down in the margin of the document.
3. Write a list of entirely the themes and group related themes together in table.
4. Write the codes next to the topics.
5. Describe the themes and reduce them to grouping together topics relating to each other.
6. Make a final decision on the abbreviation of the separate groups/categories and then arrange the subthemes (codes) in alphabetical order.
7. Group the data in each category together and perform a preliminary analysis.
8. Recode the existing data if necessary.

### 3.18 ACADEMIC RIGOR OF QUALITATIVE DATA

#### 3.18.1 Trustworthiness

Lincoln and Guba (1985:200), Denzin and Lincoln (2018:370), Streubert & Carpenter (2011:93), and Brink, van der Walt and Rensburg (2018:157-160) describes the criteria for trustworthiness as confirmability, transferability, dependability and credibility. The criteria for trustworthiness are described in more detail below:

##### 3.18.1.1 Credibility

Credibility is the trust in the evidence and translations of the findings (Polit, & Beck, 2018:415; Brink, Van der Walt, & Rensburg, 2018:157; Streubert & Carpenter, 2011:316). The researcher employed the following methods to ensure credibility: prolonged engagement at field level, triangulated the data, conducted a negative cases analysis, did peer debriefings, and checked off the research participants.

A prolonged engagement in the field is appropriate for an in-depth understanding of the way of life, language, culture, or opinions of the research participants (Polit, & Beck, 2018:418; Yin, 2016:86; Creswell, 2014:251; Brink, Van der Walt & Rensburg, 2018:111; and Creswell, & Polit, 2018:340). In present investigation, the principal investigator consumed extensive period in the field in both pastoralist and agrarian communities to better understand the nutritional taboos of pregnant women, the culture of the communities, the experiences of under nutrition, the food security phenomena, features of the study participants, and the research sites, and to develop an in-depth understanding of general phenomena. The researcher also employed observation as a data collection method.

Triangulation refers to the use of multiple method to collect data on the same topic as a way to validate the research (Polit, & Beck, 2018:419; Creswell, and Poth, 2018:340; Yin, 2016:87; Creswell, 2014:251; Creswell, & Creswell, 2018:200; Flick, 2014:339). In this study, the researcher used triangulation by collecting data on the same themes using both in-depth interviews with district health program managers, health centre directors, hospital chief executive officers and zonal experts and focus group discussions with pregnant women from five districts. This strategy assisted the researcher to collect data up to the point of data saturation.

Data were collected using audio recording and field notes with the consent of the participants. The researcher compensated the weak points of one method with another, there by strengthening the research. Furthermore, the researcher collected an adequate amount of data (indepth interview & FGD). During the interviews and discussion sessions the researcher looked for contradictory evidence in different contexts. The

researcher analysed the negative cases and weighted the positive evidence, for example, participants from the low land commented that “food insecurity was more prevalent and common in low land” whereas participants from the high land recorded that “food insecurity was less prevalent in my area”. The participants of the focus groups from Dasenech, B/tsemay and Turmi further mentioned that under nutrition among pregnant women were more dominant. The focus group participants in South Ari, again, stated that under nutrition was less common in their community.

The researcher also did peer debriefing through regular face-to-face sessions to increase the trustworthiness of the findings. A researcher who was more experienced in qualitative research methods reviewed the findings of the researcher (Polit, & Beck, 2018:422; Creswell, and Poth, 2018:343; Creswell, 2014:252). The principal investigator presented the expert with a draft report of the data that have been collected, sub-themes, themes and category; and the interpreted findings and discussed the report with him during a few face-to-face sessions. The expert compared the analysed data with the voice recordings to assess whether the data depicted the phenomenon correctly; whether key themes were identified; whether the factual and analysed data were free of errors; whether there is any evidence of bias from the researcher; whether there were any significant mistakes in the report and considered the appropriate approaches to correct these mistakes (Polit, & Beck, 2018:423).

Member checking were conducted to ascertain if the findings were accurate or not. After the data collection was completed, the researchers asked the participants to comment on the findings. The researcher collected these comments from the participants. Research participants ought to have a chance to evaluate and check trustworthiness whether the findings are a good representations of their realities or not (Polit, & Beck, 2018:420; Creswell, 2014:251; Creswell, & Poth, 2018:341, Creswell, & Creswell, 2018:200; and Creswell, 2014:251). After the qualitative data were analysed and interpreted, the researcher sent the draft report to participants and also presented to the focus groups who confirmed that the themes developed, and the findings did relate to their lived experiences.

### 3.18.1.2 Dependability

Brink, Van der Walt, and Rensburg (2018: 159), and Polit and Beck (2018:416) describe reliability as the consistency of information over time and settings. The result is reliable if the study results would be the same, the study should be conducted with participants that are comparable to the research participants in similar setting to the study. An external evaluator who is unfamiliar with the researcher and the study can assess reliability (Creswell, 2014:252; Creswell, & Poth, 2018:342). In this study, the researcher considered an external evaluator to evaluate the study process and findings. The evaluator investigated the different sections of the study including transcriptions, coding or category, the relationship between the data collected and the research questions and, the data interpretation.

### 3.18.1.3 Confirmability

Confirmability refers to the qualitative investigator's comparable concern of precision, significance, meaning, and relevance of the data, (Brink, Van der Walt, & Rensburg, 2018:159; Polit, & Beck, 2018:416) and the level of confidence that the findings relate to the participants' narratives.

In order to ensure confirmability, the researcher considered reflexivity, triangulation, and evaluation strategies throughout the research process from inception, data collection, data analysis to the report of findings.

The raw data, transcripts of the interviews, field notes, themes, codes used for the qualitative data, interview guides and the analysis were available. Triangulation, as already described, corroborated the findings.

### 3.18.1.4 Transferability

Qualitative research is not concerned about generalisability (Polit, & Beck, 2018:426) but considers the applicability of the outcomes in other locations and contexts and the portrayal of the participants and setting in sufficient detail. Polit and Beck (2018:424)

describes a thick description as a rich, point by point, detailed, and intense description of the research context, the study participants, and events and experiences detected during the inquiry. Creswell (2014:251); Creswell & Creswell (2018:200); and Creswell & Poth (2018: 343) further described a thick description as an element of collective practices. In the present investigation, the investigator delivered an exhaustive explanation and discussion of the study context, themes and findings.

#### 3.18.1.5 Authenticity

Authenticity relates to the reasonable and dependable relation of events and a real representation of the lived experiences of the participants. A transcript is authentic if it invites readers to feel the experiences of the research participants and allows researchers to increasingly develop feelings to the issue presented (Polit, & Beck, 2018:416).

### 3.19 PHASES 3: MODEL DEVELOPMENT PROCESS

In the model development phase, the principal investigator applied the theory generation process of Chinn and Kramer (2011:185). Different ideas were examined; a concept was selected; all uses of the concept were explored; different attributes were defined; a model case was designed; contrary cases were considered; consequences and antecedents were distinguished, and also empirical referents were outlined (Walker, & Avant, 2013:165). The development of a community-based model for the prevention of under nutritional status among pregnant women was based on six features of activity namely Recipient, Agent, Context, Outcome, Protocol, and Dynamics (Dick Off, James, & Wiedenbach, 1968:422).

The main aim of this phase was to respond to the research question and purpose of this study. The researcher used the theory generation process of Chinn and Kramer (2011:185) for model development. Walker and Avant (2013: 165) suggested eight very important steps for concept analysis as depicted in figure 3.3.

These steps include the selection of a concept; determining the purpose and aims; identifying applications of the concept; determining the defining attributes; identifying a model case and contrary cases; identifying antecedents and consequences; and defining empirical referents.

The development of a community-based model for the prevention of under nutritional status among pregnant women is based on six components described in the literature review (Dick off, James, & Wiedenbach, 1968:422), including the agent, recipient, context, outcomes, procedure, and dynamics. A critical reflection method was used to evaluate the model using criteria proposed by Chinn and Kramer (2011:197) relating to clarity, simplicity, generalizability, accessibility and the importance of the model. The researcher sent the proposed model electronically to senior experts (See annex N) including professors from academic institutions with experience in model development, senior nutrition specialists, program managers, policy advisers in the ministry of health, local nutrition program practitioners, nutrition consultants, medical doctors, health officials, and nurses from local clinics invited to comment and add their inputs on the proposal. The figure 3.3 have shown, six aspects of activity and 8 steps of concept analysis.



Figure 3. 3: Concept analysis steps and Model development process

### 3.20 RESEARCH ETHICS CONSIDERATIONS

Ethics are the standards and strategies that help us and the things we honour (Johnson, & Christensen, 2014:192). Research ethics, however, is a set of values established to guide and support researchers in leading ethical investigations (Johnson, & Christensen, 2014:194). The word “ethics” is generally related with goodness (Babbie, 2013:32).

The current study was conducted with human subjects. The researcher employed ethics principles and guideline proposed by Johnson and Christensen (2014:192) and Burns and Grove’s (2017:111) to minimise harm to the subjects

In accordance with the Belmont report (National Commission, 1979; UNISA, 2016:11: FDRE, 2014:21; Babbie, 2016:63 and CIOMS, 2008:14) key ethical principles refer to the respect for persons; beneficence/non-maleficence and justice. This study was conducted based on these ethical principles.

#### 3.20.1 Respect for Person

Respect for human dignity is one of the vital ethical principles of the Belmont Report. Polit and Beck (2018:136) outlined the two areas of human dignity as the privilege to self-assurance and the privilege to complete honesty.

##### 3.20.1.1 Permission letter for study

Ethical approval was secured from the Ethics and Higher Degrees Committee of UNISA (Annex A) and the UNISA Ethiopia office provided the researcher with a letter of support for the study (Annex B). A permission letter was secured from the Regional Health Bureau (Annex D) and the South Omo zone health department, respectively (Annex E).

The permission letters articulate the details of the community-based research study; the purpose and objectives of the study, the risks and benefits to the participants; explained the roles and responsibilities of the study respondents and ensured informed consent. The individuals who were not interested to participate were given the right to do so. The confidentiality of the respondents was ensured. Ethical principles were protected, and information was provided to the respondents in their local language. Confidentiality of the data was preserved throughout the study.

#### 3.20.1.2 Autonomy

Study respondents must have the free will to decide willingly and voluntarily whether to take part in a study without the risk of harmful activity, and have the option to direct inquiries, discard reacting inquiries, and drop out of the investigation without the fear of intimidation (Polit, & Beck, 2018:136; Rosentein, 2019:24). Study respondents must be able to execute free will to act willingly and autonomously. These are critical elements of the ethical principle of respect for persons (FDRE, 2014: National commission, 1979).

The Declaration of Helsinki (World Medical Association, 2000:373) posits that the study respondents must be willing, educated and voluntary respondents in the research study. Human research subjects should be protected from bodily, mental, and social harm and the privilege of human subjects on their own perspectives and choices should be respected (FDRE, 2014:21). Privacy is ensured through autonomy (Johnson, & Christensen, 2014: 211). It is a method for guarding classification and secrecy and is ensured when the investigator protects the privacy of participants (Polit, & Beck, 2018:140).

#### 3.20.1.3 Informed consent

Informed consent must be recorded as a hard copy and signed or verbally confirmed by the research participant (FDRE, 2014:21). Informed consent serves as a confirmation of a research respondent to take part in a study after being informed of the motivation, strategies, risk, benefits, research methods, and strategy for protecting privacy

(Johnson, & Christensen, 2014: 201). Informed consent is an ethical principle and refers to the contribution of respondents in the absence of harm. Investigators are expected to give respondents the opportunity to offer their free and informed consent to take part in a study (CIOMS, 2016:33). Informed consent implies that respondents have sufficient information about the study, understands the study, and are assured of the importance of their unrestricted decision. Respondents are to be empowered to agree wilfully to participation or non-participation (Polit, & Beck, 2018:139).

The researcher provided information to the respondents on the purpose of the research, the study objectives, benefits, risks, confidentiality, and the right of respondents to withdraw from the study at any time. The respondents are also empowered to ask questions about the research before data collection but also any time during the study. The research respondents were accordingly asked to sign a written consent form (see Annex G).

In this investigation, information was provided to the study respondents about their privilege (right) to request information at any time, to opt out of the study at any time, to fully understand the study procedure, and to ensure complete, voluntary participation in the study. The respondents were assured that there would be no consequence from not participating in the study and that there were no incentives/ rewards for those who took part in the study.

#### 3.20.1.4 Privacy and confidentiality

Researchers must protect the confidentiality of research respondents and secure their safety at all times. The respondents may reasonably assume that any information shared by them will be kept confidential (Polit, & Beck, 2018:137; Rosenstein, 2019 :24).

The researcher vows to respect and protect the privacy of research respondents even though they can distinguish between the individual responses (Babbie, 2016:65). The study respondents have the right to foresee that the information they provide will be

kept private (Polit, & Beck, 2018:140). Confidentiality means not disclosing the identity of the respondents to any body other than the investigator (Johnson, & Christensen, 2014: 212). An exploratory study confirms confidentiality when the researcher is able to recognise an individual's responses yet vows not to do so openly (Babbie, 2013:36). The researcher promised to keep any data from study respondents confidential, and to keep the data confidential after data collection.

#### 3.20.1.5 Disclosure

Complete honesty means that the researcher has fully disclosed all the information about the study, the risks and advantages of the study to the participants, and the participants' entitlement to choose not to participate in the study (Polit, & Beck, 2018:136). Research participants have given the privilege to pull out from an investigation at any time (Johnson, & Christensen, 2014:210). In the present investigation, clearly offered data on the benefit, risk, and have the right to stop whenever in this investigation.

#### 3.20.2 Beneficence

The research respondents must not be hurt by the study and should ideally benefit from the study (FDRE, 2014:21; Belmont Report (National Commission, 1979). No maleficence/evil or injury should be inflicted on others (Johnson, & Christensen, 2014: 201) an every-body should work to the advantage of others (Johnson, & Christensen, 2014: 201). The ethical principle of beneficence alludes to the duty of medical service suppliers and health investigators to act in a way that advantage the health and well-being of study participants in systematic studies (National Commission, 1979).

#### 3.20.3 Justice

The right to fair conduct is one of the key ethical principles of the Belmont report and refers to two concepts: the privilege to reasonable conduct and the privilege to security (National Commission, 1979; FDRE, 2014: 21). It requires that the advantage and

weighting of the research will be mutually beneficial. The study respondents were selected based on the research objectives and not on people's susceptibilities (Polit, & Beck, 2018:137). The Belmont report posits that the weights and benefits of the research ought to be shared fairly between the study respondents (National Commission,1979). Equity and fairness towards reach participants are key principles (FDRE, 2014:21).

The ethical principle of equity is directly connected to issues of likeness and justice in determining who receives the advantages and who endures the weights of biomedical research (FDRE, 2014,& UNISA, 2016).

The research advantages and disadvantages should be reasonably shared with the respondents (CIOMS, 2016:8). The researcher treated the study respondents who declined to participate in the study without any harm, honoured the consent of study respondents, and respected both pastoralist and agrarian respondents.

There is a requirement to increase the benefit to individual respondents and/or community, while reducing risk or injury or both (FDRE, 2014:21). The researcher explained the benefits and risk of the study to the research respondents more in detail.

### 3.21 DATA MANAGEMENT

Before hand, data analysis was done; quantitative information was gathered house to house, by using standardized, structured, pretested questionnaires. During the data collection period, data were checked daily within the field by supervisors and the researcher. After the field data collection process was completed, information was entered into SPSS version 25 and followed by coding of the data which included assigning numerical codes for separate answers and highlighting missing values. The researcher also prepared a code book that was used as a guide to describe the location of variables and specify the code assignments of the values. The researcher used a common data cleaning process: Simple frequency run to observe values entered to each variable and counter checked with hard copies. Sorting: used ascending and

descending data sorting mechanisms: checked with hard copy. As most scholars agree, before starting data analysis, it is important to do data checks. So, here, the researcher used commonly advisable data checks suggested by Kothari, and Garg (2019: 124) and Bowling (2014:356). This included verifying the accuracy of data, checking outliers and handling missing values. For ensuring accuracy of the data: questionnaires were checked manually during the data entry session. Information was captured on two computers which were later cross-matched and compared to detect data entry errors.

Checking outliers: After data entry was completed, data errors were resolved. Handling missing values: The researcher and assistant checked missing values in questionnaires. These were primarily due to study respondents refusals or withdrawal from the study and/or their inability to answer the posed questions.

With respect to descriptive analysis, mean, standard deviation, range, median, minimum, maximum and bar, pie graph, and charts were presented.

### 3.22 LIMITATIONS OF THE RESEARCH STUDY

The research study was conducted in rural communities at kebele level (the smallest administration unit in Ethiopia). The study used mixed method design both quantitative and qualitative approaches. Quantitative approach was used to identify contributing factors for under nutrition, food insecurity, and anaemia in pregnant women. Qualitative methods were used to explore cultural/social and behavioural practices regarding nutritional status in pregnant women. A community-based model was developed to prevent for under nutrition practice among pregnant women in southern Ethiopia.

In this study, pregnant women's dietary diversity was assessed by using 24-hour recall, and household food security was assessed by using the last 30 days as a reference. These responses are purely based on pregnant women's and household's memory and capacity to recall their previous diet consumption. However, majority of the pregnant women from the study area were illiterate. Therefore, they might not have remembered their nutrient intake.

Data regarding pregnant women's dietary diversity and household food security measurement were collected at the same time. However, the study did not measure the effect of seasonal differences in household food insecurity measurement scale(HFI) and women's nutritional status. The current investigation was conducted in rural communities among pregnant women with an extensive variety of socio-economic, health, and diet related characteristics. The present study findings are valid for pregnant women in rural communities only.

### 3.23 CONCLUSION

In this chapter of the study, the researcher presented detailed explanations of research methodology including research paradigm, research design, the three different study phases; Phase 1: Quantitative phase, the research study setting, population, sampling method and sample size, quantitative data collection process, household wealth index, validity and reliability of data collection instruments, pilot study, quantitative data analysis; Phase 2: Qualitative phase, qualitative sampling method and sample size, qualitative data collection process, qualitative data analysis, academic rigor and trustworthiness of qualitative data; Phase 3: Model development process, research ethics considerations. This chapter also presented data management and limitations of the study.

These investigation plan and technique facilitated the principal investigator to explain, describe and explore enough evidence regarding food insecurity, under nutrition and anaemia among pregnant women at randomly selected five rural districts, South omo zone, Southern, Nation Nationality People Region, Ethiopia. Due to this, the study's quantitative phase results and qualitative phase findings assisted researcher to develop community-based model for prevention of under nutritional status among pregnant women. Chapter 4 will be presenting the methods of descriptive measures and quantitative phase results, that will be presented separately from the qualitative phase findings that will be presented in Chapter 5.

## **CHAPTER 4: PRESENTATION OF THE METHODS OF DESCRIPTIVE MEASURES AND QUANTITATIVE PHASE RESULTS**

### **4.1 INTRODUCTION**

The researcher conducted this research study in South Omo Zone, Ethiopia among five rural districts. In the current study, quantitative and qualitative data were collected sequentially to address the research study objectives:

- Determine the prevalence of food insecurity at household level in Southern Ethiopia.
- Identify factors contributing to food insecurity at household level in Southern Ethiopia.
- Examine the magnitude of under nutrition among pregnant women in Southern Ethiopia.
- Determine factors contributing to under nutritional status among pregnant women in Southern Ethiopia
- Assess the prevalence of anaemia among pregnant women in Southern Ethiopia.
- Determine causative factors contributing to anaemia among pregnant women in Southern Ethiopia.
- Develop a community-based prevention model for under nutritional status among pregnant women.

In the quantitative phase, data was collected from house to house within the community via eye to eye meetings with study respondents who were pregnant women aged 15 to 49 years, from 20 May – 30 June, 2019.

This chapter presents detailed analysis of descriptive statistics like mean, median, standard deviation, variance, range, minimum, and maximum values. Applied inferential statistics via logistic regression, bivariate logistic regression and multivariate analysis,

were carried out to look at relationship among factors and outcome variables. Chapter 4 presents the results of the quantitative phase, according to the structured questionnaire's, to collect quantitative data thirteen (13) sections as outlined in annex G (see page number 301).

With respect to descriptive analysis, mean, standard division, range, median, minimum, maximum and bar, pie graph, and charts were presented

#### 4.1.1 Statistical methods for analysis

The chi-squared ( $\chi^2$ ) test measurement was utilized in the research study. The chi-squared test (Pearson's  $\chi^2$ ) was used to test for relationships between categorical factors as suggested by Kothari and Garg( 2019:235), and further testing was done by means of one way ANOVA(Kothari & Garg,2019: 261) and correlations checked via continuous variable testing ( Haemoglobin, and MUAC).

#### 4.1.2 Logistic regression Model

During bivariate analysis, crude associations were tested among single predictors and outcomes were tested for existence of relationships. After associated factors were identified, the researcher then proceeded with multivariate model analysis, to control for alternative effects and thus assess the level of confounding, mediating and interacting effect. In multivariate analysis, two or more predictors and an outcome are tested for presence of an association and their individual main effect.

With regard to model appropriateness, model fitness was evaluated using Hosmer-Lemeshow statistic. To sum up, the yields of the logistic regression model like bivariate and multivariate analysis were presented by crude odds ratio and adjusted odds ratio along with 95% confidence interval. Moreover, as Polit and Beck (2017:106) suggest,

cut-off point for p-value (less than 0.05) were utilized to declare significant association with independent variables.

## 4.2 DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

As mentioned in the method section, collected data from three (3) ecological zones, Low land, mid land and high land, respondents were 49%, 18.1% and 32.8, respectively. A total of 511 study subjects were carefully selected for sample, of which, 469 pregnant women successfully completed the questionnaire voluntarily, yielding a response rate of 92.0%. Twenty-five (25) other pregnant women did not agree to offer blood samples, and 17 pregnant women's data was incomplete, and removed from analysis.

Respondent's age, initial marital age, marital status, ethnic groups, religion, pregnant women's education, partner's education, respondent's occupation, family size, partner's occupation was presented below in detail.

### 4.2.1 Age of respondents

Table 1 have shown that the mean ( $\pm$ SD) age of the research respondent's were  $27.4 \pm 4.9$  with minimum and maximum ages of 15 and 42 years old, respectively, more than half, 52%(246) the pregnant women in the age range of 24-30 years, and 26.2%(123) were from the 15-24 year range, and others, 21.3% (100) in the age range of more than 30 years old.

### 4.2.2 Initial marital age

Table 1 have shown, the median initial marital age was 18.0, mean $\pm$ (SD), for the 1<sup>st</sup> marriage was  $18.31 \pm 1.88$  and a range with a minimum value of 14 and a maximum age value of 24 years, respectively. Similarly, SD $\pm$ mean age of the initial birth were  $1.8 \pm 19.75$ , with a median age of 20 years.

#### 4.2.3 Marital status

Regarding the marital status, a high percentage of the respondents, 96.2%(n=451),of the pregnant women were married, and for the rest, a small proportion of respondents, 2.6%(n=12), 0.4%(n=2) and 0.9%(n=4) were single, divorced and widowed, respectively.

#### 4.2.4 Ethnic groups

In this study area, more than 16 ethnic groups are living peacefully in cultural diverse settings. Concerning the particular respondents, more than a quarter, 26% (n=124) were Hammer, 23.7%(n=111) were Malle, 22.6%(n=106) were Dasench, 19.4%(n=91) were Beny and Tsemay, whereas, the remaining ,7.9%(n=37) were other ethnic groups (like Ari, Gamo & Kori)(Table 1).

#### 4.2.5 Religion

Nearly, half, 46.1% (n=216) the pregnant women were cultural religion followers, more than one third, 36% (n=172) were protestant followers, small proportion of the respondents, 8.7% (n=41) Orthodox Christian, and the rest, 8.5% (n=40) of the respondents were Muslim religion followers (Table 1).

#### 4.2.6 Pregnant women's education

Concerning pregnant women's education, the mean standard deviation (SD+mean) for level of education attended was 1.26( $\pm$ 2.77). A very large proportion, 78%(n=366) of the pregnant women were illiterate,16.8%( n=78) the research respondents had attained grade 1-8 level, 3.6%(n=17) the study respondents had attended grade 9-12, whereas, less than 1%, 0.6%(n=3) had attained tertiary level, and 1.1%(n=5) respondents were unable to read and write,in other wards, a majority, 79% (n=371) of respondents had no

formal education, whereas the rest, 20.9% (n=98) of the pregnant women attended formal education at school (Table 1).

#### 4.2.7 Partner's education

Seventy-six per cent of the partner's education were illiterate; and a only small proportion, 15.5% (n=2) had attended grades ranging from grade 1 to grade 8; 5.2% (24) had attended grade ranges between grades 9-12, only 1.7% (n=8) attended tertiary level and the rest 0.9% (4) were able write and read only. In general speaking, a majority partner's education, 77% (n=161) had no formal education, whereas, only, 22.4% (104) attended formal education (Table 1).

#### 4.2.8 Respondent's occupation

Regarding the pregnant women's occupation, a high percentage of study participants, 82.5% (n=387) were housewives, 8.7% (n=41) were pastoralists, 6% (n=28) were farmers and, the rest 2.8% (n=13) represented the 'other' category (for example, merchants 1.5%; employee 1.3%) (Table 1).

#### 4.2.9 Family size

In Ethiopia, the mean, family size was 4.9 children among currently married individuals (CSA, 2016:13). In this study; the mean ( $\pm$ SD) of the family size was 4.7(+2.7). More than half, 51.2% (n=240), of the respondent's, family composition's had 4-6 children, 31.6% (n=148) had 1-3 family members and the rest 17.3% (n=81) had more than six within their family composition (Table 1).

#### 4.2.10 Partner's occupation

Nearly, 50% (n=229) of the partners were working within pastoralist occupations, 37.8% (n=176) were in farming, 6.5% (n=30) were working as merchants, 3.4% (n=16) were

working as undesignated employees, and the rest, 1.9% (n=9) indicated that they worked as day labourers (Table 1).

Concerning their residency, a very large number, 99.6% (n= 466) pregnant women were living within rural communities.

Table 4.1: Demographic characteristics of pregnant women presented in community of South Omo Zone, Southern, Ethiopia, 2019.

Variable	Frequency	Per cent
Age(n=469)		
15-24year	123	26.2
24-30year	246	52.5
>30year	100	21.3
Marital status(n=469)		
Single	12	2.6
Married	451	96.2
Divorced	2	0.4
Widowed	4	0.9
Ethnicity(n=469)		
Malle	111	23.7
Benytsemay	91	19.4
Hammer	124	26.4
Dasenech	106	22.6
Other	37	7.9
Religion(n=469)		
Protestant	172	36.7
Orthodox	41	8.7
Muslim	40	8.5
Cultural religion	216	46.1
Education status PW(n=469)		

No formal education	371	79.1
Formal school attended	98	20.9
PW Occupation(n=469)		
Housewife	387	82.5
Farmer	28	6
Pastoralist	41	8.7
Other	13	2.8
Family Size(n=469)		
1-3 member	148	31.6
4-6member	240	51.2
>6member	81	17.3
Spouse education(n=465)		
No formal education	361	77.6
Formal school attended	104	22.4
Spouse occupation (n=465)		
Farmer	176	37.8
Pastoralist	229	49.2
Other	60	12.9

#### 4.3 HOUSEHOLD WEALTH STATUS

Assessed household living standards and asset ownership included looking at the following variables within the questionnaire i.e. quality of housing, well-springs or portable water, type of sanitation facility, ownership of livestock, ownership of land, material of dwelling floor, material of the roof, material of the walls, fuel used for cooking, electricity, radio, television, refrigerator, bicycle, motorcycle/bajaj, animal-drawn cart, car/truck, and other basic property based aspects

The wealth index is a composite measure of household cumulative living standards. The score was derived by using main factor analysis (PCA), then computing the value, and

ranking each household. Finally, the researcher used the wealth index to ensure that all households were partitioned into quintiles, each containing a comparable quantity of persons.

Figure 4.1 below showed that, only a small proportion, 36% of the households had access to drinking water whereas, the rest, 60.8% had not. On other hand, a greater proportion of the respondents, 51% (n= 238) had no toilet facility, and made open defecation within fields.

Regarding the means of transportation used, had no car (0%), motorcycle 3.6% (n=15), animal drawn transport 0.2% (n=1). With respect to the respondent's house condition, 16.2% (n=76) had a cement and/or proper floor, and the rest, 83.8% (n=393) had no floor. Notably, 16.8% (n=79) had houses with a roof; 78.5% (n=368) of the houses were walled. About 28% of the houses had separated kitchen area, whereas, the rest 71.9 % (n=337) had no separated kitchen.

Regarding house light, majority, 55.8% (n=184) of the repondents had keresone lamp for light in rural house, where as, 3% (n=14)of the respondents had of electriccity. About, 62.3% (n=259) of the respondents had mobile phone for communications, where as only, 0.7% of the respondents had non mobile phone in the house. Moreover, 25%(n=104) of respondents had a table chair in the house, 13.5% of the respondents had a radio, 12%(n= 50)of the respondents had a watch /clock, 8.7% of the respondents had bed with cotton, only,1.7%(n=7) of the respondents had television,morte than half, 54.6%(n=227) had gun to keep their cattles and only, 0.7% of the respondents had a referagerator(Table 4.1).This finding imply that there was a lower economic status in the study area, so, it needs government as well as non government organization attention for economic intervention particularly in pastoralist community.

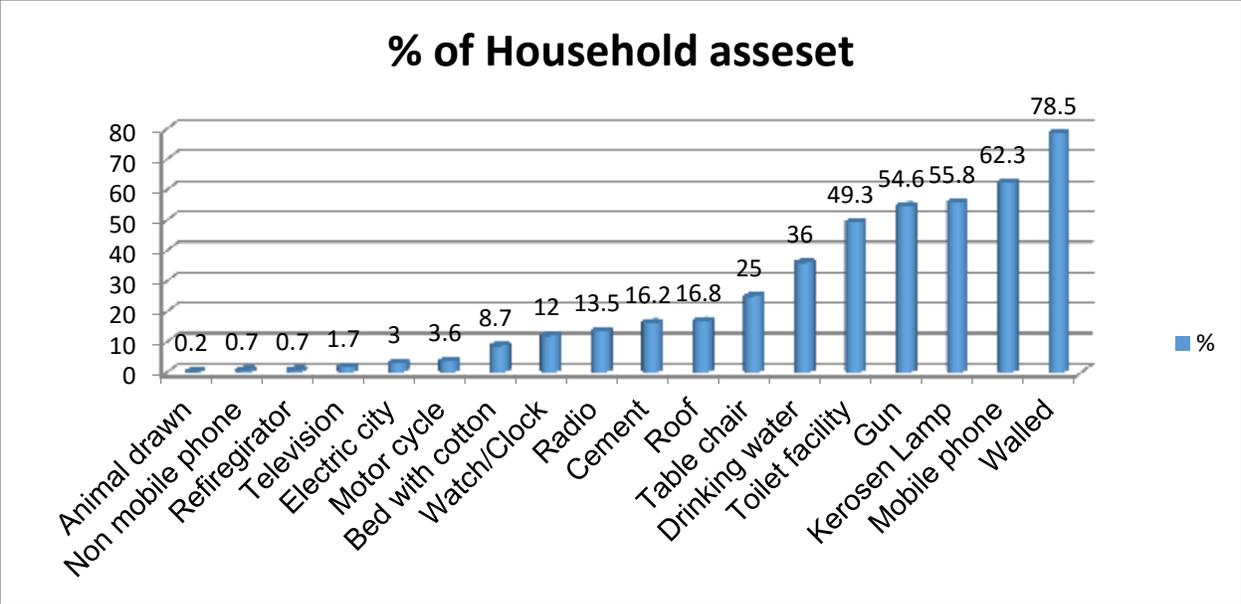


Figure 4.1: Household assets and facility possessions characteristic in rural community, south omo zone, SNNPR, 2019

4.3.1 Economic characteristics

Table 4.2 shows agricultural land possessions, majority, 88.7% (n=416) of the respondent’s had own agricultural land, whereas the rest 11.3% (n=53) of the respondent’s had no any agricultural land. Regarding agricultural land size, nearly half, 41.2% (n=193) of the respondent’s had 2-3 hectare of land, 39.3% (n=184) of the respondent’s had 2-3hectare land and the rest of 19.4% (n=91) of the respondent’s had 4-8 hectare land. Even though they had large proportion of land, it lacks fertility for productions. Concerning productions, majority, 77.2% (n=362) of the respondent’s land grow maize and sorghum in traditional way even if it lack productivity, where as, 15.8% (n=74) of the respondent’s land unable to produce crops because some of the respondents had no land and the rest of them had very small land for farming.

About, 23.5% (n=110) of the respondent’s food sources were purchased, 35.2% (n=165) of the respondent’s food sources were own production and the rest, 16.4%

(n=77) of the respondent's had food aid and safety net. As this respondent finding indicated that, there is large land they have but lost fertility for production, due to this significant proportion of respondents purchased food to survive.

Table 4.2: Economic characteristic of pregnant women in community of south omo zone, Southern, Ethiopia, 2019

Variable	Frequency	Per cent
Own any agricultural land		
No	53	11.3
Yes	416	88.7
Agricultural land hectare		
<1hectare land	184	39.3
2-3hectare land	193	41.2
4-8hectare land	91	19.4
Grow land		
No	74	15.8
Crops maize & sorghum	362	77.2
Produce more than two	33	7
Food sources		
Purchased	110	23.5
Own production	165	35.2
Food aid & safety net	77	16.4
Other	117	24.9

#### 4.4 OBSTETRICS AND HEALTH SERVICE-RELATED CHARACTERISTICS

##### 4.4.1 Obstetrics characteristics

Figure 4.2 shows, about, 13.2 % (n=62) of the pregnant women had not visited ante natal care (ANC) until this study was conducted. The mean ( $\pm$ SD) of pregnant women was  $3.5\pm 2$ , 37.1% (n=174) of the respondent's had been pregnant, in the range of 1-2

pregnancies, 35%(n=161) had been pregnant in the range of 3-4 pregnancies, and more than a quarter, 27.9%(n=131) of the respondent's had been pregnant more than four times.

Table 4.3 shows about, 15.4 % (n=72) of woman were initial pregnant or had their first pregnancy. The mean value ( $\pm$ SD) of parity was 2.4+(1.9). Nearly half, 41.4% (n=194) of the pregnant women had number of live children in range of 1-2; more than a quarter, 28.8% (n=135) of the respondent's had 3-4 live children, and the rest 14.5% (n=68) of the pregnant women had more than four live children. Likewise, one third, 33.9% (n=159) of the pregnant women measured the progression/ duration of a pregnancy by considering the start of the lady's past menstrual period (LMP). Here a majority, 45.4%(n=213) of the respondets were in the gestational age of gravidity within the 24-32-week range, and the rest twenty percent of the pregnant women had reached more than 32 weeks in terms of gestational age. The mean  $\pm$ (SD) for the gestational age was 27 $\pm$ (6.0).

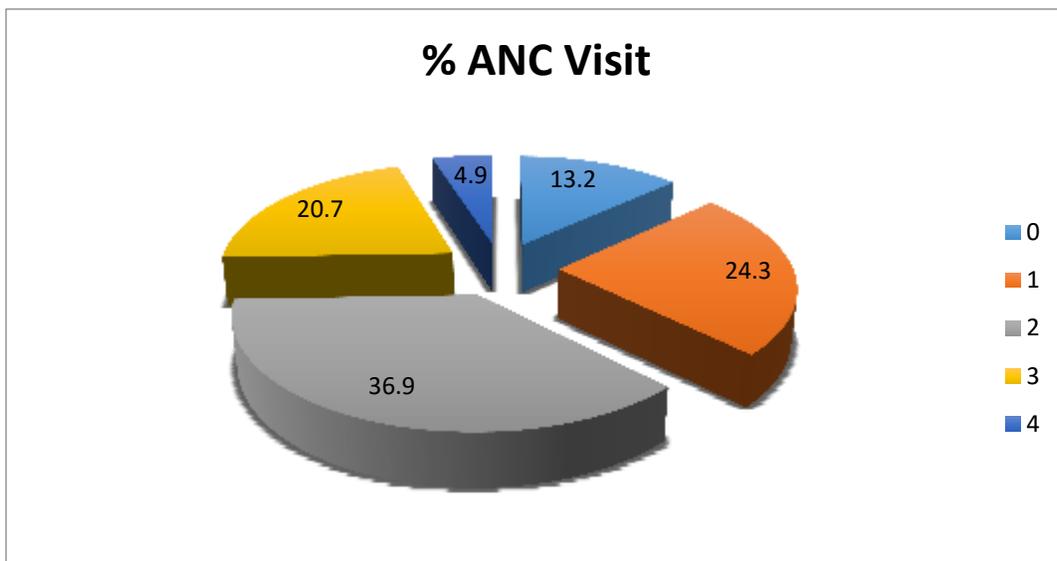


Figure 4.2: Number of ANC Visits at HF level among pregnant women in community of South Omo zone, SNNPR, Ethiopia, 2019

#### 4.4.2 Health service-related characteristics

Table 4.3 shows pregnancy-related nutrition information, only, half, 50.7% (n=238) of the respondent's received nutrition information, whereas, the rest, 46.7% (n=219) did not. The most dominant source for nutritional information was health professionals at 93.9% (n= 232) (like, Nurses, midwives, HO, MD & HEW), 3.2% (n=8), and 2.8(n=7) were family and friends, respectively.

Regarding previous malaria infection history, more than half, 50.7% (n=238) of the respondent's had history of malaria infection in the last 3 months, whereas, 49.3% (n=231) of the respondent's had no previous malaria infection (Table 4.3). Concerning insecticide treated permanent bednet (ITN's) utilization preceding the survey (last night), almost half, 50.7% (n=236) of the respondent's were utilized ITN's last night (preceding the survey), whereas, near to half, 49.7% (n=233) of the respondent's were not utilized ITN's last night (preceding the survey). Malaria infection is common in low land than high land area in Ethiopia. These are similar scenarios in the study area.

#### 4.4.3 Workload comparison

Table 4.3 shows respondent's workload comparison with their family member, half, 49.9% (n=201) of the respondent's had work overload, 48.6%(n=228) of the respondent's had equally workload and the rest, 8.6%(n=40) of the respondent's had under work load than family members. In this study area culturally women's are expected to do farming, children caring, food cooking, shopping food and other materials from market and other, but husbands only expected to keep cattle at field, due to this women were highly affected with workload burden.

Table 4.3: Obstetrics and health care correlated Features among pregnant women in South Omo zone, SNNPR, 2019

Variables	Frequency	Per cent
Gravida(n=469)		
1-2 gravida	174	37.1
3-4 gravida	161	35
>4gravida	131	27.9
Para(n=469)		
0	72	15.4
1-2	194	41.4
3-4	135	28.8
>=4	68	14.5
Gestational age (GA week) (n=469)		
10-24wk	159	33.9
24-32wk	213	45.4
>32wk	97	20.7
Nutritional information(n=469)		
No	219	46.7
Yes	238	50.7
Nutritional-information sources(n=247)		
Health professional	232	93.9
Family	8	3.2
Friends	7	2.8
Infected with malaria (last 3months)		
No	231	49.3
Yes	238	50.7
ITNs used last night (n=469)		
No	233	49.7
Yes	236	50.7

Workload compare with your family member(n=469)		
Under loaded	40	8.6
Equally loaded	228	48.6
Overloaded	201	42.9

#### 4.5 WOMEN'S DIETARY DIVERSITY

Dietary Information on individual food consumption was collected by using the previous 24-hours as a reference period /24-hour recall/. During the fieldwork, data collectors asked the pregnant women the types of foods that they may have eaten the previous day (during the day and at night). The researcher used nine questions to assess women dietary diversity (WDD) score. Based on the assessment, the findings were described in the next paragraph.

Figure 4.3 have shown, only, 25% of the respondent's received starch staples in the day preceding the survey; more than 50% of the respondent's ate dark green leafy vegetables in the preceding 24 hours; whilst the majority of research respondent's, 81.7% did not eat other nutrients rich in vitamin A, like vegetables and fruit during the reference hours; 37.7% of the research respondent's ate fruit and vegetables during the 24 hour period; only 25% of the pregnant women ate organic meat preceding the survey, out of 469 pregnant women, some (16%) study respondent's ate fish. A majority, 80% of the pregnant women did not eat eggs during the preceding day; very few (4.7%) respondents ate nuts, legumes, and seeds in the 24-hour period leading to the investigation. The present investigation was conducted in the pastoralist and agrarian district, and due to this, the majority (64%) of respondents received animal products like milk product in the preceding day before the survey.

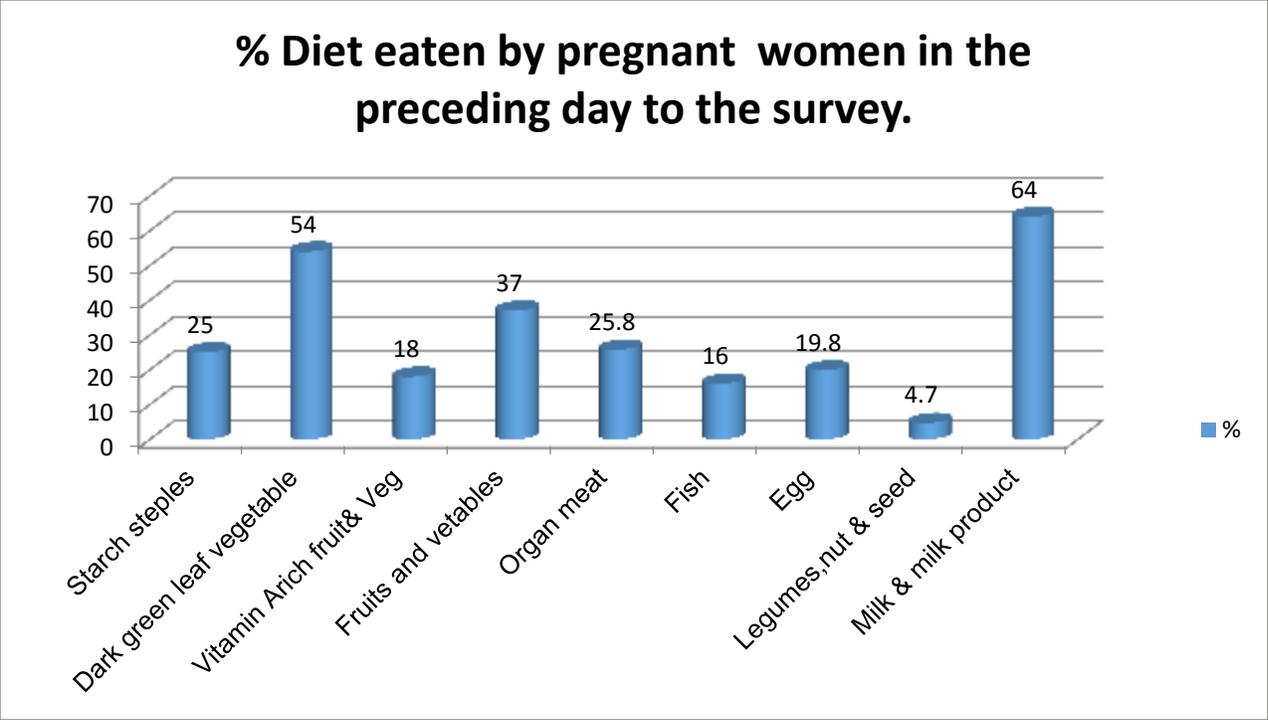


Figure 4.3: Diet ate by pregnant women within 24-hour period in the community of South Omo Zone, SNNPR, 2019.

The sum up of dietary diversity (DDS) was assessed based on nine individual questions. Here, the majority, more than three fourth (77%) of the participants were scored as having low dietary diversity (LDD), where-as, seventeen per cent of the study respondent's scored medium dietary diversity (MDD), and a small proportion, 6% of the research respondents scored high in terms of dietary diversity (HDD) as presnted in Figure 4.4.

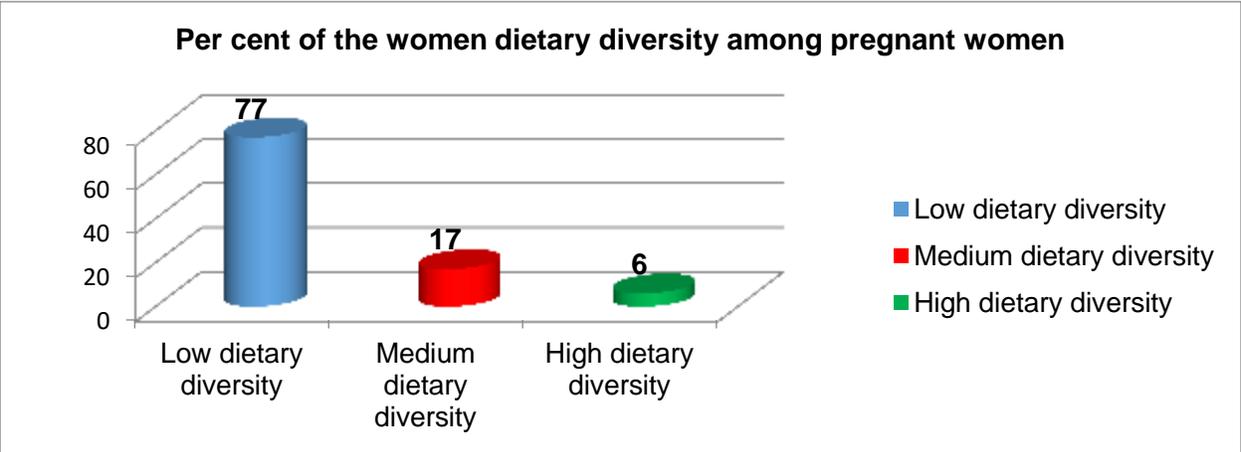


Figure 4.4: Pregnant women dietary diversity score within South Omo Zone, SNNPR, Ethiopia, 2019

#### 4.5.1 Food frequency

The pregnant women's dietary intake pattern was assessed using food frequency questionnaires (FFQ). Out of the total, 2.6% of the research respondents reported that they had never eaten porridge, where-as, 42.6%, 19.6%, and 6.6% of the research respondents indicated that, they ate porridge weekly, monthly and yearly, respectively.

Likewise, the mean (SD) serving of bread was  $2.1 \pm 0.9$ . More than one-third, 38.6% of the respondents mentioned that they had experience of taking bread daily, 43% of the respondents reported eating bread weekly, 8.3% and 0.9 % had taken bread monthly and yearly, respectively, however, significant number, 8.7% of respondents had shown that they had never taken bread as meal.

Similarly, a majority of the respondents, 91.5% had never taken food prepared from "enset", and 35.2% of the respondents also had never taken food made from roots or tubs. Notably, more than one-third, 33.5% of the research respondents had taken vegetables like dark green weekly, 17.4%, 18.1%, and 13.1% were reported as taken daily, monthly, and yearly, respectively. On the contrary, a substantial percent i.e. 17% of the respondents had never taken dark green leaf vegetable. The mean (SD) relating to the serving of dark green leafy vegetable was  $1.1 \pm 0.8$ .

Regarding pregnant women's dietary patterns in relation to fruits, the mean ( $\pm$ SD) frequency in the consumption of fruits like (mango, papaya & other) was  $1.0 \pm 0.8$ . Nearly a quarter, 23.5% of the respondents never consumed fruits, while, 12.4%, 26.4%, 24.7% and 13.0% reported eating fruits daily, weekly, monthly and yearly, respectively. In the same way, flesh meat dietary frequency of the respondents, 38.4% of the research respondents indicated that they had eaten meat once yearly, more than one third, 35.2% of the study respondents had consumed meat every month, while, 4.1%,

and 12.2% had consumed daily and weekly, respectively, whereas, a limited number(10.2%) of respondents had never eaten meat.

The mean ( $\pm$ SD) of meat eating patterns was  $1.1\pm 0.6$ . A majority of 40.5% of the research respondents consumed animal sources / products like milk products at least once weekly, 28% of the research respondents had taken animal products once monthly, while the rest, 17% of the respondents had taken them once daily. Out of the total, only, 6.8% of the study participants had never consumed milk and/or milk products.

Similarly, pregnant women's dietary pattern was measured, the mean ( $\pm$ SD) of dietary intake of fish was  $0.34\pm 0.67$ . A majority, 73.5% of the research respondents were shown to have never consumed fish as a meal, 14% of the study respondents ate fish weekly, and the rest, 8% of the research respondents consumed fish monthly. Concerning dietary patterns related to eggs, nearly half, 41.4% of the research respondents had eaten eggs once monthly, 18.1% of the research respondents had consumed eggs weekly, while the rest, 10.7% of the research respondents informed that they ate eggs once yearly. More than quarter, 25.4% of study respondents indicated that they had never eaten egg. However, 22% of research respondents reported they had a habit of drinking coffee daily, 14.7% of the research respondents had the habit of drinking of coffee weekly, while the rest, more than quarter, 29% of the respondents indicated that they had never drunk coffee.

Concurrently, nearly half, 47.5% of the research respondents were reported as having never consumed snacks between meals and 42% of the study's respondent's had taken snacks between meals once daily. A majority of the respondents, 46.9% had never eaten food made from beans, only, 2.6% of the respondents consumed food made from beans once daily, 5.3%, 19.4%, and 25.8%, weekly, monthly and yearly, respectively. Furthermore, findings showed that ,71.4% of the study respondents had never eaten food made from nuts/ peanuts, 3.6%, 14.7%, 8.5% and 1.7% ate this once daily, monthly, and yearly, respectively, as detailed in Table 4.4.

Table 4.4: Food frequency characteristic of pregnant women in the community of South Omo Zone, SNNPR, 2019

Food item	Medium serving	Daily %	Weekly %	Monthly %	Yearly %	Never %
Porridge/gruel	1.3	28.6	42.6	19.6	6.6	2.6
Bread	1.3	38.6	43.5	8.3	0.9	8.7
Enset food	0.1	1.1	4.4	2.8	0.2	91.5
Enjera prepared from cereal	1.0	4.5	31.1	35.4	6	23
Roots or tubes	0.8	6.2	19.8	21.7	17.1	35.2
Dark green leaf veg	1.1	17.4	33.5	18.1	13.1	17
Pumpkin or yellow/orange	0.7	4.9	19.8	25.2	13.4	36.7
Food made from beans	0.6	2.6	5.3	19.4	25.8	46.9
Nut/peanuts	0.3	3.6	14.7	8.5	1.7	71.4
Frequency of eating fruits (mango, papaya)	1.0	12.4	26.4	24.7	13	23.5
Meat from beef, goat	1.1	4.1	12.2	35.2	38.4	10.2
Milk, cheese	1.2	17	40.5	28.8	6.2	6.8
Meat from chicken	0.5	1.3	1.5	6.2	27.3	63.8
Egg	0.8	4.5	18.1	41.4	10.7	25.4
Fish	0.3	2.1	14.5	8.5	1.5	73.5
Oil, fat or butter	0.8	22	14.7	21.5	12.8	29
Coffee	2.2	87.6	5.8	1.7	0.6	4.3
Snack b/n meals	0.5	42.9	5.3	3.8	0.4	47.5

## 4.6 FOOD INSECURITY

### 4.6.1 Prevalence of household food insecurity

The researcher adapted Coates, Swindale, and Bilinsky (2007:13) structured questionnaires to assess household food security and based on the assessment findings, the mean ( $\pm$ SD) of the food security hunger score at household level was  $4.2\pm 3.1$  with minimum of 0 and maximum score of 9. Prevalence of household food insecurity was categorized into four levels namely: food secure and mild, moderately and severely food insecure.

Out of the total study respondents, only, 12% (n=54) of the research respondents statements revealed that they had food security at household level. Further-more, a majority, 49% (n=231) of the research respondents testified that they had severe food insecurity preceding the survey; followed by, 17% (n=81) of the household stated that they had moderate food insecurity, the rest, 22% (n=103) of households reported that they had mild food insecurity. The overall magnitude of food insecurity was 88% [95%CI: 88.2, 91.0] (Figure 4.3).

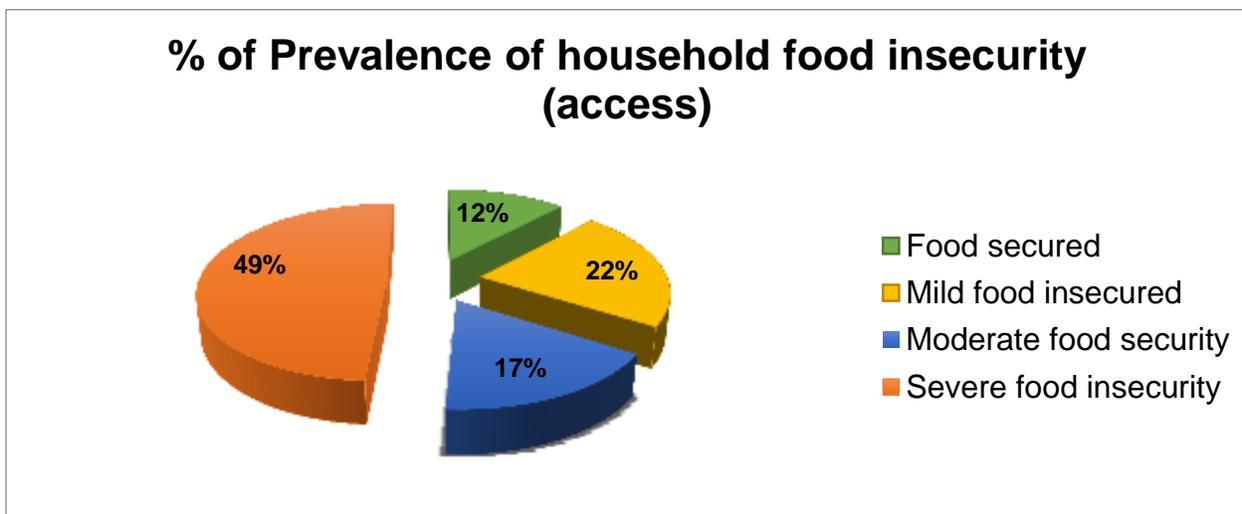


Figure 4.3: Prevalence of household food insecurity at community of south omo zone SNNPR, Ethiopia, 2019

Out of the total study respondents, a large portion of households, 70.4% (n=330) of the research respondents stated that they were worrying about food in the 30 days preceding the survey; similarly, 69% (n=325) of the study respondents informed that they were unable to eat their preferred diet in the 30 days preceding the survey. In addition to this, more than half of the households, 56.7% (n=266), through their respondent statements, indicated that they had consumed a limited range of food in the 30 days before the study. About, 40% (n=191) of the households reported that they ate food as they truly would prefer not to eat in the 30-days preceding the survey. 62.7% (n=294) research respondents announced that they ate limited meals in the 30 days preceding the survey. Similarly, 63% (n=297) of the study respondents demonstrated that they ate less meals in a day, in the 30-days preceding the survey.

On other hand, a significant number of the households i.e. 35.4% (n=166) of the respondents reported that they had no food to eat, to some extent in their house, in the 30-days preceding the survey. Out of the total study respondents, 37% (n=176) of the households stated that they often had to go to sleep at night hungry, during the thirty days leading to the survey. Similarly, nearly, one quarter, 23.5% (n=110) of the respondents indicated that they were went an entire day and night without eating food, in the thirty days preceding the survey (Table 4.5).

Table 4.5: Household Food insecurity scale at South Omo Zone, SNNPR, Ethiopia, 2019

Measurement Tool	Frequency	Per cent
Worry about food		
No	145	30.9
Yes	330	70.4
Unable to eat preferred foods		
No	144	30.7
Yes	325	69.3
Eat just a few kinds of foods		
No	203	43.0

Yes	266	57.0
Consume diets really do not need to eat		
No	278	59.3
Yes	191	40.7
Eat a smaller meal		
No	175	37.3
Yes	294	62.7
Eat fewer meals in a day		
No	172	36.7
Yes	297	63.3
No food of any kind in the household		
No	303	64.6
Yes	166	35.4
Go to sleep hungry		
No	203	62.5
Yes	176	37.5
Go a whole day and night without eating		
No	359	76.5
Yes	110	23.5

With respect to food security levels at each agro ecological level, about, 20.8% of food security was seen more prevalently within highland agroecology zones compared with counterpart zones (low and mid land agro ecology, 6.5% & 8.2%, respectively). The most elevated prevalence of (42.9%) mild food insecurity pattern reported among the research respondents were seen within lowland zones when compared with other agro ecological zones (mid and high land, 27.1% & 6.1%, respectively).

A high prevalence (29.4%) pattern of moderate food insecurity was seen in low land agro-ecology zones when compared with counterparts(14.9% & 14.3% in mid and high land), besides, the highest prevalence (73%) of severe food insecurity was seen among lowland respondents compared with mid and highland zones(35.3%& 21.4%, respectively) (Figure 4.4).

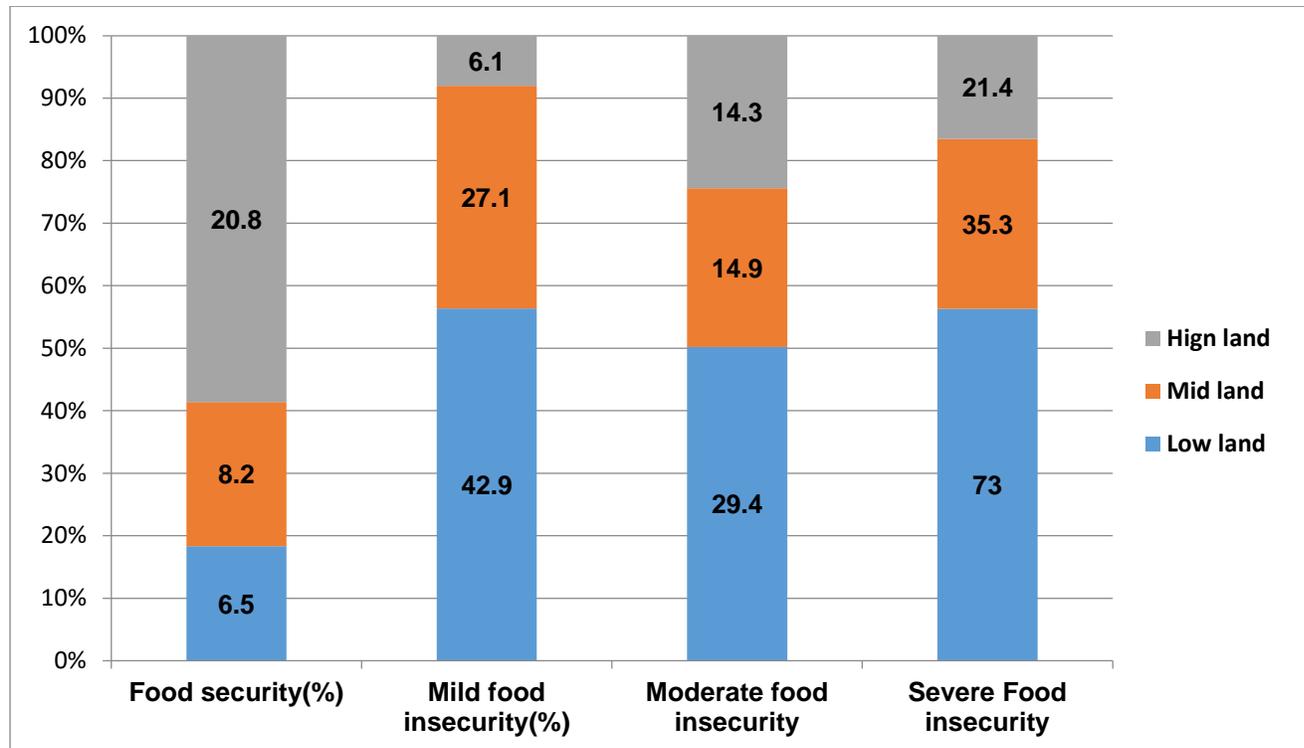


Figure 4.4: Household food insecurity by agro ecological zones within the community of South Omo zone SNNPR, Ethiopia, 2019.

#### 4.6.2 Livestock

The Majority, 84.4% (n=396) of the households, owned livestock. The mean ( $\pm$ SD) of cow's milk at each household level was  $2.09 \pm (2.29)$ . More than half, 55% (n=259) of the households had greater than one cow. Similarly, nearly half, 47% (n=221) of households had greater than two oxen and the rest of the households had one cow or none. Moreover, the mean ( $\pm$ SD) for the households had  $26.4 \pm (45.9)$  goats. 50.5% (n=237) of respondents reported that they had less than five goats.

Concurrently, a larger proportion, 53% (n=253) of the respondents indicated that they had more than one chicken in the house, however, 46.1% (n=216) of the households had one or less chickens in the house. On other hand, the mean ( $\pm$ SD) of the research respondents had 1.0( $\pm$  2.0) of donkeys/horses. However, majority, 71% (n=333) of the study respondents had zero (0) donkeys/horses in their households. By comparison, 29% (n=139) of the study respondents had greater than one donkey/horses within their households (Table 4.6).

Table 4.6: Frequency distribution of livestock at south omo zone, SNPPR, Ethiopia, 2019

Item	Frequency	Per cent
Cow		
<1cow	210	44.8
>1cow	259	55.2
Oxen		
<2oxen	248	52.9
>Oxen	221	47.1
Goat		
<5goat	237	50.5
>5Goat	232	49.5
Chicken		
<1chicken	216	46.1
>1chicken	253	53.9
Donkey/horse		
0	333	71
=>1	136	29

#### 4.6.3 Agricultural Land

The mean ( $\pm$ SD) value of the agricultural land was  $2.17\pm(1.5)$  with the least and greatest estimation values of 0 and 8 hectares, respectively. Out of the total, 11.1% (n=52) of research respondents revealed that they had no agricultural land. By contrast, more than a quarter, 28% (n=133) of the households indicated that they had one hectare of agricultural land, 26.9% (n=126), 14.3% (n=67), and 19.4% (n=91) of the households had two, three, and four or more hectares of agricultural land, respectively.

#### 4.6.4 Production

Table 4.7 shows, food production on the land, the majority, 77% (n=362) of land was covered by maize, Sorghum and/or millet. About, 15.8% (n=74) of the research respondents had shown that their land was not covered by crops. Similarly, 7% (n=33) of households described that they produced other crops like roots, tubers, fruits and vegetables. Concerning household food sources, nearly, a quarter, 23.5% (n=110) of the households indicated that they were purchased food. Likewise, 35% (n=165) of households indicated that their food sources were a result of their own production. A significant number of the respondents, 41.4% (n=194) of households admitted that food sources were primarily food aid and back up stocks; and from others (like neighbours, relatives and friend support) (Figure 4.5).

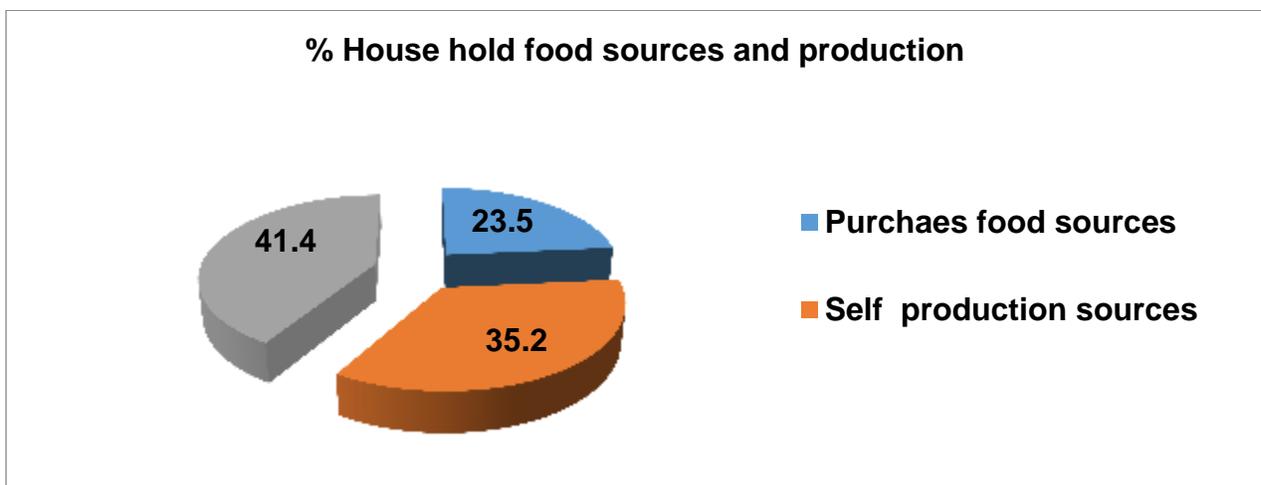


Figure 4.5: Household food insecurity by agro ecological zones within the community of South Omo Zone SNNPR, Ethiopia, 2019

Only, 24% (n= 113) of a study participant reports indicated their own food production was enough for the whole year or to cover that period partially. In contrast, a large number of study respondents, 76% (n=356) of the household reports described their own production, as being inadequate for the whole year (Table 4.7).

Table 4.7: Frequency distribution of crop production and self-sufficient at south omo zone, SNNPR, Ethiopia, 2019

Category	Frequency	Per cent
Crops production		
No	74	15.8
Maize & Sorghum	362	77.2
other	33	7.0
Own production enough		
No	356	75.9
Yes	113	24.1

#### 4.6.5 Causes of food absence

Respondents were asked to mention the cause of food absence in the household. In response, a large number of respondents, 38% (n=182) of the households indicated that, the cause of food shortage was drought similarly, one third of the research respondents i.e. 37.1% (n=174) of the respondents showed that, the cause for food shortage was climate change. On the other hand, small proportions, 9.2% (n=43) of the study respondents believed that the cause of food shortage at household level was absence of water/rain or irrigation for production. Only, 15 % (n=70) of the households explained that the cause of food shortage was not clearly known (Figure 4.6).

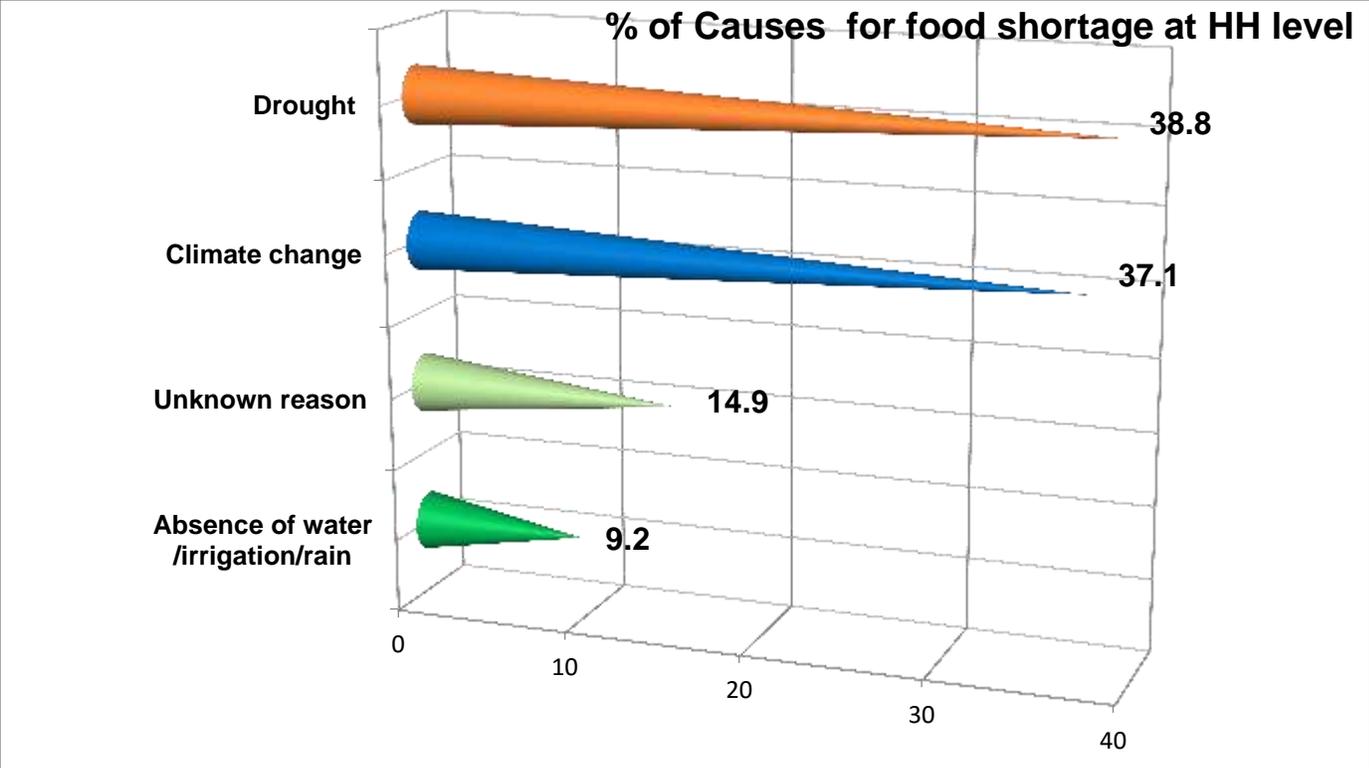


Figure 4.6: Causes of food insecurity in Household level within South Omo Zone, SNNPR, Ethiopia, 2019

4.6.6 Secondary data sources

As shown by the South omo zone disaster prevention and preparedness office evaluation report of January, 2019, 70,743 families were recorded as having need for food aid. Beyond this, 127, 773 families needed close follow up. The zonal report also showed that food insecurity was primarily caused by rain shortage, climate change, dry air conditions, insect infection, and water shortages within rivers (South Omo Zone DP report, 2019:2).

Figure 4.7 below showed that there were trends related to the number of families affected by food insecurity in this study area. These figures indicate that the need for urgent agricultural and administration intervention, particularly within pastoralist

communities. As such, policy makers and agricultural program implementers need to take urgent action to tackle these critical challenges.

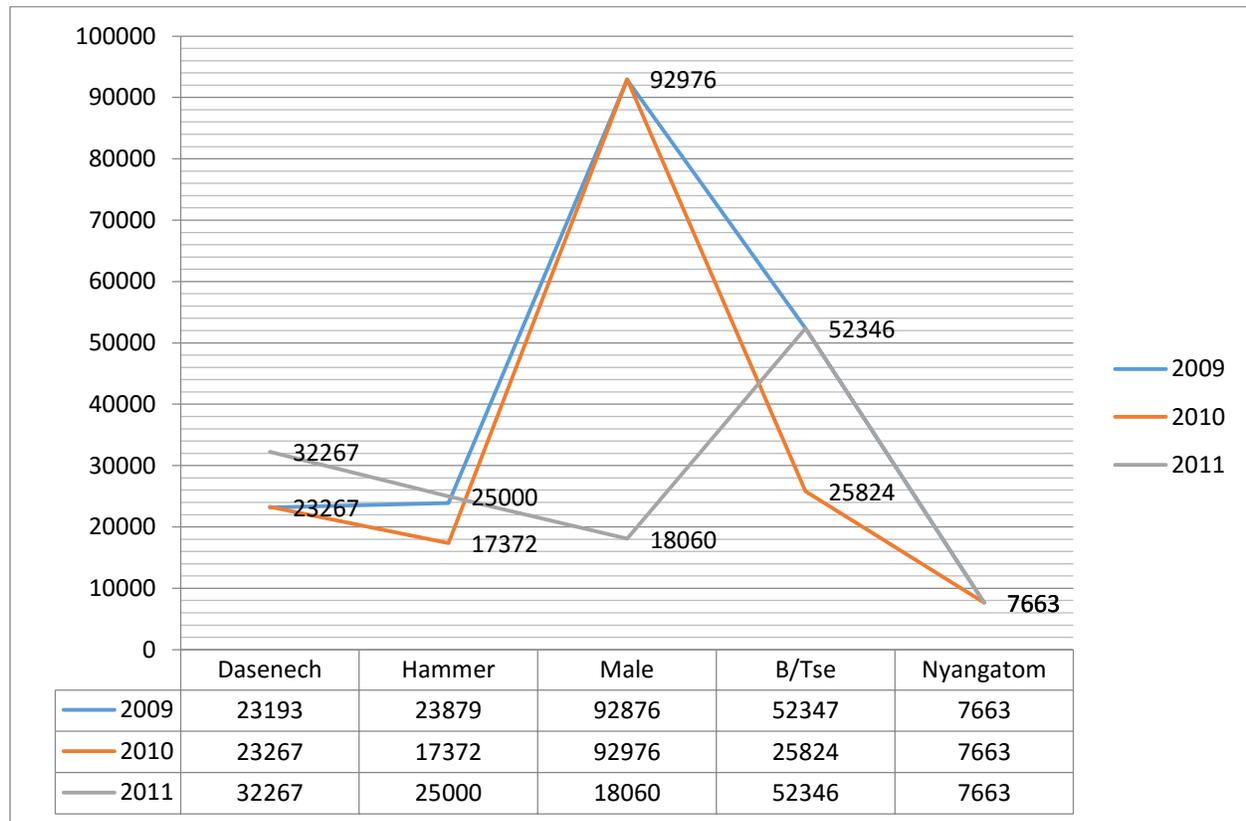


Figure 4.7: South Omo Zone 3-year household report on food aid support & number SNNPR, Ethiopia Source: South Omo zone disaster preparedness office report (2011/2019)

#### 4.6.7 Factors related with food insecurity

Bivariate analysis was carried out to detect associations with dependent variables. During the analysis, important characteristics were considered and from this, the following variables were fit for multivariate analysis i.e. household food sources, household experiences of any past food shortage over the past 12 months, number of meals each household normally has per day, food need during last 12 months, family size, access to micro finance for credit, agro-ecology, self-production enough for the year, household Wealth, position of economy, possessions of oxen, chicken, goat, horses, and cows. For each of these household variables, a *p-value* of 0.25 was used.

Importantly, dietary diversity, under nutrition among pregnant women, age of pregnant women, knowledge and practice score, education of pregnant women, education of husband, farming land, were excluded for multivariate analysis.

The food insecurity was less likely occurred in the self-production and purchased group when compared to food aid and safety net user groups ( $\chi^2=7.8$ ,  $p\text{-value}=0.007$ ). Similarly, households those who had no food shortage experience over past 12 months, had less likely to develop food insecurity when compared to households who experienced food shortage over past 12 months( $\chi^2=3.7$ ,  $p\text{-value}=0.04$ ). Moreover, household who had no need of food over 12 months were less likely to occur food insecurity when compared with counter parts( $\chi^2=40.2$ ,  $p\text{-values}<0.000$ ). The highest food insecurity was occurred in family size of 4-6memebrs when compared with counter parts( $\chi^2=2.5$ ,  $p\text{-values}<0.11$ )(Table 4.8).

Table 4.8: Bivariate logistic regression of predictor for household food insecurity at south Omo Zone, SNNPR, Ethiopia, 2019

Character	Food insecurity		X <sup>2</sup>	Crude OR (95%CI)	P-value
	Yes	No			
HH Food sources					
Purchased	95	15	7.8	0.45(0.2,0.9)	0.04
Self-production	139	26		0.4(0.2, 0.8)	0.007*
Food aid and Safety Net	181	13		1	1
HH experience any past food shortage over the past 12months					
No	199	34	3.7	0.5(0.3, 0.97)	0.04*
Yes	216	20		1	1
Food need during last 12 months					
No	134	42	40.2	0.13(0.06, 0.26)	0.000*
Yes	281	12		1	1

Family size					
1-3	130	18	2.5	1.3(0.6, 2.9)	0.41
4-6	217	23		1.8(0.8, 3.7)	0.11
>6	68	13		1	1

The prevalence of food insecurity was 51.8% (95%CI: 47.0, 56.5) in households living within agro-ecology lowlands compare with highland with 29.3% (95%CI: 25.2, 33.9) ( $X^2=19.4$ ,  $p\text{-value}<0.0001$ ). Likewise, the burden of food insecurity was highest, 77.3% (95%CI: 73.0, 81.1) for those who had no enough self-production for year compared with 22.6% (95%CI: 18.8, 26.9) from the opposite group who were able to produce food throughout the year. ( $x^2=3.4$ ,  $p\text{-value}=0.04$ ). Furthermore, study respondents from low land agro-ecology had highest prevalence of food insecurity (COR=3.7, CI: 1.9, 7.2) when compared with high land agro-ecology( $x^2=19.4$ ,  $p\text{-value}=0.000$ ). The prevalence of food insecurity was highest (COR=2.67, CI: 1.4, 4.9) among pastoralist group when compared with agrarian group( $x^2=9.5$ ,  $p\text{-value}=0.002$ )( Table 4.9).

Table 4.9: Bivariate logistic regression of predictor for household food insecurity within South Omo Zone, SNNPR, Ethiopia, 2019

Character	Food insecurity		$X^2$	Crude OR (95%CI)	P-value
	Yes	No			
Agro-ecology					
Low land	215	15	19.4	3.7(1.9, 7.2)	0.000*
Mid land	78	7		2.9(1.2, 6.9)	0.015
High land	122	32		1	1
Self-production enough for the year					
No	321	35	3.4	1.8(1.0, 3.4)	0.04*
Yes	94	19		1	1
Position of economy					

Pastoralist	220	16	9.5	2.67(1.4, 4.9)	0.002*
Agrarian	195	38		1	1

By contrast, the reporting of food insecurity was less likely in the richest group 16.8% (95%CI: 13.5, 20.7) when compared with the poorest group 21.9% (95%CI: 18.2, 26.1) ( $\chi^2=16.2$ ,  $p$ -value=0.03). Additionally, the proportion of food insecurity, 53.0% (CI:48.2, 57.7) was highest among pastoralist community members when compared with agrarian community counterparts 46.9% (95%CI: 42.2, 51.8)( $\chi^2=9.5$ , $p$ -value=0.002)(Table 4.9).

Further-more, ANOVA showed, a mean difference among variables i.e. dietary diversity (F=3.112,  $p$ =0.04), water sources (F=3.328,  $p$ =0.002), household (F=4.168,  $p$  =0.003), agro-ecology (F=10.10,  $p$ =<0.0001), household meal consumption per day (F=13.17,  $p$ <0.0001), food sources (F=3.94,  $p$ =0.020), were all statistically significant association with household food insecurity.

In multivariate analysis, possible confounders were adjusted and the characteristics that were found to be associated with food insecurity during bivariate analysis were assessed via multivariate analysis using the logistic regression model, to check for statistical significances with food insecurity. The odds of food insecurity were 2.4 times (AOR=2.4, 95%CI: 1.0, 5.2) higher among households having two or less meals every day, than the individuals who had more than three and more meals per day. Similarly, household who had no food need during last 12 months, they were 80% less likely to report food insecurity (AOR=0.2, 95%CI: 0.08, 0.4) than within the counterpart group (Table 4.10). Moreover, the odds of food insecurity was 1.8 times higher (AOR=1.8, 95%CI: 0.8, 3.7) higher among households who had 4-6 family members when compared with counter parts. This was a statistically significant relationship with food insecurity (Table 4.10).

In the same way, respondents from low land agro-ecology (AOR=3.1, 95%CI: 1.5, 6.3) and midland agro-ecology (AOR=2.9, 95%CI: 1.1, 7.8) had significantly higher odds to

have food insecurity compared with highland agro-ecology respondents. On other hand, the presence of food insecurity decreased when we moved up the poorest to richest wealth index. The odds for food insecurity was (AOR=2.5, 95%CI: 1.1, 3.6) 2.5 times higher among the poorest group when compared to the richest group. In this study, households from pastoralist communities had 3.7 times (AOR=3.7, 95%CI: 1.6, 8.7) higher odds of food insecurity than agrarian communities. This was a statistically significant association with dependent variable (Table 4.10).

Households with past experiences related to food shortage over the past 12 months (OR=0.04, 95%CI: 0.5, 0.9), and micro-finance access for credit (OR=0.48, 95%CI: 0.25, 0.9), were less likely report food insecurity, however, the associations were unsuccessful to achieve statistical significance. On other hand, the respondents who had a number of oxen (OR=0.6, 95%CI: 0.38, 1.2), number of goat (OR=0.6, 95%CI: 0.34, 1.0), and number of donkey/horse (OR=0.39, 95%CI: 0.17, 0.85) were more certain of having food insecurity, however, the association was not statistically significant.

Table 4.10: Multivariate logistic regression model of predictors for household food insecurity at south Omo Zone, SNNPR, Ethiopia, 2019

Character	Food insecurity		X <sup>2</sup>	Crude OR (95%CI)	P-value	Adjusted OR (95%CI)	P-value
	Yes	No					
Agro-ecology							
Low land	215	15	19.4	3.7(1.9, 7.2)	0.000*	3.1(1.5, 6.3)	0.002**
Mid land	78	7		2.9(1.2, 6.9)	0.015	2.9(1.1, 7.8)	0.030
High land	122	32		1	1	1	1
Household Wealth index							
poorest	70	20	16.2	3.9(1.7, 9.2)	0.001*	2.5(1.1, 3.6)	0.002** *
poor	82	14		2.6(2.5, 5.5)	0.30	1.5(1.8, 4.7)	0.2
Medium	84	7		1.2(4.5, 3.6)	0.63	1.0(1.5, 3.0)	0.9
Rich	91	4		2.4(1.7, 8.2)	0.15	1.9(0.5, 6.7)	0.29
Richest	84	9		1	1	1	1
Position of economy							
Pastoralist	220	16	9.5	2.67(1.4, 4.9)	0.002*	3.7(1.6, 8.7)	0.002** *
Agrarian	195	38		1	1	1	1
Food need during last 12 months							
No	134	42	40.2	0.13(0.06, 0.26)	0.000*	0.2(0.08, 0.4)	0.000** *
Yes	281	12		1	1	1	1
Family size							
1-3	130	18	2.5	1.3(0.6, 2.9)	0.41	1.5(0.6, 3.4)	0.33
4-6	217	23		1.8(0.8, 3.7)	0.001	1.8(0.86, 4.0)	0.01**
>6	68	13		1	1	1	1

## 4.7 UNDER NUTRITION

### 4.7.1 Prevalence of under nutrition

The mean value ( $\pm$ SD) of MUAC measurement for pregnant women was  $22.9\pm 2.1$  with a minimum value of 16cm and the maximum value following middle upper estimation (MUAC) was 29 cm.

About, 5.3% (95%CI: 3.6, 7.7) of the pregnant women revealed that they had severe under nutrition, more than one third, 34.3% (95% CI: 30.1, 38.7) of the study respondents had moderate under nutrition, as well, 14.5% (95%CI: 11.5, 17.9) of the investigation respondents had mild under nutrition, However, forty-five per cent (95%CI: 41.3, 50.3) of the respondents reported that they had no under nutrition (Figure 4.8). The general prevalence of under nutrition was 54.2% (95% CI: 49.6, 58.6).

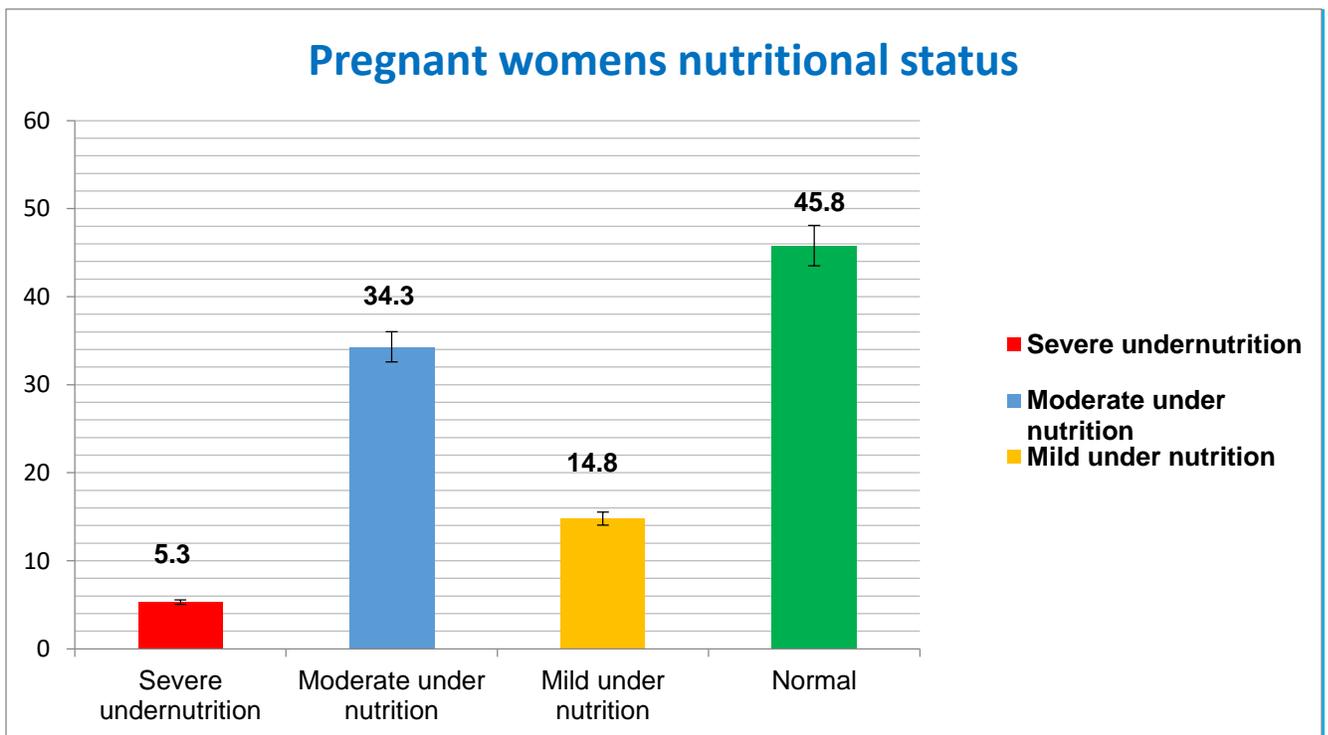


Figure 4.8: Nutrition status among pregnant women in South Omo zone, SNNPR, Ethiopia, 2019

#### 4.7.2 Predictor associated with under nutrition

During bivariate analysis, pregnant women education, husband education, household wealth index, agro-ecology, economic class (pastoralist vs. agrarian), toilet facility, food sources, household meal take per/day, starch staples, ethnicity, farming land, nutrition information, practice score, own production, drinking water, and family size were candidates for multivariate analysis.

However, the age of pregnant women, pregnant women occupation, residence, marital status, microcredits access, attitude of pregnant women, and pregnant women knowledge were not eligible for multivariate analysis.

On other hand, demo-graphic character tested like, pregnant women age( $r = -0.147$ ,  $p\text{-value} = 0.001$ ), pregnant women education ( $r = 0.191$ ,  $p\text{-value} < 0.0001$ ), partner's education ( $r = 0.191$ ,  $p\text{-value} < 0.0001$ ), food hunger ( $r = -0.114$ ,  $p\text{-value} = 0.013$ ), agricultural land ( $r = -0.107$ ,  $p\text{-value} = 0.02$ ), got ( $r = -0.143$ ,  $p\text{-value} = 0.002$ ) had statistically significant correlations with MUAC values. Moreover, ANOVA finding indicated that, food sources ( $F = 6.6$ ,  $P = 0.001$ ), diet taking per day ( $F = 8.5$ ,  $P < 0.0001$ ), agro-ecology ( $F = 10.3$ ,  $p < 0.0001$ ), household wealth index ( $F = 2.7$ ,  $p = 0.03$ ), ethnicity ( $F = 6.7$ ,  $p < 0.0001$ ) had significant mean difference and associated with under nutrition.

Thus, the prevalence of under nutrition was 58.2 % (95% CI: 52.9, 62.9) higher among non-formal schooling individuals compared with formally school attained, 38.2% (95% CI: 29.7, 48.6), this variable independently associated (COR=2.2, 95% CI: 1.3, 3.4) with under nutrition confirmed by ( $X^2 = 11.0$  and  $p\text{-value} = 0.001$ ). Similarly, out of the total, 210 partner's who had not attained any level of education, 58.1% (95% CI: 53.0, 63.1) were under-nutrition, and compared with formally attended group, 38.4% (95% CI: 29.6, 48.0) were developed under nutrition (COR=2.2, 95% CI: 1.4, 3.5). The liner trend analysis on chi-square ( $x^2 = 11.8$ ,  $p\text{-value} = 0.000$ ) indicated that there was significant association with under nutrition.

In addition, the prevalence of under nutrition was, 63.9% (95%CI: 57.5, 69.8) high in low land agro ecology zone (COR=2.5, 95% CI: 1.68, 3.89) when compared with high land, 40.9% (95%CI: 33.4, 48.8). The liner trends on chi-square( $X^2=19.9$ , p-value<0.0001) showed significant relation with under nutrition. Likewise, out of the total, 149 pastoralist respondents, mean that, 63.1% (95%CI: 56.8, 69.0) they had higher prevalence of under nutrition (COR=2.08, 95%CI: 1.44, 3.02) when compared with farmer group, 45.1% (95CI: 38.8, 51.5). The chi square trend analysis indicated ( $X^2 =14.7$ , p-value<0.0001), there was strong association with under nutrition. The prevalence of under nutrition was higher in the poorest wealth index (COR=2.4, 955CI: 1.36, 4.49) when compared to richest wealth index( $X^2 =10.6$ , p-value=0.003) (Table 4.11).

Table 4.11: Demo-graphic and agro-ecological predictors of under nutrition on bivariate in logistic regression, among pregnant women at South Omo Zone, SNNPR, Ethiopia, 2019

Character	Under-nutrition		$X^2$	Crude OR (95%CI)	P-value
	Yes n (%)	No n (%)			
Pregnant women education					
No formal education	216(58.2)	155(41.7)	11.0	2.2(1.3, 3.4)	0.001*
Formal education attained	38(38.7)	60(61.2)		1	1
Partner's education					
No formal education	210(58.1)	151(41.8)	11.8	2.2(1.4, 3.5)	0.000*
Formal education attained	40(38.4)	64(61.5)		1	1
Household wealth index					
Poorest	64(68)	30(31.9)	10.6	2.4(1.36, 4.49)	0.003*
Poor	51(53.1)	45(46.9)		1.3(0.74, 2.33)	0.34
Medium	45(49.4)	46(50.5)		1.1(0.63, 2.02)	0.66

Rich	51(53.7)	44((46.3)		1.3(0.7, 2.3)	0.30
Richest	43(46.2)	50(53.8)		1	1
Family size(composition)					
1-3	69(46.6)	79(53.4)	5.13	0.69(0.40,1.20)	0.19
4-6	140(58.3)	100(41.7)		1.12(0.67,1.86)	0.66
>6	45(55.6)	36(44.4)		1	1
Agro-ecology					
Lowland	147(63.9)	83(36.1)	19.9	2.5(1.68, 3.89)	0.000*
Mid land	44(51.7)	41(48.2)		1.5(0.9, 2.6)	0.10
High land	63(40.9)	91(59.0)		1	1
Economic Class					
Pastoralist	149(63.1)	87(36.9)	14.7	2.08(1.44,, 3.02)	0.000*
Farmer	105(45.1)	128(54.9)		1	1

The prevalence of under nutrition was high in respondents who had no drinking water facility when compared to those who had drinking water ( $X^2=3.0$ ,  $p$ -value=0.06). Similarly, out of the total, 143 respondents had no toilet facilities, 60.1% (95%CI: 53.7, 66.1) had higher under nutrition when compared with those who had toilet facilities, 48.1% (95%CI: 41.7, 54.5) were reported as suffering with under nutrition. The chi-square ( $X^2= 6.4$ ,  $p$ -value=0.009) supported the variable association with under nutrition.

Respondents' food sources from purchased and self-productions were less likely to occur under nutrition (COR=0.54, 95%CI: 0.34, 0.87) when compared with the food aid and safety net. This chi square trend analysis ( $X^2=12.9$ ,  $p$ -valence=0.001) showed significant relation with under nutrition.

Moreover, the burden of under nutrition was, 76.8% (95%CI: 65.5, 85.3) higher in household taking meals one time per day compared with household those eating 3 or more times per day, 38.9% (95%CI: 29.5, 49.2). The chi square trends supported ( $X^2=24.5$ ,  $p\text{-value}<0.0001$ ) the significant association with under nutrition. Besides, out of the total study participants, 210 respondents had not taken starch staple (cereal food), 60% (95%CI: 54.8, 65) compared with those who took the starch staple, 36.9% (95%CI: 28.8, 45.9) were developed under nutrition. The liner trends analysis on chi <sup>2</sup> ( $X^2=18.0$ ,  $p\text{-value} <0.0001$ ) indicated there was a significant association with under nutrition. The prevalence of under nutrition was higher in household who had less than one chicken when compared with greater than one chicken ( $X^2= 3.13$ ,  $p\text{-value}=0.06$ )(Table 4.12).

Table 4.12: Household facility and diet related predictor for under nutrition on bivariate logistic regression among pregnant women at south Omo Zone, SNNPR, Ethiopia, 2019

Character	Under-nutrition		$X^2$	Crude OR (95%CI)	P-value
	Yes n (%)	No n (%)			
Drinking water					
No	164(57.5)	121(42.5)	3.0	1.4(0.97, 2.05)	0.06
Yes	90(48.9)	94((51.1)		1	1
Toilet facility					
No	143(60.1)	95(39.9)	6.4	1.6(1.1, 2.3)	0.009*
Yes	111(48.1)	120(51.9)		1	1
Food sources					
Purchased	54(49.1)	56(50.9)	12.9	0.54(0.34, 0.87)	0.012
Self-production	76(46.1)	89(53.9)		0.48(0.32, 0.74)	0.001*
Food aid and Safety Net	124(63.9)	70(36.1)		1	1
Own production enough /cover the					

year					
No	199(55.9)	157(44.1)	1.5	1.3(0.87, 2.04)	0.18
Yes	50(46.3)	58(53.7)		1	1
Household meal per day					
0	16(66.7)	8(33.3)	24.5	3.14(1.21, 8.11)	0.018
1	53(76.8)	16(23.2)		5.20(2.58, 10.49)	0.000*
2	150(52.4)	136(47.6)		1.73(1.06, 2.80)	0.02
≥3	35(38.9)	55(61.1)		1	1
Starch staple					
No	210(60)	140(40)	18.0	2.55(1.66, 3.92)	0.000*
Yes	44(36.9)	75(63.1)		1	1
Number of chicken HH has					
<1 chicken	127(58.8)	89(41.2)	3.13	1.41(0.98, 2.04)	0.06
>1 Chicken	127(50.2)	126(49.8)		1	1

The prevalence of under nutrition was greater among the poor nutrition practice group, 55.7% (95%CI: 50.0, 61.2) compared with average or good nutrition practice counterparts, 22.2% (95%CI: 5.3, 55.7) ( $X^2= 4.0$ ). Besides, under nutrition was prevalent in specific ethnicity groups e.g. Malle ethnicity compared with Dasenech, there were extraordinary pervasiveness of under nourishment among the Dasenech, 62.3% (95%CI: 52.7, 70.9) Malle, 48.6% (39.6, 57.8). The chi <sup>2</sup> trends revealed ( $X^2= 25.8$ , p-value<0.0001) there are relation of the under nutrition (Table 4.13).

Multivariate analysis runs out in model of logistic regression to check statistical significance by controlling confounder factors. Household wealth quintile, the odds of being under nutrition was 2.29 times higher among poorest wealth quintile compared with richest household wealth quintile (AOR=2.29, 95%CI: 1.24, 4.23). It was statistically significant association. Likewise, pregnant women from low land agro-ecology had 2.7 times higher odds of having under nutrition as compared with pregnant women who

reside in high land agro-ecology (AOR=2.7, 95% CI: 1.6, 4.7). Also, pregnant women from pastoralist communities were 2.3 times greater odds to have under nutrition than those who were living within agrarian community (AOR=2.3, 95%CI: 1.56, 3.52). This pattern was statistically significant (Table 4.13).

Additionally, the odds of under nourishment was greater among pregnant women who did not attain the formal education (OR=2.2, 95%CI: 1.3, 3.4) compared to those who attained the formal education. Nevertheless, it was statistically failed to show a significant association in multivariate analysis. Similarly, husband from non-formal education group had greater odds of being likely to have under nutrition (OR=2.2, 95%CI: 1.3, 3.4) compared with those who attained formal education.

On other hand, when adjusted for confounders, pregnant women education, husband education, family size, and drinking water were evaluated using the logistic regression model and could not associated to multivariate analysis.

Table 4.13: Multivariate logistic regression of predictor for under nutrition among pregnant women at South Omo Zone, SNNPR, Ethiopia, 2019

Character	Under-nutrition		X <sup>2</sup>	Crude OR (95%CI)	P-value	Adjusted OR (95%CI)	P-value
	Yes	No					
Household wealth index							
Poorest	64	30	10.6	2.4(1.36, 4.49)	0.003*	2.29(1.24, 4.23)	0.008***
Poor	51	45		1.3(0.74, 2.33)	0.34	0.95(0.52, 1.75)	0.8
Medium	45	46		1.1(0.63, 2.02)	0.66	0.84(0.45, 1.56)	0.5
Rich	51	44		1.3(0.7, 2.3)	0.30	1.01(0.55, 1.87)	0.9
Richest	43	50		1	1	1	1
Agro-ecology							
Lowland	147	83	19.9	2.5(1.68, 3.89)	0.000*	2.7(1.6, 4.7)	0.000***
Mid land	44	41		1.5(0.9, 2.6)	0.10	1.76(0.88, 3.50)	0.10
High land	63	91		1	1	1	1
Economic Class							
Pastoralist	149	87	14.7	2.08(1.44, 3.02)	0.000*	2.3(1.56,3.52)	0.000***
Farmer	105	128		1	1	1	1

Regarding meal taking patterns at household level, pregnant women who were taking single diet every day had higher odds of under nutrition compared with contrary parts (AOR=3.2, 95% CI: 1.4, 7.1)  $p$ -value=0.004, it had statistically significant association. In the same way, pregnant women who do not consume starch staples in their diet had 2.6 times greater odds of developing under nutrition compared with those who consumed starch staples (AOR=2.6, 95% CI: 1.6, 4.2),  $p$ -value<0.0001. It was statistically significant with under nutrition. Pregnant women who had <1 chicken were 1.5 times higher odds of developing under nutrition compared with opposite groups (AOR=1.5, 95% CI: 1.0, 2.1) (Table 4.14).

On the other hand, pregnant women who have food source from self-production and purchased were (AOR=0.46, 95% CI: 0.27, 0.77) & (AOR=0.57, 95% CI: 0.33, 0.96), respectively, 54% and 43% were less likely to occur under nutrition compared with counterparts who received food aid and were in the safety aid group (Table 4.14).

Table 4.15 below showed, that pregnant women from the average nutritional practice group were 5.1 times more likely to have under nutrition than those who had good nutrition practices (AOR=5.1, 95% CI: 1.0, 28.0). Likewise, by comparison, Malle ethnicity, Dasnech, hammer & Beny tsemay ethnicity were more likely to have under nutrition (AOR=5.8, 95% CI: 2.17, 15.6). On the other hand, pregnant women from farming land measuring 2-hectares were 60% less-likely to develop under nutrition compared with counterparts (AOR=0.4, 95% CI: 0.24, 0.80).

In contrast, dietary diversity (DD), ante natal care (ANC) visits, and access to nutrition information failed to attain an important association in multivariate analysis within a logistic regression model.

Table 4.14: Multivariate logistic regression of predictor for under nutrition among pregnant women at south Omo Zone, SNNPR, Ethiopia, 2019

Character	Under-nutrition		X <sup>2</sup>	Crude OR (95%CI)	P-value	Adjusted OR (95%CI)	P-value
	Yes	No					
Food sources							
Purchased	54	56	12.9	0.54(0.34, 0.87)	0.012	0.57(0.33, 0.96)	0.03
Self-production	76	89		0.48(0.32, 0.74)	0.001*	0.46(0.27, 0.77)	0.003**
Food aid and Safety Net	124	70		1	1	1	1
Household meal per day							
0	16	8	24.5	3.14(1.21, 8.11)	0.018	3.27(1.11, 9.6)	0.03
1	53	16		5.20(2.58, 10.49)	0.000*	3.2(1.4, 7.1)	0.004**
2	150	136		1.73(1.06, 2.80)	0.02	1.0(0.58, 1.80)	0.9
≥3	35	55		1	1	1	1
Starch staple							
No	210	140	18.0	2.55(1.66, 3.92)	0.000*	2.6(1.6, 4.2)	0.000** *
Yes	44	75		1	1	1	1
Number of chicken HH has							
<1 chicken	127	89	3.13	1.41(0.98, 2.04)	0.06	1.5(1.0, 2.1)	0.04**
>1 Chicken	127	126		1	1	1	1

Table 4.15: Multivariate logistic regression of predictor for under nutrition among pregnant women at south Omo Zone, SNNPR, Ethiopia, 2019

Character	Under-nutrition		X <sup>2</sup>	Crude OR (95%CI)	P-value	Adjusted OR (95%CI)	P-value
	Yes	No					
Practice score							
Poor practice	167	133	4.0	1	1	1	1
Average practice	87	75		4.3(0.9, 21.5)	0.06	5.1(1.0, 28.0)	0.04**
Good practice	2	7		3.9(0.8, 19.6)	0.09	4.2(0.8, 22.1)	0.08
Ethnicity							
Malle	54	57	25.8	1	1	1	1
Benytsemay	46	45		3.4(1.4, 8.1)	0.005*	4.42(1.68, 11.58)	0.002**
Hammer	80	44		3.7(1.5, 8.9)	0.004*	4.20(1.57, 11.22)	0.004**
Dasenech	66	40		6.5(2.7, 15.6)	0.000**	5.8(2.17, 15.6)	0.000***
Other	8	29		5.9(2.4, 14.3)	0.000**	5.36(1.89, 15.2)	0.002**
Farming land							
0	31	21	9.5	0.9(0.5, 1.9)	0.9	1.1(0.34, 3.52)	0.8
1	74	59		0.8(0.4, 1.4)	0.4	0.6(0.32, 1.12)	0.1
2	54	72		0.5(0.3, 0.8)	0.01	0.4(0.24, 0.80)	0.007**
3	40	27		0.9(0.5, 1.8)	0.9	0.9(0.47, 1.84)	0.8
≥4	55	36		1	1	1	1

## 4.8 ANAEMIA

### 4.8.1 Anaemia Prevalence

The mean ( $\pm$ SD) of haemoglobin concentration adjusted for altitude was  $11.8\pm 1.7$  and smallest and largest values ranged from 6 to 16g/dl. The general prevalence of anaemia was 39.9% [95%CI: 35.5, 44.4]; 19.4% (95% CI: 16.0, 23.2) was mild, 19.6% (95%CI: 16.27, 2.5) was moderate and 0.9% (95%CI: 0.25, 2.25) was severe anaemia (Figure4.9).

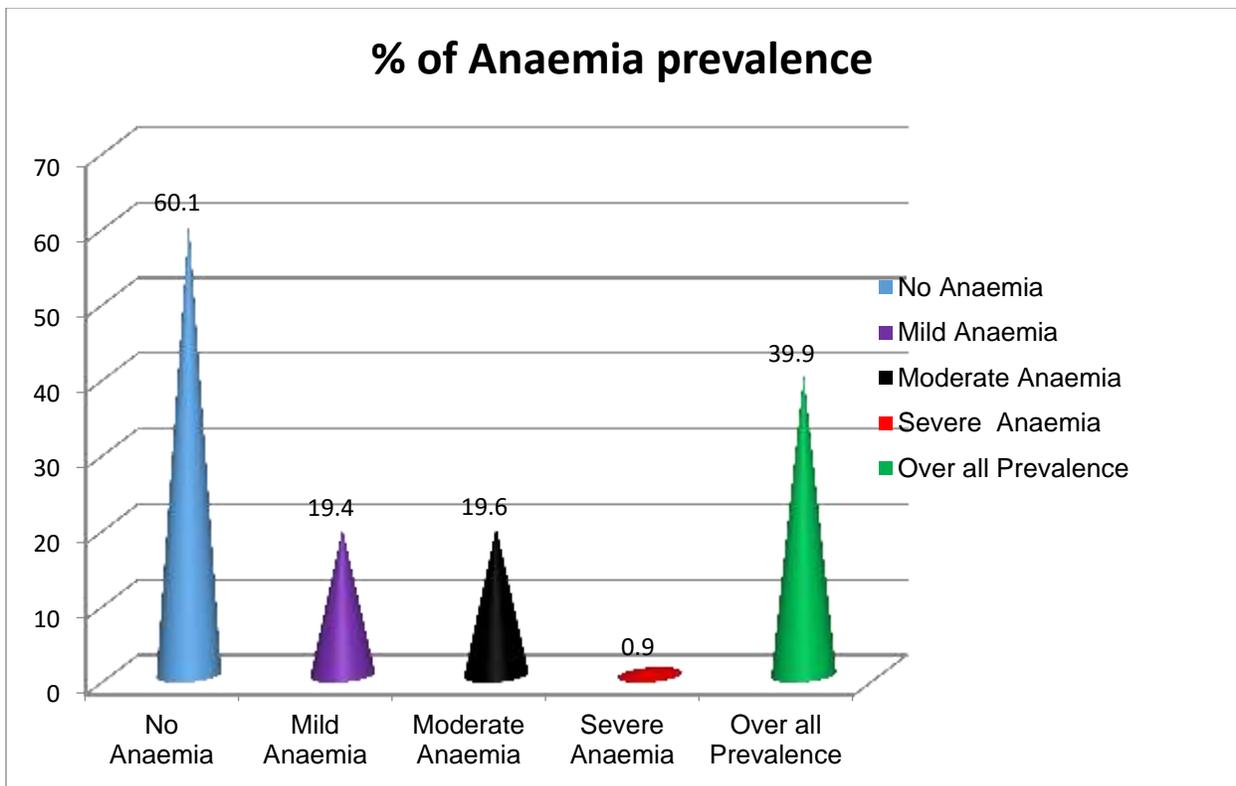


Figure 4.9: Anaemia classification and overall prevalence among pregnant women in rural of community of South Omo Zone, South nation nationality people, Ethiopia, 2019

#### 4.8.2 Nutritional Knowledge Score

Knowledge of pregnant women was assessed by using structured questionnaires that were adapted from FAO and other literary sources. Within the questionnaire, correctly answered respondents were given 1, but those that failed to respond with a correct answer were offered 0 marks. The results were entered and analysed using SPSS software's Transform category, then the researcher computed the value into the composite score.

All the research respondents were questioned about knowledge and a greater proportion, 63% of the study respondents showed that they had limited knowledge on nutrition during pregnancy. Out of all the respondents, only 8.3% (n=39) of the study respondents had relative knowledge about nutrition related to pregnancy however, more than quarter of the pregnant women had average knowledge about pregnancy nutrition.

#### 4.8.3 Nutritional attitude score

With respect to pregnant women's attitude during the study time, more than half, 53.5%(n=251) of the research respondents revealed that they had average attitudes; one third of the respondents, 33.9% of the study respondents showed that they had a positive attitude about pregnancy nutrition, the rest 12.6% (n=59) of the research respondents reported that they had negative attitude about nutrition.

#### 4.8.4 Nutritional Practice score

Majority, 64%(n=300) of the research of the respondents informed that they had poor practice about pregnancy related nutrition, on other hand, 34% of the pregnant women indicated that they had average nutrition practice; and only few of the respondents, 1.9% of the of the respondents informed that as they had good nutrition practice.

#### 4.8.5 The main reason for not taking or not utilising iron sulphate

Of the total respondents, 64% (n=300) of the research respondents reported that they did not take ferrous sulphate pills, where-as only, 36% (n=169) respondents admitted to taking iron folic acid (IFA) supplementation. The respondents were requested to provide the major reason for not taking or not using the tablets continuously, 62.3% (n=292) of the research respondents indicated that they were experienced unwanted consequence (side effects) of the tablets, followed by 56% (n=267) of the respondents had reported that, many of them forgot to take the pills. Similarly, 48% (n=255) of the respondents reported that they were unaware of the benefits of the pills and one-third (31.6%) of the respondents revealed that they were afraid that the tablet may harm their new born baby. A significant number of pregnant women, 13.9% (n=65) indicated that they were afraid of costs, even though the service was free for pregnant women. Simultaneously, more than a quarter, 28.4% (n=133) of the pregnant womens reported that they lacked belief in the usefulness of the pills (Figure 4.10).

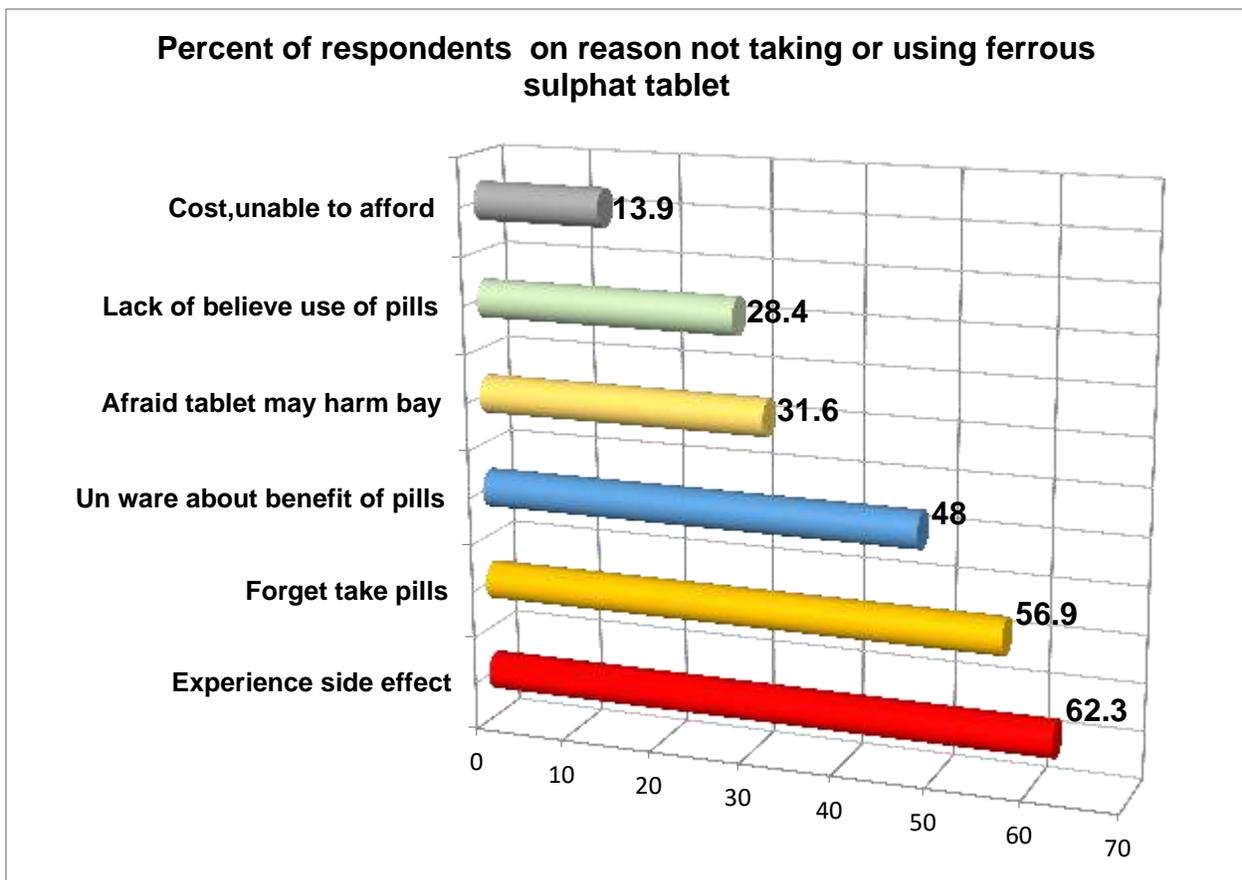


Figure 4.10: Reason for not taking or not using ferrous sulphate tablets among pregnant women at community level, South Omo Zone, Ethiopia, 2019.

#### 4.8.6 Predictors associated with Anaemia

Bivariate analysis was done to determine the significance level among these variables wealth index, ecology, religion, malaria infection, taking ferrous sulphate, dietary diversity, nutritional information, under nutrition, family size, pregnant women occupation, partner’s education, para, gestational age, ANC visit, knowledge score, nutrition practice score, workload, flesh meat, fish, drinking coffee /tea, health facility walking distance, awareness of anaemia, iron rich food, and food insecurity level were found to be statistically significant, and as per statistics rule, the consensus on the *p-value* was that less than 0.25 was accepted as the cut-off point and in this study, candidate’s variables were entered for multivariate analysis.

The table 4.16 showed that ecology lowland ( $X^2 = 35.3$ ,  $P < 0.0001$ ), partner’s education ( $X^2 = 5.0$ ,  $P = 0.06$ ,  $p = 0.01$ ), household’s wealth index ( $X^2 = 4.6$ ,  $P = 0.05$ ) and partner’s education were significantly associated with anaemia. Moreover, family size ( $X^2 = 2.6$ ,  $p$ -value = 0.19), pregnant women occupation ( $X^2 = 12.7$ ,  $p$ -value = 0.12), and religion ( $X^2 = 9.2$ ,  $p$ -value = 0.08) were candidates for multivariate analysis ( $p$ -value < 0.25).

Table 4.16: Bivariate analysis of demographic characteristics among pregnant women in community of South Omo Zone, Southern nation nationality people region, Ethiopia 2019

Predictors	Anaemia		Crude OR(95%CI)	PV	$X^2$
	Yes	No			
Ecology					
Low land	63	167	0.4(0.3,0.7)	0.000*	35.3
Mid land	53	32	1.9(1.1,3.3)	0.017	
High land	71	83	1	1(Ref)	

Religion					
Protestant	78	94	1.4(0.9,2.1)	0.098	
Orthodox	20	21	1.6(0.8,3.1)	0.16	
Muslim	9	31	0.5(0.2,1.0)	0.080	9.2
Cultural	80	136	1	Ref	
Wealth index					
Poorest	34	59	0.6(0.3,1.0)	0.08	
Poor	38	56	0.7(0.4,1.3)	0.24	
Middle	33	61	0.6(0.3,1.0)	0.05*	4.6
Rich	36	58	0.6(0.4,1.1)	0.14	
Richest	46	48	1	Ref	
Family size					
1-3	51	97	0.7(0.4,1.2)	0.19	2.6
4-6	101	139	0.9(0.6,1.5)	0.8	
>6	35	46	1	R	
Pregnant women Occupation					
House wife	146	241	0.7(.23,2.1)	0.54	
Farmer	20	8	2.9(0.7, 11.4)	0.12	12.7
Pastoralist	15	26	0.6(0.19,2.3)	0.5	
Other	6	7	1	R	
Partner's education					
No formal education	134	227	0.6(0.4, 0.9)	0.01*	5.0
Formal education attended	52	52	1	R	

NB\*\* P value less than 0.25

Additionally, study respondent's followed to ANC visits ( $\chi^2=12.0$ ,  $p=0.007$ ), gestational age ( $\chi^2=6.5$ ,  $p=0.01$ ) and parity (number of live births)  $\chi^2=6.5$ ,  $p=0.011$ ) were statistically significant with anaemia and candidates for multivariate analysis (Table 4.17).

Table 4.17: Bivariate analysis of obstetric and health care characteristic among pregnant women in community of South Omo Zone, Southern, NNPR, Ethiopia, 2019

Predictors	Anaemia		Crude OR(95%CI)	PV	X <sup>2</sup>
	Yes	No			
ANC visit					
Zero(None)	30	32	0.6(0.2,1.5)	0.30	
Once	49	65	0.5(0.2,1.2)	0.121	
twice	54	119	0.3(0.1,0.7)	0.007*	12.0
3times	40	57	0.5(0.2,1.1)	0.09	
4times	14	9	1	R	
Gestational age(GA)					
1 <sup>st</sup> trimester	63	96	0.6(0.4,1.0)	0.08	
2 <sup>nd</sup> trimester	75	138	0.5(0.3,0.8)	0.011*	6.5
3 <sup>rd</sup> trimester	49	48	1	R	
Para					
0	21	51	0.4(0.2,0.8)	0.012*	6.5
1-2	76	118	0.6(0.4,1.1)	0.121	
3-4	56	79	0.7(0.34,1.3)	0.25	
>4	34	34	1	R	

\*\* Nb:- P value less than 0.25

On other hand, study respondents, who had low dietary diversity (LDD) in the 24-hour preceding the interview, indicated that, there was high prevalence of anaemia (79.1%) when compared with pregnant women who confirmed high dietary diversity (HDD)(4.0%).The prevalence of anaemia decreased when dietary diversity level increased and vice- versa(Table 4.18).

Likewise, the prevalence of anaemia was high (85.5%) among study respondents, who did not take iron sulphate when compared with those who took iron sulphate (14.4%) regularly. It was notable that, not taking/using iron sulphate was statistically significant

with anaemia ( $\chi^2=61.3$ ,  $p=0.000$ ) (Table 4.18). Simultaneously, the respondents who were exposed to under nutrition ( $\chi^2=15.6$ ,  $p=0.007$ ) and respondents' "walking distance to near by health facility" ( $\chi^2=23.4$ ,  $p<0.0001$ ) were statistically significant with anaemia (Table 4.18).

Table 4.18: Bivariate analysis on dietary characteristic of pregnant women in community of South NNPR, South Omo Zone, Ethiopia, 2019

Predictors	Anaemia		Crude OR(95%CI)	PV	$\chi^2$
	Yes	No			
Dietary diversity(WDD)					
low DD	148(79.1%)	215	1.8(0.7,4.8)	0.216	1.6
Mid DD	33(22.2%)	51	1.7(0.6,4.9)	0.30	
High DD	6(4.0%)	16	1	R	
Under nutrition					
Mild Under nutrition	76(40.6%)	108	1.4(0.9,2.1)	0.08	
Moderate Under nutrition	30(16.0%)	27	2.3(1.2,4.1)	0.007*	15.6
Severe Under nutrition	10(5.3%)	3	6.7(1.8, 25.3)	0.005*	
No Under nutrition	71(37.9)	144	1	R	
Taking/using ferrous sulphate					
Yes	27(14.4%)	142	0.2(0.1,0.3)	0.000*	61.3
No	160(85.5%)	140	1	R	
Distance for HF walk					
Greater than 30minute	125(66.8%)	123	1	R	
Less than 30minutes	63(33.1%)	159	0.3(0.2, 0.6)	0.000*	23.4

\*\* Nb:-.P value less than 0.25

Concerning pregnant women's workload, the prevalence of anaemia was higher (50.8%) among over loaded respondents, when compare with the respondents who were under loaded (8%). The chi square analysis ( $\chi^2 =8.2$ ,  $p=0.005$ ) confirmed

workload relation with anaemia. The risk of anaemia was higher among “poor knowledge” category (67.9% when compared to those who had good knowledge (5.3%) about nutrition. As shown in Table 4.19, reports from respondents indicated that, the prevalence of anaemia was increased when the respondents’ knowledge decreased ( $X^2=4.6$ ,  $p=0.04$ ), likewise, the risk of anaemia was greater (72.7%) among respondents with poor nutritional practices, when compare with those rated as having “average nutritional practices” (26.7%), and those within “good nutritional practice” groups ( $X^2=11.2$ ,  $P=0.07$ )( Table 4.19).

Table 4.19: Bivariate analysis on health care characteristics among pregnant women women in community of Southern NNPR, South Omo Zone, Ethiopia, 2019

Predictors	Anaemia		CrudeOR(95%CI)	PV	$X^2$
	Yes	No			
Workload					
Under loaded	15(8.0%)	25	0.7(0.3, 1.3)		
Equally loaded	77(41.1%)	151	0.6(0.4,0.8)	0.005*	8.2
Overloaded	95(50.8%)	106	1	R	
Malaria infection					
Yes	85	151	0.8(0.5, 1.1)	0.16	2.6
No	102	131	1	R	
Knowledge score					
Poor knowledge	127(67.9%)	170	2.1(1.0, 4.6)	0.045*	4.6
Average knowledge	50(26.7%)	83	1.7(0.8, 3.9)	0.17	
Good knowledge	10(5.3%)	29	1	R	
Practice score					
Poor practice	136(72.7%)	164	6.6(0.8, 5.3)	0.076	11.2
Average practice	50(26.7%)	110	3.6(0.4, 29.8)	0.229	
Good practice	1(0.5%)	8	1	R	

NB:- cut off point for p-value < 0.25, candidate for multivariate analysis

As indicated by Table 4.20, the variables, the burden of anaemia was higher(33.68%) among respondents who hadn't know the benefits of birth spacing when compared with those who knows the benefit of birth spacing(6.1%). The chi<sup>2</sup> trends analysis (X<sup>2</sup>=5.3, p=value= 0.01) indicated the relation with anaemia. The risk for pregnant women eating a diet lack of iron, iron rich food(X<sup>2</sup>=12.5, p<0.0001), fish consumption(X<sup>2</sup>= 6.6, p=0.008), and usually drink coffee or tea(X<sup>2</sup>=13.7,p<0.0001) were statistically significant with anaemia.

On other hand, anthropometric measurements like MUAC (r=0.162, p-value<0.0001), women dietary diversity(r=0.132, p-value=0.04), food hunger(r=0.13, p-value=0.005), meal per day (r=0.130, p-value=0.005), age at marriage (r=0.138, p-value=0.003), age at birth(r=0.151, p-value=0.003) had statistically significant correlations with haemoglobin values. In addition to that, ANOVA analysis revealed that, gestational age (F=3.28, p=0.038), MUAC (F=5.36, p=0.001), household wealth index ratings (F=2.3, p=0.05), ANC visit (F=3.0, p=0.017), nutritional practice scores (F=6.01, p=003), food insecurity (F=4.27, p=005) had significant association with anaemia.

Table 4.20: Bivariate analysis on diet related characteristics among pregnant women in community of South Omo Zone, SouthernN NPR, Ethiopia, 2019

Predictors	Anaemia		Crude OR (95%CI)	PV	X <sup>2</sup> value
	Yes	No			
Do you know benefit of birth spacing					
No	158(33.68%)	212	1.8(1.1, 2.9)	0.01*	5.3
Yes	29(6.1%)	70	1	R	
Have you heard about anaemia					
No	81(17.27%)	107	1.2(0.8, 1.8)	0.24*	1.14
Yes	106(22.6%)	175	1	R	
Do you know the risk for pw					

eating a diet lack of iron?					
No	162(34.54%)	225	1.6(0.9, 2.7)	0.05*	3.19
Yes	25(5.33%)	57	1	R	
Do you know iron rich food?					
No	88(18.76%)	86	2.0(1.4, 2.9)	0.000*	12.5
Yes	99(21.1%)	196	1	R	
Have you received nutritional information					
No	111(23.66%)	120	1.9(1.3, 2.8)	0.000*	12.0
Yes	76(16.2%)	162	1	R	
Have you eaten Flesh meat(yesterday)					
No	154(32.8%)	219	1.3(0.8, 2.1)	0.218*	1.24
Yes	33(7%)	63	1	R	
Have you eaten Fish (Yesterday)					
No	171(36.46%)	233	2.2(1.2, 4.0)	0.008*	6.6
Yes	49(10.45%)	16	1	R	
Do you, usually drink coffee or tea					
No	56(11.9%)	43	1	R	
Yes	131(27.9%)	239	2.3(1.5, 3.7)	0.000*	13.7

Nb: cut off point for P-value < 0.25, candidate for multivariate analysis

By contrast, an individual's ethnicity, the pregnant women's level of education, marital status, residence, ITN utilization, age of pregnant women, partner's occupation, chronic disease, and attitude score could not be associated with anaemia within the bivariate model of logistic regression. After bivariate logistic regression model analysis was carried out, the eligible variables, with *P* -values that were less than 0.25 were entered in the logistic model (called multivariate analysis) to control confounder factors.

The prevalence of anaemia was higher in the respondents, who were not taking or using iron sulphate group than in the respondents who were taking or using iron sulphate groups. The odds of being anaemic were 5.7 times higher among pregnant women who were not taking or using iron sulphate than the respondents' groups who were taking iron sulphate (AOR=5.7,95%CI: 3.3, 9.8). The trend analysis via chi<sup>2</sup> test indicated that there was statistically significantly association between the groups taking and not taking ferrous sulphate and anaemia ( $\chi^2=61.3$ ,  $p<0.0001$ )(Table 4.21).

The possibility of anaemia reduced in the respondents' groups who reported walking a short distance daily i.e. walking less than 30 minutes to get to the health facility, compared to respondents who walked long distances (distance greater than 30 minutes). The odds of anaemia were 60% less likely to occur among those who walked less than 30-minutes than those who walked distances greater than 30 minutes (AOR=0.4, 95% CI: 0.3, 0.6). Similarly, the trend analysis suggested a strong relationship with pallor (anaemia) ( $\chi^2=23.4$ ,  $p<0.0001$ )( table 4.21). Moreover, the odds of anaemia were 40% less likely to occur among the respondents who had no malaria infection the past 3months compared with those who had malaria infection with in the past 3months. The pregnant women who did not follow any ANC care during their pregnancy times are more liable to develop obstetric and health related complications. In this study, out of the total respondents, 30 pregnant women did not follow any ANC care. Thus, the odds of anaemia were 80% less likely among those who followed at least ANC<sup>+2</sup> cares when compared with counter parts (AOR=0.2, 95%CI: 0.09, 0.6). In addition to this, pregnant women who had gestational age in 1<sup>st</sup> and 2<sup>nd</sup> trimester were negatively associated with anaemia (AOR=0.5, 95%CI: 0.3, 0.9).

However, the demo-graphic character like, family size composition had higher anaemia prevalence among 4-6 member families, 44% (n=101), 27% of anaemia (n=51), and 18% (n=35) were family with 1-3 and >6 family members, respectively. The trend analysis indicated that  $\chi^2$  2.6, family size has higher possibility of anaemia (OR=0.7, 95% CI: 0.4, 1.2).

In addition to this, pregnant women's occupation had higher prevalence of anaemia within the house wife occupation category, 78% (n=146); compared with the farmer occupation category's 10.6% (n=20), pastoralist groups 8% (n=15). Also, the prevalence of anaemia was higher within the non-formal or illiterate partner's education category when compared with formally attained school. This trend showed that education was a statistically significant variable ( $X^2=5.0$ ,  $p=0.01$ ), despite that, within multivariate analysis, (AOR=1.1, 95%CI: 0.6, 1.9) it was found to have insignificant association with anaemia.

Table 4.21 shown, the comparison of pregnant women work load with family members, The prevalence of anaemia was higher among over loaded group(20.2%) when compare with under loaded family members(3.1%). Thus, the odds of being anaemic was less likely among under and equally loaded category than counterparts who had over loaded workloads (AOR=0.45, 95%CI: 0.29, 0.69).

Table 4.21: Multivariate analysis on, obstetric and health related characteristics among pregnant women in community of South Omo Zone, South Nation Nationality People Region, Ethiopia, 2019

Predictors	Anaemia		Crude OR (95%CI)	P-Value	Adjusted OR (95% CI)	P-Value
	Yes	No				
Distance to HF						
Greater than 30 minutes	62	159	1	R	1	1
Less than 30 minutes	125	123	0.3(0.2, 0.6)	0.000*	0.4(0.3, 0.6)	0.000***
Taking IFA						
No	160	140	6.0(3.7, 9.6)	0.0000*	5.7(3.3, 9.8)	0.000***
Yes	27	142	1	R	R	1
Malaria infection						
Yes	82	142	1	1	1	1
No	105	140	0.8(0.5, 1.1)	0.16*	0.6(0.4, 0.9)	0.04***
ANC visit						

Zero (None)	30	32	0.6(0.2,1.5)	0.30	0.3(0.1, 0.8)	0.02**
Once	49	65	0.5(0.2,1.2)	0.121	0.4(0.13, 1.0)	0.04*
twice	54	119	0.3(0.1,0.7)	0.007*	0.2(0.09, 0.6)	0.004**
3times	40	57	0.5(0.2,1.1)	0.09	0.4(0.16,1.2)	0.10
4times	14	9	1	R	1	R
Gestational age(GA)						
1 <sup>st</sup> trimester	63	96	0.6(0.4,1.0)	0.08	0.5(0.3, 0.9)	0.021**
2 <sup>nd</sup> trimester	75	138	0.5(0.3,0.8)	0.011*	0.6(0.3, 1.0)	0.058
3 <sup>rd</sup> trimester	49	48	1	R	1	R
Workload						
Under loaded	15	25	0.67(0.3, 1.3)	0.259	0.39(0.17, 0.87)	0.03
Equally loaded	77	151	0.57(0.38, 0.8)	0.005	0.45(0.29, 0.69)	0.000***
Overloaded	95	106	1	1	1	1

\*\*\* NB: significantly associated ( $P$ -Value < 0.05)

Table 4.22 indicated, pregnant women reported that, the odds of being anaemic was 8.9 times higher among the severely under nutrition groups compared to those who had no under nutrition (AOR=8.9, 95%CI: 2.1, 37.3).

More-over, pregnant women who had not consume fish as a meal, had 2.4 times (AOR=2.4, 95%CI: 1.3, 4.5) increased risk of having anaemia. Regarding the pregnant women's drinking habit of coffee or tea regularly, the odds of developing anaemia was 1.6 times (AOR=1.6,95%CI:1.0, 2.6) higher than in those groups that did not drink coffee/tea. Besides to this, there was nearly two times (AOR=1.7, 95%CI: 1.0, 3.0) higher odds of having anaemia among non-birth spacing mothers-to-be compared to their counter parts. In the same way, the chance of developing anaemia was 2.5 times higher among the "moderate food insecure" group compared with their food secured counterpart respondents[(AOR=2.5,95%CI:1.4, 4.6)(Table 4.22).

Nevertheless, dietary diversity (AOR=1.3, 95%CI: 0.4, 3.9), meat (AOR=1.3, 95%CI: 0.8, 2.1), having prior information about anaemia (AOR=0.8, 95% CI: 0.6, 1.3), and consuming iron rich food (AOR=1.3, 95%CI: 0.9, 2.1), poor pregnant women's knowledge(AOR=1.5,95%CI: 0.6, 3.7) and poor pregnant women's nutritional practices(AOR=5.9, 95%CI: 0.7, 5.0) were factors that shown to have failed to associate with anaemia.

Table 4.22: Multivariate analysis on nutrition related characteristics among pregnant women in community of South Omo Zone, South Nation Nationality People Region, Ethiopia, 2019

Predictors	Anaemia					
	Yes	No	Crude OR (95%CI)	P-Value	Adjusted OR (95% CI)	P-Value
Under nutrition						
Mild Under nutrition	76	108	1.4(0.9,2.1)	0.08	1.5(0.9, 2.3)	0.079
Moderate Under nutrition	30	27	2.3(1.2,4.1)	0.007	2.3(1.2, 4.4)	0.10
Severe Under nutrition	10	3	6.7(1.8, 25.3)	0.005*	8.9(2.1, 37.3)	0.003***
No Under nutrition	71	144	1	R	1	R
Have you received nutritional information						
No	111	120	1.9(1.3, 2.8)	0.000*	2.0(1.2, 3.0)	0.002***
Yes	76	162	1	R	1	R
Have you eaten Fish (Yesterday)						
No	171	233	2.2(1.2, 4.0)	0.008*	2.4(1.3, 4.5)	0.006***
Yes	49	16	1	R	1	R
Do you usually drink coffee or tea						
No	56	43	1	R	1	R

Yes	131	239	2.3(1.5, 3.7)	0.000*	1.6(1.0, 2.6)	0.05**
Do you know benefit of birth spacing						
No	158	212	1.8(1.1, 2.9)	0.01*	1.7(1.0, 3.0)	0.05**
Yes	29	70	1	R	1	R
Household food security level						
Food secured	22	32	1.3(0.7,2.5)	0.3	1.3(0.6, 2.6)	1.3
Mild food insecure	43	60	1.4(0.8, 2.3)	0.14	1.5(0.8, 2.7)	0.15
Moderate food insecure	45	36	2.5(1.5, 4.2)	0.001	2.5(1.4, 4.6)	0.002***
Severe food insecure	77	154	1	1	1	1

\*\*\* NB: significantly associated ( $P$ -Value < 0.05)

#### 4.9 CONCLUSION

In this chapter of the study, the researcher presented the methods of descriptive measure and quantitative phase results includes demo-graphic characteristics( age of respondents, initial age, marital status, ethnic groups, religion, pregnant women education, partner's education), household wealth status, obstetric and health related services, women's dietary diversity, and food frequency presented in detail.

In household level, prevalence of food insecurity, cause of household food insecurity, secondary data for food insecurity, and factors related with food insecurity presented in detail. In addition to this, prevalence of under nutrition and predictors associated with under nutrition among pregnant women were presented in detail. Furthermore, anaemia prevalence, nutritional knowledge score, nutritional attitude score, nutritional practice score, the main reason for not taking or not utilizing iron sulphat, and predictors associated with anaemia presented in detail. Chapter 5 will be presenting the qualitative phase findings more in detail.

## CHAPTER 5: PRESENTATION OF QUALITATIVE PHASE FINDINGS

### 5.1 INTRODUCTION

Chapter five presentations were divided in to two sections. Firstly, it was presenting quantitative demographic characteristics of the key informants. Secondly, it was presenting qualitative participants' views, that were collected by using focus group discussions and individual in-depth interviews guide.

The following research objectives were answered:

- Identify factors contributing for food insecurity at household level.
- Determine factors contributing for under nutrition among pregnant women.
- Determine causative factors contributing anaemia among pregnant women.

As noted by Creswell, and Creswell (2018:4); Creswell (2014:232) qualitative research is an approach for studying and comprehending for the significance of individuals or human issue, data normally collected in the participant's setting, data analysis inductively working from specifics to broad-spectrum themes, and the investigator making interpretations of the meaning of the data.

Qualitative research commonly uses words, text, opinion whereas quantitative research mostly uses numbers, and relies on the use of closed-ended questions to respond to exploration questions, unlike qualitative research which may use open-ended questions.

Data analyses in qualitative research proceeds hand-in-hand with other parts of developing the qualitative study, namely, the information gathering and the write-up of findings. While interviews are going on, researchers may be analysing an interview collected earlier, writing memos that may ultimately be included as a narrative in the final report, and established the organisation of the final report (Creswell, 2014:245).

## 5.2 QUALITATIVE DATA COLLECTION PROCESS

Qualitative data was collected through in-depth interviews that were conducted using an interview guide (Annex I) and focus group discussions (FGD) that were conducted using a focus group discussion guide (Annex H ). A total of 5 focus group discussions were conducted among pregnant women in five selected district like (Koyebe, Keyiafer, Turmi, Omorate, & Gazer). The average focus group consisted of 9-12 participants. Eighteen (18) in-depths interviews were conducted among health program managers from the district health office, health centre directors, chief executive officers and zonal experts.

A mapped process was used by the researcher for the focus group discussions. First of all, the researcher and research assistant introduced themselves and explained the purpose and objectives of this research to the participants. The research team considered basic ethical principles; and ensured the participants of their anonymity and confidentiality. The researcher then asked the study participants for informed consent and permission to record their voices and take notes of the interviews and focus group discussions.

Five (5) focus groups discussions and eighteen (18) interviews were conducted in rural districts. An in-depth key informant interview took approximately 45 minutes - 1hour each while a focus group discussion lasted between 30-45 minutes. All focus group discussions were conducted in the local language (Dasenech, Hammer, Beny, Tsemay, Malle, & Ari) whereas the in-depth interviews with health program managers were conducted in Amharic; it is the official working language of South Omo Zone, Ethiopia. Both the focus group discussion and the in-depth interviews were recorded, and field notes were taken during the discussions. Voice recordings were transferred to a computer hard drive at the end of each day and then transcribed. The transcriptions were sent for translation into English. Finally, the data were catagorized and thematically analysed into themes and subthemes.

As explained in methodology section, qualitative data was collected face-to-face through focus group discussions and expert interviews. The research participants were purposeful (Yin, 2016:93) selected including health program managers (IDI) and pregnant women. The researcher divided the focus group discussions based on the duration of pregnancy (first, second and third trimester) for each selected district.

The in-depth interviews and focus group discussions were held to ascertain underlying opinions, attitudes and reasons for under nutrition status from the participants. Creswell and Creswell (2018:185) note the importance in qualitative research of intentionally selecting participants that will fully comprehend the issue and the research question. The researcher collected data from the key informant interviews and the focus group discussions. The researcher then reviewed the data, made sense of it, categorized the data and organized it into themes and subthemes.

### 5.3 DEMOGRAPHIC CHARACTERISTICS OF KEY INFORMANTS OF IN-DEPTH INTERVIEWS

Qualitative data were collected from a purposefully selected sample of health workers through in-depth interviews, using in-depth interview guide that is attached as Annexure I in page 328. Qualitative data were collected until saturation. A total of eighteen (18) health programme managers voluntarily participated in the interviews.

The majority of the participants, 83.3 % (n=15) were male participants and 17% (n=3) were female participants. The mean (SD) of the participants' age was 31.1±6.1, and the median age was 31 years with the youngest person being 23 years old and the oldest 42 years of age. More than a third of the participants, 38% (n=7) had 4-8 years of work experience; 33.3% (n=6) of the participants had more than 8 years of work experience; and 22%(n=4) of the participants had 2-4 years of work experience. The remaining 5.6 %(n=1) of the research participants had less than one year of work experience. The mean ± (SD) of work experience of the participants were 7.3±3.9, with

a minimum of 1 year experience and a maximum of 15 years of experience. A majority, 94% of the participants had at least 2years work experience.

A large proportion, 66.7% (n=12)of the participants had a qualification of a first degree, 27.8 %(n=5) of the participants had a diploma, and only 5.6%(n=1)of the participants had a master’s degree qualification. A large proportion of the participants, 38.9%(n=7) were health centre directors, more than one third, 33.3%(n=6) of the interview participants were district health office managers and nearly, 16.7%(n=3) of the members who participated in the key informant interview were zonal level experts in designation, and the rest, 11.1%(n=2) participants were chief executive officer (CEO) from hospital (Table 5.1).

Table 5.1: Basic characteristics of participants in the in-depth interview in South omo zone South NNPR, Ethiopia, 2019

Variable	Frequency	Per cent
Sex		
Male	15	83.3
Female	3	16.7
Age		
20-30 year	9	50
31-40year	8	4.4
>41year	1	5.6
Work experience with nutritional status		
< one year	1	5.6
2-4 year	4	22
4-8year	7	38.9
>8year	6	33.3
Qualifications		

Diploma	5	27.8
Degree	12	66.7
Master	1`	5.6
<b>Designation</b>		
HC <sup>c</sup> directors	7	38.9
WoHo <sup>b</sup> Head	6	33.3
CEO <sup>a</sup>	2	11.1
Zone experts	3	16.7

CEO = chief executive officer, WoHo<sup>b</sup> =Woreda health office, HC<sup>c</sup>=health centre

#### 5.4 PART ONE: IN-DEPTH INTERVIEW FINDINGS

Key informant interviews were conducted among health programme managers from the district health office, health centre directors, chief executive officers and zonal experts.

Five major themes and subthemes emerged from the in-depth interviews, as presented below:

1. Food insecurity burden, factors, coping strategies and strategies to address household food insecurity.
2. Reasons for under nutrition in pregnant women.
3. Under nutrition mitigating strategy in pregnant women.
4. Challenges for the implementation of nutrition programmes.
5. Anaemia burden, consequence and prevention strategy.

##### 5.4.1 THEME 1: FOOD INSECURITY BURDEN, FACTORS AND STRATEGIES TO ADDRESS HOUSEHOLD FOOD INSECURITY

Theme 1 relates to the food insecurity burden, factors and strategies to address household food insecurity at household level with sub-themes and categories are articulated in Table 5.2 below.

Table 5.2: Theme 1: Food insecurity burden, factors and strategies to address household food insecurity at household level with subthemes and categories.

Theme	Sub-theme	Categories
Food insecurity burden, factors and strategies to address household food insecurity	Burden of food insecurity	Worry about food, do not eat preferred food, do not eat entire day and evening
	Factors related to food insecurity	Drought, rain shortage
		Food sources always from purchasing, food aid community, pastoralist community, climate change, poor soil fertility
		Omo river is not used for irrigation, ethnic based conflict
		Population growth and no guideline available
	Suggestion to address food insecurity	Ensure food security, work safety net, youth employment/work opportunities for youth, settlement (pastoralist settlement), encourage pastoralist community for self-production, supporting water irrigation system for pastoralist area
	Coping mechanisms	Sell cow/goat and buy maize powder, eat uncommon tree (“negode”), food aid, safety net, borrow food/crop from neighbouring kebele ethnic family, go to town to wait at the family home, eat non-acceptable leaves, brides, sell fire wood and grass in town and daily labour for food in town
Collaboration and coordination	Sectorial-integration and documents/guidelines	

#### 5.4.1.1 Magnitude of food insecurity

Food security is a general health problem in developing nations such as Ethiopia. Evidence suggests that more than 820 million individuals need more to eat (FAO, UNICEF, WFP & WHP, 2019:6). It emerged from the in-depth interview that participants experienced food insecurity in their districts.

One participant from an agrarian community in the Zone with high food insecurity remarked:

*“The area is green most people planted trees, coffee in the land, not crop for day to day consumption, due to this, most farmers family participants go sleep without any foods, even others unable to eat day and night due to lack of nourishment in their house”* (28 year-old participant).

More-over, food insecurity was a common concern for pastoralist communities. Participants explained that they were worried about food and did not eat preferred food.

A district health office manager explained this phenomenon in more detail:

*“... currently in my district 29,115 peoples are using productive safety net, other 23,000 peoples are regular food aid users from government”* (Nurse, 34-year old participant). This indicates the high number of people that are food insecure and receiving support from the government.

In addition to this, a large proportion of the pastoralist communities were not working the land. Participants from the other pastoralist community explained that *“there are many people suffering from food insecurity and the community survives on government food aid”* (30-year-old participant).

In contrast to this, the participants from the in the in-depth interview sessions in the high land remarked the following:

*“In my cluster most people are agrarian and plant crop based on seasons, due to this, have no much food insecurity and food aid”* (34-year-old participant).

#### 5.4.1.2 Factors related to household food insecurity

A large proportion of participants viewed drought, rain shortage, climate change, the food aid community, and seasonal variation to household food insecurity.

One in-depth interview participant noted that the *“community created dependency for safety net aid, due to this they do not want to work”* (27-year-old participant). In Ethiopia, government developed productive safety net program (PSNP) strategy to address household chronic food insecurity by offering food or cash for poor people to ensure food needs (Cochrane, & Tamiru, 2016:650; World Bank group, 2013:2)

Another participant from the pastoralist district said:

*“... I remember the last time a lot of livestock’s died by drought”* (23 year-old participant).

The reasons for food insecurity in the agrarian community were explained by the fact that food sources are attained from purchasing, and land shortages for farming.

As a 28-year-old participant mentioned:

*“Previously there were a limited number of people living and working in their land, but recently the number of peoples increasing, as result farming land narrowing, and youth not employed”*

Most pastoralist district participants mentioned that pastoralist community agriculture was traditional farming was for subsistence. Farmers did not use technology.

A participant from the pastoralist district remarked the following:

*“Previously pastoralists benefited from omo river “sheshe” for farming the land, but now there are different projects like hydroelectric power and sugar project that decrease the water”* (35-year-old participant). “Sheshe” is an Amharic word referring to water that overflows. The pastoralist community needs a river overflow to cultivate their crops.

#### 5.4.1.3 Suggestions to mitigate food insecurity

Food insecurity is a major threat for development in Africa and especially in Ethiopia. It therefore requires intensive intervention to address food insecurity. Participants suggested different prevention strategies in the in-depth interviews, and the pastoralist settlement encouraged self-production as an important prevention strategy.

A 27 year-old participant explained:

*“... I believe the pastoralist community needs to make independent, settled and self-administer for consumption, for this, governments support for irrigation and agricultural technology transfer must be mandatory”.*

Other participants from the agrarian communities also mentioned strategies to guarantee food security, a productive safety net, and youth work opportunities are very important strategies to mitigate food insecurity.

*“Currently, youth number increasing dramatically in my district, so it needs youth work opportunities, mean time government support for those food insecure households are good options by productive safety net”* (29-year-old participant).

#### 5.4.1.4 Coping mechanisms for food-insecurity

Participants in the in-depth interviews mentioned ways in which households coped with food insecurity, namely by selling cows or cattle/goats; buying maize powder; eating uncommon tree seeds (“negode”), food aid; safety nets; borrowing food/crop from neighbour kebeles of their ethnic families; reducing the number of meals; eating very cheap food called “possese”, going to urban areas to wait at the house of relatives; eating leaves that are not acceptable; receiving brides; and going to town for daily jobs for food.

One respondent said:

*“In my cluster households sell out their livestock to buy maize-based powder during starvation” (32year old participant).*

Other respondents added the following:

*“During hunger time family go river get tree seed of ‘Negode’ and eat” ( 35 year old participant). “Negoda” in the local language of the communities, is not normally edible food.*

*“I have seen many families went their ethnic neighbour kebele to borrowed crop/ food” (30 year-old participant).*

*“In my district families eat unacceptable leaf and brides due to cope hunger”. “.... Some families get food aid, other safety net from government ...” (26 year old participant)*

*“In my town young people started to work daily labour at private house to get food” (32 year old participant)*

“... not few, large number of the family member displaced from rural to urban, to stay at relative house” (29 year participant).

#### 5.4.1.5 Collaboration and coordination to strengthen food security

Inter-sectorial integration to ensure food security is very critical. It was clear from the interviews that inter-sectorial collaboration and coordination currently was very weak.

The majority of the district health managers explained that despite the existence of district steering committees consisting of agricultural, education, finance, health, women affairs and other sectors, these are not functional and there are also no guidelines at the district level for food security and under nutrition. Says one participant:

*‘In my district, there is steering committee for collaboration and coordination, I was a member, we have met 2 times per year only, and also no practical action plans developed’* (23-year-old participant).

#### 5.4.2 THEME 2: REASONS FOR UNDER NUTRITION IN PREGNANT WOMEN

There was one subtheme presented in theme 2. The sub-theme related to reasons for under nutrition in pregnant women. The detail of the sub-theme and Categories is described in Table 5.3.

Table 5.3: Theme 2: Reasons for pregnant women under nutrition, sub-theme and Categories

Theme	Subtheme	Categories
		Poor awareness of nutrition
Reasons for under-nutrition	Reasons for under-nutrition	Economy (poverty)
		Cultural priority for husband & limited animal source food consumption
		Work overload

#### 5.4.2.1 Reasons for under nutrition among pregnant women

Most of the interview participants explained the reasons/factors that affect the nutrition of pregnant women, as poor awareness on nutrition, a weak economy (poverty), and the workload of pregnant women.

Some of the interview participants explained that culturally the husband is prioritized to receive food first. Furthermore, women are limited by cultural beliefs to consume animal sources such as milk, eggs, and meat.

The participants further elaborated on how women's workloads affect their nutrition:

*"In my community, I have seen day to day, women working agriculture, go market place and prepare family food, and fetch water from river, due this, they may loss energy, unable to substitute food and fluids"* (26-year-old participant).

Participants discussed how, culturally, food priority is given to husbands and further explained this phenomenon:

*"In my community most of pregnant women had poor awareness, and also culturally they are forced to offer food for her husband primarily and she may eat the remaining food, if the food totally completed, she may consume coffee and go her work"* (37-year-old participant).

One participant from an agrarian district mentioned that pregnant women are not permitted to eat animal source foods like milk, eggs, meat, and butter.

A district health manager expressed his view on how to address these cultural taboos:

*"So as to improve pregnant women nutritional status, I believe, community must avoid cultural inhibition of food for pregnant women"* (24-year-old participants).

### 5.4.3 THEME 3: COMMUNITY-BASED SOLUTIONS TO MITIGATE UNDER NUTRITION

Seven sub-themes are presented under theme 3. The sub-themes are presented at different levels: pregnant women, husbands, community, partners, government, health facilities and the FMOH prevention strategy. The detail sub-themes and categories are presented in Table 5.4.

Table 5.4: Theme 3: Community-based solutions to mitigate under nutrition

Theme	Subtheme	Categories
Mitigating solutions for undernutrition	Individual level	Improve PW <sup>b</sup> diet, equally accessed diet, family planning, and health education.
	Family level	care for women, husband support
	Community level	supports and monitor, contribution of communities to maternal nutrition, avoid culturally inhibited animal source food
	Partner level	Technical, financial, and logistic support, and capacity building
	Government level	adequate budget allocation, intervention for women that are women that are malnourished, support for irrigation logistics, peaceful environment and community influence
	Health facility level	Strengthen PW <sup>b</sup> screening, health sector Integration with the agricultural sector
	FMOH <sup>a</sup> level	special support for pastoralist communities, pre-maternity and maternity leave needs improvement, and drug supplements for pregnant women, i.e. iron fumarate

FMOH<sup>a</sup>= Federal ministry of health, PW<sup>b</sup> – Pregnant women

#### 5.4.3.1 Pregnant women level

Most pregnant women in the study area have no awareness about pregnancy related nutrition, and a large proportion of the participants recommended equal dietary provisions for both pregnant women and their husbands are very vital to alleviate under nutrition.

Participants also encouraged the use of family planning for birth spacing and health education as indicated in the response below:

*"If we improve pregnant women nutrition status, children feeding will improve, simultaneously, infants start to grow at uterus well, additionally, women needs to use family planning to limit number of children"* (25-year-old participant).

#### 5.4.3.2 Family level

Participants recommended family support to progress the nutritional care of pregnant mother. In pregnancy, women need higher energy foods, extra food and also snack between meals. Husband can further support nutritional improvements as indicated by the response below:

*"In my district husband is the only decision maker, and lesser support, so I advise husband especial support for pregnant women nutrition improvement"* (34-year-old participant).

#### 5.4.3.3 Community level

Most of the participants advised that the nutritional status of pregnant women should be supported and monitored. The participants further recommended that the community contribute to the nutrition of pregnant women and avoid culturally taboos that limit the consumption of food from animal sources.

*“In my district there is no encourage able things in pregnant women nutrition, therefore, community advised to have especial attention for pregnant women nutrition” (30-year-old participant).*

Moreover, other participant’s remarked: *“I advise self-production for the pastoralist community is very important soulution to overcome under nutrition and household food insecurity”.*

#### 5.4.3.4 Partner level/stakeholder

Participants who participated in the in-depth interviews suggested two broad strategies to be included in the new guidelines to manage under nutrition in pregnant women: logistical, technical and financial support for pregnant women; and capacity building for health extension workers and health care professionals such as nurses and medical doctor. Says one key informant:

*“Currently, in my district, screening given less attention, and also is working irregular, due to health extension skill gap and poor awareness, I advise the partner to offer nutrition related capacity building for front line community health workers” (28-year-old participant).*

#### 5.4.3.5 Government level

Most of the participants in the in-depth interviews advised that government should put in place the following interventions and/or programmes: an adequate budget for nutrition programs; sustainable interventions for malnourished women; support for irrigation and water pipes for pastoralist communities; and address conflict to create a peaceful environment for the implementation of nutritional programmes for pregnant women. A 27-year-old participant remarked in this regard:

*“My district is one of pastoralist community, almost all residents have gun in assumption to keep their live stocks, but sometimes, they kill people working their community unkindly, due to this, most of the time there is conflict and absence of peace between ethnic groups, as the result, we have stopped working pregnant women nutrition related activities at community level”.*

Participants believe that government has the power to address under nutrition in pregnant women and articulate this belief as follows:

*“Government has a power for community influence and able to make women development structure functional”.*

#### 5.4.3.6 Health facility level

The interview participants emphasised the significance of strengthening nutrition screening for pregnant women. A few of the participants also recommended managing severe malnourished pregnant women with drugs and therapeutic diets, and also strengthening health sector integration with the agricultural sector are very important mitigation strategies.

The hospital participant remarked in this regard:

*“Currently, in my district pregnant women nutrition screening is not given attention and so, I suggest strengthening regular pregnant women nutrition screening like under five children is very important to identify under nutrition early and it helps us to give counseling”.*

In addition to this, an agrarian district participant said:

*“I strongly recommend integration with agriculture, early warning and other sectors for the production of garden fruits, vegetables and other food category, in our community most of the farmer produce only one type of crop”.*

#### 5.4.3.7 Federal ministry of health (FMOH) level (policy makers)

Some of the participants from the pastoralist community suggested special support for the improvement of the nutrition of pregnant women as a vital community concern. Iron supplementation was also perceived to be inadequate. Participants from a peasant community recommended that pre-maternity and maternity leave should be modified and amended for pregnant women and comment that:

*“The current, government rule for pregnant women pre-maternity and maternity leave for 4 months only, I believe this is so limited, I think it better to consider at least 6 months, this may give time for maternal nutrition restoration and child breast feeding”* (28-year-old participant from an agrarian community).

In addition to this, a nutrition program is very broad and need substantial support. A 24-year-old study participant remarked:

*“In my district, there are a lot of under nutrition cases, so, I recommend, especial support in pastoralist nutrition implementation is very critical”.*

An expert commented on inadequate iron supplementation for pregnant women:

*“ Currently, we are prescribing iron sulphate that is 30 g/dl iron content, in opposite, iron fumarate consists of 106g/dl iron content, I suggest best supplementation drug for early prevention”* (28-year-old participant).

#### 5.4.4 THEME 4: CHALLENGES IN THE IMPLEMENTATION OF NUTRITION PROGRAMMES

One sub-theme was identified in theme four. The sub-theme related to a barrier to the implementation of nutrition programmes in pregnant women. The detailed sub-theme and categories have shown in Table 5.5 below.

Table 5.5: Theme 4: Challenges in the implementation of nutrition programmes, sub-theme and categories

Theme	Subtheme	Categories
Challenge for nutrition program implementation	Barrier for implementation of nutrition program	Budget, Poor awareness, logistic shortage, seasonal variation, climate change, weak inter-sectorial integration

#### 5.4.4.1 Barriers to the implementation of nutrition programmes

Almost all participants reported budget constraints; poor community awareness; and logistic shortages as challenges for the implementation of nutrition programmes for pregnant women at district level. Other study participants also explained seasonal variation; climate change; and weak inter-sectorial integration as barriers. One participant commented in this regard,

*“In my community, farmers cultivate crops accordingly, however, when it reaches, they send everything for market for selling, and then they drink alcohol and lost their money at the end of the day the family member suffer with under nutrition” (23-year-old female participant).*

Another participant remarked:

*“In my district seasonal variation is a big challenge in the implementation of nutrition for pregnant women, especially from January-June months is a lot of peoples are always suffering in nutrition related problem, however, September-October months relatively better months because they get maize and sorghum” (34-year-old participant)*

#### 5.4.5 THEME 5: BURDEN OF ANEMIA IN PREGNANT WOMEN, CONSEQUENCES AND STRATEGIES FOR PREVENTION

Two sub-themes were listed under theme 5. The sub-themes related to the burden of anaemia; the consequences of anaemia in pregnant women; and the prevention strategies for pregnant women. The sub-themes and categories are stated in Table 5.6

Table 5.6: Theme 5: Burden of Anaemia among pregnant women, consequences and strategies for prevention

Theme	Subtheme	Categories
Anaemia burden and strategy for anticipation	Burden and consequence	Highly prevalent, not seen as a major problem but take majority of cases 30% were referred still birth, maternal-hospitalization maternal death with anaemia, increased number of referral,
	Suggested local mitigating solution	Improve feeding frequency, variety, pattern, treat any malaria infection, deworm, supplement with high iron rich drug, awareness, and workload

##### 5.4.5.1 Burden and consequences of anaemia in pregnant women

Anaemia is a common health problem (WHO, 2008:7). Many mothers lose their lives and as a result, the condition also affects the foetus. Most participants reported a high prevalence of anaemia in their district. They also reported that anaemia was a neglected condition as noted by one participant from a pastoralist community:

*“ Anaemia is not seen as big problem in my district, not only this, but also neglected and not given attention, despite of this, we refer large proportion of anaemia developed*

*pregnant women for higher health facility, I guess anaemia magnitude, about 30% of referred cases (27-year-old a male participant).*

Other participant remarked in this regard:

*“In my hospital greater than expected proportion of pregnant women diagnosed with anaemia sign and symptom, I remember the previous report, out of 10 pregnant women 3-4 pregnant women identified with anaemia confirmed by laboratory” (29-year-old a male participant).*

Some participants from the agrarian community indicated the following:

“In my hospital, there are a lot of still birth cases and also maternal death with anaemia complication, seen many times” (30-year-old a male participant).

#### 5.4.5.2 Suggested local mitigating strategies

Participants agreed on the following prevention strategies for anaemia in pregnant women: improving the frequency of meals for pregnant women; providing a variety of food; treatment of malaria infection, de-worming pregnant women; iron supplementation; and raising awareness in pregnant women of this condition.

One participant commented:

“In my cluster the main root cause of anaemia among pregnant women was feeding problem, pregnant women eat available food not include variety” (42-year-old a female participant).

Another participant remarked:

*“In my community no one care for pregnant women in diet. Variety, however, community believe, if pregnant women wish, not get that wished food, something black mark may appear on her body, so, only pregnant women wished food given...” (30-year-old a female participant).*

Participants from both pastoralist and agrarian communities emphasised the importance of the involvement of husbands in the work of women for the prevention of anaemia in pregnant women. One district manager said:

*“...Work culture should be improved for pregnant women, women cultivate agricultural land, build house, prepare food at household, and mean time go market, but husband only keep goats at field, so, I suggest husband should support and involve himself in housework” (36-year-old a male participant).*

## 5.5 PART II: FOCUS GROUP FINDINGS

Five Focus group discussions were conducted in each of the five districts, namely Malle, Benytsemay, Hammer, Dasnech, and South Ari. Between 9 and 12 participants were involved in each focus group discussion (Table 5.7). The median age of participants was 29.4 years in a range of 24-38 years.

Table 5.7: Focus group discussion participants (FGD) among pregant women in 5 districts, South Omo Zone, South NNPR, Ethiopia, 2019

District	Number of participants	FGD Site
Malle	10	koyebe
Benytsemay	9	keyiafer
Hammer	12	Turmi
Dasench	10	Omorate
South Ari	12	Gazer
Total	53	

Three factors that affect the nutritional status of pregnant women were explored: causes of anaemia in pregnant women; measures of anaemia in pregnant women; and actions taken for the improvement of the nutrition status in pregnant women. The theme, sub-themes and categories are further described below.

### 5.5.1 THEME 1: FACTORS THAT AFFECT THE NUTRITIONAL STATUS IN PREGNANT WOMEN

One sub-theme was listed in theme 1. The sub-theme related to common factors of under nutrition. The sub-themes and categories are articulated in Table 5.8.

Table 5.8: Theme 1: Factors that affect the nutritional status of pregnant women, themes, sub-themes and categories

Theme	Subtheme	Categories
Factors that affect pregnant women nutritional status	Common factors of under nutrition	Nutritional taboo (culture)
		Economy(poverty)
		Awareness of the male
		Food priority given to the husband in the house
		The workload of pregnant women
		Small quantities of food

#### 5.5.1.1 Common factors of under nutrition among pregnant women

Focus group participants reported the following common factors of under nutrition: the nutritional taboo that prohibited pregnant women from consuming milk, meat, honey, and eggs; and prioritising men to eat first.

Focus group participants explained the lack of money to buy preferred food and most of participants agreed that pregnant women work more than other family members in the household; cooking, caring for their children, farming, and going to the market to buy food.

This finding correlated with the expert interviews. One focus group participant explained:

*“Duba, honey, meat, milk is forbidden to eat for pregnant women that may affect foetus”* (FGD participant from Turmi site). (The word, “duba” is an Amharic word that mean pumpkin.

Another FGD participant explained:

*“In our community, there is no special feeding and nutritional care for pregnant women; pregnant women eat what she gets”* (FGD participant from Koyebe site).

This finding also correlates with the results of the in-depth interviews.

One study participant said:

*“When I stay for long time for job I cannot eat my food on time”* (FGD participant from Keyiafer site)

Another participant stated:

*“I know many families who had large family size, so, they eat very small food”* (FDG participant from Gazer site).

The opinion of one of the participants was contradictory to the others:

“In my residence area has no much food shortage” (FGD participant from keyiafer site)

FGD participants explained that culturally women were forced to offer food to their husbands first. One study participant said:

“When I prepare food, I must give first for my husband and then for children, lastly I will eat” (FGD participant from Keyiafer site).

### 5.5.2 THEME 2: PERCEIVED CAUSES OF ANAEMIA IN PREGNANT WOMEN

One sub-theme was listed the theme 2 which is a risk factor for anaemia. The sub-theme and categories are articulated in Table 5.9.

Table 5.9: Theme 2: Perceived causes of anaemia in pregnant women

Theme	Subtheme	Categories
Major reason for anaemia among pregnant women	Risk factor for anaemia	Infection related to malaria
		Reduced frequency of meals during pregnancy
		Perception of food for sell
		Inadequate knowledge on diet variety
		Absence of ANC visit
		Blood loss
		Food insecurity

#### 5.5.2.1 Risk factors of anaemia in pregnant women

Participants in the FGD noticed that a reduced frequency of meals; inadequate knowledge on diet variety, the absence of antenatal care visits; and the perception of food for sell were common factors that predispose pregnant women to anaemia.

The participants indicated that:

*“We always eat the same food that is ‘possese’ available always in my house”. (FGD participant from Gazer site).*

An FGD participant from Turmi said:

*“I started my pregnancy follow up early at 4 month, and then health centre professional offered a lot of diet related counselling and anaemia prevention drug that is red in colour”.*

Another participant from Keyiafer site said:

*“In my community, relatively good foods sent for market for sell like “teff,” maize and other food producing crops”( FGD participant from Keyiafer site)*

A FGD participant remarked:

*“Many times, we did not eat our preference food, because absence of food in the house”( FGD participant from Gazer site)*

Most participants explained that:

*“Many days we worry for food absence”( FGD participant from omorate site)*

### 5.5.3 THEME 3: MEASURES OF ANAEMIA

One sub-theme was listed under theme 3. The sub-theme method related to measures for anaemia prevention. The sub-theme and categories are stated in table 5.10.

Table 5.10: Theme 3: Measures for reducing the burden of anaemia in pregnant women at South Omo Zone, Southern NNPR, Ethiopia, 2019

Theme	Subtheme	Categories
Suggested local mitigating solution	Measure for reducing the anaemia burden in pregnant women	Drug receiving from HC use strictly
		Male involvement
		Contraceptive methods, ANC follow up

#### 5.5.3.1 Measure for reducing the anaemia burden in pregnant women

The participants suggested important intervention for the prevention of anaemia such as strictly adhering to the prescription of drugs received from health care facilities; male involvement in the nutrition of pregnant women; and the importance of contraceptive methods to delay pregnancy.

One participant remarked:

*“In my community all the things are in the hand of our husband, so, it is better to aware our husband to involve on pregnant women nutrition” (FGD participant in Keyiafer site).*

Another participant stressed the importance of family planning.

*“I have more than 6 children,culturally women expected to give birth with out stoping,due this, we are unable to space, I think family planning is very important to space and limit the number of children” (FGD participant koyebe site).*

Regular follow-up and adherence of iron sulphate drug for anaemia prevention were further emphasised by participants.

*“...I suggests all pregnant women to go health facility to get drug and nutrition counselling and care” (FGD participant Turmi site).*

Finally, the findings above indicate the risk factors for pregnant women related to under nutrition, anaemia and household food insecurity.

## 5.6 CONCLUSION

In chapter 5, the researcher presented qualitative findings. This was divided in to two sections. Firstly, it was presented quantitative demographic characteristics of the key informants. Secondly, it was presented qualitative participants views, that were collected by using focus group discussions (FGD) and individual in-depth interviews. About, eighteen (18) in-depth interview participants were included in key informant interview; their designations were health center directors, district health office managers, chief executive hospital officers (CEO), and zonal experts. During in-depth interview participants raised their opinions and views, based on that, the researcher identified and presented five major theme and sub-themes like food insecurity burden, factors, coping strategies and strategies to address household food insecurity, reasons for under nutrition in pregnant women, under nutrition mitigating strategy in pregnant women, challenges for the implementation of nutrition programmes and anaemia burden, consequence and prevention strategy.

Furthermore five focus group discussions (FGD) were conducted in 5 districts by using FGD guide, total of 53 participants included in discussions. During the FGD sessions participants gave their views and suggestions, based on that, researcher classified 3 major theme and sub-themes such as factors that affect the nutritional states in pregnant women, perceived causes of anaemia in pregnant women, measures for reducing the burden of anaemia in pregnant women. Chapter 6 will be presenting discussion of the main quantitative results and qualitative findings in detail.

## **CHAPTER 6: DISCUSSION OF THE MAIN QUANTITATIVE RESULTS AND QUALITATIVE FINDINGS**

### **6.1 INTRODUCTION**

This chapter gives a detailed account of the main quantitative results and qualitative findings, of this mixed method research study, relating to the burden and risk factors of food insecurity and anaemia in pregnant women. Despite current interventions, food insecurity is a global challenge, in Africa and in Ethiopia. A significant body of evidence suggests that food insecurity is prevalent in agrarian communities. However, there is limited evidence of studies on food insecurity and nutritional status in pastoralist communities. The main quantitative results and qualitative findings of this study will be discussed and compared to the quantitative results and qualitative findings of the other previous research studies. This study out comes will inform policymakers, decision makers, programme implementers, and researchers on interventions and prevention strategies.

The present study aimed to answer the following research questions:

- What is the prevalence of food insecurity at household level in SNNPR, Ethiopia?
- What are the main factors that affect food security among households in SNNPR, Ethiopia?
- What is the magnitude of the under nutritional status of pregnant women in SNNPR, Ethiopia?
- What are the main factors contributing to under nutritional status of pregnant women in SNNPR, Ethiopia?
- What is the prevalence of nutritional anaemia among pregnant women in SNNPR Ethiopia?
- What are the causative factors of nutritional anaemia among pregnant women in SNNPR, Ethiopia?

- What should be done for prevention of under nutrition of pregnant women in SNNPR, Ethiopia?

## 6.2 FOOD INSECURITY

### 6.2.1 The prevalence and burden of household food insecurity

Only 12 per cent of households in the current study's finding were food secure. Furthermore, the majority of the households (49%) are severely food insecure; 17 per cent of the households experienced moderate food insecurity, 22 per cent of the households had mild food insecurity. The prevalence of food insecurity in households was 88 per cent, from mild to severe. Seven out of eight households were food insecure and the findings indicate a very high burden of food insecurity in this study area.

These findings correlate with evidence from a study conducted in the Kampala Slums in Uganda with a prevalence of 88.5% (Nantale, Tumwesigye, Kiwanuka & Kajjura, 2017:126). Another study conducted in Nairobi, Kenya showed a prevalence of 85% (Kimani-Murage et al, 2014:11), literature from Ecuador on HFI prevalence was 81% (Weigel, Armijos, Racines, & Cevallos, 2016:8), and a study from the local area conducted in Jimma, a town in South West Ethiopia indicated a prevalence of 83.5% (Kisi, Tamiru, Teshome, Tamiru & Feyissa, 2018:4). Also, 82% of households in the Sidama districts in southern Ethiopia faced mild to severe food insecurity (Regassa & Stoecker, 2011:1281). The researcher used the FANTA III tool to measure household food insecurity against certain criteria (HFIAS) (Coates, Swindale, & Bilinsky, 2007:13), and also employed a community-based household survey.

The current figure was shown a higher prevalence of food insecurity when compare with previous evidence from, Addis Ababa, Ethiopia 75% (Birhane et al, 2014:5), Tigray, Ethiopia 68.8% (Asmelash, 2014:166), Amhara, Ethiopia 65.3% (Alemu, Ahmed, Yalew, & Simanie, 2017:5), Afar, Ethiopia 70.4% (Abdu, Kahssay, & Gebremedhin, 2018:5), another study from Oromia, Ethiopia 58.5% (Mulugeta, Tiruneh, & Alemu,

2018:5), and Gojjam, Amhara, Ethiopia 58.1% (Motbainor, Worku, & Kumie, 2016:7). As study report from other country such as South eastern Kenya 62.7% (Shinsugi et al, 2015:4), In Latin America 75 and 25 % reported moderate - severe food insecurity (Schmeer, Piperata, Rodríguez, Torres, & Cárdenas, 2015:2922).The possible justification for such disparity could be that data collection was conducted during the dry season (May-June) when crops are not yet viable for consumption and due to this; food was not available during this time showing that a change in seasons may affect household food security.

Research from provincial Kenya, carried out between the arid period and the rainy season's showed huge contrasts between the after-effects of the two seasons. With the dry season indicating generally more elevated levels of food insecurity compared with the stormy season (M'Kaibi et al, 2015:10). Seasonality is an important factor that may affect HFI as well as malnutrition (Ali et al, 2013:2020). This finding indicates that there was a high burden of food insecurity in the study area that requires urgent intervention to tackle the food emergency.

Henjum et al (2019:5) stated that, there was 93% food insecurity among asylum seekers living in Norway and only 7% of the respondents were food secure. However, the present investigation reported slightly lower than Henjum's report. The reasons for such variations have been due to agro-ecological and sociodemographic characters of the study settings.

The present evidence indicated that, 70.4 % of the respondents had a feeling of anxiety and uncertainty about food supply to the household; this evidence was similar to the previous study report from the Amhara Region, Ethiopia (Alemu et al, 2017: 5), similarly, 70.8% of the research respondents were worried about the accessibility of adequate food in the household in Afar, Ethiopia (Abdu, Kahssay, & Gebremedhin, 2018:4). Food security occurs when each individual is able to access a sufficient amount of food that is affordable and nutritious (Belachew et al, 2013:7). However, in the present study finding, only 12% of households felt assured of their food security, experiencing a diet of

low-quality foods and minimal amounts of food. This finding was corroborated with study reports from the Equator, the finding demonstrated that, women residing in homes where food was in short supply had to endure foods containing less nourishment and experienced less varied diets (Weigel, Armijos, Racines, & Cevallos, 2016:12).

Qualitative findings also agree with the above quantitative evidence. Key informants and FGD participants opinions indicated that many families worry about access to food, with some households experiencing a total absence of food.

### 6.2.2 Factors for food insecurity

The multivariate regression model checked the independent variables for associations like, the number of meals normally eaten less than 2 times per day compared with counterparts, agro-ecology in lowlands, being in a pastoralist community, absence of food support during last 12 months, wealth index among poorest group, and family size composition among larger peoples in the house when compared with opposite groups were statistically significant with food insecurity at household level.

As Alemu and his colleagues (2017:7) described, the elevated predominance of family food insecurity was detected in the lowlands of Abay valley. The present findings also showed similar results, where by food insecurity was higher among lowland agro-ecology compared with highland agro-ecology zones. The possible reason for this could be due to lower levels of rainfall, climate change vulnerability, and low soil fertility, all of which might contribute to higher levels of food insecurity in the lowlands.

Family size is an important factor that affects household food security, in the present investigation, the prevalence of food insecurity was higher in families of a larger number compared to households with families of a smaller number. This evidence was supported in a previous study report from the Oromia region of Ethiopia (Mulugeta, Tiruneh & Alemu, 2018:7), also other study evidence in Sodo, Ethiopia (Tadesse, Demssie, & Kuma, 2016:18), and Tigray, Ethiopia (Asmelash, 2014:166)

shows similar pattern. Another study conducted in Ethiopia agrees with the above findings (Workicho et al, 2016:9). The possible justification for this could be that when the family size increases, the consumption of food within that family also increases. The family may as a result prioritise feeding the children over themselves, resulting in the loss of access to breakfast, lunch and dinner, for a day or even many subsequent days. This can aggravate food insecurity in this poorly resourced setting.

Despite global development and progress that has been made in reducing starvation in many countries, a large number of the world's population still live in poverty. Haque and his colleagues stated that the very poor live crosswise over many areas and various nations. Most individuals surviving on less than \$1.25 a day live in two areas, Southern Asia and sub-Saharan Africa, representing about 80% of the very poor (Haque et al, 2017:7).

The current study indicated that the likelihood of food insecurity was two and a half times higher among the poorest wealth index group compared with the richest wealth index group. This finding is in line with previous literature from Kenya (Kimani-Murage, 2014:12), Bangladesh (Haque et al, 2017:5) and Beirut, Lebanon (Jomaa et al, 2017:10). The possible explanation for this could be poor family participants unfit to buy food from market.

Interestingly, the prevalence of food insecurity was high in the pastoralist community; the odd of food insecurity was 3.7 times higher among the pastoralist community compared with the agrarian community. This finding was supported by a previous study, Mayanja, Akiiki, Greiner, and Morton (2013:13) reported that, the proportion of extremely food insecure households increased by 22.7 percentage points for the pastoralists but only by 3.1 percentage points for agro-pastoralists.

Likewise, households who reported absence of food support-needs during the last 12 months were 80% more likely to have food security as compared with those who needed food support during the last 12 months. This evidence is supported by studies

conducted earlier literature in Somali and Oromia regions, Ethiopia, revealed that harmony and danger contribute considerably to family food security (Okyere, Mekonnen, & Zerfu, 2013:467).

The present study indicated that conflicts between ethnic groups were common, and this negatively impacted on farming which led to food insecurity.

Key informant opinions indicated that, the higher proportion of participants, described the cause of family food insecurity as, drought, rain shortage, climate change poor soil fertility, food aid community, food source always by purchasing, pastoralist community, omo river not used for irrigation, population increases, seasonal variation and a lack of guidelines on household food security are responsible for the high prevalence of food insecurity reported in the study area.

A participant from a pastoralist district mentioned:

*.....' I remember last time a lot of livestock died by drought"* (23year- old male participant).

Research information from Sidama Ethiopia showed that, having a dry spell, inconsistent and increasingly deficient precipitation and flooding contrarily influence food production. Climate changes influence the nature of creation, and furthermore environmental change impacts on generation and earnings and occupations, wellbeing and food security, and gender equality (Abebe, 2018:102). Similar proof from Nigeria, Oyinloye and his colleagues recognized reasons for food insecurity in Africa and other under developed nations and these included: dry spells and other extraordinary climate occasions, Pests, animals illnesses and other farming issues like, Climate change, military clashes, absence of crisis plans, Corruption and political shakiness, Cash crops reliance, and destitution (Oyinloye et al, 2018:)

By contrast, the cause of food insecurity in agrarian communities was explained by participants. A 28-year-old participant mentioned that:

*“Previously there were a limited number of people living and working in their land, but know the size of peoples increasing, as result farming land narrowing, and youth not employed”.*

Many scholars reported on the influence of population increases on agriculture. They showed that this would likely have a large impact on the ability of smallholder farmers to self-sustain and to provide for family consumption. A scientific study report from Ethiopia revealed that, increases in the population were related with declining farm sizes (Josephson et al, 2015). Additionally, Okyere, Mekonnen, and Zerfu announced that, as home stead size expands, nourishment capabilities decreased which pointed to the need to develop farms from the present small holdings while simultaneously expanding efficiency (Okyere, Mekonnen, & Zerfu, 2013:466). Alternatively, most pastoralist district participants noted how, pastoralist community agriculture was so traditional and that their subsistence farming did not rely on technology.

A Participant from the pastoralist district said:

*“Previously pastoralists benefited from omo river sheshe for farming the land but know there are different projects like; hydroelectric power and sugar project that decrease the water” (35year -old participant)*

Most of the in-depth interview participants mentioned their own household’s own mitigating mechanisms during food insecurity and these included, reducing the number of meals, eating very cheap food and making use of food aid. This evidence was similar with the literature found in India (Gupta, Singh, Seth, Agarwa & Mathur,2015:8). Similarly, a research study was conducted in Jimma, Ethiopia by Belachew and His colleagues (Belachew et al, 2013:7) and Afar, Ethiopia by Abdu, Kahssay, and Gebremedhin (2018:4) haven shown similar scientific proof.

Likewise, the coping mechanisms during food shortage were factors that could be attributed to under nutritional status, and thus contributed to the progression of anaemia. At the time of food insecurity, the family wanted to minimise the extent of under nourishment at least time and decreasing recurrence of dinners every day and eating less liked or modest nourishment were the regular methods for dealing with stress in the region to avoid premature depletion of saved food sources (Engidaye et al, 2019:7).

In this study, Key informants described household coping strategies in food insecurity situation and these included selling livestock and buying maize powder, purchasing grass and firewood, going to visit relatives living in urban areas to get food and also some participants explained sending their youth to town for daily labour, or to work to exploit food potential opportunities. This result was comparable with the past empirical evidence from Oromia, Ethiopia (Abi, & Tolossa, 2015:133), from Afar, Ethiopia (Abdu, Kahssay, & Gebremedhine, 2018:4).

### 6.2.3 Suggestion to mitigating food insecurity

Food insecurity is a major threat for development in Africa especially in Ethiopia; hence this needs intensive interventions to tackle food insecurity. From the in-depth interviews, participants suggested different mitigating strategies such as, encouraging pastoralists' communities to be self-production, pastoralist settlement, support water irrigation systems for pastoralist farming and youth work opportunities.

In Ethiopia, the government has developed food security strategies, in addition to this, endorsed SDG by parliamentary representatives to achieve the target for food and nutrition security (FDRE,2017:2). The Sustainable Development Goals (SDG) formally known as Transforming Our World: The 2030 Agenda for Sustainable Development, it has 17 main goals and 169 targets launched by United Nations in September 2015 NewYork. In SDG list, goal 2 stated end hunger, achieves food security and improved

nutrition and promote sustainable agriculture (UN, 2015:8). SDG is a driver of under nutrition reduction; improve nutrition status that will boost sustainable development. Despite the different efforts made by the government's administrative (GOV) and partners (NGOs) to reduce food insecurity, very little variations were observed in current study. Thus, context based agricultural technology is very essential to address the gaps.

#### 6.2.4 Collaboration and coordination of sectors

Inter-sectorial integration and coordination is very important to ensure food security and nutrition. Key informant interview participants reported that the current practice of sectorial collaboration and coordination was very weak. The majority of the district health managers indicated that there was a steering committee in each district composed of agricultural, education, finance, health, women affairs and other sectors, but district collaboration and coordination was largely not functional. However, the Ethiopian Federal ministry of health (EFMOH) promotes the importance of strengthening multi-sectoral nutrition coordination and linkages across all responsible sectors and partners for effective and efficient implementation (FDRE, 2016:53).

### 6.3 UNDER NUTRITION

#### 6.3.1 Prevalence of under nutrition

Unfortunately, lack of nutrition is a common public wellbeing problem (Ngo et al, 2016:613), which is a source of great burden in developing countries, including in Ethiopia. In the present study, 5% of the respondents indicated that, as they had severe under-nutrition, more than one third, 34.3% of the respondents had moderate under-nutrition. Furthermore, 14.5% of the study respondents had mild under nutrition, despite that, 45% of the respondents indicated that they had no under nutrition. The general prevalence of under nutrition was 54.2% in the investigation led zone, which was very high under nutrition burden in the study area.

In contrast, the current figure was lower than previous literature, in SNNPR, Ethiopia 71.1% (Sonko, 2016:7). The possible justification for this could be how seasonal variations might affect food availability, and also how socioeconomic differences among study respondents may contribute for this difference.

Ethiopia has one of the highest rates of under nutrition in Sub-Saharan Africa, and faces acute and chronic under nutrition and micronutrient deficiencies (FDRE, 2015:30). However, recent evidence from an Ethiopian-based mini demographic health survey showed that, Ethiopia has witnessed promising improvements in decreasing children under nutrition over the previous years (EPHI, & ICF, 2019:22). Current findings show that under nutrition remains very high and to that end, the local government as well as central government officials need urgent attention to make significant investments in pregnant women nutrition.

### 6.3.2 Factors that affect pregnant women nutritional status

Following multivariate logistic regression analysis, the following variables were highlighted as having impact on nutritional status and they included:- those having a poor household wealth index, lowland agro-ecology, pastoralists, those who self-produced their food, those having access to one meal or less per day, those who do not feed on starch as a staple, have less than one chicken, and have access to less than 2 hectares for farming land were statistically significant with under nutrition.

Regarding the household wealth quintile, the odds of facing under nutrition was 2.29 times more likely among the poorest wealth quintile respondents compared with richest household wealth quintile. It was a statistically significant association. This is comparable with previous evidence from an Ethiopian study by Workicho et al (2016), which indicated that having a higher wealth status decreases risk of under nourishment by 28%, and also another study conducted by Assefa, Berhane, and Worku (2012:3) showed similar proof.

The prevalence of under nutrition was higher in low agro-ecology zone, the odds of under nutrition was 2.7 times higher in low land agro-ecology zones compared with highlands in the investigation zone. This evidence was similar with the previous survey report from Ethiopia which indicated that, nutritional status reports confirmed that women in the low lands are more malnourished than women in the highlands (Demissie, Mekonen, & Haider, 2003:6). This was confirmed by another survey report from Yemen (UNICEF, & UK AID, 2015:28).

However, the present study report contradicted findings from previous study reports from Alamata, Southern Tigray, Ethiopia, which showed that, prevalence of under nutrition was higher in the high land than in the lowland (Sitotaw, Hailesslasie, & Adama, 2017:7). The reason for this could be the increased risk of food insecurity occurring within low land agro-ecology and the likely presence of low dietary diversity.

Key informant interview participants identified the factors that affect pregnant women's nutrition, and these included lack of awareness about nutrition, poverty, and work loads during pregnancy. Some of the interview participants described how, within their culture, food priority was given initially to the husband. In addition to this, pregnant women are not allowed to eat animal-source foods like milk, eggs, and meat, the reason for this, as they believe, this food makes baby big and difficult during birth.

This finding was supported by past writings from Africa, Bain and his friends expressed, destitution is undeniably the driving element in the absence of assets to buy or generally obtain nourishment, yet the underlying drivers of neediness are multifaceted (Bain et al, 2013:3).

Likewise, Research evidence from Sub-Saharan Africa (SSA) demonstrated that, under-nutrition in pregnancy was common in aforementioned nations for an assortment of explanations, including destitution, food insecurity, imperfect medicinal services, fitting basic leadership power and access to contraception, significant level of female lack of education exists and regular diseases(Lindsay, Gibney, & McAuliffe, 2012:543),other

investigation from low and medium economic nations announced by Black and his partners, as portrayed, nourishment effects affect wellbeing all through the human life course in settings with deficient material and social assets (Black et al, 2013: 443).

In line with the above mentioned findings, a study conducted in Addis Ababa by Zerfu, Umeta and Baye (2016:6) revealed that pregnant women do not consume animal sources foods such as organic products and vegetables. The study also showed that nourishment prohibitions and misunderstanding towards weight increase during pregnancy could prompt unfavourable pregnancy result. A related study by Getnet, Aycheh and Tessema (2018:4) also depicted that pregnant women tend to avoid protein-rich diets because they believe that causes different health complications to them and their infants.

Another study by Zepro (2015:414) showed that 50% of the respondents avoided protein-rich diets during pregnancy because their culture prohibited them from consuming it. Similar, study findings were reported in Gambia (Perez, & Garcia, 2013).

The reason for avoidance of particular food items during pregnancy was to support in reducing the risk of difficulty in delivering and also to prevent diseases (Hadush, Birhanu, Chaka, & Gebreyesus, 2017:8). Therefore, food taboos could result in considerable risks of maternal under nutrition and also in their offspring.

The researcher considered pastoralist participants for this study; they were residing in the arid and semi-arid lands of South Omo, SNNPR, Ethiopia, their livestock keeping is the main activity. Nevertheless, pastoralism has been extremely affected by climate change for example: droughts have become more frequent and severe. Due to this, in the present study, the odd of under nutrition was 2.3 times higher among pastoralist group members compared with the agrarian group. This was significantly associated with under nutrition. This finding was supported with study in Rayitu, Ethiopia (Gebre, Biadgilign, Taddese, Legesse, & Letebo, 2018: 4), and also by study findings from Kenya, that indicated similar observations (Wayua, 2017:11598). The possible

explanations are pastoralist communities move from one place to other place in order to search water, grass for their cattle's, due this, they have no fixed land for farming and crop production, and other reasons could be pastoralist economy mainly depends on livestock, thus, drought ,absence of rain and season variation affect pastoralist nutrition status.

Several scholars' evidence showed that, pregnancy is a critical period for mother and foetus development (Black et al, 2013:443). As a result, they may require nutrient rich diets in this phase (Zerfu et al, 2016:5). However, a study report from Wondogent, Ethiopia showed that nutritional status of pregnant women was not adequate to support the increased energy and nutrient requirements (Kuche, Singh, Moges, & Belachew, 2015:92).

Similar study reports showed that, pregnant women are prone for under nutrition and malaria (Unger, Ashorn, & Cates, 2016:7). Also, Yeneabat and his colleagues study report showed that, 50% of the pregnant women's diet was inadequate (Yeneabat et al, 2019:6) and also other research reports from Tigray, Ethiopia revealed that, maternal nutritional status determines birth outcomes and neonatal survival (Abera et al, 2019:8). In developing countries, maternal under nutrition is a main contributor to underprivileged new-born development, small birth weight (LBW), and long-term new born disease and death (Marrison,& Regnault, 2016:1;WHO, & UNICEF, 2017: 10). In order to fill the gap pregnant women are advised to eat variety of diet especially, animal products, vegetables, fruits, legumes, and other nutrient rich foods.

Dietary variety is a better representation for dietary rank status of pregnant women (Ali, Thaver, & Khan, 2014:508). In this study, it was found that a large proportion, 77% of pregnant women consumed low dietary diversity (LDD), and out of the total, only 6% of the pregnant women consumed high dietary diversity. Consequently, that affects nutritional quality. Similar study findings from Oromia, Ethiopia indicated, just 25% pregnant women had sufficient dietary variety while the remaining 74.6% of the pregnant women did not have access to sufficient dietary diversity (Desta, Akibu,

Tadese, & Tesfaye, 2019:4). This was happening due to nutritional taboo, socioeconomic status, and poor availability of food in local markets.

### 6.3.3 Challenge for nutrition program implementation local context

Almost all participants reported budgetary problems, poor community awareness, absence of guidelines, and logistic shortages, all affected the implementation of pregnant women nutritional programs at district level. Findings of other studies also showed that, seasonal variation; climate change and weak inter-sectorial integration affect the implementation of pregnant women's nutritional programme. Literature reveals that, Ethiopia sustains double digit monetary development rates (World Bank web). In spite of this remarkable improvement, In Ethiopia, poverty is still a challenge, large proportion, more than 22million people are living below national poverty line. These happens mainly rural phenomena in Ethiopia (UNDP, 2018:2)

A study conducted by Arrish, Yeatman and Williamson (2017:10) indicated that guidelines are very important to give advice to pregnant women during ANC visits on benefits of consuming nutrient rich diet during pregnancy. Furthermore, studies indicate that there are many factors that affect nutrition program implementation in Africa particularly in Ethiopia. The same study report indicated that, a lack of nutrition-related training, guideline and absence of assets affects pregnant mother nutritional status (Arrish, Yeatman, & Williamson, 2017:9).

### 6.3.4 Nutritional related guidelines

Ethiopia developed 20 year health sector renovation strategic plan (HSTP) which is part of gross transformational plan (GTP) II. The main focus area of the plan is achieving universal health care through primary health care. Among other plans, nutrition is also offered adequate considerations (FDRE, 2015:12). So, nutrition is still a sensitive (cross cutting) issue in the progress towards SDG target, it has seventeen goals and given attention for reduction of malnutrition and hunger by the end of 2030(UN, 2015:8).

Besides, Ethiopia endorsed NNP II strategy (national nutrition implementation). This shows the good commitment of the country has to attain nutrition planning (NNP, 2016). This NNP II consists of 5 strategic objectives. The first of these objectives is to improve nutritional status of women (15–49 years) and adolescent girls (10–19 years). In this strategic objective the programme comprises list of intervention mechanisms to address nutritional problems in women (FDRE, 2016:27). The first mechanism is to reduce the magnitude of anaemia in reproductive age women (15- 49 years) from 19.3% to 12 %. The second mechanism is to reduce the prevalence of anaemia among pregnant women from 22% to 14 %, and the third one is to reduce the proportion of women of reproductive period with body mass index (BMI) <18.5 % from 27% to 16 %. However, key informant participants pointed out that there was no guideline within the district health office as well as at health-facility level.

#### 6.3.5 Community based mitigating solutions for under nutrition

A majority of In-depth interview and FGD participants gave their opinions on mitigation solutions. They reported that most pregnant women in the study area did not have awareness about pregnancy-related nutrition. The participants therefore suggested that awareness-raising trainings should be given to pregnant women during their ANC visits.

These findings are supported by the study conducted by Zepro (2015:415); Kominiarek and Rajan (2016:1199); Vaivada, Gaffey, Das, and Bhutta (2017: 205). A similar study conducted in Kenya by Githanga, Awiti, Ngwiri, Nyarko and Shellack (2019:14282) also revealed that, nutrition education or conseling is a main tool to averting food insecurity and under nutrition and that can improve birth outcomes. Likewise, a study conducted in Ethiopia by Serbesan, Ifa and Geleto (2019:5) also showed that it is important to raise women's awareness regarding the importance of consuming nutrient-rich diet during pregnancy. Therefore, ongoing updates on knowledge of nutrition will bring to healthier diets choices, as result; it improves fetal and maternal health (Blondin, & LoGiudice, 2018).

Participants recommended that pregnant women should get nutritional care. They should consume more energy foods, and also add snacks between meals. Husbands should also support their pregnant wives with improving their nutrition. A similar study conducted in Bangladesh also revealed that under nutrition results in low birth rate in new-borns. The researchers suggested that women should give attention to food both prior conception and during conception (Prodhan, Islam, Alam, Vasker, Kabir, & Alim, 2017: 197). Neggers (2016:34) also reported that efforts should be exerted to properly address issues of malnutrition worldwide.

Key informant participants suggested that the involvement of non-governmental organizations /partners in tackling under nutrition among pregnant women is very vital. Such organizations could provide logistic support, technical and financial support, and also capacities building trainings to health extension workers.

Majority of the interview participants stressed the significance of strengthening pregnant women nutrition screening. Some of the participants recommended managing severe malnourished pregnant women with drug and therapeutic diets, and also strengthening health sector integration with agricultural sector.

This finding is similar with the results of a study conducted by Neggers (2016:36). The results showed that routine screening for risk of under nutrition is recommended for all adults, including pregnant women as well as young children. On other hand, evidence shows that nutrition is clearly a multi-sectorial issue. Multi-sectorial coordination's and linkages for nutrition are very important (FDRE, 2016:68). The government of Ethiopia is exerting effort to address the issue of under-nutrition by considering its multi-sectorial and multi-dimensional nature by emphasizing the lifecycle method to record main activities required to progress the dietary status of planned target populations i.e kids and pregnant mother ( FDRE, 2013:15).

In order to alleviate the causes of under nutrition, effective nutrition specific interventions, including community-based programmes, implemented at scale, are required. These interventions need to be supplemented with nutrition sensitive action across different organization such as health, school, agricultural, water, finance, gender, and other pertinent sector integration is very important to mitigate under nutrition (UN, 2015: 6).

Evidence from developing nations indicated that, under nutrition is having devastating effects on pregnancy. Approximately 99% of mortality is related to under nutrition (WHO, 2008). African Union progress report revealed that, the continental target for bringing down under nourishment to 5% or less, by the year 2025 has not been met. Out of the 32 member states that have reported on the proportion of the population that is under nourished only 9 countries are on track: Egypt, Ghana, Lesotho, Mali, Mauritania, Morocco, Niger, Senegal and Togo (African Union, 2018:7). Other African nations, particularly Ethiopia is not on track. Thus, intensive technical intervention and political commitment is needed to achieve set targets.

## 6.4 ANAEMIA AMONG PREGNANT WOMEN

### 6.4.1 Anaemia burden among pregnant women

Anaemia is a significant public health issue globally. Worldwide, a lot of pregnant women suffer from anaemia (WHO, 2015:4). Threshold definition for anaemia as indicated by World Health Organization (WHO) among pregnant women is <11g/dl (WHO, 2015:12). WHO previously estimated the global prevalence of anaemia among pregnant women to be 41.8 % (WHO, 2008:7). Recently, the World Bank estimated the burden of nutrition related anaemia amongst pregnant women at worldwide and Sub-Saharan Africa at 2016 to be 40.1 % and 46 %, respectively (World Bank, 2019).

The existing study results indicate that, the general prevalence of anaemia is 39.9% [95%CI: 35.5, 44.4], 19.4% [95% CI: 16.0, 23.2], 19.6% [95%CI: 16.3, 23.5] and 0.9%

[95%CI: 0.25, 2.3] for mild, moderate and severe anaemia, respectively. These findings are categorized as having severe public health significance according to the criteria of World Health Organization (WHO, 2017:7;WHO, 2011:5).

The present investigation results are in accordance with the previous literature elsewhere, study result in pregnant women at Sokoto residents in North Western Nigeria 39.2% (Buhari, Imoru, & Erhabor, 2016:5), evidence from Ghana 40.8% (Anlaakuu, & Anto, 2017:3), and also literature from local context, pastoralist communities of Ethiopia 39.8% (Ali et al, 2018: 147), findings from Southern, Ethiopia 39.94% (Gedefaw et al, 2015:158).

On the other hand, the studies conducted in Kenya by Okube, Mirie, Odhiambo, Sabina and Habtu (2016:22); in India by Gopinath, Ashok, Kulkarni, and Renuka (2016:970); in Northern Ghana by Saaka, Oladele, Larbi, and Zeledon (2017:4); in Tanzania by Ali, Agatha, Ngowi, Nyasiro, and Gibore (2019); in Nigeria by Olatunbosun et al (2014:5) and in Burkinafaso by Meda et al (2016:3), all revealed that the prevalence of anaemia in these countries was 57%, 51%, 70%, 80.8%, 54.5% and 63.1%, respectively. Furthermore, study reports from, Easter, Ethiopia by Alene, and Dohe (2014:3) and in Jijiga, Ethiopia by Bereka, Gudeta, Reta and Ayana (2017:4) reported the prevalence of anaemia in these regions to be 56.8% and 63.8%, respectively. The reason for a lower prevalence of anaemia could be geographical and/or a study-setting discrepancy.

Likewise, the current study showed higher prevalence of nutrition related anaemia among pregnant women when compared with previous studies. Studies conducted by Zekarias et al (2017:7); by Kassa, Mucbe, Berhe and Fekadu (2017:4) and by Gebremedhin, Samuael, Mamo, Moges and Assefa (2014:6) showed prevalence of nutrition related anaemia in Ethiopia to be 23.4%, 32% and 33.2%, respectively. Other studies conducted in Ethiopia also showed that the prevalence of nutrition related anaemia in Tigray(Gebre,& Mulugeta, 2015:3), Western, Ethiopia (Alemayehu, Gedefaw, Yemane, & Asres, 2016:4), Gamogofa (Bekele,Tilahun, & Mekuria, 2016:4), Southeast, Ethiopia (Kefiyalew et al, 2014:5), Oromia (Zillmer et al, 2017:3), Addis

Ababa (Jufar,& Zewede, 2014:2), and Mekele ( Abriha, Yesuf, & Wassie, 2014:4) are 36.1%, 36.1%, 32.8%, 27.9%, 24.09%, 21.3%, 19.3%, respectively. The possible explanations for higher burden of nutritional anaemia in the investigation zone could be seasonal, socioeconomic and agro-ecological variation. National survey report demonstrated topographical variation affect nutritional related anaemia in local context (Kibret et al, 2019: 13).

Across data from 30 countries, the survey data estimation of the burden of nutritional anaemia among pregnant women was shown to be 47.3% it is between 22.0% and 23.4% in Ethiopia and Rwanda, respectively, to over 60% Burkina Faso (72.5%), Gambia (67.9%), Guinea (64.9%), Togo (64.1%), Côte d'Ivoire (63.6%) and Senegal (61.4%), however, magnitude of nutritional related anaemia among pregnant women in Africa was 50%–59% (WHO, 2017: 7).

In-depth interview participants described the burden of anaemia based on their observation of health facilities, districts and hospitals. Most of the participants mentioned that, anaemia is highly prevalent (approximately 30%) but not considered as a serious case.

About one third of the pregnant women examined at health facilities in the study area were found to be anaemic. As participants explained:

*“Anaemia is not seen as big problem in my district, and is neglected and not given attention. We refer large proportion of anaemia developed pregnant women to higher health facilities. To my knowledge, 30% of the pregnant women examined at our hospital were anaemic.”* (27year old a male participant). In addition to this, other participant said:

*“In my hospital very large proportion (around 30%) of pregnant women were diagnosed with anaemia”* (29 year old male-participant).

#### 6.4.2 Predictors associated with Anaemia

Multivariate logistic regression modelling indicated that, food insecurity, under nutrition not taking/using ferrous sulphate, drinking coffee, not eating fish, no birth space, no nutrition information, walking distance from near health facility, ANC visit, gestational age, and parity were statistically significant with anaemia.

However, family size, educational level of pregnant women, occupation of pregnant women, educational level of the husband, knowledge score(s), nutrition practice score(s), women dietary diversity score(s), access to meat, awareness about anaemia, and lack of iron in diet were not significant in multivariate analysis.

#### 6.4.3 Food insecurity, under nutrition, and dietary diversity

The proportion of anaemia was higher (41.2%) among severe food insecure household compared to food secured household (11.7%). The chance of developing nutritional anaemia is 2.5 times higher among modest food insecurity category compared with food secured respondents. This finding is comparable with other studies conducted in elsewhere in Mexico (Fischer et al, 2014:2070), Pakistan (Habib et al, 2016:9), rural Cambodia (McDonald et al, 2015:243), and also from local context, Amhara, Ethiopia (Engidaye et al, 2019:7). The possible justification for this could be lack of adequate and preferable food that is rich in nutrition.

The results of the current study shows those under nutrition respondents are 8.7 times more susceptible to anaemia than well-nourished subjects. Other studies conducted in elsewhere in Kenya (Okube et al, 2016:25), and local context, Eastern, Ethiopia (Alene, & Dohe, 2014:5), Southern, Ethiopia (Gedafaw et al, 2015:160), in where in Ethiopia, by Lakew, Biadgilign and Haile (2015:5), and by Kumera, Gedle, Alebel, Feyera and Eshetie (2018:8) showed similar results. The likely explanation for this could be lack of adequate nutrition during pregnancy leads to deficient of micro nutrient so there is a chance to develop anaemia.

The results of this study demonstrated that pregnant women who did not consume fish are 2.4 times higher odds to have anaemia than those who consumed fish. Similar results were reported from studies conducted in Ghana (Anlaakuu, & Anto, 2017:6), Louisiana (Drewery, Gaitan, Thaxton, Xu & Lammi-Keefe, 2016:7) and Ethiopia (Tadesse et al, 2017:7). The possible clarification can be, fish is a rich source of iron and is better absorbed from the body.

Nutrition related information is very important to enhance nutritional status of pregnant mothers. The findings of the current study showed that pregnant women who had no information about the benefits of nutrition were 2 times more exposed to be anaemia than those who had the information. Studies in Northwest, Ethiopia (Hailu et al, 2019:5) and Southern, Ethiopia (Duko, Tadesse, Gebre, & Teshome, 2017:1) revealed similar results. The possible justification could be lack of awareness among pregnant mothers to choose various nutrient rich foods that improve their nutritional status.

Likewise, study respondents, who had low dietary diversity (LDD) in the 24-hour period leading to the study, indicated high prevalence anaemia (79.1%) when compared with pregnant mother, who had high dietary variety (HDD) (4.0%). The prevalence of anaemia decreases when dietary diversity level increase and the vice-versa. This researcher could not find any other significant associations from multivariate analysis. Studies conducted in Ghana (Saaka et al, 2017:4) came up with similar results.

However, Mekele (Abriha, Yesuf, & Wassie, 2014:4); and Ethiopia (Zerfu, Umata & Baye, 2016:1486), and South, Ethiopia (Lebso, Anato & Loha, 2017:9) contradicted current results. The likely disparity could be lower socioeconomic status, movable communities and also nutritional taboo.

#### 6.4.4 Ferrous sulphate supplementation

The burden of anaemia was higher in respondents who did not consume iron sulphate when compared to those who consumed. Pregnant women who did not consume iron

sulphate showed 5.7 times more susceptibility to anaemia than those who consumed. Similar studies conducted in Kenya (Okube, Mirie, Odhiambo, Sabina & Habtu, 2016:23); and Ethiopia (Bereket, Gudeta, Reta, & Ayana, 2017:5); Eastern, Ethiopia (Alene& Dohe, 2014:3); North, Ethiopia (Tadesse et al, 2017:8); and Tigray, Ethiopia (Gebre, & Mulugeta, 2015:5) came up with similar results. The possible reason could be that during pregnancy the physiological iron desire is high and the measure of iron assimilated from the routine eating is not adequate to fill numerous pregnant women requirements. Therefore, iron supplementation is very important component of programs to control iron inadequacy anaemia and it also increases the haemoglobin values.

#### 6.4.5 Obstetrical issues

The results of the present study demonstrated that, pregnant women in early gestational period have lesser probability of becoming anaemic than those in third trimester. Similar studies conducted in Indonesia (Susanti et al, 2017:3); Ethiopia (Tadesse et al, 2017:7); and Ghana (Ahenkorah et al, 2016:5) came up with similar endings. The possible rationale for this could be pregnancy increase in the demand for iron. In addition, there is a rapid growth of the embryo during this period that could decrease haemoglobin levels.

#### 6.4.6 Health related factors

Malaria infection during pregnancy is a serious public and life-threatening emergency. Developing nations, particularly Africa, has higher load of malaria. Malaria causes severe anaemia in sub-Saharan Africa during pregnancy (WHO, 2014:35; Takem, and D'Alessandro (2013:6); Bauserman, Conroy, North, Patterson, Bose, and Meshnick (2019:4). The results of the present study show that pregnant women who were not infected with malaria have 40% lesser probability of becoming anaemic than those who were infected. Similar studies conducted in Ghana (Anlaku, & Anto, 2017:3), in Ethiopia (Kefyalew et al, 2014:5) reported similar results.

In contrast, evidence from Ethiopia (Ejugu, Wencheko, & Berhane, 2018:12) indicated malaria not related with anaemia. This is because malaria species especially plasmodium falciparum attacks RBC and cause anaemia.

Moreover, the results of this study also showed that pregnant women who resided in places less than 30 minutes away from health facilities are found to have lesser chances of becoming anaemic than those who resided in distant places. A similar study conducted by Onyeneho et al (2016:9) came up with similar results.

In contrast, inconsistent with the previous study report ( Gebremedhin, Enquesselassie, & Umeta, 2014:48). The basic reason could be, short distance take less time to reach nearby health facility and easily get nutrition counselling, iron supplementation and ANC follow up, and that helps to prevent anaemia.

The results of this study also showed that pregnant women who drank tea/coffee immediately after meal are 1.6 times more susceptible to becoming anaemic than those who did not. This result was consistent with study report in Ethiopia (Weldekidan et al, 2018:6).

However; a study conducted in Northern Ethiopia by Kumera et al (2018:10) showed a negative relationship between drinking coffee and becoming anaemic in pregnant women. The possible justification is coffee/tee inhibits iron absorption.

The results of this study also showed that women with intervals between births are 1.7 times less susceptible to becoming anaemic than those who do not give space between births. Similar studies conducted in Ethiopia (Ali et al, 2018:147; and Bekele, Tilahun & Mekuria, 2016:7) came up with similar results. The possible reason is subsequent pregnancy and birth reduce iron store and cause anaemia.

#### 6.4.7 Socioeconomic elements

In the present study, the socioeconomic character, the higher family size composition, has higher anaemia prevalence. However, the study failed to attain association within multivariate analysis.

The current study contradicts with previous study reports from Northwest, Ethiopia (Melku, Addis, Alem,& Enawgaw, 2014:5); and South West Ethiopia (Kenea, Negash, Bacha, & Wakgari, 2018:4). The possible justification is larger family size needs sufficient resources to manage the family, and the absence of adequate money to purchase food and to address the family need, due to this, family can expend efforts in searching solutions to address the children demands. Consequently, adults, particularly pregnant women end up not eating enough nutrient based foods which can this lead to nutritional deficiency.

A research investigation led by McClure and His colleagues (McClure, Meshnick, Mungai, Malhotra, King, Goldenber, & Dent, 2014:7) showed that socio-demographic factors assessed such as age, pregnant, education, socio-economic and marital status, were not importantly related to women anaemia. Another study conducted in China by Lin (2018:6) showed that there is no relation between educational level of pregnant women and anaemia. The present study also indicated similar results.

In contrast, literature from local context like, Mizan, Ethiopia (Gelaw, & Terefe, 2017:17928); Kibret et al (2019:8) depicted important relation between anaemia and socio-demographic category. The possible explanation for this can have been differing research methods; differing study settings and study subjects.

#### 6.4.8 Major reason and aggravating factor for anaemia

FGD participants provided numerous reasons and aggravating factors for anaemia among pregnant women. Reduced feeding frequency, always eating the same food, food insecurity, blood loss, inadequate knowledge on diet variety, absence of ANC visit, and poor perception of foods to sell, were common factors most discussants pointed-to, during the discussions.

A study by Breymann (2015) reported that parasitic infection, nutrient lack, iron shortage and blood loss were the main reasons for becoming anaemic among pregnant women. Other literature has also shown, deprived dietary status of pregnant women, and as a consequence of a lack of quantitative and qualitative food in the diet affected nutrition related anaemia (UNHCR, 2009:10).

#### 6.4.9 Consequence of nutritional Anaemia

In the current study, in-depth interview and FGD participants reported that anaemia caused maternal hospitalization, increased number of referral, still births, and even maternal death. Similar studies conducted by Breymann (2015), Drukker et al. (2015:2803) and Thompson, and Amoroso (2014:8) presented similar findings.

#### 6.4.10 Suggested local mitigating solutions

Majority of the in-depth interview participants suggested local anaemia mitigating solutions, improving pregnant women feeding frequency, and food variety to reduce the risks of pregnant women to become anaemic. Some participants advised treatment of any malaria infection, de-worming pregnant women according to the protocol, and also supplementing with high iron rich drug. In addition to this, enhancing pregnant women's awareness, and reducing pregnant women's workload are also advised. A similar finding was reported by Black et al (2013:445).

Furthermore, FGD participants also suggested important interventions like drug receiving and strictly adhering to prescriptions and raising awareness of husbands on

the importance of availing food to pregnant women. FAO suggested deprived asset setting in emerging nations at household level, dietary variety, and adjustment are very important. Adding to this, Thompson and Amoroso (2011:11) suggests improving diet access, readiness and utilization; and promoting intake of animal product diets can have a preventative effect on anaemia. A study in Addis Ababa by Mohammed, Taye, Larijani and Esmailzadeh (2019:7) showed that food taboos during pregnancy increased the risk of anaemia. The current in-depth interviewees and FGD participants' opinions' showed similar findings as the aforementioned evidence.

## 6.5 CONCLUSION

This chapter has presented the fundamental results with past writings from worldwide and nearby settings. The present investigation uncovered solid proof from quantitative results discoveries on burden of food insecurity, under nutrition and anaemia amongst pregnant women problems in the investigation zone. Besides; qualitative findings discoveries likewise demonstrated rich proof on contributing variables and findings of the burden of food insecurity, under nutrition, and anaemia.

In conclusion, the results of this study confirmed that, there is no community based prevention model related to food insecurity, under nutrition and anaemia in the study area. This is a major challenge in the implementation of nutrition programs. The findings of this study, therefore, are likely to benefit nutrition program managers, pertinent stakeholders at different level and also help policy makers by availing base line for nutrition intervention against food insecurity, under nutrition and anaemia at community level.

Furthermore, this researcher has gained a lot of experience on food insecurity; under nutrition and anaemia. The findings also help in the development of a community based prevention model that enables one to address different major contributing factors for food insecurity, under nutrition and anaemia. Chapter 7 will be presenting development of a community based prevention model.

## **CHAPTER 7: DEVELOPMENT OF A COMMUNITY BASED PREVENTION MODEL**

### **7.1 INTRODUCTION**

The previous chapter discussed the major quantitative results and qualitative findings of this mixed methods research study by substantiating them with quantitative results and the main qualitative findings of other published previous research studies and literature that is relevant to the topic. In doing so, the researcher used three research phases to attain the objectives of the research. These were Quantitative phase (phase1), Qualitative phase (phase 2) and Model development phase (phase 3). As the central reason for investigation was to develop a community-based prevention model for under nutritional status among pregnant women in Southern Ethiopia, this chapter would describe and present detailed community based prevention model development process, ;such as, major thesis finding, concept analysis and the process of theory development suggested by Walker et al (2013:161) and Chinn and Kramer (2011:158).

The reason for model development, the model assumption, six aspects of survey list: recipient, agents, dynamic, procedure, context, and outcome described by Dick Off et al (1968:422) as a foundation for development of community based model for under nutrition prevention among pregnant women.

### **7.2 MAJOR QUANTITATIVE PHASE RESULTS AND MAIN QUALITATIVE PHASE FINDINGS OF THIS RESEARCH STUDY**

#### **7.2.1 MAJOR QUANTITATIVE PHASE RESULTS OF THIS RESEARCH STUDY**

The overall prevalence of food insecurity in this study area was that 88% [95%CI: (88.2, 91.0)], 49% [95% CI: (44.75, 53.77)] had severe food insecurity, 17% [95% CI: 14.11, 20.96] had moderate food insecurity, and 22% [95% CI:(18.44, 25.93)] had mild food insecurity. In multivariate regression model, agro-ecology in low land [(AOR=3.1, 95%CI: (1.5, 6.3)], pastoralist community [AOR=3.7, 95%CI:(1.6, 8.7)], absence of food

support during last 12 months [(AOR= 0.2, 95%CI:0.08, 0.4), wealth index among poorest household [(AOR=2.5, 95% CI: (1.1, 3.6)], and family size composition among 4-6 people in the house when contrasted with below two family size in the house, and number of meal normally household eat less than 2 times per day compared with counterparts [ AOR=2.4, 95%CI: (1.0, 5.2)]:- which were statistically significant with food insecurity at household level.

Regarding the overall magnitude of under nutrition, the researcher found that 54.2% (95% CI: 49.6, 58.6), and 5.3% (95%CI: 3.6, 7.7) of the respondents had severe under-nutrition; 34.3% (95% CI: 30.1, 38.7), more than one third, of the respondents had moderate under nutrition, and 14.5% (95%CI: (11.5, 17.9) of them had mild under nutrition. However, 45% (95%CI: 41.3, 50.3) of the study respondents described that they had no under nutrition. In regression model, poorest household wealth index [(AOR=2.29, 95%CI: (1.24, 4.23)], lowland agro-ecology [(AOR=2.7,95%CI:(1.6,4.7), pastoralist setting [(AOR=2.3, 95%CI=(1.56, 3.52)], self-production as food source [(AOR=0.46, 95%CI: (0.27, 0.77)], meal less than one times/day [(AOR=3.2, 95%CI: (1.4, 7.1)],not feed starch staple [(AOR=2.6,95%CI: (1.6, 4.2)],less than one chicken have [(AOR=1.5, 95%CI; (1.0, 2.1)], average nutrition practice [(AOR=5.1, 95%CI; (1.0, 28.0)],and 2 hectare farming land [(AOR=0.4, 95%CI: (0.24, 0.8)] were positively or negatively, associated with under nutrition.

The mean standard deviation ( $\pm$ SD) of haemoglobin concentration adjusted for altitude was  $11.8\pm 1.7$  and minimum and maximum value from 6 to 16g/dl. The overall prevalence of anaemia was 39.9% [95%CI: 35.5, 44.4]; 19.4% (95% CI: 16.0, 23.2) mild, 19.6% (95%CI: 16.27, 2.5) moderate and 0.9% (95%CI: 0.25, 2.25) severe. During the multivariate logistic regression analysis, not taking or using iron sulphate [ AOR= 5.7(95%CI:(3.3,9.8)], ANC visit [AOR=0.2, 95%CI:(0.09,0.6)], gestational age[AOR=0.5, 95%CI: (0.3, 0.9)], parity [AOR=0.2, 95%CI:(0.06, 0.7)],severe under nutrition[AOR= 8.9, 95%CI: (2.1, 37.3), no access to nutritional information [AOR=1.3,95%CI: 0.8, 2.1], no fish meal intake [AOR=2.4,95%CI: (1.3, 4.5)], drinking coffee/tea [AOR=1.6,95%CI: (1.0, 2.6)], no birth space [AOR=1.7,95%CI: (1.0, 3.0)],and moderate household food

insecurity [AOR=2.5,95%CI: (1.4, 4.6)], equally distributed work load [AOR=0.45, 95%CI: (0.29, 0.69)], and short distance [AOR=0.4,95% CI:(0.3, 0.6) were statistically (positively or negatively) and significantly associated with anaemia.

## 7.2.2 MAIN QUALITATIVE PHASE FINDINGS OF THIS RESEARCH STUDY

Moreover, in-depth interviews and FGD participants' found out that drought, rain shortage, climate change, food sources always from purchasing, food aid community, living within a pastoralist community, poor soil fertility, Omo river not used for irrigation, conflict between ethnic group, increment of population number, and unavailable guideline were the main contributing factors for household food insecurity. On the other hand, poor awareness on nutrition, poverty, pregnant women workloads compared with other family members, cultural food priority being given initially to the husband, and inhibited animal-source foods like milk, egg, meat, and butter. Avoiding these foods was believed to make the baby big, contributing factor for under nutrition. Besides, infections-related with malaria, reduced feeding frequency, inadequate knowledge on diet variety, absence of ANC visit, blood loss and food insecurity all contributed to anaemia. Thus, these factors need critical attention and efforts at zonal, regional and national levels so as to avert the challenges.

Last but not least, in-deth interview and FGD participants provided their opinion on household food insecurity coping mechanisms like selling cow/goat and buying maize powder, eating uncommon tree ("negode"), getting help from food aid, access of safety net, borrowing food/crops from neighbouring ("kebele") ethnic families, eating unacceptable leaves and branches, selling fire wood and grass in town , and doing labour work at town.

## 7.3 CONCEPT ANALYSIS

### 7.3.1 Definition and description

Concepts are the basic building blocks of model development; it is critical to have the concepts sound and strong (Walker, & Avant, 2013:161). A concept represents a symbol or a building block of a larger range; it is the basis of what the researcher wants to pursue (Foley, & Davis, 2017:70). Concept refers to a basic idea: - comprehensively from the specific example, synonyms –ideas, theoretical thoughts that happen in one’s mind(Bouso et al ,2013:142, Bergdahl et al, 2016:3 ). Chinn and Kramer (2011:158) characterized and depicted a concept as an idea, mental-making of understanding, Insights of the globe comprising matters, other individuals, visual pictures, conduct, and collaborations. Thompson (2018:1) characterized a concept as an idea or expression that catches the standard of something; considered the structural unit of a model; Image or emblematic portrayal of a dynamic thought.

The researcher considered the work of Walker, and Avant (2013:161), and Chinn, and Kramer (2011:158) in developing the structure of a community-based intervention. This also helped to identify the characteristics or attributes and practical implementation considerations in developing a model to support the prevention of under nutritional status among pregnant women. The primary motivation behind this concept analysis was to develop a clear picture or meaning of community-based interventions that facilitated model development to prevent the current burden of under nutrition and food insecurity.

Scholars suggested different ladders of concept analysis methods like Rodgers' approach to concept analysis which included seven phases (Rodgers, 1989: 332). However, in this study, the researcher used common procedures for concept analysis (Walker, & Avant, 2013: 165). Each of the steps was demonstrated below:-

### 7.3.2 Select a concept

Chapter 4 presented quantitative results and chapter 5 highlighted qualitative findings in detail and also Chapter 6 discussed the major findings by comparing and contrasting them with the results from previous studies. In this process, the researcher clearly

recognized the pregnant women under nutrition and food insecurity burden, contributing factors in detail, and household and communities affected with food insecurity. As a result, the researcher selected a range of community-based interventions as foundational concepts for the proposed model development process.

### 7.3.3 Decide the points or motivations behind the investigation

Walker and Avant (2013: 167) stated it is the second step. As he described, it basically addresses the inquiry: “For what, am I doing this investigation?” Differentiating between typical, conventional language utilization of the idea and the logical use of similar ideas may be a result of researcher analysis. Other investigators might explain significance of a present concept, build up an operational definition, develop a research tool, or add to current philosophy. For instance, Chinn and Kramer discussed the purpose of concept analysis as being about setting boundaries, and creating conceptual meaning (Chinn, & Kramer, 2011:165).

In the current investigation, it was essential to determine what the meaning of community-based interventions was because it might have different contextual meaning in different health care settings. Thus, clearing up the meaning of community based intervention was very important in setting the scene for the development of the community-based model for prevention of under nutritional status among pregnant women in southern Ethiopia.

### 7.3.4 Identify all uses of the idea (concept)

As identified by Walker and Avant (2013:167), the third step suggests using vocabularies, word references, thesauruses, and accessible works. This audit of writing assists us to make crucial decisions about the characterizing traits and gives information about the basis of the concept.

A Concept is an abstract that assist the researcher to generate theory and knowledge, by naming and provide meaning to its features (Berenskoetter, 2016:4). A concept should unmistakably name the thing to which it alludes; it must be plainly characterized, and its uses in the hypothesis ought to be clear so any individual who sees the idea and its definitions inside the hypothesis can see precisely understand what is being portrayed, clarified, or anticipated (Walker, & Avant, 2013:162).

#### 7.3.5 Definition of community (dictionary definition)

The word “community” refers to every one of the individuals who reside in a specific region/geography or a gathering of individuals who are considered as a unit in view of their mutual advantages (Raj, 2016:2, Silberg/NIH, 2011:4). A study from India conducted by Raj (2016) about “community organization” as he stated as’ it is a “social organization” essential to culture, that is observed as normal gathering based on common territory, culture/tradition, language, ethnic and other (Raj, 2016:7). In the present investigation, the researcher considered that the community has a potential to gather the assets (resource) and collaborate each other, so that it is capable to create synergy for pregnant women nutritional status improvements. So, Community participants like community leaders, community influential and others need to consider as stakeholders in nutritional status and food security improvement. Thus, community involvement and being part of the solution is top remedy to prevent under nutrition and food insecurity.

#### 7.3.6 Definition of community based (concept definition)

A Community-based intervention has been effectively implemented in many developing nations particularly, in Africa, as a platform for bringing nutrition information and health care interventions at low cost. As we all agree, community-based interventions help by involving whole populations to increase community transformation. As most of past writings demonstrated, community-based platforms are the basic interventions and are broadly acknowledged as significant approaches to avert under nutrition among

mothers and children (Bhutta, Das, Rizvi, Gaffey, Walker, Horton, Webb, Lartey &, Black, 2013:463); United Nation Women (2013:1).

Nishino and Nakatani (2018:505) portrayed a community-based care setting by “Incorporated Community Care System”. Murray (2010:89) also stated cooperative community-based care can show basic collaborative functioning with communities to accomplish situated objective. Besides, living arrangement background is not adequate to guarantee for community collaboration (Chapman et al, 2003:259), also Bruce et al (2002:209) described about community based interventions. Currently, numerous community interventions suggested that, more hands-on procedures have well possibility for community implementation and continued effects. On other hand, corporation initiatives are helpful for community-based prevention such as growing relations with household through community mentoring and enhancing the ability of pregnant women and the family (The Governors prevention partnership, 2019:1).

“Community awareness, Principles, and Mobilization” Component: Included developing community partnerships to address local problems, by increasing the community’s participation ([pubs.niaaa.nih.gov/publications/10report/chap07b.pdf](https://pubs.niaaa.nih.gov/publications/10report/chap07b.pdf)). The present study indicated that, there were nutritional taboos; the cultural norm of giving food priority to the husband and also, the limited involvement of the male/husband in homework including agricultural work; all of which overly allocated the burden of workload on the pregnant women. So, as a result, the researcher, considered community knowledge or awareness as a very important means to bring behavioural change, and community mobilization in nourishment and in promoting the food security agenda at large. In addition to this, nutrition is multifactorial and dimensional, thus, community partnerships are key to solving community-based nutrition problems. Therefore, Community Knowledge, Mobilization and community partnerships are essential components to improve nutritional status among pregnant women.

Yet, community-based approaches have different meanings for different scholars. Mcleroy, Norton, Kegler, Burdine, and Sumaya (2003:529) expressed four groups of

community-based implications like: community as setting, community as target, community as agent, and community as resource. Community as setting means the gathering of individuals residing in comparative conditions.

Hence, this study considered 5 groups of communities that were significant for the model development process: community as resources, community as agent, community as target, community as partner and community as setting.

### 7.3.7 Determine the defining attributes

Walker and Avant (2013:168) characterize concept as an important attribute for investigation. The group of properties that are the most as often as possible related with the idea and that license the expert the clearest understanding into the idea. The list of features, describing characteristics or defining attributes, functions, were very much like the criteria for making differential diagnoses in medicine (Walker, & Avant, 2013:163) and Chinn, and Kramer (2011:164).

For the model development process, the researcher described attributes of the idea within a community based intervention setting, prevention of food insecurity and under nutrition amongst pregnant women in southern Ethiopia. In doing so, the principal investigator identified and took note of characteristics of themes that were observed many times during the investigation, and then recognized and categorized as important and related attributes. Key describing characteristics have been recognized to identify the concept of a public centred intervention within the settings of preventing under nutritional status among pregnant women:

### 7.3.8 Household and Community level Intervention

Household and community are very critical place to intervene with respect to pregnant women's nutritional status and household food security. Home to home visits can enhance nutritional status through awareness-creation of the household. Nutritional

taboo was one of the contributing factors for under nutrition at community level, so community context food security and nutritional status was very important intervention areas to prevent pregnant women's under nutrition.

#### 7.3.9 Collaboration and coordination

Multi-sectorial collaboration and coordination was an engine to secure food and nutrition issues and this was helpful for resources mobilization, allocation, and enhancing and initiating sectorial integration for the common goal.

#### 7.3.10 Context integration (Home, Community & Health facility)

Integration of Home, community and health facilities is main area for nutritional and food security intervention. Some nutritional problems could not be prevented within the home, because health institutions provide basic medications and crisis management. Thus, the link between community and health facilities was fundamental for prevention of under nutritional status. So, the link of each level is highly significant for the prevention and improvement of pregnant women's nutritional status.

#### 7.3.11 Community engagement and community development

Community participation is a very important intervention to implement the dietary status among pregnant women. Thus, increased community ownership of nutrition interventions can be created through a wisely implemented social mobilization process. The main concern could be given to community-based nutrition interventions, produced by local communities, as well as community workers and local government structures; consequently, this encourages active participation in administrative and resource generation to support nutrition interventions. So, Community based interventions in the setting were useful in preventing food insecurity and under nutrition among pregnant women through community engagement, community development and community

participation. These interventions and actions were a key to preventing food insecurity and under nutrition among pregnant women.

### 7.3.12 Recognised case (model)

In this investigation, a model case is considered as a case of the utilization of the idea that uncovers all the basic attributes of it. Moreover, the model case ought to be an unadulterated instance of the idea, or an unadulterated model. Likewise, model cases needed to be genuine illustrations both from reality and from works of prominent investigators who built models (Walker & Avant, 2013:169); Chinn, & Kramer (2011:168). Specifically, Chinn, and Kramer's (2011:166) stated exemplar case is a circumstance, and experience source in which the idea is denoted.

A model health extension worker was taken as a source from T kebele, South Omo Zone, South Nation, Ethiopia. MB is 32 year old community health worker. She was born and residing at T kebele and has been assigned for this health post for the last 8 years. She knows the culture, language and social event of the community. When she was assigned to the T kebele health post, there were higher number of under nourished pregnant women and children. Besides, there had no community participation in nutrition interventions. She was tasked with managing children on outpatient therapeutic feeding programs (OTP).

MB took community based nutrition training organized by non-governmental organization (NGO) at district level. After that training, she returned to her kebele and called health developmental army leaders, and discussed issues related to community-based nutrition issues. They agreed to train community and village leaders, religion leaders and women's development leaders. Then, she provided a 3-day training course on community-based nutrition.

In addition to this, MB, a health extension worker, has been regularly visiting home to home for health and nutritional counselling. Once a month, she has also been screening pregnant women and children for nutritional status, based on the nutritional screening

finding; she offered nutritional counselling for pregnant women and care takers/mothers on good practices related to nutrition.

*“Since I’ve been giving these messages, pregnant women and care takers/mothers have been practicing the actions and the pregnant women nutritional status has started to improve and also the weights of children have improved,”* 32-year-old MB says.

She added that, the community-based nutrition intervention was positively influencing pregnant women, baby’s and small children’s nutrition. The range of suggested actions included more utilization to iron folate, increase in dietary diversity, minimum acceptable diet between 6 and 23 months, and dietary variety for the young infant being raised.

Community health extension worker, MB said:

*“There are large variations in the communities because almost greater part of pregnant mothers in my kebele are practicing better women nutrition, new-born, child and small kid and care,”* and also recently, community started to participate in nutritional intervention.

### 7.3.13 Contrary case

According to Walker and Avant (2013:172) and Chinn, and Kramer (2011:170) described contrary cases are frequently very helpful to the analyst since it is regularly easier to say what something is not than what it is. A practical example of contrary case:

W/r X is a 37- years- old married, seven month pregnant woman, residing in the remotest part of the country, south omo zone, Y district, X kebele. She was born in X kebele and is still living in this kebele. It was her eighth pregnancy. She did not follow any ante natal follow up care previously, and only went health facility when she felt pain previously. She gave birth almost all children at home although she now believes health facility care is very important and plans to go.

Due to this, she did not get any nutrition related information, and she consumed one type of food (monotype) most of the time during the day and at night; she said “I always eat “Possesa” because “possesa” is a local word refers to very cheap and available in the home any time. W/ro X has seven children out of this number six of them reached for school. However, no one completed started class and most of them drop their class because of hunger/have no enough food in the house.

She put the reasons behind this as there are a lot of reasons for this hunger including the fact the husband was in a polygamous relationship (has 3 wives) in different homes. Second, her husband was a peasant (farmer), and during the crop production season, her husband sold most of the crop at the market and drank alcohol with it without bringing anything at home. Third, her husband gave little nutritional care during her pregnancy.

She added: *“I am working every job in my house day and night without other help, besides, my community had no attention for pregnant women and children nutrition status.”* Consequently, her two children were admitted to hospital for nutritional rehabilitation. Clinicians offered milk and medicine to treat them and advised her to feed a variety of food. On other hand, W/ro X Said: *“I am suffering with hunger, I eat a little in day even has no variety in the food”*. In conclusion, this case reveals that there was lack of a community-based intervention.

#### 7.3.14 Identify antecedents and consequences

Walker and Avant discussed antecedents and consequences as subsequent steps in a concept analysis (2013:173).

#### 7.3.15 Antecedents for development of community based intervention

Antecedents are those events in place proceeding to the existence of the idea (Walker, & Avant, 2013:173) for development of community based model. To develop a

community-based prevention model for under nutritional status among pregnant women in southern, Ethiopia, pregnant women, household, home, community and health facility details are key elements required to develop this prevention model.

#### 7.3.16 Community Participation

Community centred interventions require the dynamic partaking of nearby wellbeing care, professionals, agricultural extension workers, and leaders to create a solid anticipation structure (Murray, 2010:90). Community-based intervention research needs a recipient's expertise in involving and reasonably relating with communities and community agencies (Bruce, 2002:209). Community participation is significant evidence for community based intervention to occur; it is very vital and encourage-able from the begging of the nutrition implementation like planning, implementation and outcome monitoring. These create partnership between community and nutrition implementer.

#### 7.3.17 Sectorial collaboration

Nutrition and food security issues need multidisciplinary efforts to overcome under nutrition and food insecurity. So, inter-sectorial cooperation and harmonization among sectors (including agriculture, finance, health, education, community development, industry and water) are very crucial for resources sharing among sector, contributed for under nutritional status improvement among pregnant women.

#### 7.3.18 Staffs Motivation

In the investigation zone, nutritional screening, home to home visit and nutritional counselling was very limited and localized. Only few health care professionals were working regularly, so, staff's motivation to inspire the staffs for future work and commitment was not properly explored.

### 7.3.19 Household food security

Agriculture is the major source of food in Ethiopia as well as in the study area. Despite of this, recent finding revealed that, a lot of household were suffered with food insecurity.

The main causative factors for this, mentioned by most of FGD and in-depth interview participants, were poverty, and almost all pastoralist community had so traditional farming method which hindered them to increase their production. Therefore, a household food security issue is a critical need to address by creating agricultural technology usage, settlements of pastoralist community, encourage usage of improved seeds and also agricultural extension support is very crucial especially in the pastoralist communities. This helps to ensure household food security. Consequently, improves pregnant women nutritional status.

### 7.3.20 Performance review meeting and supportive supervision

Regular nutrition and food security specific supportive supervision and follow up enhance knowledge and skill of nutrition program implementer at each level (community health worker, nurses, midwives, medical doctors and nutritionist). Besides, increase encouragement, mutual problem solving, mean-time, has given the chance to improve the challenge or barrier in community based nutrition implementations. Consequently, these enhance sustainability issues in community based intervention. On other hand, monthly, quarterly and annually nutritional intervention, performance review meeting create peer learning environment, promote lesson learning environment from best performed community settings and also helps to identify nutrition intervention gap among pregnant women. Subsequently, it is necessary to develop action plans based on the findings for future intervention and actions.

### 7.3.21 Consequences for acceleration of community based intervention

The incidents that happen because of the event of the idea, at the end of the day, the results of the idea may happen (Walker, & Avant, 2013:173). The antecedents and results examination encourage community based intervention.

### 7.3.22 Improved pregnant women nutritional status

Improved pregnant women nutritional status is an important outcome. Therefore, every stakeholder has responsibility and accountability to exert efforts in nutritional improvement among pregnant women and as well as household. Hence, efforts of male involvement, agents (agricultural extension workers, nurses, health extension workers, and medical doctors), other governmental, non-governmental organizations and community contributions are very important to progress nutritional status among pregnant women.

### 7.3.23 Reduced sickness and death related to nutrition

In the second outcome, there was reduced sickness and death associated with nutrition. During pregnancy there is a lot of nutrient demand for which they are vulnerable for different nutrition deficiency. The current study's finding showed that almost 40% of the pregnant women were anaemic (in different category mild, moderate and severe). Hence, adequate and sustainable community based nutrition interventions are critical for decreasing of nutrition related disease and death correlated with complication of under nutrition.

### 7.3.24 Achievement of SDG 2

United Nation (2015:17) declared 17 sustainable development goals to change the globe, out of the seventeen goal, SDG 2 promotes eradication of hunger, succeed food security and enhanced nutrition, and encourage sustainable farming and also SDG 3

promotes good health and well-being of all human beings, including pregnant women (FAO, 2015:4) and UN (2015:17). Nutrition is fundamental for the achievement of all workable development goals (SDG) (UN 2015:1). A community based intervention approach is needed to ensure nutrition security for pregnant women as well as household.

### 7.3.25 Define empirical referents

As evidence indicated, empirical referent for defining characteristics is last stage in an idea examination. Empirical referents are classes of real wonders that by their quality exhibit the event of the idea itself. It is a method by which we can quantify the characterizing qualities or characteristics (Walker, & Avant, 2013:174). The empirical referents have been identified in previous chapter four, from the experience of pregnant women, household and health program managers on nutrition interventions. Community health extension workers, nurses, community and agriculture extension workers practical involvement in community based intervention. Community based approach is not new approach in health care, but not given adequate attention.

## 7.4 ASSUMPTIONS OF THE MODEL

The developed Community based prevention model was built based on the next assumptions:

- Pregnant women's awareness is required to decide nutrition variety
- Community engagement, and community ownership is vital in contributing to nutrition improvement
- Multi-sectorial collaboration and coordination need for nutrition security or prevention of under nutrition
- Nutritional and food security activity required mentoring and coaching
- Community health workers and health care professionals (HCP) required capacity building

- Nutritional taboo need to avoid by household and community
- Male involvement facilitate pregnant women nutrition improvement
- Agricultural extension technology and home garden require enhancing nutritional status.
- Community based prevention model improves pregnant women nutritional status

## 7.5 REASON FOR MODEL DEVELOPMENT

The main reason for using a model is to provide context and situations based a solution to a problem. Chinn and Kramer (2011:186) also understand phenomena, and contribute the accomplishment of the practice that clearly shows an outcome. The motivation behind the model connected to the concepts and structure and also embedded within the organization of the prototypical usually explicit. The overall drives of the proto typical focus on an individual, a family and community (Chinn, & Kramer, 2011:187). Therefore, the primary purpose was to develop a community-based prevention model for under nutritional status among pregnant women southern Ethiopia. Hence, it definitely support in enhancing pregnant women nutritional status.

## 7.6 MODEL DEVELOPMENT PROCESS

The researcher has adapted social ecological model as theory, this study as it could provide basis for development of community based prevention model for under nutritional status among pregnant women. Social ecological model can be affected by multiple levels of factors, namely: intrapersonal factors/individual factors, inter personal level, institutional elements, community reasons, and community strategy (Mcleroy, Bibeau, Steckler, & Glanz, 1988:355).

In this study, the process was guided by six aspects of activity for the present model development process suggested by Dick Off, James and Wiedenbach (1968:422) like: a) Recipient, b) Agent, c) Context, d) Procedure, e) Dynamics, and f) Outcome .The current study described the model aspects advised by the above mentioned authors.

These aspects assisted in community based prevention model development process. Each of the concepts is separately discussed in the following way:

### 7.6.1 Recipient

A recipient is an individual who gets care. Any other person, whose activity contributes to realizing the nursing goal (Dick Off, James,& Wiedenbach,1968:26). In current study, the principal recipient was pregnant women residing south omo rural community, who needs nutritional interventions and actions to tackle under nutrition. In addition to this, the second recipient in this study was household in general, who needs food security intervention and mitigation solutions. The pregnant women and household participants received nutritional care and food security support from husband, family participants, neighbours, women developmental armies, health extension workers, nurses, nutritionists, medical doctors, health officers, community leaders, and partners implementing on nutrition programme.

#### 7.6.1.1 Pregnant women as recipients

In this study, the primary recipient was pregnant women who were affected by under nutrition, anaemia and food insecurity. The current evidence showed that, pregnancy is a basic time for mother and foetus growth (Black et al, 2013:443); consequently, it requires nutrient rich diets in this phase (Zerfu et al, 2016:5). Under nutrition is the intergenerational cycle; it passes from one cycle to other cycle (FDRE, 2016:17). Thus, it needs government, partners, stakeholder efforts and critical intervention to mitigate this under nutrition arena. Also, husband involvement in caring pregnant women nutrition status should not be forgotten and should critically be emphasized, particularly, for food priority was given for husbands culturally in this study area. On the other hand, pregnant women workload was among the contributing factor pointed out by FGD and key informants' participants. Therefore, husband support and involvement in housework is vital to reduce pregnant women under nutrition and anaemia.

### 7.6.1.2 Household as recipient

Household is the second recipient in this study. The current finding showed that only few households ensured food security, whereas, majority of the households were suffered with food insecurity. Thus, it needs agricultural experts, police makers, local government, and concerned body efforts and interventions to tackle this hunger and food insecurity.

### 7.6.2 Agency

Agent is an individual who represent or a nurse or someone who expected to execute a care for specific client (Dick Off, James, & Wiedenbach,1968:426). In present investigation, agent is implementers towards the enhancements or enrichments and anticipation of under nutrition status among pregnant women.

The main agent in this study was, a health care professional like midwives(HCP) responsible for pregnant women nutritional care like counselling dietary diversity during pregnancy, screening of pregnant women regularly and take action, followed focused antenatal care (FANC), and micronutrient advices(iron folic acid supplementation), and health education. Second agent was, nutritionist responsible for nutritional composition and variety and others. The third agent in this study was agricultural extension worker, who was responsible for garden farming, advice for improved seed utilization, agricultural technology for farming and facilitating household food security. The health extension workers and midwives were very crucial facilitators in community based nutrition interventions. The figure 7.1 showed the recipient and agent relationships.

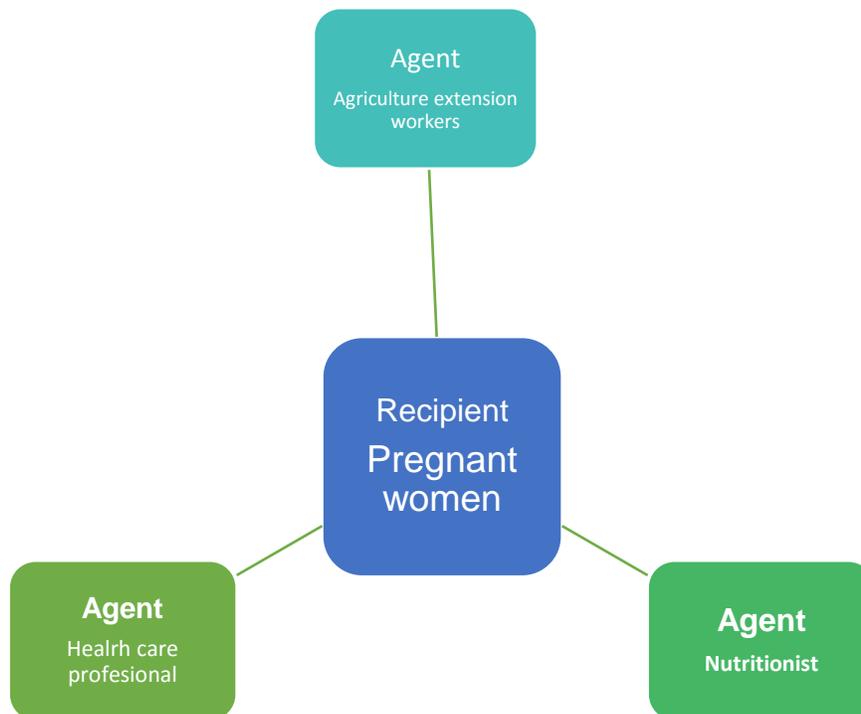


Figure 7.1: Recipient and agent of community based prevention model

### 7.6.3 Context

Context is a setting like physical, social, psychological, geographical environment in which care is provide or communication take places (Devito, 2016: 36). Context refers to a setting, a location or the physical structure of the hospital or health center (Dick Off, James, &Wiedenbach,1968:428). The context of this investigation was home/household level, community level, and health facility in southern omo region residing pregnant women.

To be effective and efficient community based enrichment and prevent of nutritional status, the interaction of this three context (home, community and health facility are very important). The figure 7.2 has shown the structure of three contexts.



Figure 7.2: Context followed for development of community based prevention model

#### 7.6.3.1 Home environment context

Home environment is very important context for improvement of pregnant women nutritional status. It is also a critical context to create pregnant women nutritional awareness during home to home visit by health extension workers. Family participants especially husbands are encouraged to engage in income generating activities to fill the nutritional gaps.

Husbands and others family members in the home should support and care pregnant women. In order to fill the pregnancy nutrient demands, pregnant women are expected to eat varieties of home available food. Furthermore, they should be encouraged to keep diet patterns (frequency).

### 7.6.3.2 Community context

Community refers to a gathered individuals with a joint distinguishing or residing in collected area, topography, have their own belief, culture, religion within a peoples (Merriam –Webster Dictionary, 2014). Boyes-Watson (2006:362) described “community” as relationship with friends, families and other co-worker. The context of community was detail described in the hand book of community practice (Weil, Reisch & Ohmer, 2013:1). Scientific evidence from Addis Ababa, Ethiopia indicated that, pregnant women did not take animal source food due to food taboo and misunderstanding (Zerfu, Umata, & Baye, 2016:6). Similarly, the current study, key informant participants raised their opinion on food taboo that community culturally inhibited animal source food.

Community based nutritional forum and nutritional dialogs are very important to enhance pregnant women nutrition. Community based pregnant women food demonstration helps for pregnant women to get important nutrients. Ethiopia particularly south omo zone has a lot of movable community; thus, they need outreach and mobile nutritional care to address that unreached communities. In Ethiopia there is women development armies’ leader and follower (FDRE, 2015:41) residing at rural and urban communities, and they are expected to transmit key health information for families to establish community ownership and create healthy and productive communities. Community engagement and empowerment is a very important tool for improvement of dietary status among pregnant women.

### 7.6.3.3 Health facility (organization) context

Health facility (Health centre, health post, and Hospital) is an important context in this study. Social behavioural change communication (SBCC) is vital instrument to enhance pregnant women awareness on nutrition.

Besides, Client based nutrition specific counselling’s for pregnant women improve nutritional status. Regular pregnant women nutritional screening and actions based on

the screening results are crucial interventions to prevent under nutrition, and also link the under nutrition women with supplementary programs to tackle under nutrition (severe under nutrition) with ready therapeutic food.

Furthermore, health care professionals needs to advance quality of focused ante natal care (FANC) with full of nutritional care packages, during pregnancy follow up client based counselling, nutritional advices for varieties of food consumptions, supplement iron folic acid with counselling and good client negotiations for regular adherence. Consequently, sectorial coordination and partnership between different sectors (such as education, health, water, agriculture, finance and other) are essential to facilitate nutrition program.

#### 7.6.4 Procedure (protocol)

A sequence of actions that are completed in confident manner or instruction, it is an agreed of activities that is an acknowledged method of undertaking something (Merriam-Webster Dictionary, 2016). Dick Off, James, and Wiedenbach (1968:430) indicated that procedure is a step to be taken towards some accomplishment, or principle, rule, routine, or protocol governing the activity.

In this study, proposed protocol of activity were solution designing consultative workshop, partnership, inter-sectorial collaboration and coordination (ICC), capacity building, integrated supportive supervision (ISS), performance review meeting, staff motivation, community engagement, community forum to discuss their experience, challenges and solutions. This guiding process, techniques or protocol of the activities would assist active community engagement in community based prevention model for pregnant women nutritional status, thus helps to enhance dietary status of pregnant women as well as their children. Figure 7.3 depicted the procedure, technique or protocol of the activity followed during model development.



NB: CND (Community nutrition day, ICC= Inter-sectorial collaboration and coordination)

Figure 7.3: Guiding procedure for development of community based prevention model

#### 7.6.4.1 Solution designing consultative workshop

Solution designing consultative workshop is a significant procedure which was included in this community based prevention model. It helps community to identify opportunities, challenges, weakness, and success story in nutrition program. Solution designing consultative workshop is possible to conduct at each level of the health structure in Ethiopia, to mention some of them: Ministry of health, Regional health bureau, Zonal health department, and District health office.

However, the principal intension in this investigation was community; so, at community level, it comprises of community leaders, women development army leaders, HEW, HCP, nutritional program implementer partners and others stakeholder working nutrition program at community level.

During consultative workshop every stakeholder were expected to identify and discuss peculiar barriers, challenges and root causes for the identified challenges in pregnant women nutritional status. Community context nutritional intervention and solutions should be suggested by stakeholders.

Finally, an action plan should be developed to follow the improvement of pregnant women's nutrition status after consensus built. Prevention of pregnant women under nutritional status was the main theme of this study, so, community based model helps to improve the pregnant women nutritional status; Therefore, Solution designing consultative workshop mainly focused on community context nutrition implementation. Hence, community active participation and ownership should improve in pregnant women nutritional status.

#### 7.6.4.2 Nutrition awareness campaign and communication

Current findings indicated that a greater proportion, 63 per cent of investigation respondents, indicated that they had less awareness about pregnancy related nutrition. Out of all respondents, only 8.3 per cent of the study subjects had good knowledge about nutrition related to pregnancy. Besides, In-depth interviews and FGD participants raised their opinion about the topic and similarly, poor awareness was an important factor for under nutrition among pregnant women.

Previously done studies also showed that nutritional interventions and education strategies are essential because of poorest awareness of the study participants (Naeeni, Jafari, Fouladgar, Heidari, Farajzadegan, Fakhri, Karami, & Omid, 2014 :8). Holder, and Treno (1997: S195) stated media advocacy in public information campaigns are very important for community based prevention. According to Food Agriculture Organization of United Nation( 2016a:1), adequately nourished, pregnant women need to have access to sufficient and good quality food ,and it is, essential to comprehend what establishes a good diet for health, thus, nutrition awareness is very crucial.

In this study area, pregnant women are accustomed eating the same food for subsequent days for different reason: lack of awareness and other aforementioned; because of absence of resources this can lead to nutrient deficient and end up with under nutrition.

Nutrition awareness campaigns are very important guiding procedures that help to reach every segment of communities. There are different methods to implement. In Ethiopia, there is community based health care system which is led by female health extension workers. These health extension workers are expected to perform 16 health packages, including education and communication packages (FDRE, 2015:40). Therefore, it is great opportunity to link the nutrition awareness campaign with this program. To easily reach target group, home to home visit is a basic practice of health extension workers activities. This helps them to know context, culture, nutritional habit, taboo, and get the opportunity to counsel each household. During the home visit they might find target groups (like pregnant women and children), easily in order to transfer nutritional advices for all family participants.

The second method to create awareness is based on using local media (like FM radio), that easily reaches pastoralists as well as agrarians' communities to enable them to convey and understand the messages (key message prepared by local language). The third method involves health professionals (nurses & nutritionists) needing to provide outreach health education and communication at community level. Alkerwi, Sauvageot, Malan, Shivappa and Hébert (2015:2834) indicated that nutritional awareness affects diet quality. Within other literature, FAO expert descriptions and education and awareness can give consumers better options, but ultimately they choose what they eat from what is available and affordable to them. In turn, this influences their-own nutritional status (Pepino, 2014:4). So, the above methods enable the communities to enhance their dietary status.

#### 7.6.4.3 Capacity Building

Capacity building is the procedure by which people and organizations, health facility get training, improve ability, and keep up the aptitudes, information, advices, and different assets expected to carry out their responsibilities expertly. It grants people and associations to perform at a superior limit (UN, 1992; WHO web site, & Denmark, 2003:2). Community capacity building is a reasonable methodology to conduct transformation among individuals that create improvements in health and nutrition, which results to organization improvement.

Capacity enhancement is a key tool to raise knowledge, skill and practice of households, community leaders, women development army leaders, health extension workers and health care professionals. Capacity building is, therefore, a vital for successful nutritional intervention and for quality nutritional care provision to pregnant women and health workers (health extension workers) whom they are grade 10 completed and 01 year introductory course taken. Besides, they might not get national nutritional program training or other nutritional refreshment workshop. Therefore, it is great opportunity to link agriculture sensitive nutrition with other sectors and enhance agricultural extension workers and experts with nutrition program.

#### 7.6.4.4 Inter sectorial collaboration and coordination (ICC)/Partnership

Sectorial collaboration is needed that as nutrition is mainly determined by factors outside the health sector. So, World health organization described it in their statement,

*“ICC means, sectoral integration in activities to bring health results; it is carried out outside the health division, in joint efforts are essential to bring productive outcomes” (WHO, 2008:2).*

In this study, inter-sectorial collaboration and coordination is considered as a significant activity plan, integration with other sector like agriculture sector, education sector, health

sector, and other pertinent sector to enhance the nutritional status of pregnant women. These partnerships enhance synergy and mutual support for one common objective and improve the implementation capacity.

The main objective of this inter-sectorial collaboration and coordination (ICC) is to concrete efforts of all stakeholders in pregnant women nutrition intervention and to enhance pregnant women nutrition status. As World Bank document showed that, multi-Sectoral approach is a very important tool to reduce under nutrition (The World Bank, DFID, & Government of Japan, 2013:31). ICC is a vital protocol of the activity that helps to accelerate the pregnant women nutrition and household food security. Besides, ICC committee participants have an authority to address household income enhancement by local income generation activity at community level, and are also mainly expected to emphasis agricultural production by especially using climate adapted seed, improved seed, and encouraging the household in agricultural technology use. In addition, pastoralist community are more affected with food insecurity and under nutrition; thus, it needs governmental and other partner's involvement in pastoralist settlements and self-agricultural production.

#### 7.6.4.5 Community engagement

Community engagement is "*a functioning social procedure that helps, cooperation, correspondence, exchange, inclusion between health institutions and community for scope of nourishing, social, and organizational outcomes*" (Silberberg, Cook, Drescher, Weaver, & McCloskey, 2011:7; South and Phillips (2014:695) described community engagement is an important change instrument that is suitable with in public health system and helps to achieve set of outcome.

In this study, community engagement and mobilization is a fundamental guiding procedure for prevention and improvement of pregnant women nutrition status. Evans and Hudson (2014:4) stated that: community engagement is an essential section of any community based initiative. So, committed effort is an essential to engage and develop

relationships with local community partners and other party to enhance pregnant women nutrition status. Gray, Bedford, Deconinck, and Brown (2014:6) discussed the importance of community involvement in entirely phases of service provision: planning, assessment, budgeting, design, resource, monitoring, implementation, reporting and evaluation. So, participatory design and planning of nutrition activity helps to reduce barriers and achieve guiding procedures.

Community nutrition day (CND) is one of important community nutritional activity, so every month community health workers and health professionals are expected to plan nutritional education to create nutrition awareness, and pregnant women screened for under nutrition at community level and other nutrition related activity helps to prevent pregnant women nutrition status. The finding in this study showed that pregnant women consume mono type food (one type of food), so that food demonstration and re demonstration at community level at regular interval for pregnant women should help to enhance a dietary diversity score level and prevent under nutrition. So, Community sensitization, Community outreaches (Mass nutritional screening, House-to-house visits for counselling and under nutrition case finding) and community involvement in nutrition activities is key tool for the success of this guiding process.

#### 7.6.4.6 Mentoring and coaching the nutrition programme

“Mentorship” is a partnership where higher expert support to bring skill for less qualified individuals. In other word, it is education and advancement connection between specialist and new staffs (Hodgson, & Scanlan, 2013:389). Gentry, Weber, and Sadri (2008:243) stated about the benefit of mentoring for job performance, and also help for staffs motivations. The proof recommends that mentorship programs provide strong peer support by timely feedback, recognition and acknowledgement that inspire employee, as the results improve nurse retention (Block, Claffey, Korow, & McCaffrey, 2005:139).

Nutrition program implementation needs knowledge and experience; thus, regular provision of mentorship and coaching for extension workers and midwives (community health care providers) and health professionals from experienced and qualified experts is a vital activity plan to facilitate immediate improvement of nutrition status or performance and development of skills by a form of job training that enable health extension workers to acquire knowledge and skill to implement pregnant women nutrition status.

#### 7.6.5 Dynamics (power)

Dynamics is a power that yields development or transformation. The power or dynamics as explained in detail (Dick Off, James, & Wiedenbach, 1968:431), as biological, or chemical, physical, or mental bases energy that initiates the movement towards the accomplishment of an objective. The dynamics for this study are confidentiality, trust, acknowledgment, praise and reward, behavioural change towards nutritional taboo, and commitment and will from nutritional program implementers are important energy sources that help to develop community based prevention model. Figure 7.4 depicted dynamics source for activity in community based model development.

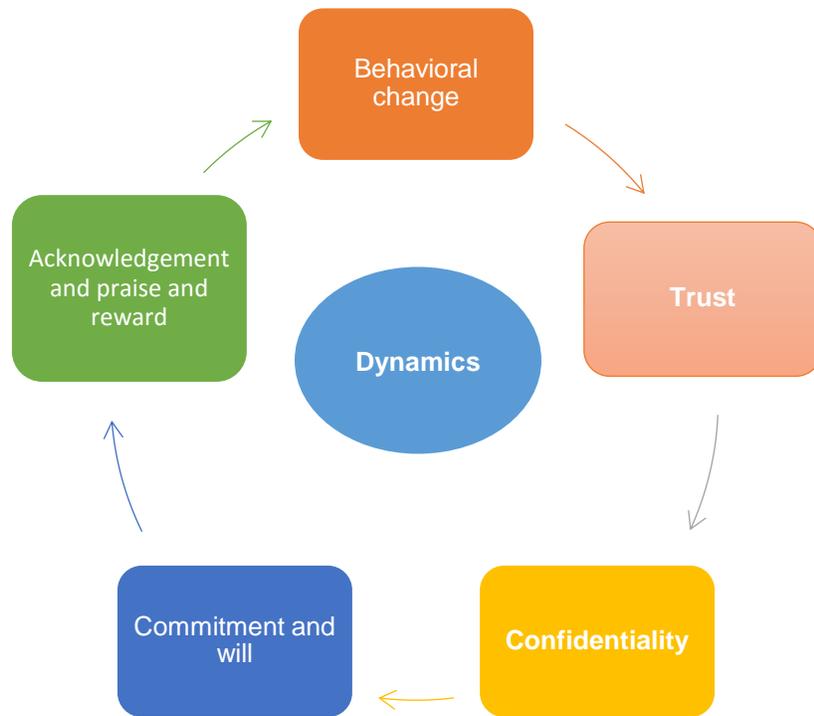


Figure 7.4: Dynamics or power for development of community based prevention model

#### 7.6.5.1 Confidentiality

Patient privacy on the information given needs to be held in secret, that is made by consensus between a physician, nurses and a client (General Medical Council, 2017:18, Ellenchildpinch, 2000:6, & Segen's, 2012). Confidentiality is a basic energy source for the activity in this study, which facilitate community based prevention model development. During pregnant women nutrition counselling, any information that a pregnant women or household provide to a service providers(nurse/other care givers) is private and needs to be kept confidential and abstain to disclosed to a third party, this encourage pregnant women or community to enhance active participation in nutrition status prevention.

#### 7.6.5.2 Trust building

Trust relationships with client (pregnant women, household and community) were identified as an energy source for the community based model development that recognized during concept analysis. Trust is a more challenging issue in these contexts where the patients may be more vulnerably positioned and or dependent on the expertise of the service provider. In this way, suppliers trust in clients and influence in the nature of care and client health linked to practices (Brennan, Barnes, Calnan, Corrigan, Dieppe, & Entwistle, 2013:686). On other literature, the effects of praise on education and conduct (behaviour), predominantly as it relays to inspiration (Ferguson, 2013:37).

Therefore, health care professionals /health extension workers relationship with pregnant women, household and community is very crucial energy source, that facilitate interaction, ownership in under nutrition prevention through community based model. In order to build trust, health professionals, and health extension workers are required skill, personal positive behaviours, respect of pregnant women/ community and provision of pertinent information are very important characters that encourage pregnant women, household and community in active participation, involvement and ownership in community based under nutrition prevention process.

#### 7.6.5.3 Acknowledgment, praise and reward

Being congratulated frequently makes individuals feel better. Pride, joy and expanded sentiments of certainty are on the whole basic response to constructive reaction and furthermore add to inventive reasoning and imaginative critical thinking at work (Maercker, & Miiller, 2004:345, & Umlas, 2006). Akafo and Boateng (2015:120) expressed connection among reward and work inspiration and employment fulfilment had factually significant relationship. In this study, acknowledgment, praise and reward are key dynamic sources that inspire pregnant women, household and community in nutritional status.

It is an operational plan(Dick Off, James,& Wiedenbach, 1968:428) and dynamic in the development of community based prevention model for pregnant women nutritional status and also nurses(midwives) (HCP), health extension workers, nutritionists, and agricultural extension workers should be acknowledged, praise and reward for their contribution. Thus, motivate them to improve pregnant women nutritional status. So, provision of acknowledgement, praise and reward is a fundamental powerful tool, which inspires and motivates staffs for future work. Consequently, agents and recipient develop common goal in improvement of pregnant women nutritional status.

#### 7.6.5.4 Behavioural change towards nutritional taboo

Conduct change: "In modifying the manner in which one doing and respond, conduct change additionally influences one work all in all" (Pam, 2013:1). Conduct change can allude to any change or adjustment of human conduct (Encyclopaedia of public health, 2019). As indicated by Condon and Coulson (2017:1), an intervention planning, operation for behavioural change is vital to address the gap among target population. Behavioural change is a challenging procedure.

So, Chambliss (2015:1) suggested the A's framework to guide change such as: assess the general situations, advice based on the findings, agree on the option given, assist for behavioural change, and arrange, support professionals in testing an extensive behavioural change implementation method.

In the present study, culturally, pregnant women did not allow to consume animal sources food like meat, milk, egg and other like honey, believing that newly born baby may be big and lead to labour complications. On the other side, food priority was given for husband and then women eat last at home if food present; otherwise, they go field work without diet. This finding is accepted as a normal context at this study area, due to this, large figure of pregnant women were under nourished. Therefore, social behavioural change communication (SBCC) is mandatory to transform husband, community and pregnant women behaviour towards nutritional status and household

food security. Behaviour change needs process or step or ladder from lower to top. Hence, it needs health extension workers, nurses, clinicians, other staffs and agricultural extension workers efforts to bring positive behaviour in pregnant women nutritional status.

#### 7.6.5.5 Commitment and will

“Commitment” is a guarantee or choices to accomplish things or readiness or ability to provide occasions and vitality to a duty, action, or thing that someone trust in (Becker,1960:35). Government commitment and will were the main obstacles for worldwide society for total eradication of under nutrition and food insecurity, absence of commitment nutritional programs, police, and strategies and assets expected to improve nutrition challenge are probably not going to be received successfully(Baker, Brown, Wingrove, Allender, Walls, Cullerton, Lee, Demaio,& Lawrence, 2019:11). Similarly, previous investigations of nutrition commitment as demonstrated that significant level of political concern is essential to mobilize assets and skilled human (Harrisa, Drimieb, Roopnarainec, & Covica, 2017:55).

Moreover, Baker, Hawkes, Winggrove, Demaio, Parkhurst, Thow and Walls (2018:12) described commitment is an important activities to accomplish nutritional objectives. Along these lines, strong commitment from all stakeholders at all levels is essential to ending hunger and eradicating all types of under nutrition and food insecurity (WHO,& FAO, 2018:11). Hence, nutrition and food security activity needs different stakeholder’s efforts and commitment to save the life of pregnant women, so, political leaders, partners working nutrition program, agricultural extension experts, civil society, community, household and administration unit should be focus on nutrition intervention to save the life of the pregnant women and the next generation. Thus, these dynamic sources for the activity facilitate the development of community based prevention model.

### 7.6.6 Outcome

Outcome is the finale fact or accomplishment of the action (Dick Off, James, & Wiedenbach, 1968:28). In this study, outcome is a community based prevention model for under nutritional status for pregnant women at southern Ethiopia, terminus including reducing pregnant women morbidity and mortality related to under nutrition, achievement of SDG 2, improved pregnant women nutrition status through community engagement, staff motivation, strong multi-sectorial collaboration and coordination, and community based care. The figure 7.5 depicted endpoint of the activity.

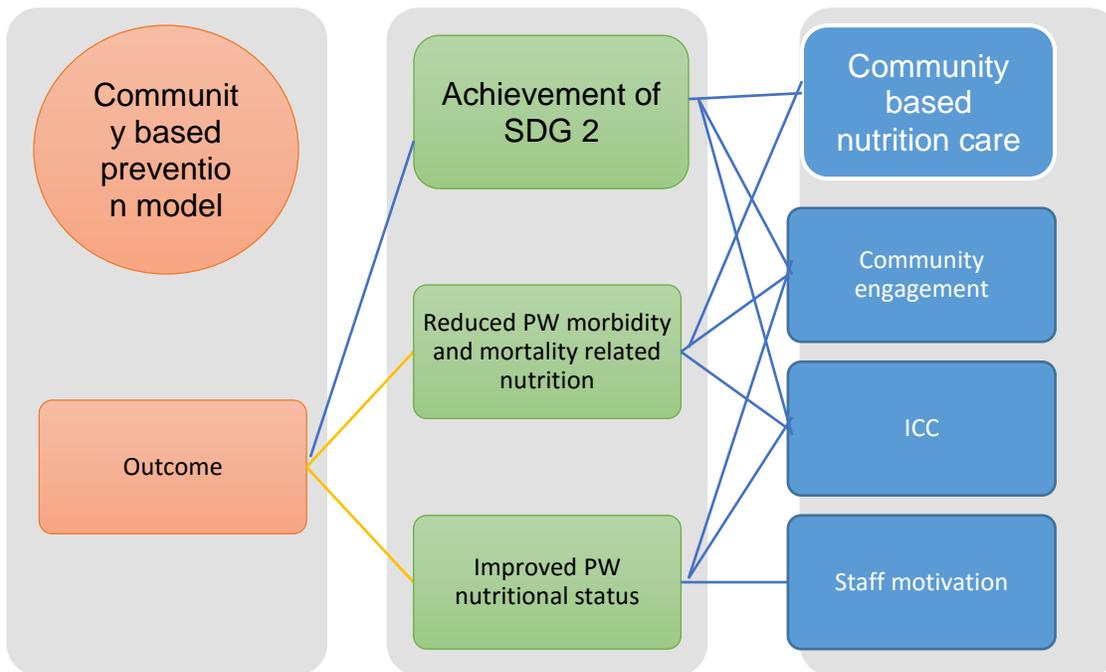


Figure 7.5: Outcome of the action

#### 7.6.6.1 Improved pregnant women Nutritional status

Improved pregnant women nutritional status is a fundamental outcome. Therefore, every stakeholder has responsibility and accountability to exert efforts in nutritional improvement among pregnant women and as well as households. Hence, efforts related to male involvement, agents (agricultural extension workers, nurses, health extension workers, and medical doctors), other governmental, non-governmental organisations and community contributions are very important to enhance dietary status among pregnant women.

#### 7.6.6.2 Reduced pregnant women morbidity and mortality related to nutritional status

Reduced pregnant women's morbidity and mortality related to nutritional status as result of community based model that might be linked with community engagement, staff motivation, and multi-sectorial coordination and collaboration help to prevent pregnant women nutritional status.

#### 7.6.6.3 Achievement of SDG 2

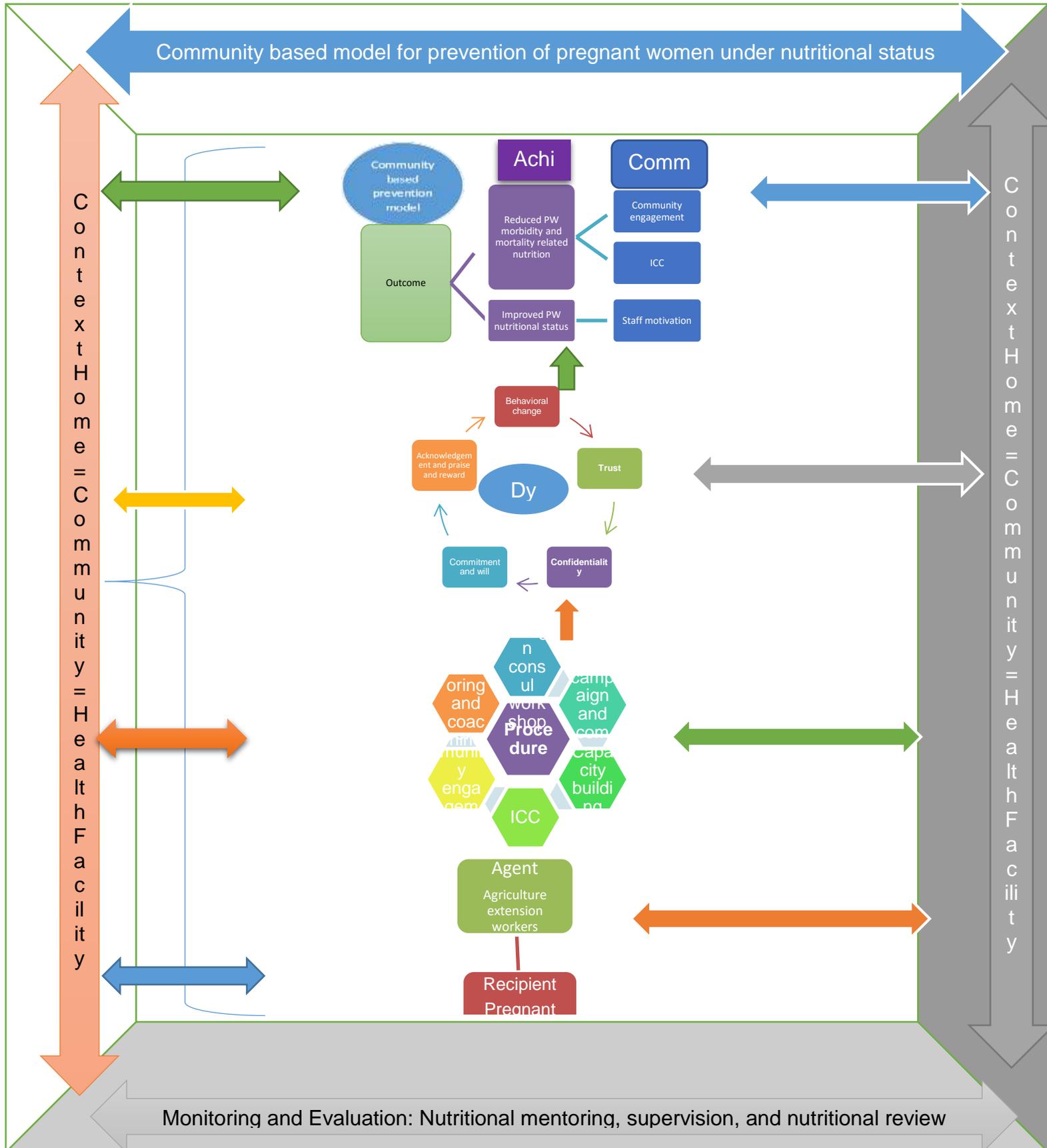
It is indicated in SDG 2 that: total eradication of hunger accomplishes food security, enhances sustenance and encourages farming (modern agricultural). Integration of multi-sectorial, household income generation, settlement of pastoralist, agricultural technology including improved seed result, guaranteed family nourishment certainty and enhanced pregnant women nourishment. This community based model will be validated during a post -doctoral project.

### 7.7 SCHEMATIC PRESENTATION OF PROPOSED COMMUNITY-BASED PREVENTION MODEL

A model is characterized as a figurative illustration of an empiric practice in the type of words, mathematical symbols, pictures, and figures (Chinn, & Kramer, 2008:184).

Moreover, Bhattacheree (2012:14) pointed out a prototypical is a demonstration of totally or portion of a framework that is built to investigate that structure. Figure 7.6 has shown schematic presentation of proposed community based prevention model.

Figure 7.6: Schematic presentation of community based prevention model



## 7.8 EVALUATION OF THE MODEL (CRITICAL REFLECTION)

The researcher sent the proposed community based prevention model by email to senior panel experts(see annex N) composed of different professional categories like professors from academic education, doctors (PhD) who had experience on model development, senior nutrition specialists, senior nutrition program managers, nutrition consultants, policy advisers, local nutrition program implementers, medical doctors, health officers, nurses requested to give comments by using criteria suggested by Chinn, and Kramer (2011:197); critical reflection considered on this criteria: model clarity, model simplicity , model generality, model accessibility,model importantance, Depending the above criteria senior panel experts sent comments on each part of the model. Here presented some of the comments:

### **Panel expert's opinion and critical reflection on Community based prevention model**

#### 1. Model clarity:

The model is clearly stated that it begins from the facts/findings of the research and approaches from different scholars. The model has clearly implied and contextualized all the stakeholders up on whom the model implemented. It is important to see the procedures how the model is going to be launched and implemented what we see in the document. But, the community side discussions should give strong attention.

#### 2. Simplicity:

The project/model can be easily applicable because the problems are dig-out from and by the community itself. Of course, the things have cultural aspects like nutritional taboo are hard by their nature. But, since the issue of nutrition is life issue, so every individual needs to understand and act up on it.

#### 3. Generality:

The model is inclusive of all population groups especially the pregnant, households, community leaders, health care providers, organizations, and government bodies in

general. So for the project`s implementation these stakeholders are essential and the nutrition problem can be solved in community level intervention in collaboration with these general approaches is mandatory.

#### 4. Accessibility:

The model is scientifically designed and generated from the findings and well documented procedurally that makes the model easily accessible.

#### 5. Importance:

No question is an important about the importance of the model. This model can bring an impact on the over whole nutrition problem of the community; because, most of the nutrition problem can be solved by the intervention on pregnancy level for the coming generation building. So, it is an appropriate model for prevention of under nutrition among pregnant women as well as children in the community level.

## 7.9 CONCLUSION

In this chapter the researcher has described a development of community based prevention model process, as he was started from introduction of the chapter, and followed by presentation of major quantitative results and qualitative findings of the thesis, and then considered concept analysis conducted based on an eight steps method (Walker, & Avant, 2013:161) and Chinn and Kramer (2011:158). Furthermore, the survey list that had six aspects (Dick Off, James, & Wiedenbach,1968: 422) was rationally used for the model development process. In general, the purpose of model development, the model development process, structure of the model, evaluation of the model methods, expert panel opinions about the model, were all incorporated and integrated in the development of the finalised version of the proposed model. Chapter 8 will be presenting discussion of conclusions and recommendations in more detail.

## **CHAPTER 8: DISCUSSION OF CONCLUSIONS AND RECOMMENDATIONS**

### **8.1 INTRODUCTION**

The current study was guided by seven research study objectives as outlined earlier in section 1.5 of chapter 1 of this study. The research study objectives of this mixed method study were achieved as evidenced by the research quantitative phase results and qualitative phase findings that have been presented in chapters 4 and 5, respectively, and further discussed in chapter 6. In addition, a community-based prevention model for under nutritional status among pregnant women was developed, as discussed in chapter 7 of this doctoral thesis.

The main purpose of this chapter of the thesis is to discuss conclusions, recommendations, as well as concluding remarks.

### **8.2 RESEARCH METHODOLOGY**

This section presents the overview of key aspects related to the investigation; all of which were selected cautiously to address a particular research question and study purpose (Burns, & Grove's, 2017:52). In this investigation the researcher used mixed methods with combination of quantitative & qualitative methods and in order to minimise the limitation of both methods (Creswell, & Creswell, 2018:216). Within this, the principal investigator utilised three phases: an initial, middle and last phase. During the initial phase, the researcher collected and analysed quantitative data, and developed instruments to collect qualitative data based on emerging results. During the middle phase, the researcher collected qualitative data by using FGD and in-depth interview guide and analysed. During the last phase, the researcher analysed concepts (Walker, & Avant, 2013:161) and developed the model to prevent under nutritional status by considering 6 survey lists (Dick Off, James, & Wiedenbach, 1968:422).

Research strategies allude to methods and practice used to gather and analyse the information (Bowling, 2014:166). Similarly, they allude to the techniques the investigator

used in accomplishing all the planned aspects of the research process (Kothari, & Garg, 2019:6). This study was conducted in a randomly chosen setting of South Omo, Southern Ethiopia. The present investigation utilised both quantitative and qualitative methodologies. The technique for gathering data were conducted through individual dialogue (face to face) in mutually acceptable environments either within participants' chosen venue or the hospital setting (Kothari, & Garg, 2019:93).

Before quantitative data were collected, a pre-test was conducted out of the selected district. Then some corrections were made to the questionnaire and information was gathered by going house to house in randomly selected communities. Similarly, qualitative data were gathered by using in-depth interview guide from district health managers, health centre directors, chief executives officers, Zonal nutrition experts and zonal level agricultural experts and also five focused group discussions (FGDs) were conducted in 05 districts among pregnant women.

### 8.3 CONCLUSIONS

In this study, 7 out of 8 of the households were food insecure. This figure indicates that there was a very high burden of food insecurity in Southern Ethiopia. Besides, the magnitude of under nutrition among pregnant women 54% in South Omo zone, SNNPR, Ethiopia. Correspondingly, the prevalence of anaemia was 39.9% among pregnant women, which represented severe public health significance in the study area. Thus, food insecurity, under nutrition and anaemia were public health problems in pastoralist communities as compared with agrarian community. The above problems affirm the need for nutritional and economic transformation and intensive intervention from pertinent stakeholders such as the agricultural sector, health sector and policy makers, towards reducing food insecurity, under nutrition, and anaemia.

About 77% of pregnant showed low scores for dietary diversity, also 17% of the pregnant women had moderate dietary diversity (DD) score and amazingly, only 6% of the pregnant women scored a high DD. So, community level, context based, practical

food demonstrations for pregnant women are excellent interventions to enhance dietary diversity score.

On other hand, only 8.3% of the pregnant women had good knowledge concerning nutrition while, 63% of the pregnant women had no awareness (poor knowledge) and the rest 28.7% of the pregnant women had average knowledge on nutrition. In addition to this, 53.5% of the pregnant women had average attitudes, 33.9% had a good attitude and the rest 12.6% of the pregnant women held negative attitudes towards the nutritional status. Likewise, majority, 64% of the pregnant women had under nutritional practice, 34% of the study respondents had average nutritional practices, and only, 1.9% pregnant women had good nutritional practices. Health care professionals (midwives, nurses) and health extension workers' (community workers) counselling on nutrition is fundamental in promoting an increase in pregnant women's nutritional status. Additionally, community-based awareness campaigns were exceptionally useful in raising community and pregnant women's awareness on nutrition.

By contrast, community-based food demonstrations, and video shows to guide pregnant women's practices was very important to improve the knowledge, attitudes and practices of pregnant women on nutritional status.

Agro-ecology in lowland, being a pastoralist community, absence of food support during last 12 months, wealth index among poorest group, and family size composition among larger peoples in the house when compared with counterpart groups were positively or negatively associated with food insecurity at household level. Besides that, having the poorest household wealth index, existing within lowland agro-ecology, being pastoralist, self-production of food source, having less meals per day, not feeding on a starch staple, having less than one chicken and having access to less than 2 hectares of farming land were statistically significant as factors that influenced under nutrition. Hence, food insecurity, under nutrition, not taking/using ferrous sulphate, drinking coffee, no fish meal, no birth space, having limited or no nutrition information, having a minimal walking distance from the health facility, limited ANC visits, gestational age, and parity were positively or negatively associated with anaemia. These major contributing

factors need active community based interventions to enhance pregnant women nutritional status.

In addition to the above, the key informant interviews and FGDs participants suggested that, drought, rain shortages, climate change, food sources that were primarily purchased, living on food aid, being in a pastoralist community, poor soil fertility, Omo river not used for irrigation, conflicts between ethnics groups, increases in population, and lack of access to nutritional guidelines were the main contributing factors for household food insecurity. On other hand, poor awareness on nutrition, poverty, and pregnant women workloads, cultural food priority being given to the husband, and inhibited access to animal source foods like milk, egg, meat, were all implicated. Besides, infections related to malaria, reduced feeding frequency, use of food for selling, inadequate knowledge on diet variety, absence of ANC visits, blood loss and food insecurity, predisposed individuals to anaemia. These factors need critical attention at zonal, regional and national level to avert the challenges.

The above study report shows that, there were a significant proportion of individuals with food insecurity; under nutrition and anaemia, which could be found at household or community level because of weak linkages between context and intervention. So, community-based interventions and action are the best remedies for prevention and improvement of nutrition among pregnant women. In this study, for the community-based prevention model development process, eight concept analysis steps were applied (Walker, & Avant, 2013) and also Chinn, and Kramer's (2011:158) recommendations were reviewed with regard to the structure of the model. Besides that, the researcher considered six aspects of activity for the present model development process (Dick Off, James, & Wiedenbach, 1968:422) that were: a) Recipient b) Agent c) Context d) Procedure, e) Dynamics and f) Outcome

By reviewing different literature and scholarly sources, the principal investigator developed a community-based prevention model so as to manage food insecurity, under nutrition and anaemia problem among pregnant women. Besides, this developed community-based prevention model would help local health and agricultural program

manager's decision-making, policy makers, non-governmental organizations (NGO) and other pertinent stakeholders working on nutrition.

## 8.4 RECOMMENDATIONS

The recommendations will be presented under practice, policy-makers' and future research

### 8.4.1 Practice Recommendations

#### 8.4.1.1 RHB/ZHD/WoHo and Health Facility

The current findings indicated that, under nutrition was highly prevalent in this study area, so for the health facilities, monthly and quarterly pregnant women nutrition screening and monitoring of pregnant women nutritional status are very vital. Thus, health facility (health center, health post, hospital) should plan nutritional screening for pregnant women and under five children at community and near by health post. This screening session helps us to identify whether adequately nutritioned or under nutritioned, that assist us to offer nutritional conseling and other nutritional intervention accordingly. So as, health facility staff should exert effort to have regular monthly community health days (CHD) for nutritional screening and linking with other program areas.

In addition to this, health facility staff should work on iron supplementation; because only a small proportion of mothers took iron sulphate in their pregnancy follow up: Even in maternity, from the health facility, out of 15 pregnant women only 3 pregnant women received iron sulphate. Thus, regional, zonal, and district health office staff should support health care professionals and health extension workers in order to adhere to the national and WHO recommendations for pregnant women supplementation.

Consequently, the majority of the pregnant women do not use iron sulphate drug in regular way due to different reasons, like, experienced of side effect, forget to take the pills, unaware of the benefits, afraid about what may harm the baby and others.

Therefore, tablet provision may not work unless it is supported by counselling. The regional, zonal and district health offices are required to support the capacity building on maternal nutrition status and food security by enhancing attitudes, knowledge and practices of community health extension workers and health care providers. In order to delay pregnancy, family planning is a key method. In this study area, there are large family sizes at household. So availability of long acting family planning is recommended.

#### 8.4.1.2 Husband Involvement

In this pastoralist community, women are expected to do every work in the house such as caring children, house building, farming land, going to the market and others while males spent their day in the field herding cattle. Men should also be encouraged to help their pregnant wives with house work.

#### 8.4.1.3 Pregnant women level

During pregnancy, early ante natal care follow-up at health facility is very vital. Therefore, every pregnant woman should Attend ANC follow-up, follow-up nutrition advising activities and take iron sulphate and other offered drug accordingly. In addition, every pregnant woman should eat a varied diet from local contexts (not the same diet thought the pregnancy).

#### 8.4.1.4 Partners/Non-governmental organization

Partners working in maternal nutrition in the study area, needs to focus on mitigation strategy to tackle under nutrition among pregnant women. They should provide logistic, technical and financial support, and also avail capacity building for health extension workers as well as HCP.

#### 8.4.1.5 Improvement of multisector coordination and collaboration

Food security and nutrition are the cross-cutting issues in this study area. Hence, various sectors should exert effort to ensure pregnant women nutritional status. Therefore, partnership on issues associated with nutrition coordination and mainstreaming in sectoral policies and strategies are very important. Health, agriculture, education, water (WASH), finance, productive safeynet program/social protection/PSNP, and other pertinent sectors collaboration and coordination are very essential to improve the pregnant women nutritional status.

#### 8.4.2 Policy Makers' Support

Food security and nutrition are a fundamental human right. However, there was high food insecurity and under nutrition in this study area, especially in pastoralist communities. Therefore, it needs policy maker's urgent intervention to tackle food insecurity and under nutrition in the affect communities. Even though, they had relatively large land in the pastoralist community, there was rain scarcity as well as a lack of adequate irrigation systems within the local community. Thus, a lot of households were suffering from food insecurity and under nutrition. Policy makers should give attention to the development of an adequate irrigation system in Omo River by availing motor pump for irrigation for the pastoralist area.

##### 8.4.2.1 Ministry of Agriculture

One of the findings in this research thesis was, subsistence farming with little /without technology was used, so, the production was not sufficient for the family throughout the year; therefore, they suffered with food insecurity. It needs Agricultural sector effort to modernize production, so researcher recommend to improve, soil, and climate adapted seed for the pastoralist area. Not only this, but also there was a need to promote fertilizer usage. So as to upgrade productivity, researcher recommended governments' support for agricultural technology transfer.

Importantly, findings from key informants and FGDs indicated that, almost all pastoralist communities were movable from one place to other as they search for water and grass for their livestock. Therefore, it is better to settle in one place and lead their life as agrarian communities, if water is accessible, they may not move from one place to other.

#### 8.4.3 Future Research

Based on current findings, the researcher recommends the following research areas for future research:

- Testing the effectiveness of the developed community-based prevention model for under nutritional status among pregnant women, as well as validation of different contributing factors. Proto type of this model needs to be teste in the similar agro-ecological zones in Ethiopia in large.
- National level research that covers agro-pastoralist and agrarian communities within town and rural contexts.
- Longitudinal research that allows us to know the progress of food insecurity and under nutrition during different season.

### 8.5 CONCLUDING REMARKS

This study was conducted to develop a community-based prevention model for under nutritional status based on the current quantitative results and qualitative findings and literature review. This study confirmed that there was extraordinary weight of food insecurity, under nutrition and anaemia in the study area. Therefore, immediate action should be taken to alleviate the problem.

Reduced meal intake, residing low land agro-ecology, being pastoralist community, absence of food support, poorest wealth index household, less than one chicken, food insecurity, under nutrition, absence of iron utilization, drinking coffee/tea, no fish meal, lack of nutrition information were identified as contributing factors for food insecurity. Moreover, drought, rain shortage, climate change, poor soil fertility, food prices,

failure to use omo river for irrigation, population increase, seasonal variation and absence of guide line, poor awareness on nutrition, poverty, and pregnant women's workloads were identified by in-depth and FGD participants as risk factor. It needs different stakeholder's effort and intervention to tackle and improve the nutritional status of pregnant women in the study area.

Traditional taboo such as food priority was identified as one of the main factor in this pastoralist community: initially food was given for husband, and then gives for children, women expected to eat at last if only food is available. Also, animal sources diet not allowed for pregnant women to eat like: milk, egg, meat, and better because they believe it makes the baby big and end up birth complication.

Therefore, the current burden and contributing factors were needs government and NGO efforts to avert food insecurity and under nutrition in the pastoralist as well as agro-pastoralist community. In this respect, the research questions have been addressed and the planned community-based prevention model has been developed. This will result in benefits to pregnant women and family participant's food and nutritional security. The present community-based prevention model could assist as a reference point for nutritional interventions at community level.

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## ANNEXURE A: UNISA ETHICAL CLEARANCE LETTER



**RESEARCH ETHICS COMMITTEE: DEPARTMENT OF HEALTH STUDIES  
REC-012714-039 (NHERC)**

1 November 2017

Dear Mr Tsegaye Alemu Gute

**Decision: Ethics Approval**

**HS HDC/760/2017**

Mr Tsegaye Alemu Gute

Student No 61625159

Supervisor: -Prof ZZ Nkosi

Qualification: PhD

Joint Supervisor: -

**Name:** Mr Tsegaye Alemu Gute

**Proposal** Development of a community based prevention model for nutritional status among pregnant women in Southern Ethiopia

**Qualification:** DPCHS04

Thank you for the application for research ethics approval from the Research Ethics Committee: Department of Health Studies, for the above mentioned research. Final approval is granted from 1 November 2017 to 1 November 2022.

*The application was reviewed in compliance with the Unisa Policy on Research Ethics by the Research Ethics Committee: Department of Health Studies on 2 August 2017.*

*The proposed research may now commence with the proviso that:*

- 1) The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
- 2) Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Research Ethics Review Committee, Department of Health Studies. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*



University of South Africa  
Preller Street, Muckleneuk Ridge, City of Tshwane  
PO Box 392 UNISA 0003 South Africa  
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150  
[www.unisa.ac.za](http://www.unisa.ac.za)

3) *The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.*

4) *[Stipulate any reporting requirements if applicable].*

**Note:**

*The reference numbers [top middle and right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the Research Ethics Committee: Department of Health Studies.*

Kind regards,

*Prof J. E. Maritz*

Prof JE Maritz  
CHAIRPERSON  
[maritje@unisa.ac.za](mailto:maritje@unisa.ac.za)

*Prof MM Moleki*

Prof MM Moleki  
ACADEMIC CHAIRPERSON  
[molekmm@unisa.ac.za](mailto:molekmm@unisa.ac.za)

*A Phillips*

Prof A Phillips  
DEAN COLLEGE OF HUMAN SCIENCES



ANNEXURE B: SUPPORT LETTER FROM UNISA ETHIOPIA OFFICE, ADDIS,  
ABABA TO SNNPR RHB



06 DECEMBER, 2017

UNISA-ET/KA/ST/29/06-12-17

SOUTHERN NATIONS NATIONALITIES AND PEOPLES REGIONAL  
HEALTH BUREAU  
HAWASSA

Dear Madam/Sir,

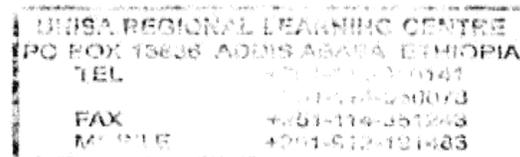
The University of South Africa (UNISA) extends warm greetings. By this letter, we want to confirm that Mr. Tsegaye Alemu Gute (student number 61625159) is a PhD student in the department of Health Studies at UNISA. Currently, he is at the stage of data collection on his research entitled "*Development of a community based prevention model for nutritional status among pregnant women in Southern Ethiopia.*"

This is therefore to kindly ask your esteemed bureau to assist the student so that he will be able to collect the necessary data for his doctoral thesis. Attached, please find the ethical clearance that he secured from the Department of Health Studies (UNISA).

Sincerely,

Tsige GebreMeskel Aberra

Deputy Director – Academic and ICT Support



## **ANNEXURE C: Request letter for support form SNNPR RHB**

From: Tsegaye Alemu Gute  
Email: tsegayea49@gmail.com  
SNNPR, Hawassa  
Date: 10Feb, 2019

To: SNNP Regional Health Bureau  
Hawassa  
Subject: Application for support letter  
Dear Sir /Madam:

.  
My name is Tsegaye Alemu Gute. I have granted BSC & Master of general public health from Hawassa University. I have over 12 years of work understanding as general wellbeing calling and pro in various associations, for example, locale wellbeing office as head, zonal program facilitator, right now; I am working in NGO/JSI venture as Regional vaccination authority position.

Directly, I am working my PhD explore. The title " Development of a community based prevention model for under nutritional status among pregnant women in southern Ethiopia " The reason for this investigation to decide and investigate factors adding to nourishing status among pregnant women in Southern Ethiopia so as to build up a network based aversion model to make more grounded in pregnant women sustenance status and wellbeing administration arrangement. In this manner, I will gather data to know the variables that upset well dietary status among pregnant women in provincial network.

For my investigations, I want to gather data both in community level member and health facility level managers. I need to get some information about their feeding frequency, feeding habit, food security status, knowledge and practice toward their nutritional status. Whatever data I gather will be kept carefully classified. No data recognizing the

participants will ever be discharged to anybody outside of this data assortment action. Respondent participation in the present study is totally voluntary, and they have the right not to respond to any single inquiry or the entirety inquiries. Additionally, respondents have the right to stop the interview totally whenever. However, we trust that respondents will take part in this study, since the outcomes will help the administration and policy development for dealing with under nutritional status of pregnant women to improve services.

At last, I am sympathetically mentioning your bureau to offer me a memo of help to direct exploration study among pregnant women at community level. For your detail reference and lucidity, I have attached a proposal report copy. My studies will conduct in 5 districts in South omo Zone; that is, Dasench, Hammer, Benytsemay, Malle &S/Ari districts. I would like to value your brief reaction.

Warm respects,

A handwritten signature in blue ink, consisting of several loops and a vertical line extending downwards.

Tsegaye Alemu Gute

E-mail: tsegayea49@gmail.com

Tel: +251 911017337

**ANNEXURE D: PERMISSION LETTER FROM SNNP Regional to South Omo Zone**



የደቡብ ብሄሮች ብሔረሰቦችና ሕዝቦች ክልላዊ መንግሥት ጤና ቢሮ  
 South Nations Nationalities and People's Regional State Health Bureau

ቁጥር ዘ/2.11/35367  
 Ref. No  
 ቀን 26/09/2011  
 Date



ጎሰ ደቡብ አሞ ዞን ጤና መምሪያ :-ጂንካ

**ጉዳይ :- ለጥናት ስለሚደረግ ትብብር ይሆናል**

ከላይ በርእሱ ለመጥቀስ እንደተሞከረው UNISA University የፕሊፕሊ ተማሪ የሆኑት አቶ ጸጋዬ አለሙ በ " Development of a community based prevention model for nutrition status among pregnant women in south ethiopia ". በሚል ርዕስ የምርምር ጥናታቸውን ለመስራት UNISA University( institutional review board) የሰነ ምግባር ታይቶ የፀደቀ ስለሆነ እና ጥናታቸውን ለማሳካት ዝግጅታቸውን ያጠናቀቁ ስለሆነ አስፈላጊው ትብብር እንድታደርጉ እናስባለን ::

አንድም አናት በወለድ ምክንያት መሞት የለባትም!

*Handwritten signature*

የጤና ምርምርና ቴክኖሎጂ ሽግግር ደጋፊ የሥራ ሂደት ባለቤት  
 Health research and technology transfer support process owner

**ገልጻፊ:-**

ለጤና ምርምርና ቴክኖሎጂ ሽግግር ደጋፊ የሥራ ሂደት  
 ሀዋሳ  
 አቶ ጸጋዬ አለሙ



☎ 149 Awassa (20-92-09) (20-59-50) (20-92-08) (20-54-06) (20-02-32) Fax (20-57-92) (20-59-55) (20-54-09) (12-40-79) E-mail snnpdhl@telecom.net.et snnpdpo@telecom.net.et snnprhiv@telecom.net.et Code 251-0462 t.t

**ANNEXURE E: PERMISSION LETTER FROM SOUTH OMO ZONE TO DISTRICTS**



ደቡብ ቆሌር ብሔረሰቦችና ሕዝቦች ክፍላዊ መንግስት ጤና ቢሮ  
የደቡብ ስሞ ዞን ጤና መምሪያ Ref.No

South Nations Nationalities and People's State Health Bureau

South Omo Zone Health Department

ቁጥር 0027/47/2/011  
ቀን 28/9/011  
Date

ለዳሰንች ወርዳ ጤ/ጥ/ዕ/ቤት

ገ/ሥ/ሥ/ሥ ል/ሥ/ሥ/ሥ  
ደ/ሥ/ሥ/ሥ

ለፀመር ወርዳ ጤ/ጥ/ዕ/ቤት

ለበናይ ፀግይ ወርዳ ጤ/ጥ/ዕ/ቤት

ለማሌ ወርዳ ጤ/ጥ/ዕ/ቤት

ባለቤት

**ጉዳይ: የጥናት ትብብር እንዲደረግላችው ስለመጠየቅ ይሆናል**

ከላይ በርዕሱ ለመጥቀስ እንደተሞከረው አቶ ፀጋዬ አለሙ " Development of a community based prevention Model for nutritional status among pregnant women in South Ethiopia" በማለት ርዕስ የምርምር ጥናታችውን ለመስራት ስላመለከቱ በእናንተ በኩል ተገቢው ትብብር እንዲደረግላችው እናሳስባለን።

" እንድም እናት በወሊድ ምክንያት መጥፋት የለባትም"

ግንባር



ገ/ሥ/ሥ/ሥ  
Mintesnot Meika Gujo  
የመምሪያ ጉዳይ  
Department Head

- Doctor for Africa

- ለእኛ ፀጋኔ ኔገራ

ግንባር

## **ANNEXURE F: STUDY INFORMATION SHEET**

Study information sheet

Title of the research: Development of a community based prevention model for under nutritional status among pregnant women in southern Ethiopia

Principal investigator: Tsegaye Alemu Gute PhD student in Health studies at UNISA

Supervisor: Professor ZZ NKOSI

Hello, my responsibility in this study is as an information gatherer for the investigation led by Tsegaye Alemu Gute PhD Student at University of South Africa. Realize I might want to chat with you and collect data by arranged survey. Prior to Data collection, a composed consent will be taken from you to affirm whether you are willing to take part or not.

Reason: a definitive motivation behind this investigation is to decide and investigate factors contributing to under nutritional status, food insecurity and anaemia based on the findings develop community based prevention model for prevention of under nutritional status among pregnant women in Southern, Ethiopia.

Technique and Procedure: I want to ask you about your socio-economics characteristics, your nutritional status, Dietary diversity, KAP of Nutritional status and your household food security status and blood test will be taken from at the tip of your finger.

Hazard or potentially inconvenience: There is no hazard or distress you should fear as participating in this investigation, yet at the hour of test consumption you may feel pain and the study may take 30-45minte.

Advantages: I inform you that you won't get any payment for participating in the investigation. Be that as it may, contingent upon your research centre outcome you may

get treatment. In the event that your outcome shows extreme iron deficiency, at that point promptly we refer you to Hospital. On the off chance, that your outcome is moderate. We will treat you with Ferrous sulphate and on the off chance that it is mild we will offer you nutritious counseling. Next to this, the after effects of this investigation will have both immediate and unusual advantage to you and the other pregnant women.

Right to pull back from the investigation: Participant ship in the present investigation is voluntarily, and participants have right to decide unable to address any single inquiry or the entirety of the inquiries. Study repondents have right to end the meeting totally whenever you wish with no results by any means.

Confidentiality: You don't have to give your name. Whatever data you give will be kept carefully private and no data recognizing you will ever be discharged to anybody outside of this data collection action.

In any case, we trust that you will take part in this investigation and give right data to every one of the inquiries.

Contact data: If you have any request and misty issue please contact researcher.

A handwritten signature in blue ink, appearing to be 'Tsegaye Alemu GUTE', written in a cursive style.

Tsegaye Alemu GUTE  
SNNP Regional JSI RMNCH Specialist  
Cell phone: +251911017337  
Email address: tsegayea49@gmail.com

## ANNEXURE G: English version Questionnaire

### Section I: Informed Consent

I have understood about the objectives, reason, system, risk and additionally distress, benefits, right to pull put from the investigation and confidentiality of the investigation. In addition, I have been educated that all regarding my data will be kept carefully mystery/not unveil for other people and utilized uniquely for this specific investigation. Likewise, I have been all around educated that my name won't be inquired. I have the privilege not to answer and gives that I don't need. On the off chance that I need to pull out from the study I have right to do as such. I affirm that my participation in this study is totally voluntary. For any explanation compassionately counsel my supervisor Prof Z.Z. Nkosi ( [nkosizz@unisa.ac.za](mailto:nkosizz@unisa.ac.za) ) and furthermore the Chair of the University of South Africa , Department of Health Studies, Research Ethics Committee, Prof J E Maritz, [maritje@unisa.ac.za](mailto:maritje@unisa.ac.za)

Study contestant signature: \_\_\_\_\_ Date: \_\_\_\_\_

Information Collector signature: \_\_\_\_\_ Date: \_\_\_\_\_

### Section II: Identification

District name:		Interviewer visit	
City name:			
Kebele name(smallest structure)		Agro ecology	
Village name		Date	
Respondent Number		Interviewer name	

		and signature	
--	--	---------------	--

Section III: Socio-Demographic Characteristics

S.N	Queries Items	Coding variables	Skip to
001	How old are you?Age	-----years	
002	What is your marital status?	1. Single 2. Married 3. Divorced 4. Widowed 5. Separated	
003	What is your religion?	1. Protestant 2.Clutural 3.Orthodox 4. Muslim 5. Catholic 6.specify if any other option __	
004	What is your Ethnicity/ Language/?	1.Malle 2.Hammer 3.Dasenech 4.Beny 5.Tsemay 6. Ari 7.specify if any other-----	
005	How many Family members in house?	-----	
006	What is your Educational level?	Grade: _____	
007	What is your occupation?	1.Housewife	

		2.Farmer 3. Private business/merchant 4. Employee 5. Other specify_____	
008	What is your husband educational level?	Grade: _____	
009	What is your husband occupation?	1.Farmer 2. Private business/merchant 3. Employee 4. Day labourer 5.Pastoralist 6. Other specify_____	
010	Where is your residence?	1.Rural 2.Urban	
011	How old were you when you were married, first?	---- years	
012	How old were you when you gave birth, first?	--- years	

#### Section IV: House Hold Economic status

S.N	Questions	Coding Categories	Skip to
200	Does any member of this household own any agricultural land?	1.Yes 2.No	No, Skip Q202
201	If you say yes, how many (local units) of agricultural land does?	Local units----- (specify)	

202	What do they grow with the land?	1.Crops, If crops – which crops? 2. Legumes, If legumes – which one 3.Vegetables, If veggies – which veggies? 4.Fruits? If fruits – which fruits? s/ 5.Tubers? if tubers – which tubers?			
203	What is your source of food?	1. purchase, 2.own production 3. food aid 4. safety net			
204	If you say own production- is it enough for the whole year or covers partially?	1.Yes 2.No			
205	Does your household own any livestock, herds?other farm animals or poultry?	1.Yes 2.No			No, Skip Q204
206	If you say yes, how many of the following animals do in this		Yes	No	Number
		Milk cows			

	household own?	Oxen				
		Horses/donkeys/mules				
		Camels				
		Shoats				
		Chicken				
207	Does any member of your household have a bank or microfinance saving account?	1.Yes 2.No				
208	Does your household have:	Variables	Yes	No		
		Electricity?	1	2		
		Watch/clock?	1	2		
		Radio?	1	2		
		TV?	1	2		
		M/ telephone?	1	2		
		NM elephone?	1	2		
		refrigerator?	1	2		
		Table? chair?	1	2		
		bed with cotton/sponge mattress?	1	2		
		An electric mitad?	1	2		
		Kerosene S?	1	2		
		Kerosene lamp/pressure lamp?	1	2		
		Gun?	1	2		
		Kitchen?	1	2		
		bicycle?	1	2		

		Motorcycle or motor scooter/Bajaj?	1	2	
		animal-drawn cart?	1	2	
		car or truck?	1	2	
209	What type of fuel does your household mainly use for cooking?	1.Electricity 2.Natural gas 3.Biogas 4.Kerosene 5.Charcoal 6.Wood 7. Straw/shrubs/grass 8.Agricultural crop 9.Animal dung 10.No food cooked In household 11. Other specify			
210	Do you have separate room which is used as a kitchen?	1.Yes 2.No			
211	Observation & record house condition. What is the main material of the floor?	1.Natural floor Earth/sand 2.wood 3.Cement/ Ceramic tiles 4.Other-----			
212	Observation house & Record. What is the main material of the roof?	1. Iron/aluminium steel 2. grass 3.soil(Earth) 4. plastic 5. Other specify			

213	What is the main material of the exterior walls? record observation	<ol style="list-style-type: none"> <li>1.leaf/grass</li> <li>2.Wood and mud</li> <li>3.plastic sheets</li> <li>4.Cardboard</li> <li>5.Wood</li> <li>6.Otherspecify</li> </ol>	
214	What is the main source of drinking water for participants of your house hold?	<ol style="list-style-type: none"> <li>1.Piped water</li> <li>2.Dug well-protected</li> <li>3. Dug well- un- protected</li> <li>4.water from spring –protected source</li> <li>5. water from spring –unprotected source</li> <li>6. Rain water</li> <li>7. Tanker Truck</li> <li>8.SurfacewaterRiver/Lake/Ponds/Stream/Dam</li> <li>9. Bottled water</li> </ol>	
215	Is there anything to the water to make it safer to drink?	<ol style="list-style-type: none"> <li>1.Yes</li> <li>2.No</li> <li>3.I do not know</li> </ol>	
216	What usually do to make the water safer to drink?	<ol style="list-style-type: none"> <li>1.Boil</li> <li>2.chlorine-water</li> <li>3.Goard/pur/ Bishan Gari/Aquatabs</li> <li>4.Solar disinfection</li> <li>5.sand</li> <li>6.other specify-----</li> </ol>	
217	What type of toilet facility do your household usually use?	<ol style="list-style-type: none"> <li>1.Flush to piped sewer system</li> <li>2.Ventilated pit latrine (VIP)</li> <li>3.PIT Latrine with slab</li> <li>4. PIT Latrine without slab/open pit</li> <li>5.No Facility/Bush/Field</li> <li>6.Other specify-----</li> </ol>	

218	Have you passed stool, where did you use/defecate?	1.Flush to piped sewer system 2.Ventilated pit latrine (VIP) 3.PIT Latrine with slab 4. PIT Latrine without slab/open pit 5.Bush/Field 6.Other specify-----	
219	Do you regularly wear shoe?	1. Yes 2. No	

Section V. Obstetrics and health service related Characteristics

S.N	Questions	Coding Categories	Skip to
300	What is your obstetrical score	1.Gravida_____ 2.Para_____	
301	How were your previous deliveries?	1. Normal 2. Abnormal	
302	What type of chronic diseases does your family suffer from?	1. Diabetes 2. Renal disease 3.Hypertension 4. Other specify____ 5. No	
303	How many antenatal visits do you have on the current pregnancy?	-----	
304	Do you have pregnancy related nutritional information?	1.Yes 2.No	IF No, Skip Q306
305	If Yes, from where?	1. Health provider 2. Family 3. Media	

		4. Friends 5. Others specify	
306	Have you ever infected with malaria in the last 3 months?	1. Yes 2. No	
307	Did you use ITNs yesterday night?(please, observe bed)	1. Yes 2. No	
308	What types of domestic activities do you at home?	1. Cooking 2. Sanitation 3. Water fetching 4. Wood collection 5. Agricultural activities 6. Other household activities	
309	How would you rate your workload when compare your workload to your family members or any non pregnant women in your area?	1. Under loaded 2. Equally loaded 3. Overloaded	
310	How much time do you spend when you are walking from nearby health facility to your home?	1. Less than 30 minutes 2. Longer than 30 minute 3. I don't Know	
311	Is this current pregnancy wanted?	1. Yes 2. No	
312	Have you experienced any complication in previous pregnancy?	1. Yes 2. No	

Section VI: Women dietary diversity scores (WDD)

WDD data gather by considering preceeding 24-hours as a reference time.

Instruction: Please, read the list of foods. Place a 1/one/ in the box. If the respondent ate the food in question, place a zero/0/ in the box if respondent did not eat the food.

S.N	Questions	Coding Categories Yes = 1 No = 0	Skip to
A	Did you eat starchy staples eat in 24hours? (combination of Cereals and White roots and tubers)?	-----	
B	Did you eat dark green leafy vegetables in 24hours?	-----	
C	Did you eat vitamin A rich vegetables and fruits in 24hours?	-----	
D	Did you eat other fruits and vegetables in 24hours?	-----	
E	Did you eat organ meat in 24hours?	-----	
F	Did you eat meat and fish in 24hours?	-----	
G	Did you eat eggs in 24hours?	-----	
H	Did you eat legumes, nuts and seeds in 24hours?	-----	
I	Did you eat milk and milk products in 24hours?	-----	

Section VII: Food Frequency Questionnaires and Dietary Source

No	Food item	Medium serving	How often?				
			Daily	Wee	Month	Yea	Never

				kly	ly	rly	
1	How often you eat food i.e gruel or Porridge prepared from cereal grains (i.e. sorghum, maize, "enset", "teff" wheat)?						
2	How often you eat bread?						
3	How often you eat foods prepared from "enset" (Local food type "Bulla" and "Kocho")?						
4	How often you eat food "Enjera" prepared from cereals?						
5	How often you eat Food made from roots or tubers other than enset. (For example, white potatoes, white sweet potato)						
6	How often you eat Dark green leafy vegetables (for example, cassava leaves, pumpkin leaves, kale, amaranth leaves, or other dark green leaves)?						
7	How often you eat yellow/orange-fleshed squash, carrots, or yellow/orange-fleshed sweet potatoes?)						
8	How often you eat food made from beans (e.g., kidney beans, haricot beans, field peas, cowpeas, chickpeas or others)?						
9	How often you eat groundnuts/peanuts, or any nuts?						
10	What is the frequency of eating fruits? (mango, papaya, orange, banana, apple, etc)						

11	How often you eat meat from beef, lamb, goat, pork						
12	How often you eat milk, cheese or yogurt						
13	How often you eat meat from chicken?						
14	How often you eat eggs?						
15	How often you eat fresh or dried fish?						
16	How often you eat food with oil, fat, or butter?						
17	How often you drink Coffee?						
18	How often you eat Snacks between meals?						

Section VIII: House hold food Security status measuring questionnaires

Questionnaire asked with a recall period of four weeks (30 days)4weeks.

S.N	Questions	Coding Categories	Skip to
500	Did you worry about your household would not have enough food?	0 = No 1 = Yes	NO ,Skip to Q2
500a	How often did this happen in the past?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times) 3 = Often (more than 10 times)	
501	Did 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	
501a	How often did this happen in the past ?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times)	

		3 = Often (more than 10 times)	
502	Did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No 1 = Yes	
502a	How often did this happen in the past?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times) 3 = Often (more than 10 times)	
503	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	
503a	How often did this happen in the past?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times) 3 = Often (more than 10 times)	
504	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	
504a	How often did this happen in the past?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times) 3 = Often (more than 10 times)	
505	Did you or any household participants have to eat fewer meals in a day because there was not enough food?	0 = No 1 = Yes	

505a	How often did this happen in the past?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times) 3 = Often (more than 10 times)	
506	How ever no food to eat of any kind in your house because of lack of resources to get food?	0 = No 1 = Yes	
506a	How often did this happen in the past?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times) 3 = Often (more than 10 times)	
507	Did you or any household member go to sleep at night hungry because there was not enough food?	0 = No 1 = Yes	
507a	How often did this happen in the past?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times) 3 = Often (more than 10 times)	
508	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	
508a	How often did this happen in the past?	1 = Rarely (1–2 times) 2 = Sometimes (3–10 times) 3 = Often (more than 10 times)	
509	Is there any family member migrated for	0=No	

	work?	1=Yes	
510	Do you have farming land owned by the household?	0=No 1=Yes	
511	Did you need food aid during the last year?	0=No 1=Yes	
512	How many times the household normally eat per day?	_____	
513	Did any household member change his/her food consumption over the past 12 months compared to the previous year?	0=No 1=Yes	
514	Has the household experienced any food shortages over the past 12months?	0=No 1=Yes	
515	If yes, what were the main reason(s) for these food shortages?	_____	

Section IX: Questionnaire prepared to assess pregnant Women's Knowledge on nutrition status during pregnancy

S.N	Questions	Coding Categories	Skip to
600	How should a pregnant woman eat in comparison with a non-pregnant woman to provide good nutrition to her baby and help him grow?	<ol style="list-style-type: none"> <li>1. Eat more food (Eat more frequently)</li> <li>2. Eat more protein-rich foods</li> <li>3. Eat more iron-rich foods</li> <li>4. Use iodized salt when preparing meals</li> </ol>	

		<p>5.Other</p> <p>6.Don't know</p>	
601	Which types of supplements/tablets have you taken during pregnancy?	<p>1.Iron supplements</p> <p>2.Folic acid supplements</p> <p>3.Other</p> <p>4.Don't know</p>	
602	What is the health benefit for taking folic acid supplements/tablets?	<p>1.For normal development of the nervous system of the unborn baby (brain, spine and skull)</p> <p>2.To prevent birth defects/abnormalities the nervous system of the unborn baby (brain, spine and skull)</p> <p>3.Other</p> <p>4.Don't know</p>	
603	When a pregnant woman is under nourished, she is at risk of having a low-birth-weight baby, meaning that the baby is small or has a low birth weight. What are the health risks for these babies?	<p>1.Slower growth and development</p> <p>2.Risks of infections/being sick</p> <p>3.Risks of dying</p> <p>4.Risks of being under nourished/having micronutrient deficiencies</p> <p>5.Risks of being sick once adult/developing chronic diseases in adulthood (heart disease, high blood pressure, obesity, diabetes)</p> <p>6.Other</p> <p>7.Don't know</p>	
604	It is recommended that a woman	1.To rebuild/fill up their body	

	waits at least two or three years between pregnancies, that is before coming pregnant once again. Please can you tell me why this is recommended?	<p>stores of nutrients (fat, iron and others)</p> <p>2.For the mother to be healthier before having a new baby/to be prepared for the arrival of a new baby</p> <p>3.Other</p> <p>4.Don't know</p>	
605	What are the signs of under nutrition?	<p>1.Lackofenergy/weakness: cannot work, study or play as normal (disability)</p> <p>2.Weakness of the immune system</p> <p>3.Loss of weight/thinness</p> <p>4.growth faltering</p> <p>5.Other</p> <p>6.Don't know</p>	
606	What are the reasons why people are under nourished?	<p>1.Not getting enough food</p> <p>2.Food does not contain enough nutrients</p> <p>3.Disease/ill and not eating food</p> <p>4.Other</p> <p>5.Don't know</p>	
607	Have you heard about iron-deficiency anaemia?	<p>1.Yes</p> <p>2.No</p> <p>3.Don't know</p>	
608	Can you tell me how you can recognize someone who has anaemia?	<p>1.Less energy/weakness</p> <p>2.Anaemia/pallor</p> <p>3.Spoon nails/bent nails (koilonychias)</p> <p>4.More likely to become sick (less</p>	

		immunity to infections) 5.Other 6.Don't know	
609	What are the health risks for pregnant women of a lack of iron in the diet?	1.Risk of dying during or after pregnancy 2.Difficult delivery 3.Other 4.Don't know	
610	What are the causes of anaemia?	1.Lack of iron in the diet/eat too little, not much 2.Sickness/infection (malaria, hookworm infection, other infection such as HIV/AIDS) 3.Heavy bleeding during menstruation 4.Other 5.Don't know	
611	How can anaemia be prevented?	1.Eat/feed iron-rich foods/having a diet rich in iron 2.Eat/give Vitamin-C-rich foods during or right after meals 3.Take/give iron supplements if prescribed 4.Treat other causes of anaemia (diseases and infections) – seek health-care assistance 5.Continue breastfeeding (for infants 6–23 months old) 6. <i>Other</i> 7. <i>Don't know</i>	

612	Can you list examples of foods rich in iron?	1.Organmeat (Live, Kidney, Heart) 2. Flesh meat (Beef, goat) 3. Fish and seafood	
613	When taken during meals, certain foods help the body absorb and use iron. What are those foods?	1. Vitamin-C-rich foods, such as fresh citrus fruits (orange, lemons, etc.) 2.Other 3.Don't know	
614	Some beverages decrease iron absorption when taken with meals. Which ones?	1.Coffee 2.Tea 3.Other 4.Don't know	

Section X. Attitudes towards a health or nutrition-related problem

S.N	Questions	Coding Categories	Skip to
700	How likely do you think you are to be iron-deficient/anaemic?	1. Not likely 2. You're not sure 3. Likely	
701	How serious do you think iron-deficiency/anaemia is?	1. Not serious 2. You're not sure 3. Serious	
702	How good do you think it is to prepare meals with iron-rich foods such as beef, chicken or liver?	1. Not good 2. You're not sure 3. Good	
703	How much do you like the taste of iron-rich food item or meal?	1. Dislike 2. You're not sure 3. Like	
704	How good do you think it is to have three meals a day and snacks?	1. Not good 2. You're not sure 3. Good	
705	How good do you think it is to	1. Not good	

	have different types of foods at meals?	2. You're not sure 3. Good	
706	How likely do you think you are to have a low-birth-weight baby?	1. Not likely 2. You're not sure 3. Likely	
707	How good do you think it is to eat more food during pregnancy?	1. Not good 2. You're not sure 3. Good	
708	How good do you think it is to prepare meals with iodized salt?	1. Not good 2. You're not sure 3. Good	
709	How good do you think it is to prepare meals with vitamin-A-rich foods such as carrots, green leafy vegetables, sweet potatoes or liver?	1. Not good 2. You're not sure 3. Good	

Section XI. Practice towards a health or nutrition-related problem

S.N	Questions	Coding Categories			Skip to
800	Yesterday, during the day and night, did you eat any of the following?	Type	Yes	No	
		Organ meat (liver, kidney)	1	2	
		Flesh meat (beef, lamb, goat, pork)	1	2	
		Fish	1	2	
		Chicken	1	2	
801	Do you usually eat fresh fruits, such as lemon, orange & mango or drink juice made from them?	1.Yes 2.No 3.Don't know/no answer			
802	When do you usually eat	1.Before a meal			

	fresh citrus fruits?	2. During the meal 3. After a meal 4. Other( <i>specify</i> ) _____ 5. Don't know/no answer	
803	Do you usually drink coffee or tea?	1. Yes 2. No 3. Don't know	
804	When do you usually drink coffee or tea?	1. Two hours or more before a meal 2. Right before a meal 3. During the meal 4. Right after a meal 5. Two hours or more after a meal 6. Other( <i>specify</i> ) _____ 7. Don't know/no answer	
805	Do you have iron Supplement?	1. Yes, I have 2. No, I have not 3. Don't know	IF No Skip 807
806	If yes <u>Ques 805</u> , do you take it daily?	1. Yes I take it 2. No I did not take it 3. I Don't know iron supplementation	
807	Do you have folic acid? Supplement?	1. Yes, I have 2. No, I have not 3. Don't know	IF No Skip 809
808	If yes <u>Ques807</u> , when did you start Taking this supplement?	1. Before pregnancy 2. Within the first trimester 3. Later 4. Don't know	
809	Did you use salt to cook the	1. Yes	

	main meal eaten by participants of your family last night?	2. No 3. Don't know	
810	If Yes <u>Quest 809</u> : What kind of salt did you use?	1. Iodized 2. Not iodized 3. Don't know/no answer	

Section XII: Haemoglobin level and anthropometric measurement

900. What is MUAC measurement cm? -----

901. What is haemoglobin measurement level? -----

Section XIII: Compliance or adherence to Iron folic acid supplementation(IFAS)

S.N	Questions	Coding Categories	Skip to
1000	Are you taking ferrous sulfat supplementation?	1.Yes 2.No	IF No Skip
1001	How often (frequency)of supplementation?	1. Daily 2. Every other day 3. Weekly	
1002	Do you think that supplementation is important?	1. Yes 2.No	
1003	Have you encountered any side effect about ferrous sulfate?	1.Yes 2. No	
1004	How many tablet you are taking daily?	1.1tab 2.2tabs 3.3tabs	

1005	Have you gotten the evidence on benefits of ferrous sulfate complementation thru gestation?	1.Yes 2. No		
1006	Do you think that supplementation prevent anaemia?	1.Yes 2. No 3.I do not know		
1007	How long (days) ferrous sulfate supplemented during your recent pregnancy?	1.1-30 days 2.31-60days 3.61-90 days 4.More than 90 days 5.Not supplemented		
1008	What are your Adherence levels?	1.Adhered 2.Not adhered		
1009	How many times do you visit to refill supplement?	1.Once monthly 2.Every 2-3 months 3.As remembered 4.I don't know		
1010	How much time for walking distance from nearby health facility?	1.Less than 30 minutes 2.Longer than 30 minute 3.I don't Know		
1011	What are barrier to supplementation adherence?	Variable	Ye s	N o
		Forget to take the pills		
		Unaware about the benefits of pills		
		Experienced of side effect		

		Afraid that tablet would harm my baby			
		Due to cost, unable to afford			
		Lack of belief in the usefulness of the pills			

Really, I appreciate your contribution in this investigation! Cheers!!!

## ANNEXURE H: ENGLISH VERSION FOR FGD GUIDE

Development of a community based prevention model for under nutritional status among pregnant women in southern Ethiopia

### Focus Group Discussion (FGD) Guide

#### General:

Hello/good morning/afternoon! My name is Tsegaye Alemu Gute and I will encourage you to participate in this discussion. This is Bereket Burejo and he will take notes and help me. We would like to be grateful to you as such a great amount of time for setting aside the effort to be here today. We will discuss about pregnant women under nutritional status, food insecurity and anemia. We are keen on discovering from you what you think about nutritional status among pregnant women in this community. This data will be anonymized and will be treated as private. On the off chance that anytime you would prefer not to keep partaking in this discussion, you are allowed to leave the gathering and we will never again be asking you further inquiries. The data talked about today will assist us with understanding what should be possible to improve under nutritional status by developing community-based model, among pregnant women in South Ethiopia.

#### Voice record:

We might want to record this dialog. Despite the fact that we will take notes, we are not ready to compose everything down and need to have the option to return and tune in to any data we may have missed. All notes and the record will be kept confidential. Is everyone OK with recording this discussion? Yes, No

We kindly ask you to keep alternate while talking and don't interrupt on any individual. We are keen on what every one of you need to state, so please make an effort to remain aware of one another's opinions. This discussion will last around 30 minutes.

Before we start, does any individual have any enquiries? Yes/ No. If they say yes please, kindly reinform the study procedure and their rights.

1. Would you tell us about the under nutrition status among pregnant women in your communities?
  - Reason for under nourishment
    - Is there any culture/forbidden or restrict pregnant women nutrition?
    - Religion?
    - Dietary diversity
    - Compare you feeding with your family members
    - Pregnant women nutrition issues
    - Nutritional counseling
    - Is there any challenge during pregnant women implementation?
2. Would you tell us about anaemia in your community?
  - Cause of anaemia
  - Prevention of anameia
  - Are taking IFAS?
  - Is there any advantage of taking IFAS?
3. Would you tell us about food insecurity in your community?
  - How was the burden?
  - Reason for food insecurity
  - Coping mechanisms
4. What do you suggest to improve pregnant women nutritional status in Southern Ethiopia?
  - Are there any additional recommendations you might want to share as of now? Something else to include?

## ANNEXURE I: INDEPTH INTERVIEW GUIDE

1. Would you tell me iron-deficiency Anaemia in your community?

Probing questions:

- Sign & symptoms, & burden of Anaemia?
- What are the health risks for pregnant women of a lack of iron in the diet?
- Causes Anaemia?
- How can Anaemia be prevented?
- How ferrous sulphate/folic acid is providing for pregnant women in Southern Ethiopia?
- For how long it recommended taking?
- Is there enough logistics (Ferrous sulphate/folic acid)

2. Would you tell me about under nutritional status among pregnant women in your community? Probing questions

- What are the major reasons for under nutrition status?
- Is there guideline to implement nutritional status?
- What are the challenges in implementation of the nutritional status among pregnant women?
- What are your suggestions for prevention of under nutritional status among pregnant women at rural community, individual level, HC/WoHo level, country's policy level?
- Is the HC/WoHo providing nutritional prevention services? What kind of services offering?
- Does WoHo allocate any resource / budget assigned for nutrition program?

3. Would you tell me about food insecurity status among household in your community? Probing questions

- What are the reasons for food insecurity in your community?
- What are the coping mechanisms for food insecurity in your communities?

- Is there any guide line to implemnt food security issues in your community?
  - Do you have any food insecurity mitigation plan?
  - What are the mitigation strategies for food insecurity in the household?
  - Is there any strengthen and weakness during implementation?
  - What about resoucrs?
4. Would you tell us the possible barriers to implementing of interventions to reduce burden? Probing questions
- Under nutritional status
  - Food insecurity
  - Anaemia
  - Do you have any general comments?

I would like to appreciate your kind opinion & suggestion.

Thank you very much for your constructive comment

**ANNEXURE J: AMHARIC VERSION FOR STUDY INFORMATION SHEET**

የጥናት መረጃ ገጽ

የጥናትና ምርምር ዓርጸት በኢት/ያ በደቡብ-ብ/ብ/ህ/ክ/መ በነፍሰጡር እናቶች ሊከሰት የሚችለውን የአመጋገብ ችግር/የምግብ እጥረት በማህብረሰብ መር ስርአተ ምግብን በመተግበር የመከላከል ስልት ማዘጋጀት ነው።

ጥናቱን የሚያጠናውህ በደቡብ አፍሪካ ዩኒቨርሲቲ በጤና ትምህርት የፒችዲ ተማሪ የሆኑት አቶ ፀጋዬ አለሙ ጉቴ (የተማሪ ቁጥር 61625159) ናቸው። የቅርብ ተቆጣጣሪህ በደቡብ አፍሪካ ዩኒቨርሲቲ መሪ መምህር(ፕሮፍሰር) የሆኑት HH ኒኮሲ ናቸው። ጤና ይስጥልን ስም----- -----ይባላል።በደቡብ አፍሪካ ዩኒቨርሲቲ የፒችዲ ተማሪ ለሆኑት አቶ ፀጋዬ አለሙ ጉቴ በሚያከናውኑት ጥናት በመረጃ ሰብሳቢነት እሰራለሁ።

አሁን ከእርሶ ጋር መነጋገር እፈልጋለሁ ከዚያም ብሃላ በተዘጋጀው መጥቀስ መሰረት መረጃን እሰበሰባለሁ።መረጃውን ከመሰብሰቤ በፊት በጥናቱ ለመሳተፎ ፈቃድኛ መሆኖን ወይም አለመሆኖን ለማረጋገጥ የጹሁፍ ስምምነት እወስዳለሁ።

የጥናቱ አላማ/እቀደሰ

የዚህ ጥናት ዋና አላማ የስርአተ ምግብ ችግር ሊያመጣ የሚችል ምክንያት መለየት፣ መመርመርና በኢት/ያ በደቡብ-ብ/ብ/ህ/ክ/መ በነፍሰጡር እናቶች ሊከሰት የሚችለውን የአመጋገብ ሁኔታን በማህብረሰብ መር ስርአተ ምግብን በመተግበር የመከላከል ስልት ማዘጋጀት ነው።

ጥናቱ የሚካሄድበት መንገድና በቅድም ተከተል የሚሰሩ ድርጊቶች

ጥቂት ጥያቄዎችን ስለ ራስዎ ማህበራዊና ኢኮኖሚያዊ ባህሪያት፣ የሥርዓተ ምግብ ድግግሞሽ (ስንት ግዜ)ና የተመገቡትን የተለያዩ የበለፀገ የምግብ አይነት፣በሥርዓተ ምግብ ላይ ያሉትን እውቅት፣አመለካከትና ተግባር፣በቤተሰብ ደረጃ ያለውን የምግብ ዋስትና መጠን ልጠይቆት እናም ከጥፈሮ ጭፍ ላይ የደም ናሙና ለምርመራ እውስዳለሁ።

በጥናቱ በመሳተፎ አደጋ፣ሰቃይ፣አለመመቻት

ጥናቱ ውስጥ በመሳተፎ ምንም አይነት አደጋ፣ሰቃይ፣አለመመቻት አይገጥሙትም፣ነገር ግን ከጥፍሮ ጭፍ ላይ የደም ናሙና ለምርመራ ሲወሰድ ህመም ሊሰማዎት ይችላል።

ጥናቱ የሚፈጅው ግዜ

በጥናቱ ሲሳተፉ ከ30-45ደቂቃ ሊፈጅ ይችላል።

በጥናቱ በመሳተፍ የሚያገኙት ጥቅም፡

በጥናቱ በመሳተፍ የሚያገኙት ምንም አይነት ክፍያ አይኖረትም ፡ነገር ግን በምርመራ ወቅት ውጤቱን ተከትሎ የምክር አገልግሎት መስጠትና ከባድ ችግር ከተገኘ ወደ ሆስፒታል ይላካሉ።ከዚህ በተጨማሪም ከዚህ ጥናት ውጤት ሲወጣ ለእርሶና ለሌሎች ነፍሰጡር እናቶች በቀጥታም ሆነ በተዘዋዋሪ ተጠቃሚ ይሆናሉ።

ከጥናቱ ስለማቋረጥ ያሉት መብት

በዚህ ጥናት ተሳትፎዎ በሙሉ ፈቃደኝነት ላይ የተመሰረተ ነው።

ከፈለጉ ሁሉንም ወይም በተናጥል ጥያቄ ላለመመለስ መምረጥ ይችላሉ።ከፈለጉ በማንኛውም ግዜ ሙሉ በሙሉ ቃለ መጠየቁን ያለ ምንም ችግር ማቆም ይችላሉ።

ምስጥራዊነት

ስሞን እንዲሰጡ አያስፈልግም ፤ማንኛውም የሚሰጡት መረጃ ምስጥራዊነቱ በጥብቅ ይጠበቃል።መረጃው ከዚህ ውጭ ለሌላ አካል አይሰጥም።ቢሆንም ግን በጥናቱ እንደሚሳተፉና ትክክለኛ መረጃ እንደሚሰጡ ባለሙሉ ተስፋ ነኝ።

የግንኙነት መረጃ

ማንኛውም ጥያቄና ግልጽ ያልሆነ ጉዳይ ካሉት እባክትን ጥናት የሚያካሄዱትን ቢያገኙ

ፀጋዬ አለሙ ጉቴ በደቡብ/ብ/ብ/ህ/ክ/መ ጄኤሳአይ እስታፍ

ስልክ ቁጥር: +251911017337

የኤሜል አድራሻ: [tsegayea49@gmail.co](mailto:tsegayea49@gmail.co)

**ANNEXURE K: AMHARIC VERSION QUESTIONAIRE**

Amharic Questionnaire: በአማራጅ የተዘጋጀ መጠይቆች

ክፍል I: መተማመኛ ቅጽ

እኔ ከታች የፈረምኩት የጥናቱ ተሳታፊ ስለ ጥናቱ ግብ፣፤ዓለማዊ፤ በቅደም ተከተል የሚሰሩ ተግባራት ፤አስጊ /አደገኛ እና /ወይም የማይመች ነገር ፤ከጥናቱ የሚገኝ ጥቅም፤ ከጥናቱ ለማቋረጥ መብት እንዳለኝና የምሰጠው መረጃ ምስጢራዊነቱ የሚጠበቅ መሆኑን፤ በተጨማሪም የምሰጠው መረጃም ለዚህ ጥናት ብቻ እንደሚያገለግል ተብራርቶልኛለሁ/ለሌሎች እንደማይወጣው ተረድቻለሁ። በተጨማሪም ስሜ እንዲሁም ማንኛውም መለያ መታወቂያ እንደማልጠየቅ ተረድቻለሁ።

የማልፈልገውን ጥያቄ ላለመመለስ መብት አለኝ።በማንኛውም ሰዓት ቃለ መጠየቁን ምንም ምክንያት መስጠት ሳያስፈልገኝ ከፈለኩ ማቋረጥ እንደምችል ተገንዝቢያለሁ።

በቃለ መጠየቁ ላይ መሳተፊ ሙሉ በሙሉ በፋቃደኝነት ላይ የተመሰረተ መሆኑን በፍርማዬ አረጋግጣለሁ።

በቃለ መጠየቁ የሚሳተፉ ተሰሳሳፊ ፍርማዎ: \_\_\_\_\_

ቀን \_\_\_\_\_

ለበለጠ ስለጥናቱ ገለፃ ለመረዳት ከፈለጉ የጥናትና ምርምር ተቆጣጣሪዬን ፕሮፌሰር ዘዘ ኒኮሲን በዚህ የመልክት አድራሻ ( [nkosizz@unisa.ac.za](mailto:nkosizz@unisa.ac.za) ) መላክ የሚችሉ ሲሆን በተጨማሪም የደቡብ አፍሪካ ዩኒቨርሲቲ የጤና ትምህርት ክፍል ሊቀመንበር ፤የጥናትና ምርምር ሰነ ምግባር ኮምቴ የሆኑትን ፕሮፌሰር ጀኢ ማርቴዝን በዚህ የመልክት አድራሻ [maritje@unisa.ac.za](mailto:maritje@unisa.ac.za) መጠያቅ ይችላሉ።

የመረጃሰብሳቢ ስም----- ፍርማ\_\_\_\_\_

ቀን \_\_\_\_\_

ክፍል ሁለት: የመጠይቁ መለያ መረጃ ቅጽ			
የወረዳ ስም ከተማ:		የቃለ መጠይቅ አቅራቢ ጉብኝት	
የቀበሌ ስም		ስነምዳር/አግሮ ኢኮሎጂ	
የመንደር/ጎጥ ስም		ቀን	
የመለኛ መለያ ቁጥር		የቃለ መጠይቅ አቅራቢ ስም	

ክፍል ሦስት : አጠቃላይ ማህበራዊና ኢኮኖሚያዊ ነክ መረጃን በተመለከተ የተዘጋጀ መጠይቅ።

ኮድ	ጥያቄ	ምላሽ/ምርጫ	አስተያየት/ዝላል/አለፍ
001	እድሜሽ ስንት ነው	-----በዓመት	
002	የትዳር ሁኔታ	1. የተፋታች 2. የሞተባት 3. ያገባች 4. ያላገባች 5. ሌላ ካለ ይግለጹ---	
003	ሀይማኖት	1. ፐሮቴስታንት 2. ባህላዊ ሃይማኖት	

		3. ካቶሊክ 4. ኦርቶዶክስ 5. ሙሲሊም 5. ሌላ: ካለ: ይግለጹ _____	
004	ብሔረሰብ?	1. ማሌ 2. ሀመር 3. ዳሰነች 4. በና 5. ፀማይ 6. አረ 7. ሌላ ካለ ይግለጹ _____	
005	የቤተሰብ ብዛት ስንት ነው?	-----	
006	የትምህርት ደረጃ ስንት ነው?	ክፍል: _____	
007	የስራ ሁኔታ?	1. የቤት እመቤት 2. ገበሬ 3. የግል ንግድ 4. የመንግስት ሰራተኛ 5. ሌላ ካለ ይግለጹ _____	
008	የባለቤትነት የትምህርት ደረጃ ስንት ነው?	ክፍል: _____	
009	የባለቤትነት ሥራ ሁኔታ?	1. ገበሬ 2. የግል ንግድ 3. የመንግስት ሰራተኛ 4. የቀን ሰራተኛ 5. ሌላ ካለ ይግለጹ _____	

010	የት ነው የምትኖረው	1.ገጠር 2.ከተማ	
011	ለምን ያህል ግዜ በተከታታይነት ኗረዋል (አሁን የሚኖሩበት ቦታ ስም)?	_____ በአመት	
012	ለመጀመሪያ ግዜ ሲያገቡ ዕድሜዎት ሰንት ነው?	---- በአመት	
013	የመጀመሪያ ልጅን ሲወልዱ ዕድሜዎት ሰንት ነው ?	--- በአመት	

ክፍል አራት: የኢኮኖሚ ሁኔታ በቤተሰብ ደረጃ

ከድ	ጥያቄ	ምላሽ/ምርጫ	አስተያየት/ዝለል/አለፍ
200	ከቤተሰብ አባላት ውስጥ ማንኛው የእርሻ መሬት ያለው አለ ወይ?	1.አዎን 2.አይደለም	አይደለም, ወደ ጥያቄ ዝለል202
201	አዎን ካሉ, ምን ያህል ጥማድ የእርሻ መሬት አላችሁ?	ጥማድ----- (ሌላ ካለ ጥቀስ)	
202	ምንድን ነው በመሬቱ ላይ የሚያመርቱት?	1.ሰብል, ሰብል ከሆነ – የትኛው ሰብል? 2. ጥራጥሬ, ጥራጥሬ ከሆነ– የትኛው ጥራጥሬ 3.አትክልት/ቅጠላ ቅጠል,አትክልት ከሆነ– የትኛው አትክልት? 4.ፍራፍሬ? ፍራፍሬ ከሆነ – የትኛው	

		<p>ፍራፍሬ?</p> <p>5.ስራስር? ስራስር ከሆነ – የትኛው ስራስር?</p>			
203	<p>የምግብ ምንጭን ምንጭን ነው</p>	<p>1.በግዥ</p> <p>2.በራስ በማምረት</p> <p>3.ከምግብ እርዳታ</p> <p>4.ሰፍትኔት</p>			
204	<p>በራስ ማምረት ከሆነ - የሚመረቱ ለዓመቱ በቂ ወይም በከፊል የሚሸፍን ነበር ወይ?</p>	<p>1.አዎን</p> <p>2.አይደለም</p>			
205	<p>በቤታችሁ ውስጥ ከብት ወይም የምታረቡት ሌላ እንስሳ ወይም ዶሮዎች አላችሁ ወይ?</p>	<p>1.አዎን</p> <p>2.አይደለም</p> <p>3.አላውቅም</p>	<p>አይደለም, ወደ ጥያቄ ዝለል207</p>		
206	<p>በተራ ቁጥር 205 ላይ ላለው ጥያቄ ምላሽ አዎን ከሆነ፣ ከሚከተሉት እንስሳዎች ውስጥ ምን ያህል በቤታችሁ አለ ?</p>		አዎን	አይደለም	ቁጥር
		የወተት ላም			
		በሬዎች			
		ፈረስ፣አሀያናበቅሎዎች			
		በቅሎዎች			
		በጎች			

		ዶሮዎች				
207	ከቤተሰባችሁ አባላት ውስጥ የባንክ ወይም የማይክሮ ፋይናንስ ቁጠባ ሂሳብ አላችሁ ወይ?	1.አዎን 2.አይደለም 3.አላውቅም				
208	በቤታችሁ ውስጥ		አዎ	አይደለም		
	:	Variables	ን			
		ኤልክትሪክ?	1	2		
		ሰዓት?	1	2		
		ፈዲዩ?	1	2		
		ቴሌቪዥን?	1	2		
		የሞባይል ስልክ?	1	2		
		የቤት ስልክ?	1	2		
		ፍርጅ?	1	2		
		ጠረጴዛ? ወንበር?	1	2		
		አልጋ ከጥጥ ፍራሽ /አስፖንጅ ፍራሽ?	1	2		
		የኤሌክትሪክምጣድ?	1	2		
		የነጭ ጋዝ ምድጃ?	1	2		
		ኩራዝ?	1	2		
		ሽጉጠጥ/ጠመነጃ?	1	2		

		ማድቤት?	1	2	
		ሳይክል?	1	2	
		ሞተር ሳይክል ወይም ባጃጅ ?	1	2	
		An animal-drawn cart?	1	2	
		መኪና ወይም የጫነት መኪና?	1	2	
209	በቤት ውስጥ ምግብ ለማብሰል በዋናነት የሚጠቀሙት ምንድን ነው?	1. ኤልክትሪክ 2. የተፈጥሮ ጋዝ 3. ባዮ ጋዝ 4. ነጭ ጋዝ 5. ከሰል 6. እንጨት 7. ሰንበሌጥ/ቁጥቋጥ/ሳር 8. የግብርና ሰብል 9. የእንስሳት ፍግ 10. የበሰለ ምግብ በቤት ውስጥ የለም 11. ሌላ ካለ ይጥቀስ			
210	ምግብ ለማብሰያነት የሚጠቀሙበት የተለየ ክፍል አለችሁ ወይ?	1. አዎን 2. አይደለም 3. አላውቅም			
211	የቤቱ ወለል የተሰራው ከምንድን ነው? (እባክ ወለሉን ይመልከቱና ይመዝገቡ)	1. የተፈጥሮ መሬት/አሸዋ 2. በእንጨት 3. በእቦት 4. ከሲሚንት 5. ከጡብ 6. ሌላ ካለ ይጥቀሱ			
212	የቤቱ ጣራ የተሰራው	1. ከቆርቆሮ			

	ከምንድን ነው? (እባክ ጣራውን ይመልከቱና ይመዝገቡ )	2. ከሣር(በሰንበሌጥ) ክዳን 3. ከአፈር(ኩይሳ) 4. ከፕላስቲክ 5. ሌላ ካላ ይጥቀሱ	
213	የቤቱ ውጫዊ ግድግዳ በዋናነት የተሰራው ከምንድን ነው (እባክ ግድግዳውን ይመልከቱትና ይመዝገቡ)	1. ከቅጠልና ከሣር 2. ከእንጨትና ከጭቃ 3. ከፕላስቲክ ሸራ 4. በካርቶን 5. ከእንጨት 6. ሌላ ካላ ይጥቀሱ	
214	የቤተሰባችሁ አባላት በዋናነት ለመጠጥትነት በዋናነት የምትጠቀሙት የውሃ ምንጭ ምንድን ነው?	1. የቧንቧ ውሃ 2. የተከለለ የግድጓድ ውሃ 3. .ያልተከለለ የግድጓድ ውሃ 4. የተከለለ የምንጭ ውሃ 5. ያልተከለለ የምንጭ ውሃ 6 . የዝናብ ውሃ 7. የታንከር ውሃ 8. የወንዝ፤ሀይቅ፤ኩሬ፤ግድብ 9. የታሽገ ውሃ	
215	ውሃን ለማከም የሚጠቀሙበት ነገር አለ ወይ ?	1. አዎን 2. አይደለም 3. አላውቅም	
216	አብዛኛውን ግዜ	1. ማፍላት	

	የመጠጥ ውሃ ለማከም/ንጹህ ለማድረግ ምንድን ነው የምትጠቀሙት?	2.በክሎሪን ማከም 3.ቢሻን ጋሪ /አኳዋ ታብ ማከም 4.በፀሀይ ማጥለል 5. በአሸዋ ማጥለል 6. ሌላ ካለ ይጥቀሱ-----	
217	አብዛኛውን ግዜ የቤተሰባችሁ አባላት የሚጠቀሙት የመፀዳጃ ቤት ምን ዓይነት ነው ?	1.በውሃ መሄጃ ባንቧ የሚሰራ መጻዳጃ ቤት 2.አየር መውጫ ያለው መጻዳጃ ቤት/ቪኤፒ/ 3.. መጻዳጃ ጉድጓዱ እስላብ ያለው 4. መጻዳጃ ጉድጓዱ እስላብ የሌለው 5. የመፀዳጃ ቤት የለም/ሜዳ ላይ ነው የምንፀዳዳው 6.ሌላ ካለ ይጥቀሱ-----	
218	የት ነው ባለፈው ግዜ ለመጨረሻ የተጻዳዱት?	1.በውሃ መሄጃ ባንቧ የሚሰራ መጻዳጃ ቤት 2.አየር መውጫ ያለው መጻዳጃ ቤት/ቪኤፒ/ 3.. መጻዳጃ ጉድጓዱ እስላብ ያለው 4. መጻዳጃ ጉድጓዱ እስላብ የሌለው 5. የመፀዳጃ ቤት የለም/ሜዳ ላይ ነው የምንፀዳዳው 6.ሌላ ካለ ይጥቀሱ-----	
219	ሁል ግዜ ጫማ ይጫማሉ ወይ?	1.አዎን 2.አይደለም 3.አላስታውስም	

ክፍል አምስት. የወሊድና የጤና አገልግሎት ተያያዥነት ያላቸው ሼሬብል

ከድ	ጥያቄ	ምላሽ/ምርጫ	አስተያየት/ዝለል/እለፍ
300	የፅንሰና ወሊድ ብዛት	1.እርግዝና _____ 2.ወሊድ _____	

301	የቀድሞ ወሊድ ሁኔታ	1. ጤናማ/የተለመደ 2. ከተለመደው ውጭ መሆን/ከተፈጥሮ የተለየ	
302	ስር የሰደደ በሽታ	1.ስኳር 2. የኩላሊት በሽታ 3.ግፊት 4.የለም 5. ሌላ ካላ ይጥቀስ	
303	በአሁን እርግዝና ውቅት ምን ያህል ግዜ የቅድመ ወሊድ ክትትል አድረገዋል?	-----	
304	ከእርግዝና ጋር በተያያዘ የስርዓተ ምግብ መረጃ አግኝተዋል ወይ ?	1.አዎን 2.አይደለም 3.አላውቅም	አይደለም, ወደ ጥያቄ ዝለል306
305	አዎን ካሉ ከየት አገኙ?	1. ከጤና ባለሙያዎች 2. ከቤተሰብ 3. ከሚዲያ 4. ከጎደቾች 5. ሌላ ካላ ይጥቀስ	
306	በባለፉት 3ወራት ውስጥ በወባ ታሞው ነበር ወይ?	1.አዎን 2.አይደለም 3.አላውቅም	
307	ትላንት ማታ በኬሚካል የተነከረ የአልጋ አጎበር ተጠቅመዋል ወይ? (እባካ,	1.አዎን 2.አይደለም 3.አላውቅም	

	አልጋውን ያመልከቱ)		
308	በቤት ውስጥ የትኛውን ተግባራትን ነው የምታከናውኗል?	<ol style="list-style-type: none"> <li>1. ምግብ ማብሰል</li> <li>2. ጽዳት ማጽዳት</li> <li>3. ውሃ መቅዳት</li> <li>4. እንጨት መልቀም</li> <li>5. የግብርና ሥራ መስራት</li> <li>6. ሌሎች በቤት ውስጥ የሚወሩ ሥራዎችን</li> </ol>	
309	የአንቺን የሥራ ጫና ከቤተሰብሽ ወይም ነፍሰጡር ካልሆኑ ሴቶች ጋር እንዴት ነው የምታነጻጸረው?	<ol style="list-style-type: none"> <li>1. ከሌሎች ያነሰ ነው</li> <li>2. ከሌሎች እኩል ነው</li> <li>3. ከፍተኛ የሥራ ጫና</li> </ol>	
310	የአሁን እርግዝና ፈልገው/አቅደው ነው ወይ	<ol style="list-style-type: none"> <li>1. አዎን</li> <li>2. አይደለም</li> <li>3. አላውቅም</li> </ol>	
311	ከዚህ ቀደም በነበረው እርግዝና፤ የተወሰነበት እርግዝና ገጥሞት ነበር ወይ	<ol style="list-style-type: none"> <li>1. አዎን</li> <li>2. አይደለም</li> <li>3. አላውቅም</li> </ol>	

ክፍል ስድስት: በሴቶች/ግለሰብ ደረጃ የተመገቡትን የተለያዩ የበለፀገ የምግብ አይነት/ የምግብ ቅይጥ/ መረጃ መስተሰብያ መጠይቅ። የሚጠየቀው ባለፈው በ24 ሰዓት ውስጥ የተመገቡትን ነው

አሁን ትላንት ቀንና ማታ ስለተመገቡት የምግብ አይነት እጠይቋለሁ

መመሪያ: እባክዎ, የተዘዘሩትን የምግብ አይነት ለመለሻችን አንብበው: በ24 ሰዓት መመገቡን ከነገሩት 1 (አንድ) ቁጥር በሰጥኑ ውስጥ ያስቀምጡ ፤ መለሻችን የተዘረዘሩትን ምግብ ካልተመገቡ 0 (ዜሮን) በሰጥኑ ውስጥ ያስቀምጡ።

ከድ	ጥያቄ	ምላሽ አዎን = 1 አይደለም = 0	አስተያየት/ዝላል/አለፍ
ሀ	የዋና ምግብ ከእስታርች (የአዝርትና ነጭ ሥራ ሥሮች ቅልቅል)	-----	
ለ	ያልደመቀ አረንጓዴ ቅጠላ ቅጠል	-----	
ሐ	ሌላ በሻይታሚን ኤ የበለጸገ ፋራፍሬና አትክልት	-----	
መ	ሌላ ፋራፍሬና አትክልት	-----	
ሠ	የአካል ሥጋ( ጉበት፣ኩላሊትOrgan)	-----	
ረ	ሥጋና ዓሳ	-----	
ሰ	እንቁላል	-----	
ሸ	ባቄላ መሰል ጥራጥሬ, ለውዝ and ዘር	-----	
ቀ	ወተትና የወተት ውጤቶች	-----	

ክፍል ሰባት: የሥርዓተ ምግብ ድግግሞሽና የምግብ ምንጭ

ተ/ቁ	የምግብ አይነት	በአማካይ የሚጠቀሙት	በምን ያህል ጊዜ?				
			በየቀኑ	ሳምንት	ወር	በዓመት	ፈጽሞ
1	ገንፎ ወይም አጥሚት ከጥራጥሬ እህል የተሰራ (ለምሳሌ. ከበቆሎ የተሰራ፣ከገብስ፣ ከእንሰት፣ ከስንዴ፣ ከጤፍ)?						
2	ዳቦ						
3	የእንሰት ምግብ ( ቆጮና ቡላ)?						
4	እንጆራ ከእህል የተዘጋጀው						

5	ሌሎች ምግቦች ከስራስር ወይም ክብ ስር ያላቸው ከእንሰት የተለዩ. (ለምሳሌ, ነጭ ድንች, ነጭ ሰከር ድንች)						
6	ያልደመቀ አረንጓዴ ቅጠላ ቅጠል (ምሳሌ, የቦይና ቅጠል(cassava leaves), ዱባ፤ቃርያ፤ amaranth leaves, ወይም ሌሎች ያልደመቀ አረንጓዴ ቅጠሎች)?						
7	ዱባ ወይም ቢጫ/ብርትኳን-fleshed squash, ካሮት, ወይም ቢጫ/ብርትኳን-ስኪር ድንች?)						
8	ከባቄላ የተሰሩ ምግቦች (ምሳሌ., ኩላሊት፤ባቄላ፤አተር፤ ሽንብራ ወይም ሌላ)?						
9	አቾሎኒ፤ለውዝ/አቾሎኒ ለውዝ, ወይም ለውዝ?						
10	ፍራፍሬ የመመገብ ድግግሞሽ (ማንጎ፤ ፓፓያ፤ ብርትኳን፤ሙዝ፤ ፖም(አፕል) ወዘተ..)						
11	የበሬ፤የቦግ ጠቦት፤የፍየል፤የአሳማ ሥጋ						
12	ማንኛውም ወተት፤አይብ ወይም እርጎ						
13	ማንኛውም የዶሮ ሥጋ?						
14	ማንኛውም እንቁላል						
15	ማንኛውም ትኩስ ወይም ደረቅ ዓሳ?						
16	ማንኛው ምግብ ከዘይት፤ቅቤ፤ጭማ?						
17	ቡና						
18	ቁርስ/መቆያ በመመገቢያ መሃል						

ክፍል ስምንት: በቤተሰብ ደረጃ ያለውን የምግብ ዋስትና መለኪያ ልኬት የማስታወስ ጥያቄው የሚጠየቀው በ4ስምንት ወይም 30 ቀን ያለውን ነው። የጥያቄ ምላሽ አዎን ከሆነ የሚከተሉትን ምርጫዎች ያቅርቡ(ከጥያቄ ቁጥር 500-508 ድረስ ለላው ይጠቀሙ)

1 = አልፎ አልፎ (1-2 ግዜ)

2 = አንዳንድ ግዜ (3-10 ግዜ)

3 = ብዙ ግዜ (ከ10ግዜ በላይ)

ከድ	ጥያቄ	ምላሽ/ምርጫ	አስተያየት/ዝላል/እለፍ
500	ቤተሰቦችሁ ባላፉት 30 ቀናት ውስጥ በቂ ምግብ የለም ብሎ የሰጋበት ግዜ ነበር ወይ	0 = አይደለም 1 = አዎን	አይደለም, ወይ ጥያቄ ዝላል 501
501	አንቺ ወይም የቤተሰቦችሽ አባላት ባላፉት 30ቀናት ውስጥ የምትፈልጉትን ምግብ ያልበላችሁበት ግዜ አለ ወይ?	0 = አይደለም 1 = አዎን	አይደለም, ወይ ጥያቄ ቁጥር 502 ዝላል
502	ባለፈው 30ቀናት ውስጥ በቂ ምግብ ባለመኖሩ ምክንያት አንቺ ወይም ከቤተሰቦችሽ አባላት አንዱ ጥቂት የምግብ አይነት በቀን ውስጥ የተመገበ ሰው ነበር ወይ??	0 = አይደለም 1 = አዎን	አይደለም, ወይ ጥያቄ ቁጥር 503 ዝላል
503	አንቺ ወይም ከቤተሰቦችሽ አባላት መብላት የማይፈልገውን ምግብ በልታችዎል ወይ?	0 = አይደለም 1 = አዎን	አይደለም, ወይ ጥያቄ ቁጥር 504 ዝላል
504	አንቺ ወይም ከቤተሰቦችሽ አባላት ከሚያስፈልግው ምግብ በታች ትንሽ የተመገበ ስው ነበር ወይ ?	0 = አይደለም 1 = አዎን	አይደለም, ወይ ጥያቄ ቁጥር 505 ዝላል

505	አንቺ ወይም ከቤተሰቦችሽ አባላት አንዱ ጥቂት ምግብ በቀን ውስጥ የተመገበ ሰው ነበር ወይ?	0 = አይደለም 1 = አዎን	አይደለም, ወደ ጥያቄ ቁጥር 506 ዝለል
506	አንቺ ወይም ከቤተሰባችሁ አባላት የምትበሉትን ማንኛውንም ምግብ አጥታችሁ ታውቃላችሁ ወይ?	0 = አይደለም 1 = አዎን	አይደለም, ወደ ጥያቄ ቁጥር 507 ዝለል
507	አንቺ ወይም ከቤተሰቦችሽ አባላት እየራበው ማታ ወደ መኝታ የሄደ ሰው ነበር ወይ??	0 = አይደለም 1 = አዎን	አይደለም, ወደ ጥያቄ ቁጥር 508 ዝለል
508	አንቺ ወይም ከቤተሰቦችሽ አባላት ቀኑንና ማታ ሙሉ ማንኛውንም ምግብ ሳትበሉ ውላችሁ አደራችሁ ወይ?	0 = አይደለም 1 = አዎን	
509	ከቤተሰቦችሽ አባላት ለሥራ የተሰደደ ነበር ወይ	0 = አይደለም 1 = አዎን	
510	ቤተሰቦችሽ ምን ያህል የእርሻ መሬት አላችሁ	-----	
511	ባለፈው ዓመት የምግብ እርዳታ አስፈልጎችሁ ነበር ወይ	0 = አይደለም 1 = አዎን	
512	አንቺ ወይም ቤተሰቦችሽ ብዙን ጊዜ በቀን ስንት ጊዜ ነው የምትመገቡት	_____	
513	ከቤተሰቦችሽ አባላት ባለፉት 12 ወራት አመጋገባችሁን ቀይራችሁ ነበር ወይ በዚህ በፊት ከነበረው ዓመት ሲነፃጸር?	0 = አይደለም 1 = አዎን	

514	የቤተሰቦች አባላት ባለፉት 12 ወራት ውስጥ የምግብ እጥረት/ጉድለት አጋጥሟችሁ ነበር ወይ?	0 = አይደለም 1 = አዎን	
515	ለጥያቄ ቁጥር 514 ምላሽ አዎን ካሉ፣ ምንድን ነው ዋናው ምክንያት?	_____	
516	የቤተሰቦችሁ የምግብ ምንጭ ምንድን ነው(ተገቢውን ምላሽ ክበቡት)?	1. በረስ በማምረት 2. የግዥ ምግብ 3. ከመንግስት እርዳታ 4. ከዘመድ ወይም ጓደኛ የሚሰጥ 5. ሌላ ካለ ይጥቀሱ---	

ክፍልዘጠኝ: የነፍሰጡር እና ቶች የሥራ ዓተምግብ የእውቀት ደረጃ ለመገምገም የተዘጋጀ ጥያቄዎች

ኮድ	ጥያቄ	ምላሽ/ምርጫ	አስተያየት/ዝልል/እለፍ
600	እንዴት ነው የነፍሰጡር እና ቶች አመጋገ ነፍሰጡር ካልሆኑ እና ቶች በአንፃር?	1. ብዙ ምግብ ይመገባሉ ( ከወትሮ በተለየ መልኩ በተደጋጋሚ ይመገባሉ) 2. በፕሮቲን የበለፀገ ምግብ ይመገባሉ 3. በአይረን የበለፀገ ምግብ ይበላሉ 4. ምግብ ሲያዘጋጁ አዮዲን ያለበትን ጨው ይጠቀማሉ 5. ሌላ 6. አላውቅም	

601	አብዛኛውን እና ቶች በእርግዝና ግዜ ከሁለት አይነት ተጨማሪ ወይም እንክብካቤ ልልተጠቃሚናቸው? እና ማንናቸው?	<ol style="list-style-type: none"> <li>1. የአይረን ተጨማሪ/እንክብካቤ</li> <li>2. ፎሊክ አሲድ ተጨማሪ/እንክብካቤ</li> <li>3. አላውቅም</li> <li>4. ሌላ</li> </ol>	
602	ፎሊክ አሲድ እንክብካቤ መውሰዱ ምን ዓይነት ጥቅም አለው?	<ol style="list-style-type: none"> <li>1. የጽንሰ ነርቭ ሲስተም ጤናማ በሆነ መንገድ እንዲያደግ ይረዳል (ማለትም የአዕምሮ፣ የአከርካሪና የራስ ቅል)</li> <li>2. የጽንሰ ነርቭ ሲስተም በወሊድ ጊዜ የሚያጋጥመውን እንክን ወይም ጉድለት ለመከላከል ይረዳል (ማለትም የአዕምሮ፣ የአከርካሪና የራስ ቅል)</li> <li>3. አላውቅም</li> <li>4. ሌላ</li> </ol>	
603	አንድ እናት በምግብ እጥረት ከተጎዳች፣ ከጤናማ ክብደት በታች የሆነ ልጅ መውለድ፣ ማለትም ህጻኑ በጣም ትንሽ መሆን ወይም ክብደቱ በጥጥም ትንሽ መሆን። የነዚህ ህጻናት የጤና ችግሮች ምን ዓይነት ናቸው?	<ol style="list-style-type: none"> <li>1. የዕድገት መዘግየት እንዲያጋጥም ያደርጋል</li> <li>2. ለእንጨክሽንና ለህመም ያጋልጣል</li> <li>3. ለሞት ይዳርጋል</li> <li>4. የምግብ እጥረት /የንጥረነገሮች እጥረት ያጋልጣል</li> <li>5. በህክምና ለምድድኑ በሽታዎች ያጋልጣል (የልብ በሽታ፣ ከፍተኛ የደም ግፊት፣ ጤናማ ያልሆነ ውፍረት፣ ለስኳር በሽታ)</li> <li>6. ሌላ</li> <li>7. አላውቅም</li> </ol>	
604	አንድ እናት በሁለት እርግዝናዎች መሃል ቢያንስ ከሁለት እስከ ሶስት አመት እንዲትቆይ ይመከራል። እባክዎን ይህ ለምን እንደሚመከር	<ol style="list-style-type: none"> <li>1. እራስን ለመገንባት /ሰውነታቸው ውስጥ ንጥረ-ነገሮችን ለምክማቸት (ማለትም ስብ፣ አይረን፣ እና ሌሎችንም)</li> <li>2. እናት ቀጣዩን ልጅ ከመውለዱ በፊት ጤናማ</li> </ol>	

	ልነግሩኝ ይችላሉ?	እንዲትሆን ይረዳታል። 3. ሌላ 4. አላውቅም	
605	የምግብ እጥረት ምልክቶች ምን ምን ድናቸው?	1. የሃይል እጥረት/ የጉልበት መድከም: እንደጤናማ ሰው መስራት፣ ማጥናት ወይም መጨመት አለመቻል (ጉድለት) 2. የበሽታ መከላከል አቅም መዳከም 3 የክብደት መቅነስ ወይም የሰውነት መክሰት 4. የእድገት መደናቀፍ 5. ሌላ 4. አላውቅም	
606	ሰዎች በምግብ እጥረት የሚገዱት ለምድነው?	1. በቂ ምግብ ስለማያገኙ 2. ምግቦቹ በቂ ንጥረነገሮች ስለማይዙ 3. በሽታ/ህመምና ምግብ ያለመመገብ 5. ሌላ 4. አላውቅም	
607	ስለ አይረን እጥረት የደም ማነስ ስምተው ያውቃሉ?	1. አዎን 2. አልሰማውም 3. አላውቅም	
608	የደም ማነስ ያለበትን ሰው እንዴት መለየት እንደሚቻል ልነግሩኝ ይችላሉ?	1. የሃይል ወይም የጉልበት ማነስ 2. መንጥእት/ የቆዳ መገርጠት 3. የጥፍር መታጠፍ /የማንኪያ ቅርጽ መያዝ 4. ለህመም የመጋለጥ እድል መጨመር (የበሽታ መከላከል አቅም መዳከም) 5. ሌላ 6. አላውቅም	

609	ነፍሰጡር እናት አይረን የሌለውን ምግብ በመመገብ የሚያስከትለው ይጤና ችግሮች ምንድናቸው?	<ol style="list-style-type: none"> <li>1. በእርግዝና ወይም በኋልላ ለሞት የመጋለጥ ችግር</li> <li>2. ወሊድን ከባድ ማድረግ</li> <li>3. ሌላ</li> <li>4. አላውቅም</li> </ol>	
610	የደም ማነስን ምን ልያስከትል ይችላል?	<ol style="list-style-type: none"> <li>1. በምግብ ውስጥ የአይረን ንጥረ-ነገር ያለመኖር/ብዙ ያለመመገብ</li> <li>2. በሽታ/ኢንፌክሽን (እንደ የወባ በሽታ፣ የመንጠቆ ትል፣ ኤች/አይ/ቪ ኢንፌክሽን)</li> <li>3. በወር አበባ ወቅት ከባድ የደም መፍሰስ ማጋጠም</li> <li>4. ሌላ</li> <li>5. አላውቅም</li> </ol>	
611	የደም ማነስ በሽታን እንዴት መከላከል ይቻላል?	<ol style="list-style-type: none"> <li>1. በአይረን ንጥረ-ነገር የበለጸገ ምግብ በመመገብ</li> <li>2. በቫይታሚን ሲ ንጥረ-ነገር የበለጸገ ምግብ በመመገብ</li> <li>3. የአረን ንጥረነገር ያለበትን እንክብል በሃኪም ትዕዛዝ መሠረት መውሰድ</li> <li>4. ለደም ማነስ በሽታ አጋላጭ የሆኑ በሽታዎችን መከላከል(በሽታን ኢንፌክሽን)</li> <li>5. የጡት ማጥባትን መቀጠል (ከ6-23 ወራት ዕድሜ ድረስ)</li> <li>6. ሌላ</li> <li>7. አላውቅም</li> </ol>	
612	በአይረን ንጥረ-ነገር የበለጸጉ ምግቦችን ልዘረዝሩልኝ ይችላሉ?	<ol style="list-style-type: none"> <li>1. የኦርጋን ስጋ (ጉበት፣ ኩላሊት፣ ልብ)</li> <li>2. የአካል ስጋ (የበሬ፣ የፍየል ስጋ)</li> </ol>	

		3. አሳና የባህር ውስጥ ምግቦች	
613	በምንመገብበት ጊዜ አንድ አንድ የምግብ አይነቶች የአይረን ነጥረ-ነገር ወደ ሰውነታችን ውስጥ እንዲገባ ወይም እንዴመጠጥ ይረዳሉ። እኚህ የምግብ አይነቶች ምን ምንድናቸው?	1. በሻይታሚን ሲ የበጸጉ ምግቦች፡ እንደ ብርቱኪን፣ ሎሚና የመሳሰሉ የፍራፍሬ አይነቶች። 2. ሌላ 3. አላውቅም	
614	አንዳንድ የመጠጥ አይነቶች የአይረን ነጥረ-ነገር ወደ ሰውነታችን ውስጥ የመጠጥ አቅምን ይቀንሳሉ ወይም ያስተጓጉላሉ። የትኞቹ የመጠጥ አይነቶች ናቸው?	1. ቡና 2. ሻይ 3. ሌላ 4. አላውቅም	

ክፍል አስር፡ ከዚህ ቀጥሎ ከጤና ወይም ከሥነ ምግብ ጋር ተያያዥነት ካላቸው ችግሮች ያለውን አመለካከት እጠይቃለሁ

ተ/ቁ	ጥያቄ	መልስ/ምርጫ	አስተያየት/ዝልል/እለፍ
700	የአይረን ንጥረነገር እጥረት የሚከሰት የገም ማነስ መያዝዎን እንዴት እርግጠኛ ልሆኑ ይችላሉ?	1. አላውቅም 2. እርግጠኛ አይደሉም 3. በእርግጠኝነት	
701	በአይረን ንጥረ ነገር እጥረት የሚከሰት የደም ማነስ ምን ያህል አስከፊ ነው ብለህ ታስባለህ?	1. አሳሳቢ አይደለም 2. እርግጠኛ አይደለህም 3. አሳሳቢ ነው	
702	በአይረን ንጥረነገር የበለጸጉ ምግቦችን ለምሳሌ እንደ ስጋ፣ ዶሮ ወይም ጉበት ያሉ ምግቦች ማዘጋጀት ምን ያህል ጥሩ ነው ብለህ ታስባለህ/ሽ?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለህም 3. ጥሩ ነው	
703	በአይረን ንጥረነገር የበለጸጉ ምግቦችን ምን ያህል ትወዳቸዋለህ/	1. አልወድም	

	ትወጅያቸው፡አሻ?	2. እርግጠኛ አይደለም 3. እወዳለሁ	
704	በቀን ሦስት ጊዜ ምግብ መብላትና መክሰስ መጠቀም ጥሩ ነው ብለህ/ሽ ታስባለህ/ታስብዋለሽ?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለም 3. ጥሩ ነው	
705	የተለያዩ የምግብ አይነቶችን መመገብ ምን ያህል ጥሩ ነው ብለው ያስባሉ?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለም 3. ጥሩ ነው	
706	አስተነኛ ክብደት ያለው ህፃን ይኖረኛል ብለው ገመተው ያውቃሉ ወይ?	1. ሊሆን አይችልም 2. እርግጠኛ አይደለም 3. ሊሆን ይችላል	
707	በእርግዝና ወቅት ብዙ መመገብ ምን ያህል ጥሩ ነው ብለው ያስባሉ?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለም 3. ጥሩ ነው	
708	ምግብ ስናዘጋጅ አዮዲን ያለበትን ጨው መጠቀም ምን ያህል ጠቃሚ ነው ብለው ያስባሉ?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለም 3. ጥሩ ነው	
709	በሻይታሚን ኤ የበለጸጉ ምግቦችን እንደ ካሮት፣ አረንጓዴ ቅጠል ያላቸውን አትክልቶች፣ ስኳር ድንች ወይም ጉበት ማዘጋጀት ምን ያህል ጥሩ ነው ብለው ያስባሉ?	1. ጥሩ አይደለም 2. እርግጠኛ አይደለም 3. ጥሩ ነው	

ክፍል አስራ አንድ፡ ከዚህ በመቀጠል ከጤና ወይም ከሥነ ምግብ ጋር ተያያዥነት ካላቸው ችግሮች ያለውን አተገባበር እጠይቃለሁ

ተ/ቁ	ጥያቄ	ኮድ			ዝላል/እለፍ
800	ትላንትና ከተዘረዘሩት ውስጥ ምሳና እራት ተመግበዋል?	አይነት	አዎ	አይደለም	
		የስጋ ክፍል(ጉበት፣ኩላሊት)	1	2	

		ስጋ(የበሬ ስጋ፣ የበግ ስጋ፣የፍየል ስጋ፣ የአሳማ ስጋ)	1	2	
		ዓሳ	1	2	
		ዶሮ	1	2	
801	ከፍራፍሬዎች እንደ ሎሚ ብርቱኪን እና ማንጎ የተዘጋጀ ጁስ አዘውትረው ይጠጣሉ?	1. አዎን 2. አይ 3. አላውቅም/መልስ የለም			
802	ፍራፍሬዎችን በየትኛው ግዜ ነው አዘውትረው የሚጠቀሙት?	1. ከምግብ በፊት 2. ከምግብ ጋር 3. ከምግብ በኋላ 4. ሌላ (ዘርዘር) _____ 5. አላውቅም/መልስ የለም			
803	ቡና ወይም ሻይ አዘውትረው ይጠጣሉ?	1. አዎን 2. አይ 3. አላውቅም			
804	ቡና ወይም ሻይ አዘውትረው የሚጠጡት በየትኛው ግዜ ነው?	1. ምግብ ከመመገብ ሁለት ሰዓትና ከዚያ በፊት 2. ምግብ ከመመገብ በፊት 3. በምመገብበት ሰዓት 4. ወዲያው ከምግብ በኋላ 5. ከምግብ በኋላ ሁለት ሰዓትና ከዚያ በላይ ቆይቼ 6. ሌላ (ዘርዘር) _____ 7. አላውቅም/መልስ የለም			
805	የአይረን ንጥረነገር እንክብል አለህ/ሽ?	1. አዎ አለኝ 2. አይ የለኝም 3. አላውቅም			መልሱ አይ ከሆነ 807 ዝለል

806	ለጥያቄ ቁጥር 805 መልሱ አዎን ከሆነ፣ በየቀኑ ይወስዱታል?	1. አዎ 2. አይ 3. አላውቅም	
807	የፎሊክ አሲድ ንጥረነገር እንክብል አለህ/ሽ?	1. አዎ አለኝ 2. አይ የለኝም 3. አላውቅም	መልሱ አይ ከሆነ 809 ዝለል
808	ለጥያቄ ቁጥር 807 መልሱ አዎን ከሆነ፣ እንክብሉን መውሰድ የጀመሩት መቼ ነው?	1. ከእርግዝና በፊት 2. በመጀመሪያው ሶስት ወራት ግዜ 3. ከእርግዝና በኋላ 4. ወስጆው አላውቅም	
809	ማታ ለቤተ ሰባቸሁ እራት ስያዘጋጁ ጨው ተጠቅመዋል?	1. አዎ 2. አይ 3. አላውቅም	
810	ለጥያቄ ቁጥር 809 መልሱ አዎን ከሆነ፣ ምን አይነት የጨው አይነት ነው የተጠቀሙት?	1. በአዮዲን የበለጸገ 2. አዮዲን የሌለው 3. አላውቅም/መልስ የለም	

ክፍል አስራ ሁለት : የሂሞግሎቢን ደረጃና የአካል መጠን ልኬት

900. የሙዋክ ልኬት (MUAC cm) መጠን በሴ.ሜ -----

901. የሂሞግሎቢን መጠን(Hemoglobin level )-----

ክፍል አሥራ ሶስት: አሁን ስለአይረን ፎሊክ አሲድ እንክብል ተከታትለው እንደሚወስዱ ጥያቄ እጠይቋታለሁ

ኮድ	ጥያቄ	ምላሽ/ምርጫ	አስተያየት/ዝለል/አለፍ
1000	አይረን ፎሊክ አሲድ	1.አዎን	አይደለም, ወደ ጥያቄ

	እንክብል/ተጨማሪ እየወሰድሽ ነው ወይ?	2.አይደለም	ዝላል
1001	በየስንት ግዜ ነው እንክብልሉን እየወሰድሽ ያለሽው?	1.በየቀኑ 2.በየሁለተኛ ቀን 3.በየሳምንቱ	
1002	ተጨማሪ እንክብል አስፈላጊ ነው ወይ	1.አዎን 2.አይደለም	
1003	አይረን ፎሊክ አሲድ እንክብል እየወሰድሽ ማንኛውም የጎንደሽ ጉዳት አጋጥሞት ያውቃል ወይ?	1.አዎን 2.አይደለም	
1004	በቀን ምን ያህል እንክብል እየወሰድሽ ነው?	1.1እንክብል 2.2እንክብል 3.3እንክብል	
1005	በእርግዝናዎ ወቅት ስለ ተጨማሪ አይረን ፎሊክ አሲድ እንክብል ጠቀሜታ መረጃ?	1. አዎን 2.አይደለም	
1006	ተጨማሪ አይረን ፎሊክ አሲድ እንክብል የደም ማነስ ይከላከላል ብለው ያስባሉ ወይ?	1. አዎን 2.አይደለም 3.አላውቅም	
1007	የቅርብ እርግዝና ወቅት ተጨማሪ አይረን ፎሊክ	1.1-30 ቀን 2.31-60ቀን	

	አሲድ እንክብል የወሰዱበት ቀናት ብዛት	3.61-90 ቀን 4. ከ90 ቀን በላይ 5. እንክብል እየወሰድኩ አየደለሁም																									
1008	እንክብሉን የመከታተል ደረጃው	1. እንክብልን እወስደለሁ 2. እንክብልን አልወስድም																									
1009	ተጨማሪ አይረን ፎሊክ አሲድ እንክብል ለመውሰድ የጤና ተቋማት ጉብኝት ድግግሞሽ	1. በየወሩ 2. በየ 2-3 ወር 3. ባስታወስኩት ወቅት 4. አላስታውሰስም																									
1010	ከአቅራቢያው ጤና ተቋም የአንድ ግዜ ጉዞ ምን ያህል ደቂቃ/ሰዓት ይፈጃል	1. ከ30 ደቂቃ ያነሰ ነው 2. ከ30 ደቂቃ በላይ ነው 3. አላውቅም																									
1011	ተጨማሪ አይረን ፎሊክ አሲድ እንክብል ለመጠቀም መሰናክል የሚሆኑ ነገር ምንድን ነው	<table border="1"> <tr> <td>የቃላት አይነት</td> <td>አዎን</td> <td>አይደለም</td> </tr> <tr> <td>እንክብል</td> <td></td> <td></td> </tr> <tr> <td>ለመውሰድ</td> <td></td> <td></td> </tr> <tr> <td>መርሳት</td> <td></td> <td></td> </tr> <tr> <td>የእክብል ጥቅም ያለማውቅ</td> <td></td> <td></td> </tr> <tr> <td>የጎንደሽ ጉዳት ማጋጠም</td> <td></td> <td></td> </tr> <tr> <td>እንክብልሉ ህጻን ይጎዳል ብሎ መፍራት</td> <td></td> <td></td> </tr> <tr> <td>በዋጋ ምክንያት</td> <td></td> <td></td> </tr> </table>	የቃላት አይነት	አዎን	አይደለም	እንክብል			ለመውሰድ			መርሳት			የእክብል ጥቅም ያለማውቅ			የጎንደሽ ጉዳት ማጋጠም			እንክብልሉ ህጻን ይጎዳል ብሎ መፍራት			በዋጋ ምክንያት			
የቃላት አይነት	አዎን	አይደለም																									
እንክብል																											
ለመውሰድ																											
መርሳት																											
የእክብል ጥቅም ያለማውቅ																											
የጎንደሽ ጉዳት ማጋጠም																											
እንክብልሉ ህጻን ይጎዳል ብሎ መፍራት																											
በዋጋ ምክንያት																											

		መግኝት ያለመቻል			
		እንክብል			
		እንደሚጠቅም			
		እምነት ያለመኖር			

ቃለ መጠየቁን በመሳተፎና በመጨረሻ በጣም አሰግናለሁ!

### ANNEXURE L: AMHARIC VERSION FOR FGD GUIDE

በደቡብ ኢት/ያ በነፍሰጡር እናቶች ሊከሰት የሚችለውን የአመጋገብ ችግር/የምግብ እጥረት የማህበረሰብ መር ስርአተ ምግብን በመተግበር የመከላከል ስልት ማዘጋጀት ነው።

ለነፍሰጡር እናቶች የጉሮፕ ውይይት መምሪያ

1. በአከባቢያችሁ ስለአለው የነፍሰጡር እናቶች ሥርዓት ምግብ ችግር ልትነግሩን ትችላላችሁን?

ፕሮቢንግ ጥያቄዎች

- ለምግብ እጥረቱ መንስኤው ምንድን ነው
- በባህላችሁ በእርግዝና ወቅት የሚከለክሉ ምግቦች አሉ ወይ
- ሀይማኖትስ በአመጋገብ ላይ ተጽኖ ያደርጋል ወይ?
- ምግብ ማበላጸግ ምን ይመስላል
- የነፍረጡር እናቶች አመጋገብ ከቤተሰብ አባላት ሲነጻጸር ምን ይመስላል
- የነፍሰጡር እናቶች አመጋገብ ምን ይመስላል
- በእርግዝና ወቅት የሥርዓተ ምግብ ምክር አግኝተዋል ወይ
- ከነፍሰጡር እናቶች ሥርዓት ምግብ አተገባበር ላይ ያጋጠሙ ተግዳሮቶች ካለ ቢነግሩን

2. በአከባቢያችሁ ከነፍሰጡር እናቶች ጋር በተያያዘ ስላለው የደም ማለስ ቢነግሩን?

ፕሮቢንግ ጥያቄዎች

- የደም ማለስ መንስኤው ምንድን ነው
- የደም ማለስን እንዴት እንከላከላለን

- አይረን ፎሊክ አሲድ እንክብል እየወሰዱ ነው ወይ?
- አይረን ፎሊክ አሲድ እንክብል ጥቅም አለው ወይ?

3. በአከባቢያችሁ ስላለው የምግብ ዋስትና ችግር ሊነግሩን ይችላሉ?

ፕሮቢንግ ጥያቄዎች

- የምግብ ዋስትና ችግር ጨናው ምን ይህል ነው?
- የምግብ ዋስትና ችግር መንሴኤው ምንድን ነው ?
- የምግብ ዋስትና ችግር በቤተሰብ ሲገጥማችሁ እንዴት ነው የምትቋቋሙት ?

4. በደቡብ ኢት/ያ የነፍሰጡር እናቶችን አመጋገብ ለማሻሻል ምን መደረግ አለበት ይላሉ?

- እስካሁን ከነገሩን በተጨማሪ ሌላ የሚነግሩን ነገር ካለ?

**ANNEXURE M: AMHARIC VERSION IN-DEPTH INTERVIEW GUIDE**

1. በአከባቢያችሁ ስለ ደም ማለስ ሁኔታ ልትነግሩን ትችላላችሁ?

ፕሮቢንግ ጥያቄዎች

- የደም ማነስ ምልክት፤ጫና ምን ይመስላል?
- የአይረን ንጥረ ነገር የሌለው ምግብ በእርግዝና መመገብ በጤና ላይ የሚያመጥው ተጽኖ ምንድን ነው?
- የደም ማነስ መንሴኤው ምንድን ነው?
- የደም ማነስን እንዴት እንከላከላለን ?
- በደቡብ ኢት/ያ የአይረን ፎሊክ አሲድ ለነፍሰጡር እናቶች እንዴት እየተሰጠ ነው?
- የአይረን ፎሊክ አሲድን ምን ያህል ጊዜ እንዲወስዱ ነው የሚመከረው?
- በቂ የአይረን ፎሊክ አሲድን ግብአት አላችሁ ወይ

2. በአከባቢያችሁ ስለአለው የነፍሰጡር እናቶች ሥርዓት ምግብ ችግር ልትነግሩን ትችላላችሁን?

ፕሮቢንግ ጥያቄዎች

- ለምግብ እጥረቱ ዋና መንሴኤው ምንድን ነው ?
- ሥርዓተ ምግብን ለመተግበር የሚጠቀሙበት ጋይድ ላይን አለ ወይ?

- ከነፍሰጡር እናቶች ሥርዓት ምግብ አተገባበር ላይ ያጋጠሙ ተግዳሮቶች ካለ ቢነግሩን ?
- በነፍሰጡር እናቶች ላይ የሚከሰተውን የሥርዓተ ምግብ ችግር ለመከላከል በገጠር ማህበረሰብ፤ በግለሰብ፤ በጤና ተቋም፤ በሀገር ፖሊሲ ደረጃ የእርሶ አስተያየት ምንድን ነው?
- በጤና ተቋም ምን ዓይነት የሥራዓተ ምግብ አገልግሎት እየተሰጠ ነው ያለው?
- የወረዳው ጤና ጽ/ቤት ለሥርዓተ ምግብ ሀብት ወይም በጀት መደብል ወይ አመዳደቡስ ምን ይመስላል?

3. በማህበረሰባችሁ በአባወራ ደረጃ ስላለው የምግብ ዋስትና ሁኔታ ሊነግሩን ይችላሉ?

ፕሮቢንግ ጥያቄዎች

- በማህበረሰባችሁ ለምግብ ዋስትና ችግር መንሴኤው ምንድን ነው?
- የምግብ እጥረት ሲከሰት ችግሩን ለመቀነስ እቅድ አላችሁ ወይ?
- በማህበረሰባችሁ የተከሰተውን ዋስትና ችግር ለመቋቋም ቤተሰቦች ምንድን ነው የሚያደርጉት ?
- የምግብ ዋስትና ችግር ለመከላከል የሚተገበር ጋይድ ላይን አላችሁ ወይ?
- የምግብ ዋስትና አተገባበር ላይ ያለው ጠንካራና ደካማ ጎኖች ምንድን ናቸው?
- የምግብ ዋስትና ለመተግበር ሀብት ተመድቦል ወይ?

4. በአጠቃላይ በማህበረሰባችሁ የሥርዓተ ምግብ ጋር ተያይዞ የሚከሰተውን ጫና ለመቀነስ የሚተገበር ተግባር ላይ እንቅፋቶች ምንድን ናቸው?

ፕሮቢንግ ጥያቄዎች

- የምግብ እጥረት
- የምግብ ዋስትና ያለመኖር
- የደም ማነስ
- ሌላ ተጨማሪ አስተያየት ካሏት?

በቃለ መጠየቁ ስለተሳተፉትና አስተያየትና ምክር ስለሰጡ ማድነቅ እወደለሁ ለገንቢ አስተያየቷ እጅግ በጣም አመሰግናለሁ!!!

## ANNEXURE N: PANEL EXPERT'S BIOGRAPHY FOR MODEL DEVELOPMENT

SN	Profession	Area of experts	Education	Work place
1	Public Health Specialist	MCH advisor	PhD	Minster of Health AA
2	Public Health Specialist	Public health advisor	Master of Nutrition	Regional RB Hawassa
3	Medical Practitioner	Nutrition Focal	Medical doctor	Jinka Hospital
4	General Practitioner	Quality focal	Medical doctor	Koyebe Hospital
5	Public Health Professional	Chief executive officer	BSC	Primary Hospital
6	Public Health Specialist	Nutrition Advisor	MPH	Zonal
7	Public Nutritionist Specialist	Nutrition Consultant	Masters of Nutrition	UNICEF
8	Nursing	Lecturer	Master Nursing	University
9	Public Health Specialist	Lecturer(Associated prof)	PhD	University
10	Public Health Specialist	RMNCHN Advisor	Master PH	RHB
11	Senior Health manager	M&E Expert	PhD	WHO
12	Senior Nutritionist	Nutrition consultant	Master of HN	WFP
13	Public health professional	Nutrition Expert	PhD	University
14	Ass Prof	Lecturer	PhD	University
15	Public Nutrition Specialist	Nutrition Focal	Masters of Nutrition	Hospital
18	Public Health Specialist	Public health advisor	Master PH	MOH
19	Assistant Professor	Lecturer	PhD Fellow	University
20	Public Health Specialist	Zonal manager	Master PH	Zonal

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THE DEVELOPMENT OF A COMMUNITY BASED  
PREVENTION MODEL FOR UNDER NUTRITIONAL STATUS  
AMONG PREGNANT WOMEN IN SOUTHERN ETHIOPIA

by

TSSEGAYE ALEBRO GUTE

Submitted in accordance with the requirements for  
the degree of

DOCTOR OF LITERATURE AND PHILOSOPHY

in the subject

HEALTH STUDIES

of the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROF ZERISH ZETHU NKOSI

March, 2020

# THE DEVELOPMENT OF A COMMUNITY BASED PREVENTION MODEL FOR UNDER NUTRITIONAL STATUS AMONG PREGNANT WOMEN IN SOUTHERN ETHIOPIA

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