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EFFECTS OF CHILD FEEDING PRACTICES ON NUTRITIONAL STATUS OF CHILDREN 6 - 59 MONTHS OF AGE: THE CASE OF SOUTHERN NATIONS, NATIONALITIES AND PEOPLES' REGION, ETHIOPIA

BY

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EFFECTS OF CHILD FEEDING PRACTICES ON NUTRITIONAL STATUS OF CHILDREN 6-59 MONTHS OF AGE: THE CASE OF SOUTHERN NATIONS, NATIONALITIES *AND PEOPLES' REGION,* ETHIOPIA

By

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Advisor

Terefe Degefa (Ph.D)

July, 2019

Addis Ababa, Ethiopia

DECLARATION

I, the undersigned, declare that this is my original work, has not been presented for degrees in any other university and all sources of materials used for the thesis have been duly acknowledged.

Name: Netsanet Lemma **Signature_____ date _____**

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This is to certify that the thesis prepared by Netsanet Lemma Mishiko entitled:***Effects of Child Feeding Practices on the Nutritional Status of Children 6-59 Months of Age: The Case of Southern Nations, Nationalities, and Peoples' Region, Ethiopia*** and submitted in partial fulfilment of the requirements for the Degree of Master of Science in Population (Reproductive Health) Studies complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

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Abbreviations and Acronyms

ANC	Ante-natal Care
BF	Breast Feeding
BMI	Body Mass Index
CED	Chronic Energy Deficiency
CSA	Central Statistical Agency
EAs	Enumeration Areas
EDHS	Ethiopian Demographic and Health Survey
FMOH	Federal Ministry of Health
HAZ	Height for Age Z Score
HEW	Health Extension Works
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
ICF	Inner City Fund
IYCF	Infant and Young Child Feeding
MUCA	Mid Upper Arm Circumference
NCHS/WHO	National Center for Health Statistics/World Health Organization
NNP	National Nutrition Programme
PA	Physical Activity
P: Value	Probability Value
SD	Standard Deviation
SDT	Self-determination Theory
SNNPR	Southern Nations, Nationalities, and Peoples' Region
SPSS	Statistical Package for Social Scientists
STIS	Sexually Transmitted Infections
TV	Television
OR	Odds Ratio
UNICEF	United Nations Children’s Fund
UN	United Nations
WB	World Bank
WHO	World Health Organization

Effects of Child Feeding Practices on the Nutritional Status of Children 6-59 Months of Age: The Case of Southern Nations, Nationalities, and Peoples' Region, Ethiopia

Abstract

Background: *Malnutrition remains one of the most common causes of morbidity and mortality among children throughout the world. It is one of the most serious public health problems in Ethiopia. There are also different problems in different regions of the country related to feeding practices. The aim of this study is to investigate the effects of child feeding practices on nutritional status of Children 6-59 months of age in the case of SNNPR, Ethiopia.*

Method: *This study was carried out using quantitative data to analyses.The child data from Ethiopian Demographic and Health Survey-2016 was taken for analysis. The study considers last birth children 6-59 months of age in SNNPR region. A binary logistic regression was fitted to analyze the effects of child feeding practices on nutritional status of children 6-59 months of age using SPSS Version 20.*

Results: *This study show that Improved source of drinking water((AOR: 0.531; 95% CI: (0.531 - 0.772)). richer wealth status ((AOR: 0.479; 95% CI: (0.262 - 0.876)) and richest wealth status ((AOR: 0.367; 95% CI: (0.167 - 0.809)), Antenatal Care four or more visiting (AOR:0.629; 95% CI: (0.409 – 0.972), two under five children ((AOR:1.533; 95% CI:(1.034 - 2.273)) and three or more under-five children ((AOR:3.275; 95% CI:(1.398 - 7.672)), 18-23 age in month ((AOR:6.431; 95% CI: (2.440-16.952)) and 36-47 age in month ((AOR: 13.518; 95% CI: (3.494 - 52.307)) and very small or smaller than average sized children ((AOR: 1.615 ; 95% CI: (1.037 - 2.516)) have shown statistically significant effect on stunting of last born children 6-59 months.*

Conclusion: *Strategies to improve nutritional status of children, improving the nutritional status of the mother and her income status. With respect to health extension workers generally giving participatory nutrition education to create awareness and to develop behavior change communication for better feeding and caring practices among the community.To promote family planning programs in order to control number of children and also to increase birth interval is another important component.*

Key Words*: Child Feeding Practice, Breast Feeding, Under Five Children, Stunting, Ethiopia*

CHAPTER ONE
INTRODUCTION

1.1. Background of the Study

Malnutrition is a major public health problem worldwide. It affects all age groups and population, especially the poor and vulnerable ones (Delisle, 2008). Malnutrition is associated with a lot of morbidity and more than one-third of the deaths among children under 5 years globally. A majority of those who suffer from the brunt of malnutrition are in developing countries (Tankoi *et al*., 2016).

Malnutrition in children is one of the most serious public health problems in Ethiopia and the highest in the world (World Bank, 2004).The country has the second highest rate of malnutrition in sub-Saharan Africa (FMOH, 2008) and with high under five mortality rate (67/1000 live births) which is mainly due to infection and malnutrition (EDHS, 2016).

Malnutrition is a complex phenomenon that stems from various underlying determinants, including a lack of optimal feeding practices for infants and young children (Patrice, 1997). Nutritional status of children is influenced by three broad underlying causes: food, health and care (UNICEF, 1998). Focusing on these underlying causes of malnutrition appears to show and promote a better understanding of the underlying causes in order to achieve good nutritional outcomes.

Food for nutrition as "food security" at the household level, and assessed by the level of sustainable access to safe food of sufficient quantity and quality (providing energy, protein and micro nutrients).However, having access to quality and quantity food by itself does not necessarily improve nutritional status since levels and types of care provided to children are influential factors. (UNICEF, 1998).

Care is referring to a process taking place between a caregiver and the receiver, has several components that affect nutrition levels: appropriate complementary feeding, hygiene and health-seeking behaviors are factors that support good nutrition. Thus understanding care as a process that translates food availability at the household level and the presence of health service into good growth and development of the child are important to note (Engle, 1992).

Health includes access to medical services as well as to clean water and hygiene and sanitary environment. The health environment is assessed in terms of access to safe water and sanitation, the presence of malarial breeding sites, the quality of shelter, and consequent levels of cold, stress, and overcrowding. Access to basic health services determines which infection and disease can be prevented or treated (UNICEF, 1998).

Understanding the effect of infant and young child feeding (IYCF) practices on improving the nutritional status of children under two years of age, the World Health Organization (WHO) developed a set of core indicators to assess IYCF practices (WHO, 2010).These indicators incorporated both breast-feeding and complementary feeding linked practices. Appropriate feeding practices, therefore, include timely initiation of feeding of solid and semi-solid foods from age 6 months and to improve the quantity and quality of foods children consume, while maintaining breastfeeding (UNICEF, 2011).

There is strong evidence that the promotion of appropriate complementary feeding practices reduces the incidence of stunting and leads to better health and growth outcome (Black *et al*., 2013). Therefore, as an effective intervention strategy for malnutrition, WHO and United Nation for Child Fund (UNICEF) recommended introduction of adequate complementary foods at 6 months with continued breastfeeding for 2 years of age or beyond (WHO, 2010). And this will have a potential to improve the nutritional status of children in developing countries. However, in Ethiopia, the prevalence of appropriate complementary feeding practices among children aged 6–23 months was very low (7 %) (EDHS, 2016). Poor child feeding practice and childhood malnutrition are highly prevalent in SNNP Region of Ethiopia with malnutrition rates similar to national levels. Since Amhara, Benishangul gumuz, Affar, Dire dawa and Tigray including SNNP region are above the national average. Thus, it is different nation and nationalist with different culture and religion lives in SNNPR and it has good diversity in SNNPR that was selected.

1.2. Statement of the problem

Nutritional status is the result of complex interactions between food consumption and the overall status of health and health care practices. Numerous socioeconomic and cultural factors influence patterns of child feeding and nutritional status of women and children (EDHS, 2016). Malnutrition remains one of the most common causes of morbidity and mortality among children throughout the world. It has been responsible, directly or indirectly, for 60% of the 10.9 million deaths annually among children under five. Over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the first year of life (Mancharia *et al*., 2004).

Malnutrition is one of the leading causes of morbidity and mortality in children under the age of five in developing countries (UN, 2010). Ethiopia being one of these countries malnutrition is an important public health problem; stunting, underweight and wasting were identified as 38%, 24% and 10%, respectively in children under five (EDHS,2016).

Child under-nutrition continues to be a major public health problem in the SNNP Region of Ethiopia with malnutrition rates similar to national levels as reflected in the rates of three commonly used anthropometric indicators. According to the results from the 2016 Ethiopian Demographic and Health Survey (EDHS), 39 per cent of children under 5 are stunted,6 per cent of children under 5 are wasted and 21 per cent of children under 5 are underweight in the SNNP Region (EDHS,2016).

The poor nutritional status of women and children has been a consistent problem in Ethiopia. Under-nutrition is an underlying cause of 53 percent of infant and child death. Lack of dietary diversity and micro nutrient-dense food consumption, and problematic child feeding practices contribute to the high rates of child under nutrition (Tibilla, 2007).

Malnutrition during childhood is a result of a wide range of factors, most of which relate to unsatisfactory food intake or severe and repeated infections, or a combination of the two. The most frequently suggested causes of malnutrition are: poverty, low parental education, lack of sanitation, low food intake, diarrhea and other infections, poor feeding practices, family size, short birth intervals, maternal time availability, child rearing practices and seasonality. There are also economic, social, and cultural causes of malnutrition, which underscore the close link between malnutrition (Tibilla, 2007).

In Ethiopia child feeding practice and health facility is a common issue of the government strategies that it includes in its health policy in the country(EDHS, 2016).There are also different problems in different regions of the country related to feeding styles and practice such as lack of knowledge of mothers on exclusively breast feeding, in adequate professional attitude on advantage of early feeding, lack of sustained promotion on breast feeding, inadequate capacity of HEWs and community promoters, harmful traditions, lack of Infant formula code/proclamation and occupational influence(FMOH, 2010). Regarding Child under-nutrition, parents lack proper knowledge to feed children in Ethiopia (EDHS, 2016).

Limited researches has been conducted to assess the determinants of child feeding practices on nutritional status of children 6-59 months like (Mahari and Yonas, 2017) in Benishangul-Gumuz region Metekele Zone gumuz mothers feeding practice (Hiwot *et al*., 2016) in Southern Ethiopia on mothers in konso through relying only on small geographic area and populations. Likewise an attempt has been made by (Mahari and Yonas, 2017) to assess the effects of child feeding practices on nutritional status of children 6-59 months, did not consider variables related with source of drinking water, access to media and minimum dietary diversity which have a significant effect for children nutritional status. Poor child feeding practice and childhood malnutrition are highly prevalent in SNNPR. Therefore, the study aims at filling the gap of knowledge using the data that was obtained from (EDHS, 2016).

1.3. Objective of the study

1.3.1. General objective

The general objective of this study was to assess the effects of child feeding practices on nutritional status of Children 6-59 months of age in the SNNPR, Ethiopia, 2016/17.

1.3.2. Specific objectives

The Specific objectives were to:

a) Investigate the demographic determinants of child feeding practice on nutritional status of Children 6-59 months of age.
b) Examine the proximate determinants of child feeding practice on nutritional status of Children 6-59 months of age.
c) Identify the socio-economic determinants of child feeding practice on nutritional status of Children 6-59 months of age.

1.4. Hypotheses

The hypotheses to be tested in this study were:

- No access to media and low household wealth status may be associated with higher risk of low nutritional status of children 6-59 months of age.
- Large family size is likely to associate with higher risk of low nutritional status of children 6-59 months of age.
- Low breast feeding and minimum dietary diversity are likely associated with high risk of low nutritional status of children 6-59 months of age.
- Low nutritional status of children 6-59 months of age are higher in rural than urban areas.

1.5. Significance of the study

Child malnutrition is the most widely spread disorder in tropical and subtropical areas. Malnutrition is a primary cause of poor health and death in developing countries and continues to be a major public health problem (Sanghvi and Murray, 1997, United Nations Children's fund (UNICEF), 1998)). Economically Ethiopia remains one of the poorest countries in the world and malnutrition is one of the major and most pressing health problems; especially among children. This study analyses the EDHS 2016 data to assessing the effects of child feeding practices on nutritional status of Children 6-59 months of age in SNNPR. Since different nation and nationalist with different culture and religion lives in SNNPR and it has good diversity SNNPR was selected.

Thus the finding of the study could serve as base line information for the area in activities related to the risk of children under nutrition, to minimize the risk of food insecurity, access to health care services, poverty, hygiene and sanitation. In general, the result of the study will be used for policy makers, planners and other interested researchers to design appropriate interventions in the areas related to child health and nutrition.

1.6. Limitations of the study

- The direction of the causal relationship between child feeding practice and child under nutrition was not clear because the EDHS data was cross-sectional data.
- Even though conducting qualitative data was important in this research to validating results, interpreting statistical results in a very meaningful way and clarifying puzzles that may go against usual expectations by triangulating it with quantitative results, lack of finance are the major constraint.

CHAPTER TWO

REVIEW OF RELATED LITRATURE

2.1. Introduction

All life processes in the body are in a strong dependence of diet, and what constitutes for its food – since the very first days of the life. Every living organism in its live processes continuously spends some constituent substances. Much of these substances are being "burned" (oxidized) in the body, resulting in energy release. The energy the organism uses to maintain a constant body temperature, also to ensure the normal functioning of the internal organs (heart, respiratory system, circulatory system, nervous system, etc.) and particularly to perform any physical work (Anonymous, 2012).

Theory of Nutrition

Food is the essence and the first condition of life. Not surprisingly, all the universal natural science concepts have been including the theory of nutrition as their important and essential part. In the history of science there were two theories of nutrition. The first occurred in ancient times, and the second – the classical theory of a balanced diet. (Anonymous, 2012) The ancient theory of nutrition is associated with the names of Aristotle and Galen, and is a part of their representations of the living. According to this theory the power to all structures of the body is due to the blood, which is continuously formed in the digestive system of nutrients as a result of a complex process of unknown to nature, in a way similar to the fermentation. (Anonymous, 2012)

"The classical theory of a balanced diet is closely related to common belief about the ideal food and optimal balanced diet. This theory is based on a balanced approach for the assessment of diet, and it still retains its value up to now. In its simplest form, this approach focuses on the part that the body should have a supply, composed of such molecular structure that would compensate for their expense and loss from the metabolism, work, and for growth that also applies to the young organisms" (Anonymous, 2012).

The classical theory is also based on the following fundamental principles: inflow of substances must exactly match their expenses; influx of nutrients provided by the destruction of structures and absorption of food nutrients – nutrients needed for metabolism and construction of structures of the body; utilization of food is carried out by the body; food consists of several components of different physiological significance: food, ballast and toxic substances; (Anonymous, 2012)

Self-Determination Theory and Physical Activity

Self-Determination Theory (SDT) (Ryan and Deci, 2002) is a motivational theory that has received significant research attention and support in predicting physical activity (PA) as well as in the development of PA interventions. SDT draws a distinction between intrinsic motivation, which involves engaging in a behavior for its own sake (i.e., for challenge and enjoyment), and extrinsic forms of motivation. The latter involves doing an activity because it is instrumental to achieving a separate consequence and this can be experienced as heteronomous (i.e., controlling) or autonomous to varying degrees. SDT proposes a continuum for the internalization of motivation, whereby individuals become more autonomous (or self-determined) to engage in behaviors over time as their extrinsic motives or reasons become more internalized. Facilitation of this internalization process has been found to nurture more autonomous motivation with an ensuing predictive influence on adaptive outcomes such as behavioral engagement/persistence and well-being (Ryan and Deci, 2008).

The strengths and weakness of SDT. One of the strengths of SDT is that it offers malleable processes of behavioral change that can be targeted in different health behavior interventions (Fortier *et al.*, 2007). Essentially, SDT researchers can develop and implement intervention strategies that are purported to satisfy the three basic psychological needs, thus fostering internalization and positive behavior change, in this case, adoption and maintenance of PA. The purpose of SDT interventions is to assist individuals' progress on the continuum towards more autonomous forms of motivation. Weakness of SDT with other health behaviors (e.g., brushing teeth, wearing a seat belt) which are less intrinsically satisfying, intrinsic motivation can be targeted to a considerable extent in the case of PA by honing in on people's natural interest and enjoyment in activities such as sports, dancing, water activities, etc. (Fortier *et al.*, 2009, Ryan *et al.*, 2008).

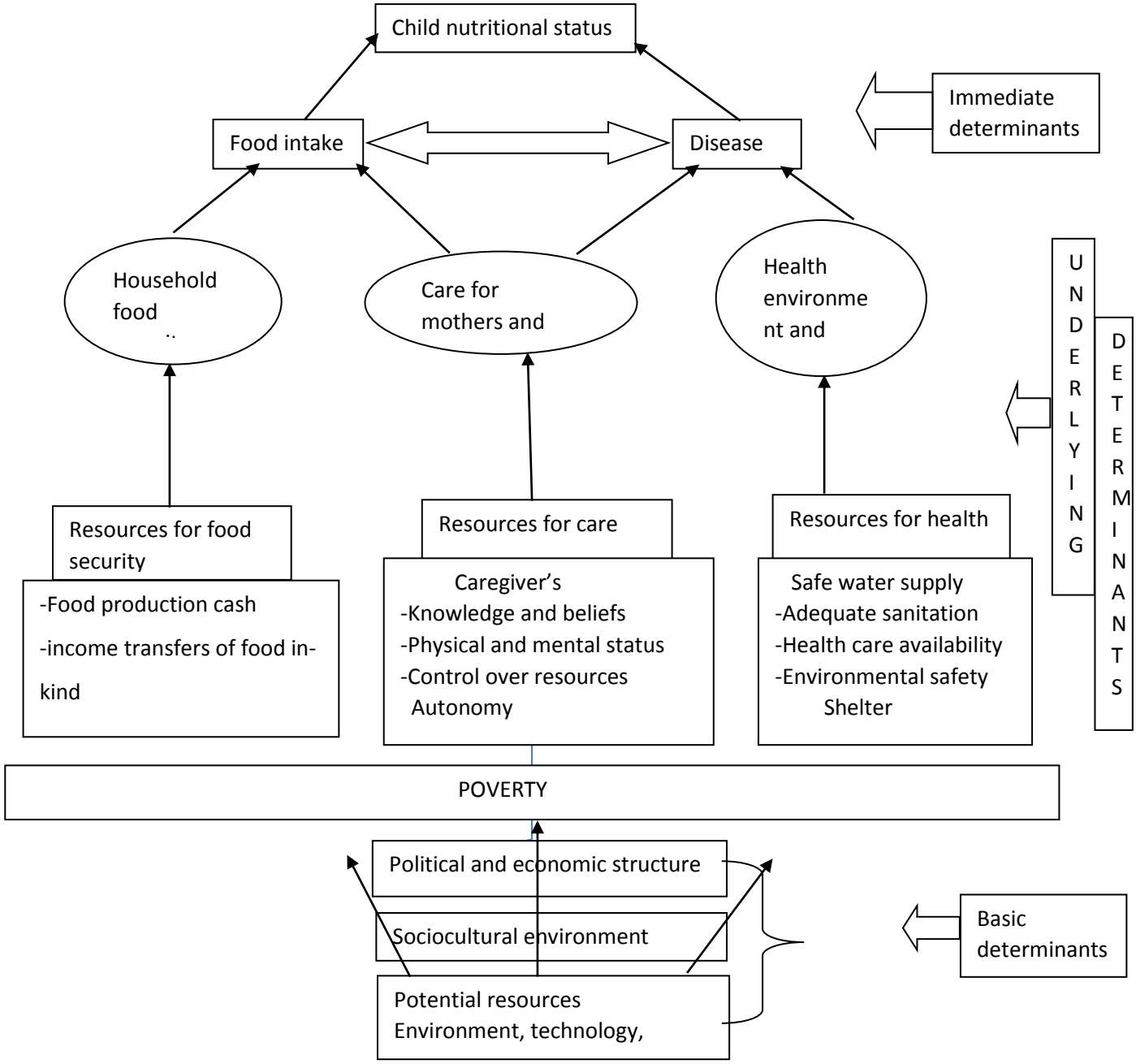

Figure 1: Conceptual Framework of the Study

Sources: UNICEF *et al.*,(1998)

2.2. Conceptual framework

The 1990 UNICEF policy review on the strategy for improved nutrition of children and women in developing countries states that freedom from hungers is a basic human right and continued malnutrition is unacceptable. In view of this, nutritional framework was adopted. To identify potential determinants of malnutrition UNICEF's nutrition conceptual frame work is drown. It reflects relationships among factors and their influences on children's and women's nutritional status (Figure 1).

2.2.1 Description of the Conceptual Framework

The most significant immediate causes of malnutrition are inadequate dietary intake and disease is often directly affecting the individual. Moreover, they form a vicious cycle: Inadequate dietary intake increases the likelihood of illness because of weakened immune levels; illnesses lead to a loss of appetite and poor absorption, which in turn worsen under nutrition. The main *underlying* causes of under nutrition are lack of household food security, inadequate care for mothers and children, and poor health and environmental conditions. Each factor is determined by the social and economic resources available to the individuals and the household as a whole.

Poverty is a key factor affecting all underlying determinants. Caring practices include appropriate nutrition and support for mothers during pregnancy and lactation, infant feeding practices (breastfeeding and complementary feeding), and health-seeking behaviors and cognitive stimulation. The caregiver's knowledge and beliefs also are important resources that influence what types of health services are accessed and what caring practices are adopted. Factors affecting the health and environment conditions of the household include access to health care from affordable, qualified providers and safe water and sanitation services. Poor environmental safety, including lack of adequate shelter, is also a critical determinant of under nutrition.

The *basic* causes of under nutrition are insufficient resources available at the country or community level, and the political, social, and economic conditions that govern how these resources are distributed. The basic causes also influence institutions. These include both the formal institutions that provide public sector services, such as health and education, and the informal institutions that determine the social and cultural norms regarding the rights of women and vulnerable groups in the population.

Indicate the link between child feeding practices and child nutritional status. Adequate nutrition is essential for growth and development of children, and malnutrition reflects poor social and economic development .According to the WHO for childhood stunting, four main factors are responsible for stunting:(1)household and family factor-maternal disease, age short stature, poor nutritional status, short birth interval, poor care practices, inadequate water supply and sanitation, food insecurity, low caregiver education;(2)inadequate complementary feeding-poor-quality food, low dietary diversity and intake of food, infrequent and inadequate feeding, insufficient frequency of feeding;(3) inadequate practice of breastfeeding-early

cessation of breastfeeding, nonexclusive breastfeeding; and (4) clinical and sub clinical infection-diarrhea, malaria are directly linked to under nutrition in children (WHO, 2010).

2.3. Empirical review

2.3.1. Socio- economic and Demographic Determinants of Children Nutritional Status

2.3.1.1. Child Characteristics

Children are most vulnerable to malnutrition in developing countries because of low dietary intakes, lack of appropriate care, and inequitable distribution of food within the household. Malnutrition remains one of the most common causes of morbidity and mortality among children throughout the world (Birara *et al*., 2014). According to study conducted in Nigeria, Children's characteristics associated with child malnutrition included incomplete immunization for age, recent episodes of diarrhoea and acute respiratory infection, higher birth order and incomplete immunization of the child (Owoaje *et al*., 2014).

The empirical results of the study conducted in Japan revealed that the pattern of growth-faltering in children by age was identified. Children aged 12-59 months were less-nourished than those aged 0-11 months (Kamiya , 2011). Study done in Ethiopia shows that the pattern of growth-faltering in children by age was identified. Children aged 13-59 months were less-nourished than those aged 0-12 months (Anware *et al*., 2016). A study conducted that in Ethiopia also shows that revealed socio economic, demographic and child health and care practices characteristics considered, age of the child 11-23 months, sex of the child and breast feed the child still now remained to be significantly associated with stunting (Birara *et al*., 2014).

2.3.1.2. Maternal Characteristics

A woman’s nutritional status affects her capacity to successfully carry her pregnancy to term, deliver children and care for her children. 22 percent of women in Ethiopia are undernourished with a BMI of less than the 18.5 cut off point and only eight percent are obese with a BMI of more than 25.0 (EDHS, 2016). These figures put Ethiopia among sub-Saharan countries with the highest proportion of malnourished women. A study conducted that in Nigeria revealed that Socio-economic factors significantly associated with malnutrition were residence in a high density area, family accommodation in a single room apartment and family weekly expenditure on food below $55 (Owoaje *et al.*, 2014).

According to the study done in Japan level of education of parents, attitudes of mothers towards domestic violence, assets of household, local health services, and the condition of sanitation and water were considered to be important determinants of nutritional status of children (Kamiya , 2011). In line with this the study conducted in Ethiopia also shows that child nutritional status is strongly associated with the child's age, gender, immunization status and the mother's use of antenatal care, farm size, household size, water source and incidence of morbidity (Tadiwos and Degnet , 2013).

A study conducted in two states of Nigeria shows that mothers ANC visit, discussion on pregnancy and childbirth with partner and delivery attended by a skilled health worker has significance role on child malnutrition. A child whose mother had fewer than four government antenatal care visits was more likely to be malnourished, a child whose mother who rarely or never discussed pregnancy and childbirth with her husband and who did not have her last delivery attended by a skilled health worker was more likely to be malnourished (Hamel *et al.*, 2015).

Study done in Ethiopia shows that almost 87% of the children had preceding birth interval greater than twelve months. More than half (56.5%) of the children were living in a household with more than five members. Children whose preceding birth interval was less than two years were 1.43 times at higher risk of being malnourished compared to children with preceding birth interval greater than 24 months [adjusted odds ratio (AOR) = 1.43, 95% CI: 1.02–2.04] (Neima *et al*.,2017). The study conducted in Brazil shows that chronic malnutrition (-2 standard deviations/height for age) was found in 8.6% of children and was associated with mother's age and educational level, type of residence, number of rooms, flooring, water supply, and low birth weight (< 2,500 g) in children aged ≤ 24 months (Silveira *et al*., 2010). According to the study done in Ethiopia shows that regarding religion, Protestant Christian was slightly more than half, constituting 185(58.7%) followed by Orthodox (Hiwot *et al*., 2017).

Another study done in Ethiopia also revealed that children from households in Tigray, Affar and Amhara regions were less-nourished. Level of education of parents, possession of media infrastructure (TV and radio), assets of household, contraceptive adoption and the condition of sanitation and water were considered to be important determinants of nutritional status of children (Anware *et al.*, 2016).

2.3.1.3. Women Education

Mother's education plays a vital role in increased receptivity to knowledge and awareness related to nutritional requirements of their infants. According to study done by Liaqat *et al.*, (2007) a positive relationship was found between the nutritional status of infants and educational status of mothers ($P< 0.001$). The study revealed that the majority of infants with evidence of malnutrition belonged to the mothers with virtually no school education. In line with this a study done in Bangladesh also shows that the children of illiterate women were nutritionally more vulnerable than children of their women who had secondary and higher education (OR=1.69, 95% CI=1.33-2.15) (Giashuddin *et.a*l, 2003). Study conducted in Nigeria also shows that children with less educated mothers were significantly more likely to be stunted. Households with food insecurity and less educated mothers were more likely to have malnourished children (*Ajao et al*., *2010).*

2.3.1 4. Place of Residence

According to study done in Brazil type of place of residence has effect on children nutritional status. I.e. including other determinants type of residence contributed for chronic malnutrition (-2 standard deviations/height for age) about 8.6% of children (Silveira *et al*., 2010).

2.3.1.5. Household Wealth Status

Maternal and child under nutrition is highly prevalent in low-income and middle-income countries, resulting in substantial increases in mortality and overall disease burden (Canaan *et al*., 2015). According to study done in Pakistan there was strong association of malnutrition with family size, income of the parents and child number in the family. This indicates that the risk of malnutrition due to large family size and lower income (Khattack and Ali ,2010).

A study done in Ghana shows that, mothers of malnourished children were more likely to be unmarried or cohabiting, have lower family incomes, HIV infection and chronic disease. They were less likely to stay with or provide alternative care for their child. Awareness and use of social services, health insurance and a cash transfer programme were low (Tette *et al*., 2016). According to the research conducted in Kenya being poor, mother being a house wife and number of children in the household were the key determinants for stunting (Tankoi *et al*., 2016). The study conducted in Ethiopia shows that the middle wealth quintile to the households, number of children aged 6-59 months in the household and giving honey to the

child in the morning were remained to be significantly and independently associated with underweight (Birara *et al*., 2014).

2.3.1.6. Source of Drinking Water

Hygiene practices directly affect the cleanliness of the environment and the number of infectious agents that children may ingest They are divided into personal and household hygiene practices The personal hygiene practices include, hand washing, bathing and cleaning the child while household hygiene practices include cleaning of house and child's play area, adequate waste disposal, use of sanitary facilities and use of safe water (UNICEF,1997, UNICEF, 1998, Lamountagne *et al.*,1998, Abate, 1998)

A study conducted in rural India shows that improved conditions of sanitation and hygiene practices are associated with reduced prevalence of stunting. i.e Compared with open defecation, household access to toilet facility was associated with a 16–39% reduced odds of stunting among children aged 0–23 month (Rah *et al.*, 2015).

2.3.2. Proximate Determinants

The proximate determinants, characteristics having a direct influence on child nutritional status , considered in this study are breastfeeding and complementary feeding.

Following are discussions that these proximate determinants exert on child nutritional status .

2.3.2.1 Breast Feeding

Breastfeeding is very common in Ethiopia with 97% of children ever breastfed. Almost three-quarters of children are breastfed within the first hour of life. Only 8% of children who were ever breastfed received a prelacteal feed, though this is not recommended (EDHS, 2016). WHO recommends that children receive nothing but breast milk (exclusive breastfeeding) for the first six months of life. Fifty-eight percent of children less than six months are exclusively breastfed. Children age 0-35months breastfeed until a median of 23.9 months and are exclusively breastfed for 3.1 months (EDHS, 2016). A cross-sectional study aimed to determine the prevalence of malnutrition and identify the relationship between feeding practices and malnutrition in children below 5 years, in 7 remote and poor counties of China shows that the higher prevalence of stunting among Chinese children who had never been breastfed, who had been breastfed for less than 1 year, or had been fed with semi-solid foods of poor quality (Zhou *et al*., 2012).

Another study conducted in India shows that there was significant association between underweight with the birth order of the child, birth weight of the child and time of initiation of the breast-feeding to the child.

This study also states that there was significant association between stunting with the sex of the child (Gandhi *et al*., 2014). A study done in Bangladesh shows that it was 16% of women still exclusively breastfed their children for less than 6 months. Of the children 38.1% were stunted and 38% were under weight for their age. Overall, 46% of children were suffering from diseases (Giashuddin *et al*., 2003). This shows that breast feeding has impact on children nutritional status.

A study carried out in Ethiopia also shows that 80 cases and 320 controls, more than half (52.5%) of the cases and the controls (53.8%) were males and females, respectively. Breast Feeding (BF) was started immediately after birth in only 43.8% of the cases. Nearly 94% of the mothers of the cases had no breast feeding information as part of Ante Natal Care (ANC) follow up (Wubante , 2017).

2.3.2.2. Complementary Feeding

The World Health Organization (WHO) estimated that inappropriate feeding of infants and young children was responsible for one-third of the cases of malnutrition worldwide (WHO, 2006). It has been recognized that inappropriate feeding practices include absence of exclusive breastfeeding in children below 6 months old, premature lactation after 6 months, and giving complementary foods too late.

A study conducted in Nigeria shows that children who did not receive timely complementary foods had higher odds for wasting. Children who did not receive the minimum dietary diversity had higher odds for underweight than children who received the minimum dietary diversity. Children who did not receive the minimum feeding frequency were more likely to be stunted than their peers who received the minimum feeding frequency (Udoh and Amodu, 2016).

2.4 Analytical Framework

Based on the conceptual framework and objective of the study the analytical frame work is shown below (Figure 2).

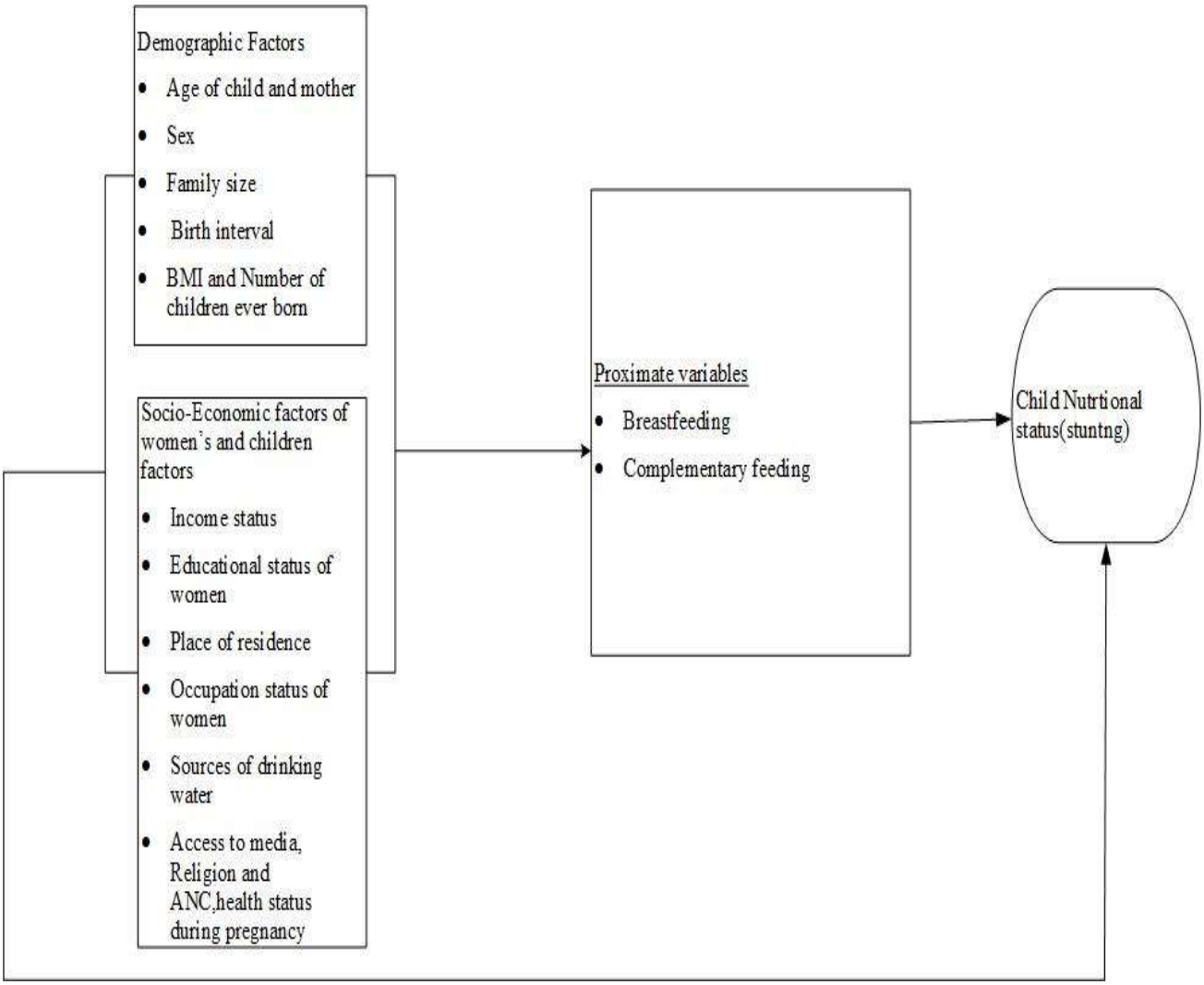

Figure 2: Analytical frame work of the study

Source: Developed by author based on the literature

CHAPTER THREE

MATERIALS AND METHODS

3.1.Description of the Study Area

Ethiopia lies in the Horn of Africa, between 3^{O}N and 15^{O}N latitudes and 33^{O}E and 48^{O}E longitudes. The country is land locked and is bounded by Djibouti in the east, Somalia in the east and Southeast, Kenya in the South, South Sudan in the West, Sudan in the North and Eritrea in the north and north east. Ethiopia is estimated to have a total area of 1,127,127 Km^2 with a topographic diversity encompassing high and rugged mountains, flat-topped plateau, deep gorges with rivers, and rolling plains (CSA, 2010).

Among the African countries, Ethiopia ranks the second-most populous country of Africa after Nigeria. Based on the 2007 Census the national population projection of Ethiopian was 94,351,001 million, with a yearly growth rate of 2.5 percent (CSA, 2013). Nearly half of Ethiopia has a young population, with 47 percent of its population under the age of 15 years, while only 4 percent are age 60 years or older (EDHS, 2016). Women within the reproductive years of 15-49 constitute 20.7 percent of the total population (CSA, 2013).

Ethiopia is a large country divided into 9 regions and 2 city administrations (CSA, 2010). Southern Nations, Nationalities, and Peoples' Region (often abbreviated as SNNPR) is one of the nine ethnically based regional states (*kililoch*) of Ethiopia. It was formed from the merger of five *kililoch*, called Regions 7 to 11, following the regional council elections on 21 June 1992 (Lyons and Terrence, (1996). Its capital is Awasa. The SNNPR borders Kenya to the south (including a small part of Lake Turkana), the Ilemi Triangle (a region claimed by Kenya and South Sudan) to the southwest, South Sudan to the west, the Ethiopian region of Gambela to the northwest, and the Ethiopian region of Oromia to the north and east. Besides Awasa, the region's major cities and towns include Sodo, Arba Minch, Bonga, Chencha, Dila, Irgalem, Mizan Teferi, Wendo, Welkite, and Worabe.

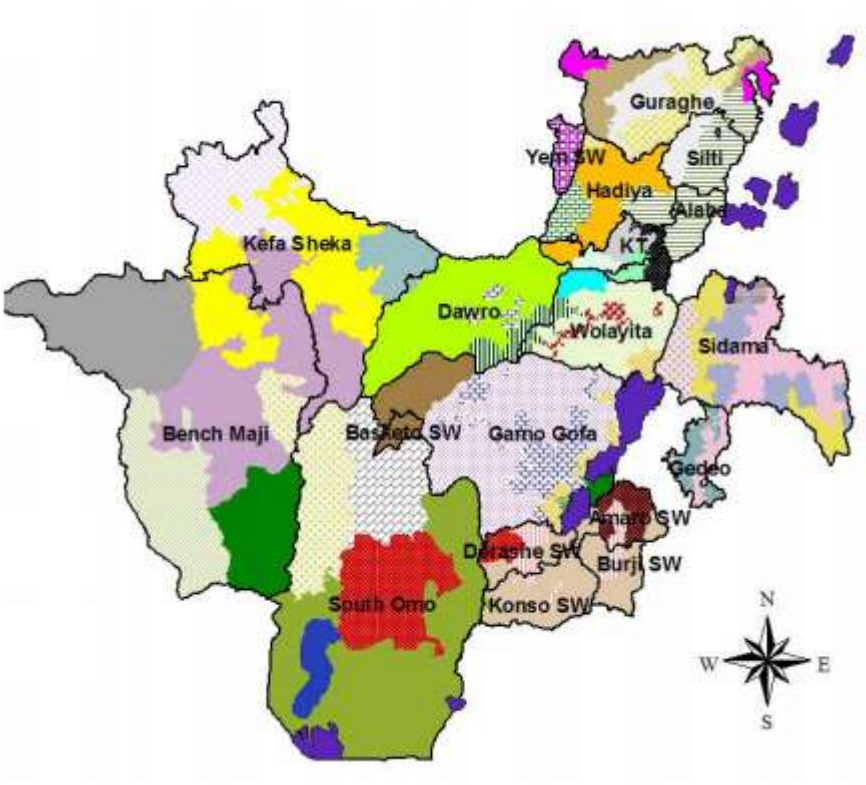

Fig 3: Distribution of study samples for SNNP Region

Source; Analyzed for this study only by GIS and cartographic directorate(CSA)

Based on the 2010 Census conducted by the Central Statistical Agency of Ethiopia (CSA), the SNNPR has an estimated total population of 14,929,548 of whom 7,425,918 men and 7,503,630 women. According to 2017 population projection total population was projected to 19,170,007 of whom 9,500,004 were men and 9,670,003 women. 13,433,991 or 89.98% of the population are estimated to be rural inhabitants, while 1,495,557 or 10.02% are urban. According to 2017 population projection total population was projected to 19,170,007 of whom 15,992,000 were rural and 3,178,000 urban; this makes the SNNPR Ethiopia's most rural region. With an estimated area of 105,887.18 square kilo meters, this region has an estimated density of 141 people per square kilo meter. For the entire region 3,110,995 households were counted, which results in an average for the Region of 4.8 persons to a household, with urban households having on average 3.8 and rural households 4.9 people (CSA, 2013).

The SNNPR Water Resources Bureau announced that as of the fiscal year ending in 2006, they had increased the area of the Region that had access to drinkable water to 54% from 10-15% 15 years ago (CSA, 2006).

Priority was given to certain Zones, such as Sidama, Welayta and Gurage, as well as the Alaba special woreda and several resettlement areas (CSA, 2006).

Values for other reported common indicators of the standard of living for the SNNPR as of 2016 include the following: 18.2% of the inhabitants fall into the lowest wealth quintile; adult literacy for men is 64.6% and for women 35.3%; and the Regional infant mortality rate is 65 infant deaths per 1,000 live births, which is greater than the nationwide average of 48; at least half of these deaths occurred in the infants' first month of life (EDHS, 2016).

The 2010 census reported that the predominantly spoken mother tongue languages large to small include Sidama (19.59%) and Amharic (4.10%). Other languages spoken in the State include Kambaata, Mello, Goffa, Gedeo and Dima; because of the relatively few number of speakers of most of the languages in the region, the working language of the state is Amharic (the most widely spoken language in Ethiopia and formerly the only official language) (CSA, 2010) The CSA reported that for 2004-2005 100,338 tons of coffee were produced in the SNNPR, based on inspection records from the Ethiopian Coffee and Tea authority. This represents 44.2% of the total production in Ethiopia. Farmers in the Region had an estimated total 7,938,490 head of cattle (representing 20.5% of Ethiopia's total cattle), 3,270,200 sheep (18.8%), 2,289,970 goats (17.6%), 298,720 horses (19.7%), 63,460 mules (43.1%), 278,440 asses (11.1%), 6,586,140 poultry of all species (21.3%), and 726,960 beehives (16.7%) (CSA,2006).

3.2. Source of data

This study was carried out using quantitative data to analyses the effects of child feeding practices on nutritional status of children 6-59 months of age in SNNPR. Data was obtained from the 2016 EDHS. This survey is the fourth comprehensive survey designed to provide population and health indicators at the national (urban and rural) and regional levels. The Ethiopian Demographic and Health Survey has been collected by the Central Statistical Agency with the prime objective of generating health and demographic information on family planning, fertility levels and determinants, fertility preferences; infant, child, adult and maternal mortality; maternal and child health; nutrition, malaria, women's empowerment, and knowledge of HIV/AIDS along other household characteristics (CSA and ICF international, 2016).

The EDHS covered 9 regions and 2 city administrative councils. The 2016 EDHS sample was selected using a stratified two-stage cluster design. EAs were the sampling units for the first stage. The sample included 645 EAs (202 in urban areas and 443 in rural areas) selected from the list of enumeration areas of the 2007 Population and Housing Census sample frame.The study design, as DHS survey are known by cross sectional.

Households comprised the second stage of sampling. A complete listing of households was carried out in each of the 645 selected EAs and representative sample of 18,008 households was selected for the 2016 EDHS. In the interviewed households 16,583 eligible women were identified for individual interview; complete interviews were conducted for 15,683 yielding a response rate of 95 percent. From the total of 16,583 interviewed women in 2016 EDHS 1171 where women from SNNPR then 680 of women were considered in the analysis since they have children 6-59 months of age in their last birth. The source of population was children aged 6-59 months of age and their index women aged 15-49. The study population was selected children aged 6-59 months of age and their index women aged 15-49 they have children 6-59 months of age in their last birth excluding those who have not children 6-59 months of age in their last birth

Household questionnaire, the woman's questionnaire, and the men's questionnaire were used in the EDHS. The Woman's Questionnaire was used to collect information from all women age 15-49. These women were asked questions regarding: maternity care, fertility history and preference, mortality, Knowledge and use of family planning methods, awareness and behavior regarding AIDS and other sexually transmitted infections (STIs) nutritional status of women and young children and some aspects of their demographic and socio-economic background. The current study therefore used data from women's questionnaire by considering the effects of child feeding practices on nutritional status of Children 6-59 months of age.

3.3. Variables and their description

Depending on the review of literatures that help to clarify the objective of the study variables listed below were needs to be explained in accordance with their dependent and independent nature in the context of the analysis made in the main study.

3.3.1. Dependent Variable

- **Child nutritional status:**

`The dependent variable is children's malnutrition status measured in terms of stunting. Children whose height for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age (stunted). Was categorized as, "1" if "Yes and "0" if "No".

3.3.2. Intermediate Variables

Early initiation of breastfeeding: Initiation of breastfeeding within 1 hour of birth. It was categorized as, "1" if "Yes and "0" if "No".

Exclusive breastfeeding under 6 months: It is recommended that children be exclusively breastfed during the first 6 months of their life; this means that they should be given nothing but breast milk .Was categorized as, "1" if "Yes and "0" if "No".

Initiation of complementary feeding (solid, semi-solid or soft foods): After the first 6 months, breast milk is no longer adequate to meet the nutritional needs of the infant, and complementary foods should be added to the child's diet. It has been recommended that meat, poultry, fish, or eggs should be part of the daily diet, and eaten as often as possible (WHO 2010),was categorized as, "1" if "Yes" and "0" if "No".

Minimum dietary diversity: It is recommended that children 6 to 23 months receive foods from at least 4 food groups daily.The four food groups should come from a list of seven food groups: grains, roots, and tubers; legumes and nuts; dairy products (milk yogurt, cheese); flesh foods (meat, fish, poultry, and liver/organ meat); eggs; vitamin A-rich fruits and vegetables; and other fruits and vegetables. Was categorized as, "1" if "Yes and "0" if "No".

Minimum meal frequency: Breastfed children are considered to be consuming standard minimum meal frequency if they receive solid, semi-solid, or soft foods at least twice a day for infants age 6-8 months and at least three times a day for children age 9-23 months. Non-breastfed children age 6-23 months are considered to be fed with a minimum meal frequency if they receive solid, semi-solid, or soft foods at least four times a day. Was categorized as, "1" if "Yes and "0" if "No".

3.3.3. Independent Variables

- **Child characteristics**

Age: Refers to the age of the children at the time of the survey. It was categories in to seven and coded as 6-8,9-11,12-17,18-23, 24-35, 36-47 and 48-49.

Sex: Categorized as male and female

Size of child at birth: It was categorized as average or larger than average and very small or smaller than average.

Birth interval: Categories as first birth, <24months, 24-36months,37-48months and above 49 months.

- **Maternal characteristics:**

Age:-Refers to the age of the women at the time of the survey. It was categories in to five and coded as 15-24, 25-34, 35-39 and 40-49.

Body Mass Index (BMI)**:** height < 45cm, body mass index (BMI) < 18.5 cm (thinness), weight < 45kg and mid upper arm circumference (MUAC) < 22.5cm WHO (2003) classified the BMI for the assessment of nutritional status as follows: under-weight (CED) < 18.5, normal 18.5-24.9, overweight 25-29.9 and obese 30 and above.

Number of children aged <=5: It was categories in to three and coded as 1child, 2 child and 3 and above.

ANC visits: It was categorized as 0, 1- 3 and 4^{+}.

Family size: It was categorized as,<5 and >=5

Family income: Depending on women's household income status, it was classified as poorest, poorer, middle, richer and richest.

Place of residence: Categorized as Urban and Rural.

Maternal education: Categorized as; No education and educated.

Maternal occupation: Refers to working status of women at the time of the survey. Categorized as not working and working.

Source of drinking water: Coded as improved source of water and unimproved source of water.

Exposure to mass media: Information obtained with regard to watching television, listening to radio and reading newspaper was considered to measure exposure to media in the analysis. It was classified into three categories: **Frequently used** if a woman has an almost every day access to either of these media, **sometimes** if a women has infrequent access and **No access** if a woman has no access to any of these media.

Religion: Refers to the religious affiliation of a woman at the time of the survey. It was classified into; Christians, Muslim and others.

3.4. Data Organization and Analysis

The secondary data which was taken from child data of EDHS-2016 was used for analysis. The data was cleaned; organized and analyzed using statistical packages SPSS v.20. The study considers children 6-59 months of age in SNNPR region. The three major anthropometric indicators to assess children's malnutrition are: Weight-for-age (Underweight) is a composite index of height-for-age and weight for-height. It takes into account chronic malnutrition. A child can be underweight for his/her age because he or she is stunted, wasted, or both. Weight-for-age is an overall indicator of a population's nutritional health. Children with height- for- age where by height of a child is below minus two Z-score of the expected height of a reference child (NCHS/WHO, 2010) of the same age. Children who are below minus three standard deviations (-3 SD) are considered severely stunted. This study therefore uses children whose height-for-age Z-score is below minus two standard deviations (-2 SD) (stunting) to assess children nutritional status.

To investigate the proximate, demographic and socio-economic determinants of child feeding practice on nutritional status of children 6-59 months of age were binary logistic regression model was fitted. Univariate (simple descriptive statistics of all variables) and bivariate association of the dependent variable with each of the independent variable were performed. Statistical significance at $P<0.1$, $P<0.05$ and $P<0.01$ was performed based on the chi-square statistics for the bivariate analysis Since, it is used to show the extent to which each of the independent variable is influence with children's malnutrition.The chi-square test is intended to test how likely it is that an observed distribution is due to chance. The individual test of parameters is useful to determine if an individual variable provides additional information in the presence of all other variables. It was used to show the association of one to one or dependent to one independent variable.

In descriptive statistics percentage and frequency values was employed to analyze the demographic and socio-economic characteristics of the children. Bivariate analysis was undertaken independently for demographic and socio-economic variables against the outcome variables.

Logistic regression model used to estimate the relationship between two or more variables. It indicates the significant relationships between dependent variable and independent variables and also the strength of impact of multiple independent variables on a dependent variable. To avoid over fitting and under fitting, we should include all significant variables. A good approach to ensure this practice is to use a step-wise method to estimate the logistic regression.

Logistic regression model at multivariate analysis was used to estimate the strength of associations between the dependent and independent variables. In multivariate analysis all the demographic and socioeconomic, variables was looked together in relation to nutritional status of children 6-59 months of age. The purpose of multivariate analysis is to determine the extent to which all the variables have an influence on nutritional status of children 6-59 months of age dependent on each other's presence. Since the interest is in identifying children at risk of malnutrition, the dependent variables was coded as 1 if the children were stunted (−2 SD) and coded as 0 if not.

The logistic regression model was used in this study to show the association of malnutrition with k independent (x1, x2, xk), demographic and socio - economic variables is therefore given by:

$$\text{Logit } P(x) = a + \sum_{i=1} \beta i\, xi;\ i = 1, 2 \ldots k$$

Where, βi's are regression coefficients , a = constant and Exp (βi) = Odds ratio

The Exp(B) or Odds ratio is determined from the logistic regression which shows the increasing or decreasing chance of nutritional status of 6-59 months of children for each predictor variables controlling the effects of others. An odds ratio gives an estimate of the magnitude of association between the dependent variable (stunting) and predicator variable. In this analysis an odds ratio of 1.0 indicates no difference, a ratio below 1 indicates a negative association and a ratio above 1.0 indicates a positive association between the independent variable and the dependent variable (stunting). P-values ($P < 0.1$, $P < 0.05$, $P < 0.01$, $P < 0.001$) were considered to be significant.

CHAPTER FOUR

RESULT AND DISCUSSION

4.1. Socio- economic and Demographic Characteristics of the Respondent

Number and percentage of women age (15-49) and children 6-59 months by different socio-economic and demographic characteristics that included in the study 2016 EDHS can be seen in Table 1 below.

Table 1 Percentage distributions of women aged 15-49 and children 6-59 months by demographic and socio-economic characteristics, SNNPR, using 2016/2017 EDHS.

Women and child Characteristics	N	%	Women and child Characteristics	N	%
Place of residence			**Source of drinking water**		
Urban	61	9.0	Unimproved	388	57.1
Rural	619	91.0	Improved	292	42.9
Total	680	100	Total	680	100
Age of Women			**BMI***		
15-24	125	18.4	Underweight	98	14.5
25-34	367	54.0	Normal	529	78.3
35-39	115	16.9	Overweight	40	5.9
40-49	73	10.7	Obese	9	1.3
Total	680	100	Total	680	100
Education			**Family size**		
No education	397	58.4	<5	315	46.3
Educated	283	41.6	>=5	365	53.7
Total	680	100	Total	680	100
Religion of women			**Access to media**		
Christian	561	82.5	Not at all	478	70.3
Muslim	98	14.4	Some times	91	13.4
Others	21	3.1	Frequently	111	16.3
Total	680	100	Total	680	100
Women work			**Ante natal care**		
Not working	267	39.3	None	205	30.1
Working	413	60.7	1-3 visit	207	30.4
Total	680	100	Above 4 visit	268	39.4
Household wealth status			Total	680	100
Poorest	116	17.1	**Number of children below age 5**		
Poorer	157	23.1			
Middle	174	25.6	One child	355	52.2
Richer	144	21,2	Two children	285	41.9
Richest	89	13.1	3 and above children	40	5.9
Total	680	100	Total	680	100
Complementary feeding			**Sex of child**		

No	390	57.4	Male	347	51.0
Yes	290	42.6	Female	333	49.0
Total	680	100	Total	680	100
****Min dietary diversity**			****Early breast feeding**		
No	591	86.9	No	168	24.5
Yes	89	13.1	Yes	512	75.3
Total	680	100	Total	680	100
Meal frequency			****Exclusive breast feeding**		
No	567	83.4	Not exclusively breast fed	85	12.5
Yes	113	16.6	Exclusively breast fed	595	87.5
Total	680	100	Total	680	100
Age in month			**Birth interval**		
6-8	62	9.1	First birth	113	16.6
9-11	54	7.9	<24 months	123	18.1
12-17	117	17.2	24-36 months	170	25.0
18-23	88	12.9	37-48 months	125	18.4
24-35	177	26.0	49and above months	149	21.9
36-47	111	16.3	Total	680	100
48-59	71	10.4	**Size of child at birth**		
Total	680	100	Average /larger than average	549	81.3
			Very small/smaller than average	126	18.7
			Total	680	100

*Note * Body mass index do not add up to the total as there are missing observation. **Correlations of exclusive breast feeding =-0.0314 shows smaller downhill (negative) linear pattern, **Early breast feeding =-0.0373 shows a smaller downhill (negative) linear relationship and **Min dietary diversity =-0.0537 shows a smaller downhill (negative) linear relationship.*

Source: Computed from the survey data.

As can be seen from Table 1 above the sampled women were predominantly rural residents. Nearly 91% of those women were residing in rural areas at the time of the survey. The proportion of women in the young age cohort are (18.4%), 25-34 were (54%), 35-39 were (16.9%) and 10.7% of them were 40-49 age group. 58.4% of the sampled women aged 15-49 who have children 6-59 months of age in their last birth were illiterate, whereas educated women was 41.6%. Above two third (82.5%) of these women are Christians, other religion followers were 3.9% and 14.4% of them were Muslim. Among sampled women 39.26% of them were not working at the time of the survey whereas 60.74% of them were engaged in different works. The percentage distributions of women in poorest income status were 17.06%, while 23.09%, 25.59%, 21.18% and 13.09% of them were in poorer, middle, richer

and richest income status respectively. 57.06% of the sampled women aged 15-49 who have children 6-59 months of age in their last birth used unimproved sources of drinking water whereas 42.94% of them were used improved sources of drinking water.

Women who were not taken any of antenatal care visit in their last birth were 30.15% while, women who take only 1-3 antenatal visiting were 30.44% and women who take 4 and above antenatal visit were 39.41%. Proportion of women aged 15-49 who have children 6-59 months of age in their last birth with large family size (>=5) were 53.68% while 44.32% of them were lived in small household members. On the other hand, above two third of the sampled women had no access to mass media (70.29%) whereas the percentage of women with sometimes access to media where 13.38 while percentage of women with frequent access to media was 16.32.

About 14.5 percent of sampled women aged 15-49 who have children 6-59 months of age in their last birth were under-weight, 78.25% of them has normal body mass index while women with overweight and obese were 5.92% and 1.33% respectively. Women who have only 1 under-five age child were 52.21%, women who have two under-five age children were 41.91% and women who have more than under-five children during the survey were 5.88%. From the last births of sampled women 51.03% and 48.97% of children were male and female respectively.

From the last births of children of the sampled women 57.35% were not taken complementary feeding in their 6-59 months of age the rest of them (42.65%) taken complementary feeding. On the other hand 24.71% of the children were not taken early initiation of breast feeding but 75.29% of them were taken early initiation of breast feeding. Among children 6-59 months of age who were born to SNNPR women in 15-49 age group, 87.5% were exclusively breast fed while 12.5% of them were not exclusively breast fed. From the last births of sampled women 81.3 and 18.7of children were average or larger than average and very small or smaller than average respectively.

The majorities 83.38% of children 6-59 months of age have not taken minimum dietary diversity and only 16.62% have taken minimum dietary diversity. The proportion of children in 6-8, 9-11, 12-17, 18-23, 24-35, 36-47 and 48-59 months age group were 9.12%, 7.94%, 17.21%, 12.94%, 26.03%, 16.32% and 10.44% respectively.

Bivariate results of stunting

Stunting of last birth children 6-59 months of age in SNNPR on 2016 EDHs data. 61.2 % of children 6-59 months of age in their last birth were not stunted. On the other hand 38.8 % of children 6-59 months of age in their last birth were stunted (Figure 4).

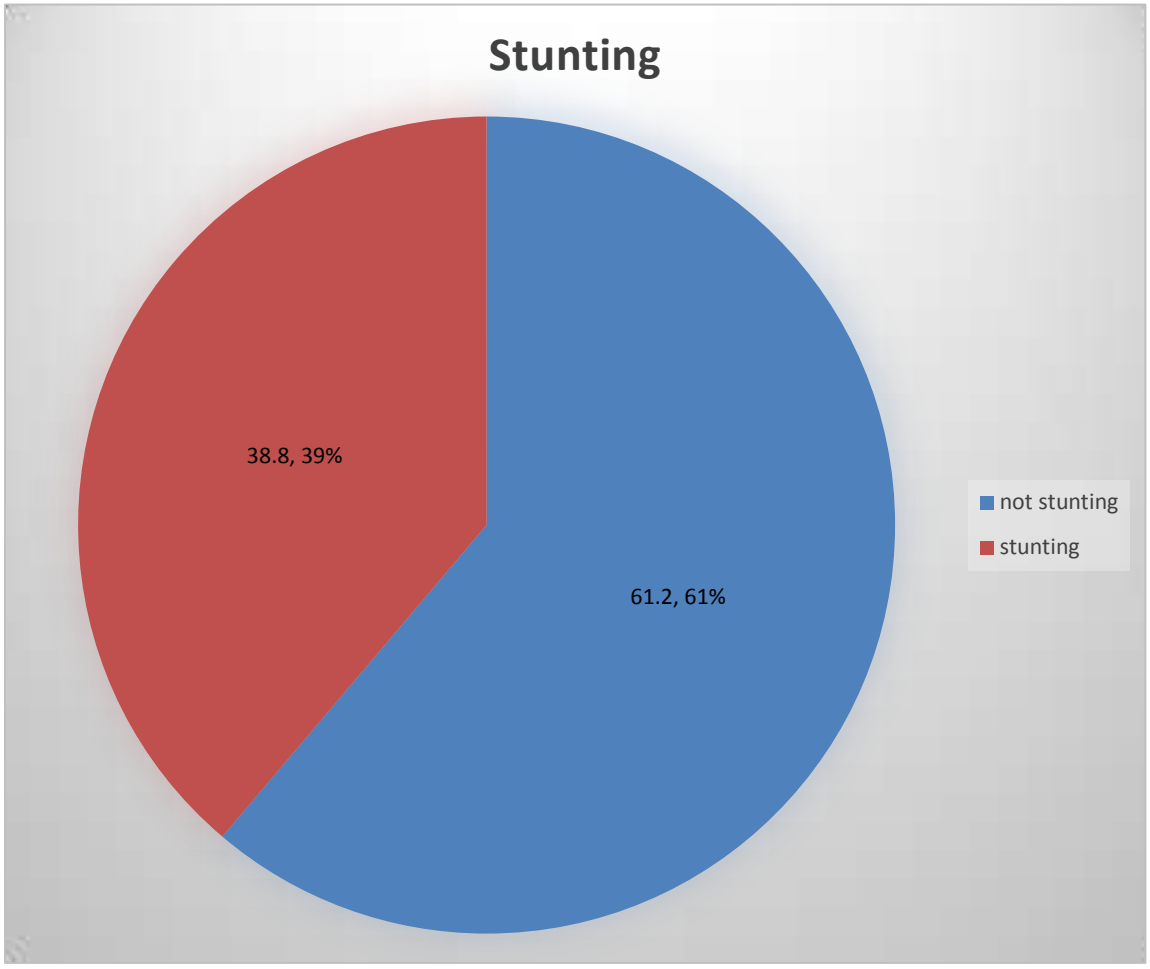

Figure 4: Stunting of last birth children 6-59 months of age in SNNPR on 2016 EDHs data.
Source: Processed from EDHS data, 2016.

Table 2 The Percentage distribution for all independent and dependent variable run in the bivariate analysis in the stunting are shown below.

Stunting				Pearson Chi-Square	Sig	Stunting				Pearson Chi-Square	Sig
covariates		No	Yes			**Covariates**		No	Yes		
		n(%)	n(%)					n (%)	n (%)		
Meal frequency	No	58.6%	41.4%	9.882	0.002*	**Early breast feeding**	No	59.5%	40.5%	0.257	0.612
	Yes	74.3%	25.7%				Yes	61.7%	38.3%		
Women work	Not working	60.7%	39.3%	0.047	0.82	**Exclusive breast feeding**	No	60.5%	39.5%	0.906	0.341
	Working	61.5%	38.5%				Yes	65.9%	34.1%		
Household wealth status	Poorest	52.6%	47.4%	11.211	0.024*	**Age in month**	6-8	88.7%	11.3%	36.171	0.000*
	Poorer	58.0%	42.0%				9-11	77.8%	22.2%		
	Middle	59.2%	40.8%				12-17	64.1%	35.9%		
	Richer	67.4%	32.6%				18-23	55.7%	44.3%		
	Richest	71.9%	28.1%				24-35	52.5%	47.55		
Religion	Christian	63.1%	36.9%	0.082	0.165		36-47	53.2%	46.8%		
	Muslim	52.0%	48.0%				48-59	60.6%	39.4%		
	Others	52.4%	47.6%			**Sex of child**	Male	63.1%	36.9%	1.118	0.290
Family size	<5	63.2%	36.8%	0.986	0.617		Female	59.2%	40.8%		
	>=5	59.5%	40.5%			**Complementary feeding**	No	56.4%	43.6%	8.747	
Women education	Uneducation	56.9%	43.1%	7.253	0.007*		Yes	67.6%	32.4%		
	Educated	67.1%	32.9%			**Minimum dietary diversity**	No	60.2%	39.8%	1.678	0.195
Access to media	Not at all	59.8%	40.2%	4.852	0.088		Yes	67.4%	32.6%		
	Sometimes	57.1%	42.9%			**Birth interval**	Firth birth	63.7%	36.3%	11.040	0.026*
	Frequently	70.3%	29.7%				<24 months	52.8%	47.2%		
Number of children below age 5	One child	63.7%	36.3%	3.307	0.191		24-36 months	55.3%	44.7%		
	Two children	59.6%	40.4%				37-48 months	68.0%	32.0%		
	3 and above children	50.0%	50.0%				49 and above months	67.1%	32.9%		
Body mass index	Underweight	56.1%	43.9%	1.853	0.603	**Age of Women**	15-24	64.8%	35.2%	1.790	0.617
	Normal	61.4%	36.8%				25-34	61.6%	38.4%		
	Overweight	67.5%	32.5%				35-39	56.5%	43.5%		
	Obese	66.7%	33.3%				40-49	60.3%	39.7%		
Ante natal	None	54.1%	45.9%	8.973	0.011*						

care											
	1-3 vist	59.9%	40.1%			**Source of drinking water**	Unimproved source	58.8%	41.2%	2.216	0.137
	4 and above	67.5%	32.5%				Improved source	64.4%	35.6%		
Size of child at birth	Average /larger than average	63.9%	36.1%	8.390	0.004*	**Type of place of residence**	Urban	68.9%	31.1%	1.662	0.197
	Very small/smaller than average	50.0%	50.0%				Rural	60.4%	39.6%		

Significant level were *** P<0.001, ** P<0.01 and *P< 0.05

Source: Processed from EDHS data, 2016.

Association between child nutritional status (stunting) and demographic and socioeconomic indicators are presented in table 2. In this study among several variables age of child in month, complementary feeding, wealth index, meal frequency, number of antenatal care visits, size of child at birth and education of mother have significantly associated with stunting of last born 6-59 months children.

There was a significant association ($p < 0.05$) between ages in months of children and the stunting of last born children 6-59 months of age. The proportion of children who were stunted in the age group 9-11, 12-17, 18-23, 24-35, 36-47 and 48-59 are 22.2%, 35.9%, 44.3%, 47.5%, 46.8% and 39.4% respectively when compared to children in 6-8 months of age group. The proportion of children who were not stunted in 9-11, 12-17, 18-23, 24-35, 36-47 and 48-59 age groups were 77.8%, 64.1%, 55.7%, 52.5%, 53.2% and 60.6%, respectively when compared with children in 6-8 months of age group (88.7%).

There was a significant association between ($p<0.05$) between complementary feeding and the stunting of last born age 6-59 months age children. Stunting was observed to be prevalent (43.6%) among children who did not take complementary feeding compared to those who were taken (32.4%).

Household wealth status also has significantly ($p<0.05$) associated with stunting of last born 6-59 months age children. Children who were stunted in poorer, middle, richer and richest wealth quintile group were 58.0%, 59.2%, 67.4% and 71.9% compared with children in the poorest wealth quintile group (52.6%).

Similarly, meal frequency was also has significantly associated ($p<0.05$) with stunting of last born 6-59 months age children. Stunting was less prevalent in children who were nourished as in the recommended meal frequency (25.7%) compared with those children were not nourish (41.4%) as recommended.

On the other hand women's antenatal care visits has significantly associated ($p<0.05$) with stunting of last born 6-59 months age children. The percentage distribution of stunting among children where there mother had attended one to three and four or more antenatal care visits were 40.1% and 32.5% compared with children where there mother did not attend any antenatal care visits (45.9%).

Education of women has significantly associated ($p<0.05$) with stunting of last born 6-59 months children. Stunting is more prevalent in children where their mothers were not educated (43.1%) compared with those children where their mothers had educated (32.9%).

Size of child at first birth has significantly associated ($p<0.05$) with stunting of last born 6-59 months children. Stunting is more prevalent for very small or smaller than average sized children (50%) compared with those of an averaged or larger than average sized children (36.1%).

4.2. Presentation of the Study Finding

The individual test of parameters is useful to determine if an individual variable provides additional information in the presence of all other variables. Nonetheless, the binary logistic regression test is helpful to ascertain if there is a regression relation between the dependent and all independent variables (Table 3).

Table 3 Binary logistic regression model for women age 15-49 showing adjusted OR and crude OR on their last age 6-59 months.

	Adjusted OR		Crude OR			Adjusted OR		Crude OR	
variables	**OR**	**SE.**	**OR**	**SE.**	**Variables**	**OR**	**SE.**	**OR**	**SE.**
Place of residence					**Source of drinking water**				
Urban (ref)	1		1		Unimproved (ref)	1		1	
Rural	1.213	0.44	0.691	0.288	Improved	0.531**	0.101	1.269	0.16
Education					**BMI**				
No education (ref)	1		1		Overweight (ref)	1		1	
Educated	0.917	0.181	1.546**	0.162	Underweight	1.412	0.584	0.963	0.784
Number of children below age 5					Normal	1.165	0.412	1.564	0.736
One child (ref)	1		1		Obese	3.597	3.055	1.255	0.713
Two children	1.533*	0.308	0.571	0.335	**Exclusive breast feeding**				
3 and above children	3.275**	1.422	0.676	0.338	Not Exclusively breast fed(ref)	1		1	
Women occupation					Exclusively breast fed	0.698	0.1969	1.261	0.244
Not working (ref)	1		1		**Access to media**				
Working	1.161	0.212	1.035	0.161	Frequently (ref)	1		1	
Household wealth status					Not at all	1.094	0.309	0.564*	0.297
Poorest (ref)	1		1		Sometimes	1.702	0.602	0.895	0.231
Poorer	0.680	0.191	2.308**	0.3	**Complementary feeding**				
Middle	0.695	0.196	1.857*	0.286	No (ref)	1		1	
Richer	0.479*	0.147	1.765*	0.282	Yes	1.340	0.683	1.611**	0.162
Richest	0.367*	0.148	1.24	0.295	**Min dietary diversity**				
Ante natal care visiting					No (ref)	1		1	
None (ref)	1		1		Yes	1.024	0.330	1.366	0.241

1-3 vist	0.781	0.178	1.762**	0.191	**Size of child at birth**				
4 and above	0.6*	0.13	1.393	0.193	Average / larger than average (ref)	1		1	
Family size					Very small/smaller than average	1.614*	0.365	0.564**	0.199
>=5 (ref)	1		1						
<5	1.165	0.222	1.17	0.158	**Meal frequency**				
Age in month					No (ref)	1		1	
6-8 (ref)	1		1		Yes	0.750	0.215	2.05**	0.232
9-11	2.299	1.222	0.195**	0.469	**Sex of child**				
12-17	4.099*	1.940	0.439*	0.408	Female (ref)	1		1	
18-23	6.431*	3.180	0.86	0.31	Male	0.8638	0.15991	1.181	0.158
24-35	9.247**	6.248	1.222	0.324	**Early breast feeding**				
36-47	13.518*	9.332	1.387	0.286	No (ref)	1		1	
48-59	8.266*	5.829	1.354	0.308	Yes	0.791	0.176	1.096	0.182

Note BMI: body mass index; (ref): Reference category; SE: Standard error; OR: Odds ratio; AOR: Adjusted odds ratio, COR: crude odds ratio, Significant level were *** P<0.001, ** P<0.01 and *P< 0.05

Both the adjusted and unadjusted logistic regression analysis presented in the above table assesses the association between child nutritional status (stunting) and different demographic and socioeconomic indicators for last born 6-59 months age children.

The unadjusted logistic regression model (without controlling the effect of other factors) education of mother, source of drinking water, media exposure, wealth index, number of under-five children, age group of child, antenatal care visits, complementary feeding, meal frequency and size of child at birth had significantly associated with stunting of last born 6-59 age children. However, the adjusted logistic regression analysis result shows among the variables considered in the model source of drinking water, wealth index, number of under-five children, age group of child, antenatal care visits and size of child at birth had significantly associated with stunting of last born 6-59 months age children.

Source of drinking water

Both the adjusted and unadjusted logistic regression analysis shows that source of drinking water had a significant effect on stunting of last born 6-59 months age children. The adjusted logistic regression model result showed that children who lived in households using an improved drinking water source are 46.9% less likely to be stunted compared with those children lived in households having unimproved water source ((AOR: 0.531; 95% CI: (0.531 - 0.772)).

Women Education

Women education had significant effect on stunting of their last born 6-59 age children in the unadjusted model. Children with their educated mothers are 33.8% less likely to be stunted compared with no education mother children ((COR: .662; 95% CI: (0.477 - 0.917)). But in the adjusted model education of mother have no significant effect on stunting of last born 6-59 months age children.

Household wealth status

Household wealth status of women had significant association with stunting of last born children 6-59 months of age both in adjusted and unadjusted model. Women in richer wealth quantile is significantly associated ((AOR: 0.479; 95% CI: (0.262 - 0.876)) with stunting of last born children 6-59 months of age when compared to women in poorest wealth status and also women in richest wealth status have a statistical significant effect ((AOR: 0.367; 95% CI: (0.167 - 0.809)) on stunting of last born children 6-59 months of age when compared to women in poorest wealth status on the adjusted model. The odds of stunting of last born children 6-59 months among mothers in richer wealth status were 52.1% less likely to be stunting of last born children 6-59 months of age than mothers in poorest wealth quintiles. Similarly odds of women in richest wealth status were 63.3% less likely to be stunting of last born children 6-59 months of age compared to women in poorest wealth status on the adjusted logistic regression model.

Antenatal care

Women who take only three or less antenatal care visits on their last birth had not statistically significant effect on stunting of children 6-59 months of age when compared to women who were not taken any of antenatal care visits in their last birth. But women who take four and above antenatal care visit had a significant effect (AOR:0.629; 95% CI: (0.409 – 0.972) on stunting of children 6-59 months of age when compared to women who were not taken any of

antenatal care visit in their last birth both in the adjusted and unadjusted model . Women who take four or more antenatal care visits were 37.1% less likely that their last 6-59 months age children to be stunted compared to women who were not taken any of antenatal care visits.

Access to media

Access to media had a significant association with the stunting of last born children 6-59 months of age only in unadjusted model. But this association vanished when the demographic and socioeconomic factors are controlled. Women who had no access to mass media (COR:1.611; 95% CI: (1.013 – 2.563) have statistically significantly associated with stunting of last born children 6-59 months of age when compared to women with frequent access to media on unadjusted model. The odds of women with no access to mass media were 1.611 times more likely that their last born children of age 6-59 months to be stunted compared to women with frequent access to media (See TableA-2, Appendix).

Number of under-five children

Women who have only two and three or more under-five children during the survey period had a significant effect on stunting of the last born children 6-59 months of age when compared to women who have only one child both in the adjusted and unadjusted logistic regression model. Women who have only two under five children during the survey period were about 1.533 times more likely for stunting of their last born children 6-59 months of age compared to women who have only one child ((AOR:1.533; 95% CI:(1.034 - 2.273)). Similarly, women who have three or more under five children during the survey period were about 3.275 times more likely for stunting of their last born children 6-59 months of age compared to women who have only one child ((AOR:3.275; 95% CI:(1.398 - 7.672)).

Complementary feeding

Complementary feeding had a statistically significant effect on stunting of last born 6-59 months age children only in unadjusted logistic regression model ((COR: 0.623; 95% CI: (0.450-0.863)). Children who had taken complementary feedings were 37.7% less likely to be stunted compare with those children who had not taken any complementary feedings.

Meal frequency

Meal frequency had a significant effect on stunting of last born 6-59 months age children only in the unadjusted logistic regression model((COR: 0.538; 95% CI: (0.337 - 0.858)). Children who were nourished in the recommended meal frequency were 46.2% less likely to be stunted compared with those children who were not nourished in the recommended (7+) meal frequency.

Age in month

Age in month of children had a significant effect on the child malnutrition both in the adjusted and unadjusted logistic regression models. Children in 12-17 age group with (AOR:4.099; 95% CI: (1.621-10.367)), 18-23 age group with(AOR:6.431; 95% CI: (2.440-16.952)), 24-35 age group with (AOR:9.247; 95% CI: (2.459-34.765)), in age group 36-47 with (AOR: 13.518; 95% CI: (3.494 - 52.307)), and in 48-59 age group with (AOR: 8.266; 95% CI: (2.075 - 32.930)), had showed a significant effect on child malnutrition i.e. stunting of children when compared to children within 6-8 months age group while only children in 9-11 age group have showed a non-significant effect on child malnutrition (stunting) when compared with children in 6-8 months age group in the adjusted logistic regression model.

The odds of stunting of last born 6-59 months children belonging to the age group 12-17, 18-23, 24-35, 36-47 and 48-59 months were 4.099, 6.431, 9.247, 13.518, 8.266 times more likely the odds of stunting of children belongs to 6-8 months of age group, respectively for the adjusted model (See TableA-2, Appendix).

Size of child at birth

Size of child at birth had significantly associated with stunting of last born 6-59 months age children both in the adjusted and unadjusted logistic regression model. Children having a very small or smaller than average sizes during their births were 1.615 times more likely to be stunted compared with those children having and average or larger than average sizes ((AOR: 1.615 ; 95% CI: (1.037 - 2.516)).

Even though variables discussed above have significant effect on stunting of the last born children 6-59 months of age there are some variables like place of residence, women occupation, family size, minimum dietary diversity, early breastfeeding, exclusive breastfeeding, sex of the child, body mass index that does not show statistical significant effect both in the adjusted and unadjusted model.

5.2. Discussion of the Study Finding

In this study it is found that drinking water source, wealth status, access to media, number of under-five aged children in the household, age of child in months, size of child at first birth, complementary feeding, meal frequency, ANC and education of mother had significantly affect stunting of the last born children 6-59 months of age. On the other hand, mothers work status, early breastfeeding, exclusive breastfeeding, minimum dietary diversity, family size and BMI had no influence on stunting of the last born children 6-59 months of age.

The findings of this study both in the adjusted and unadjusted odds ratio showed that drinking water source had significantly associated with stunting of last born 6-59 months aged children. Children lived in households that had improved drinking water source are 46.9% less likely to be stunted compared with those children who had lived in households having unimproved drinking water source. This is because hygiene practices directly affect the cleanliness of the environment and the number of infectious agents that children may ingest. This result is consistent with a study conducted by Rah *et al.*, (2015) in rural India that showed improved conditions of sanitation and hygiene practices are associated with reduced prevalence of stunting.

The results of this study also shows that household wealth status of women had significant association with stunting of last born children 6-59 months of age in both models. Number of under-five children in the household also significantly contributes for stunting of the last born 6-59 months aged children. The study conducted by Khattack and Ali, (2010), Tette *et al*.,(2016) and Tankoi *et al*.,(2016) also shows that there was strong association of malnutrition with income of the parents and child number in the family. This indicates that the risk of malnutrition due to large family size and lower income. Being poor, mother being a house wife and number of children in the household were the key determinants for stunting. They were less likely to stay with or provide alternative care for their child. Awareness and use of social services, health insurance and a cash transfer program were low.

Another result of this study reveals that age in month of children had a significant impact on child malnutrition. Children in 12-17, 18-23, 24-35, 36-47 and 48-59 age groups have showed a significant effect on child malnutrition i.e. stunting when compared to children in 6-8 age group. Study done by Kamiya, (2011), shows that including the various socioeconomic, demographic and child health and care practices characteristics considered,

age of the child 11-23 months (AOR= 2.30; 95% CI: 1.28-4.12), remained to be significantly associated with stunting and some studies done in Ethiopia like, Birara *et al*., (2014) and Anware *et al*., (2016) shows that the pattern of growth-faltering in children by age was identified, Children aged 12-59 months were less-nourished than those aged 0-11 months.

The unadjusted odds ratio women who had no access to mass media had statistically significant association with stunting of last born children 6-59 months of age when compared to women with frequent access to media. In line with this study done in Ethiopia also revealed that children from households in Tigray, Affar and Amhara regions were less-nourished. Possession of media infrastructure (TV and radio) considered to be important determinant of nutritional status of children (Anware *et al*., 2016) since mass media can be influential component in providing information, attitudes and knowledge about child feeding and caring practice. However, this study indicated that when the effect of other indicators are controlled media exposure had no significant effect on stunting of last born 6-59 months aged children.

Similarly, in unadjusted odds ratio complementary feeding and meal frequency had showed significant impact on stunting of last born 6-59 months aged children. Children who were provided with complementary feedings had 38% less likely to be stunted compared with those children without complementary feedings. In the same way children who were nourished as in the recommended meal frequency had 51.2% less likely to be stunted compared with those children who did not nourish in the recommended eating frequency. In line with this result, a study conducted by Udoh and Amodu, (2016) in Nigeria shows that children who did not receive timely complementary foods had higher odds for wasting. Children who did not receive the minimum dietary diversity had higher odds for underweight than children who received the minimum dietary diversity. Children who did not receive the minimum feeding frequency were more likely to be stunted than their peers who received the minimum feeding frequency.

Mother's educational status also showed a significant impact on the stunting of 6-59 months aged children in the unadjusted odds ratio. The crude odds ratio indicated that educated mother children had 35.3% less likely to be stunted compared with those of none educated mother children. Consistent with this result, a study done by Liaqat *et al.,* (2007) was found a positive relationship between the nutritional status of infants and educational status of

mothers. The study revealed that the majority of infants with evidence of malnutrition belonged to a mothers with virtually no school education. In line with this similar study done by Giashuddin *et.al*, in 2003 in Bangladesh also shows that children of illiterate women were nutritionally more vulnerable than children of their women who had secondary and higher education Another study conducted by Ajao *et al*., in 2010 in Nigeria also shows that children with less educated mothers were significantly more likely to be stunted. Households with food insecurity and less educated mothers were more likely to have malnourished children.

Another remarkable finding of this study is ANC have inversely related on stunting of children 6-59 months of age in both adjusted and unadjusted odds ratios. Women who take four or more antenatal care visits had a statistically significant effect on stunting of children 6-59 months of age when compared to women who were not taken any of antenatal care visits in their last birth. The study reveals that women who were taken four or more antenatal care visits had 37.1% less likely that their last born 6-59 months age children to be stunted compared with those children where their mother were not take any antenatal care visits.

Finally, this study reveals that size of child at birth had significantly associated with stunting of last born 6-59 months aged children in both the adjusted and unadjusted logistic regression models. The study found that very small or smaller than average size children had 1.615 times more likely to be stunted compared with an average and larger than average sized children.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1. SUMMARY

Ethiopia is one of the sub-Saharan African countries characterized with declining but still has high population growth. Ethiopia is the most populous landlocked country in the continent of Africa and the second-most populous country of Africa after Nigeria. Malnutrition in children is one of the most serious public health problems in Ethiopia and the highest in the world. The country has the second highest rate of malnutrition in sub-Saharan Africa and with high under five mortality rate (67/1000 live births) which is mainly due to infection and malnutrition. The objective of this study was to assess the effects of child feeding practices on nutritional status of Children 6-59 months of age in the SNNP Region. The variable considered as dependent variable in this study was children nutritional status (stunting) of last born 6-59 months age children. The total number of observations considered in this study was 724 but due to missing values and applicability to household level indicators we finally used 680 observations in the descriptive and logistic regression analysis. All model analysis used weighting procedures as obtained in the EDHS manual.

The children's malnutrition status measured in terms of stunting was categorized as, "1" if "Yes and "0" if "No". Logistic regression model was utilized to assess the effect of independent variables on the dependent variable. Based on the 2016 EDHS data, both the descriptive and analytical results were processed. The descriptive results were used to help describe the distribution of all socio-economic and demographic characteristics against each independent variable. The independent variables are all categorical, which includes variables like place of residence, drinking water source, wealth status, BMI, ANC, access to media, age in month, minimum dietary diversity, exclusive breast feeding, women education, women occupation, family size, number of under-five children, complementary feeding, meal frequency, sex of the child, size of child at birth and early breast feeding. Controlling for the effects of others, according to the result obtained from logistic regression model, it is found that source of drinking water, wealth status, age in month of child, number of under-five children in the household, ANC and size of child at birth has significantly related with stunting of the last born children 6-59 months of age.

5.2. Conclusions

This study investigated the effects of child feeding practices on nutritional Status of last birth children 6-59 months of age based on the 2016 EDHS data in the case of SNNPR, Ethiopia. In this study among all independent variables considered in the study (the adjusted model) some household, mother and child's characteristics were significantly affected the dependent variable. From these characteristics, drinking water source, wealth status, number of under-five children in the household, ANC, age in month and size of child at birth Significantly affecting the stunting of last born 6-59 months age children. Even though variables discussed above have significant effect on stunting of the last born children 6-59 months of age there are some variables like place of residence, women occupation, family size, minimum meal diversity, sex of the child, BMI, exclusive breastfeeding and early breastfeeding that doesn't show any statistical significant effect both on adjusted and unadjusted binary logistic regression model. Strategies to improve nutritional status of children should also include improving the nutritional status of the mother and her income status. To promote family planning programs in order to control number of children and also to increase birth interval is another important component.

5.3. Recommendations

- Efforts need be made on regional mass media agencies in order to give priority on child feeding practice and general child and mothers nutritional status to penetrate in to the culture values and norms of the society that expose children to malnutrition.
- Regional health bureaus have to work on extension workers in order to better guide community to use family planning for birth interval, ANC visiting and giving much attention on child feeding practice.
- Makes them more likely to be employed outside their home environment is important in order to reduce child malnutrition since mothers in low economic status were less likely to stay with or provide alternative care for their child.
- Since there is strong bond between mothers and children there need to promote women's health and nutrition as a strategy that will benefit child nutritional status.

References

Abate, G. (1998). "Child care practices in households with malnourished children and those with well-nourished children in a slum area of Addis Ababa Ethiopia " MSc Thesis, University of Nairobi Pp 1-6, 37-51

Ajao KO,Ojofeitimi EO, Adebayo AA, Fatusi AO and Afolabi OT, (2010)."Influence of Family Size, Household Food Security Status, and Child Care Practices on the Nutritional Status of Under-five Children in Ile-Ife, Nigeria" *African Journal of Reproductive Health December; 14(4):123*

Alemayehu Eshetu, Eskezyiaw Agedew, Amare Worku and Binyam Bogale,(2016) ."Determinant of Severe Acute Malnutrition among Children Aged 6-59 Months in Konso, Southern Ethiopia: Case Control Study"*Quality in Primary Care 2(4): 181-6*

Anonymous, (2012)." health and nutrition Blog" Spiral Journey"Dia naturals"

Anware Mohammed Ali, Muhdin Muhammed hussen Batu and Krishan Kanta Kaushik, (2016)."Socio-Economic Determinants of Nutritional Status of Children Ethiopia"International Journal of Scientific and Research Publications, Volume 6, Issue 3, March 2016 ISSN 2250-315

Birara Melese Yalew and Amsalu Fand Bikes D, (2014). "Prevalence and Factors Associated with Stunting, Underweight and Wasting: ACommunity Based Cross Sectional Study among Children Age 6-59 Months atLalibela Town, Northern Ethiopia" Journal Nutr Disorders

Black RE, Victora CG, Walker SP and Bhutta ZA, (2013). "for the Maternal and Child Under nutrition Group". Maternal and child undernutrition: maternal and child under nutrition and overweight in low-income and middle-income countries. Lancet.

Canaan Negash, Whitin Susan J., Henry Carol J., Tefera Belachew and Tewodros G.Hailemariam , (2015). "Association between Maternal and Child Nutritional Status in Hula,Rural Southern Ethiopia: A Cross Sectional Study" PLOS ONE DOI:10.1371/journal. pone.0142301.

Caulfield LE, de Onis M, Blossner M and Black RE, (2004). "Undernutrition as an underlying cause of child deaths associated with diarrhea, pneumonia, malaria, and measles" Am ClinNutr. ;80:193-8.

Central Statistical Agenc [Ethiopia] and ORC Macro,(2006). *Ethiopia Demographic and Health Survey 2005.*Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency and ORC Macro.

Central Statistical Agency:(2010).*The 2007 Population and Housing Census of Ethiopia: Statistical Report for Southern Nations, Nationalities and Peoples' Region; Part I: Population Size and Characteristi*

Central Statistical Agency and ICF international, (2012).Ethiopia Demographic and Health Survey2011.addisababa,ethiopia and Claverton, meryland ,USA: CSA and ICF

Central Statistical Agency (CSA) [Ethiopia] and ICF, (2017). *Ethiopia Demographic and Health Survey 2016*. Addis Ababa, Ethiopia, and Rockville, Maryland, USA: CSA and ICF

Delisle HF, (2008). "Poverty: the double burden of malnutrition in mothers and the intergenerational impact". Ann N Y AcadSci. 2008;1136:172-84.

Engle P. L, (1992). 'Care and child nutrition ' Theme paper for the international conference on nutrition (ICN): Paper prepared for nutrition section, UNICEF New York Pp 5-8

E.patrice, (1997 ."The Care Initiative : Assessment , Analysis and Action to Improve Care for Nutrition" UNICEF Nutrition Section. New York; Apr.

Fedral Ministry of health, (2008)."Program Implementation Manual of National Nutrition Progra(NNP) I". Addis Ababa, Ethiopia;

Federal Democratic Republic of Ethiopia Ministry of Health, (2010)."Health Sector Development Program IV 2010/11 – 2014/15" Addis Ababa, Ethiopia;

Fortier MS, Sweet SN, O'Sullivan TL, Williams GC: A self-determination process model of physical activity adoption in the context of a randomized controlled trial. Psychol Sport Exerc 2007, 8:741-757.

Fortier MS, Williams GC, Sweet SN, Patrick H: Self-Determination theory: Process models for health behavior change. In Emerging theories in health promotion practice and research: Strategies for improving public health.. 2 edition. Edited by: Diclemente RJ, Crosby RA, Kegler MC. San Fransisco, CA: John Wiley 2009:157-18

Gandhi Shreyash J ,Godara Naresh , Modi Anjali and Kantharia SL, (2014).“Impact of Feeding Practices On Nutritional Status Of Children Inrural Area of Navsari District” International Journal of Medical Science and Public Health l3(11):

Giashuddin MS, Kabir M, Rahman A, Hannan MA, (2003). “Exclusive breastfeeding and nutritional status in Bangladesh”. Indian Journal Pediatr. ;70(6):471-5.

Hamel Candyce, Enne Joseph, Omer Khalid, Ayara Ndem, Yarima Yahaya, Cockcroft Anne, and Andersson Neil, (2015). “Childhood malnutrition is associated with maternal care during pregnancy and childbirth: a cross-sectional study in Bauchi and Cross River States, Nigeria” Journal of Public Health Research; 4:408.

Hiwot Eshete,Yewelsew Abebe, Eskindir Loha, Teklemichael Gebru and Tesfalem, Tesheme, (2017).“Nutritional Status and Effect of Maternal Employment among Children Aged 6–59 Months in Wolayta Sodo Town, Southern Ethiopia: A Cross-sectional Study”. Ethiop Journal Health Sci ;27(1):155.

Jennings J and hirbaye MB, (2008).“Review of Incorporation of Essential Nutrition Actions into Public Health Programs in Ethiopia”.

Kamiya Yusuke, (2011) “Socioeconomic Determinants of Nutritional Status of Children in Lao PDR: Effects of Household and Community Factors” Journal Health Popul Nutr;29(4):339-348

Khattack M.M.A. Khan and Ali S., (2010). “malnutrition and associated risk factor in preschool children (2-5 years) in district swabi (NWEP)-pakista”. Journal.med.sci.,10(2):3439.

Liaqat Perveen ., Rizvi M.A., Qayyum A. And Ahmed H., (2007).“Association between complementary feeding practice and mothers education status in Islamabad” J Hum Nutr Diet;20 (4):340-4.

Lyons, Terrence, (1996)."Closing the Transition: The May 1995 Elections in Ethiopia". *Journal of Modern African Studies*. 34 (1): pp. 121-142

Mahari Tadele Wuneh and Yonas Deressa Guracho, (2017). "Nutritional Status and Feeding Practice of Children 6-59 Months Old, Metekele Zone of Benishangul-Gumuz Region, Northwest Ethiopia" *International Journal of Clinical Urology.* Vol.1, No. 2,pp. 20-29.

Mancharia C.w, Kog-Makau.W and Murok N.M, (2004)."Dietary intake,feeding and care practices at children in kathonzweni, Division, Makuenl,district, Kenya". East Africa Medical journal. August 81: 5-6.

Morris SS, Cogill B and Uauy R, (2008). "Effective international action against under nutrition" why has it proven so difficult and what can be done to accelerate progress?Lancet.371:608–21.

Neima Endris, Henok Asefa, and Lamessa Dube, (2017)."Prevalence of Malnutrition and Associated Factors among Children in Rural Ethiopia" BioMed Research International Volume, Article ID 6587853, 6 pages

Owoaje Eme ,Onifade Oluwadolapo and Desmennu Adeyimika , (2014). "Family and socioeconomic risk factors for under nutrition among children aged 6 to 23Months in Ibadan, Nigeria" Pan African Medical Journal"; 17:161

Rah Jee Hyun, Cronin Aidan A, Badgaiyan Bhupendra, Aguayo Victor M, Coates Suzanne, Ahmed Sarah, (2015). "Household sanitation and personal hygiene practices are associated with child stunting in rural India: a cross-sectional analysis of surveys"BMJ Open2015;5:e005180.

Ryan RM and Deci EL, (2002)."Overview of self-determination theory: An organismic dialectica perspective. In Handbook of Self-Determination Research".Edited by: Deci EL,Ryan RM. Rochester, NY: University of Rochester Press:3-33.

Ryan RM, Patrick H, Deci EL, Williams GC: Facilitating health behavior change and its maintenance: Interventions based on Self- Determination Theory. Eur Health Psycholog 2008, 10:2-5.

Silveira Katia B. R., Alves Jullyana F. R., Ferreira Haroldo S., Sawaya Ana L. And Florencio Telma M.M.T., (2010).“Association between malnutrition in children living in favelas, maternal nutritional status, and environmental factors” Journal *Pediatr (RioJ).; 86(3): 215220.*

Tadiwos Zewdie and Degnet Abebaw, (2013).”Determinants of Child Malnutrition: Empirical Evidence from Kombolcha District of Eastern Hararghe Zone, Ethiopia” Quarterly Journal of International Agriculture, 52 (4): 357-372

Tankoi Edward olodaru Ole, Asito Stephen Amolo and Adoka Samson, (2016). “Determinants of Malnutrition among Children Aged 6-59 Months in Trans Mara East Sub-County, Narok County, Kenya” Int Journal Pub Health Safe 1:3

Tette Edem M. A., Sifah Eric K., Nartey Edmund T., Peter Nuro-Ameyaw, Donkor Pricilla Tete and Biritwum Richard B., (2016). “Maternal profiles and social determinants of malnutrition and the MDGs: What havewe learnt?” Tette et al. BMC Public Health 16:214

Tibilla MA, (2007).“The nutritional impact of the world food programme-supported supplementary feeding programme on children less than five years in rural tamale, Ghana”.

Udoh Ekerette Emmanuel and Amodu Olukemi K.,(2016).“Complementary feeding practices among mothers and nutritional status of infants in Akpabuyo Area, Cross River State Nigeria” *SpringerPlus 5:2073*

UNICEF, (1997).“The care initiative, Assessment, analysis and action to improve care for nutrition”. UNICEF, New York Pp 2-32

UNICEF, (1998). “The state of the world’s children 1998 Oxford and New York Pp 7-35 United Nations Childrens Fund. Progress for children.

United Nation System Standing Committee On Nutrition. Report On He World Nutrition Situation, 2010.

UNICEF, (2011). “Programming Guide for Infant and Young Child Feeding, Nutrition Section Programmes”. New York: UNICEF;

World Bank, (2004). world development report: Making Services Work for Poor People. Oxford University Press. Washington, D.C;.online source :www.worldbank.org

World Health Statistics,(2010). World Health Organization, Geneva :WHO;

World Health Organization. physical status: the use and interpretation of anthropometry: report of a WHO expert committee. WHO technical report series 854 [Internet]. Geneva; 1995. Online source: http://www.who.int/childgrowth/publications/ physical status/en.

WHO,(2006). Infant and Young Child Nutrition, Quardrnnial Secretariat Report. 9th World Health Assembly, Geneva: WHO;

WHO, UNICEF, USAID, FANTA, AED, UC DAVIS, and IFPRI. Indicators for assessing infant and young child feeding practices part 2: measurement. Geneva: The World Health Organization; 2010.

Wubante AA, (2017).“Determinants of infant nutritional status in Dabat district, North Gondar, Ethiopia: A case control study”. PLoS ONE12(3): e0174624.

Zhou Hong PhD, Wang Xiao-Li PhD, Ye Fang BSc, Zeng Xiaopei Lily BSc,Wang Yan DrPH, (2012).“Relationship between child feeding practices andmalnutrition in 7 remote and poor counties, P R China”*Asia Pac* Journal *Clin Nutr ;21 (2):234-240.*

Appendix
Table A-1: Pearson Chi-Square Test

Table 1

Variables	Response Category	stunting				Pearson Chi-Square Tests	
		not stunting		stunting			
		Count	Row N %	Count	Row N %		stunting
Women age group	40-49	44	60.3%	29	39.7%	Chi-square	1.790
	15-24	81	64.8%	44	35.2%	df	3
	25-34	226	61.6%	141	38.4%	Sig.	.617
	35-39	65	56.5%	50	43.5%		
family size	>=5	217	59.5%	148	40.5%	Chi-square	.986
	<5	199	63.2%	116	36.8%	df	1
						Sig.	.321
Mother's media exposure	Frequently	78	70.3%	33	29.7%	Chi-square	4.852
	Not at all	286	59.8%	192	40.2%	df	2
	Sometimes	52	57.1%	39	42.9%	Sig.	.088
	Previously married	5	35.7%	9	64.3%		
Minimum diet diversity	No	356	60.2%	235	39.8%	Chi-square	1.678
	yes	60	67.4%	29	32.6%	df	1
						Sig.	.195
Mother's body mass index	overweight	27	67.5%	13	32.5%	Chi-square	1.853
	underweight	55	56.1%	43	43.9%	df	3
	normal	325	61.4%	204	38.6%	Sig.	.603
	obese	6	66.7%	3	33.3%		
Age of child in month	6-8	55	88.7%	7	11.3%	Chi-square	36.171
	9-11	42	77.8%	12	22.2%	df	6
	12-17	75	64.1%	42	35.9%	Sig.	.000*
	18-23	49	55.7%	39	44.3%		
	24-35	93	52.5%	84	47.5%		
	36-47	59	53.2%	52	46.8%		
	48-59	43	60.6%	28	39.4%		
Sex of child	female	197	59.2%	136	40.8%	Chi-square	1.118
	male	219	63.1%	128	36.9%	df	1
						Sig.	.290
Early breast feeding	no	100	59.5%	68	40.5%	Chi-square	.257
	yes	316	61.7%	196	38.3%	df	1
						Sig.	.612
Exclusive breast feeding	no	360	60.5%	235	39.5%	Chi-square	.906
	yes	56	65.9%	29	34.1%	df	1
						Sig.	.341
Birth interval	first birth	72	63.7%	41	36.3%	Chi-square	11.040
	< 24 months	65	52.8%	58	47.2%	df	4
	24-36 months	94	55.3%	76	44.7%	Sig.	.026*
	37 - 48	85	68.0%	40	32.0%		
	47and above months	100	67.1%	49	32.9%		

Variables	Response Category	stunting				**Pearson Chi-Square Tests**	
		not stunting		stunting			
		count	Row N%	count	Row N%		stunting
Complementary foods	no	220	56.4%	170	43.6%	Chi-square	8.747
	yes	196	67.6%	94	32.4%	df	1
						Sig.	.003*
Wealth index (combined)	Poorest	61	52.6%	55	47.4%	Chi-square	11.211
	Poorer	91	58.0%	66	42.0%	df	4
	Middle	103	59.2%	71	40.8%	Sig.	.024*
	Richer	97	67.4%	47	32.6%		
	Richest	64	71.9%	25	28.1%		
	Improved Facility	45	70.3%	19	29.7%	df	1
						Sig.	.115
Meal frequency	no	332	58.6%	235	41.4%	Chi-square	9.882
	yes	84	74.3%	29	25.7%	df	1
						Sig.	.002*
Source of drinking water	Unimproved source	228	58.8%	160	41.2%	Chi-square	2.216
	Improved source	188	64.4%	104	35.6%	df	1
						Sig.	.137
Mother's work status	not working	162	60.7%	105	39.3%	Chi-square	.047
	working	254	61.5%	159	38.5%	df	1
						Sig.	.829
Number of children below age 5	one	226	63.7%	129	36.3%	Chi-square	3.307
	two	170	59.6%	115	40.4%	df	2
	three or more	20	50.0%	20	50.0%	Sig.	.191
Number of antenatal care visit	none	111	54.1%	94	45.9%	Chi-square	8.973
	one to three visit	124	59.9%	83	40.1%	df	2
	four and above	181	67.5%	87	32.5%	Sig.	.011*
Place of residence	urban	42	68.9%	19	31.1%	Chi-square	1.662
	rural	374	60.4%	245	39.6%	df	1
						Sig.	.197
Size of Child at Birth	Average / larger than average	351	63.9%	198	36.1%	Chi-square	8.390
	Very small/smaller than average	63	50.0%	63	50.0%	df	1
						Sig.	.004*
education of mother	No education	226	56.9%	171	43.1%	Chi-square	7.253
	Primary or above	190	67.1%	93	32.9%	df	1
						Sig.	.007*

Table A-2: Binary logistic regression output table.

Variables in the equation								
Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
women_age			1.08	3	0.782			
women_age(1)	-0.03	0.42	0.005	1	0.942	0.97	0.426	2.21
women_age(2)	0.017	0.308	0.003	1	0.956	1.017	0.556	1.859
women_age(3)	0.262	0.332	0.622	1	0.43	1.3	0.678	2.493
Religion			2.423	2	0.298			
Religion(1)	-0.373	0.259	2.072	1	0.15	0.689	0.415	1.144
Religion(2)	-0.036	0.561	0.004	1	0.949	0.965	0.321	2.899
familysize(1)	0.093	0.209	0.199	1	0.656	1.098	0.728	1.655
media			3.504	2	0.173			
media(1)	0.13	0.289	0.202	1	0.653	1.139	0.646	2.007
media(2)	0.581	0.35	2.753	1	0.097	1.788	0.9	3.552
mindietdiverstiy(1)	0.017	0.321	0.003	1	0.958	1.017	0.542	1.908
bodymass_index			1.427	3	0.699			
bodymass_index(1)	0.278	0.443	0.393	1	0.531	1.32	0.554	3.144
bodymass_index(2)	0.093	0.39	0.056	1	0.812	1.097	0.511	2.355
bodymass_index(3)	0.832	0.882	0.89	1	0.346	2.298	0.408	12.944
Age_month			24.106	6	0			
Age_month(1)	0.798	0.544	2.156	1	0.142	2.222	0.766	6.449
Age_month(2)	1.555	0.476	10.663	1	0.001	4.733	1.862	12.032
Age_month(3)	1.871	0.495	14.306	1	0	6.495	2.463	17.126
Age_month(4)	2.27	0.624	13.216	1	0	9.682	2.847	32.924
Age_month(5)	2.534	0.648	15.297	1	0	12.605	3.54	44.879
Age_month(6)	2.118	0.676	9.825	1	0.002	8.315	2.211	31.262

Child_sex(1)	-0.088	0.18	0.239	1	0.625	0.916	0.644	1.302
earlybreastfeeding(1)	-0.173	0.217	0.635	1	0.426	0.841	0.549	1.288
exclusive(1)	-0.401	0.289	1.92	1	0.166	0.67	0.38	1.181
Birthinterval			2.334	4	0.675			
Birthinterval(1)	-0.255	0.379	0.452	1	0.501	0.775	0.369	1.628
Birthinterval(2)	-0.05	0.351	0.021	1	0.886	0.951	0.478	1.891
Birthinterval(3)	-0.418	0.368	1.292	1	0.256	0.658	0.32	1.354
Birthinterval(4)	-0.146	0.346	0.178	1	0.673	0.864	0.438	1.704
comp(1)	0.34	0.515	0.434	1	0.51	1.404	0.512	3.855
wealth_index			6.033	4	0.197			
wealth_index(1)	-0.245	0.279	0.773	1	0.379	0.782	0.453	1.352
wealth_index(2)	-0.317	0.278	1.306	1	0.253	0.728	0.422	1.255
wealth_index(3)	-0.591	0.295	4.001	1	0.045	0.554	0.31	0.988
wealth_index(4)	-0.814	0.394	4.27	1	0.039	0.443	0.205	0.959
MFR(1)	-0.361	0.301	1.438	1	0.23	0.697	0.387	1.257
drinking_water(1)	-0.486	0.189	6.599	1	0.01	0.615	0.425	0.891
mothers_work(1)	0.133	0.182	0.532	1	0.466	1.142	0.799	1.633
Under5children			7.303	2	0.026			
Under5children(1)	0.435	0.244	3.169	1	0.075	1.544	0.957	2.492
Under5children(2)	1.163	0.443	6.885	1	0.009	3.2	1.342	7.631
ANC			4.653	2	0.098			
ANC(1)	-0.201	0.224	0.81	1	0.368	0.818	0.528	1.267
ANC(2)	-0.469	0.219	4.586	1	0.032	0.626	0.407	0.961
place_residence(1)	0.136	0.375	0.132	1	0.717	1.146	0.549	2.389
size_childBIRTH(1)	0.498	0.223	4.984	1	0.026	1.646	1.063	2.548
education(1)	-0.092	0.205	0.2	1	0.655	0.912	0.611	1.364
Constant	-1.804	0.975	3.423	1	0.064	0.165		

Table A-3: Model evaluation results

Logistic model for stunt1,goodness-of-fit test	
(Table collapsed on quantiles of estimated probabilities	
number of observation	671
number of groups	10
Hosmer-lemeshow chi2(8)	9.83
prob>chi2	0.2775