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**ROLE OF SOCIAL DETERMINANTS ON DIETARY HABIT AND NUTRITIONAL
STATUS OF PRIMARY SCHOOL STUDENTS IN SELECTED SCHOOLS IN
HAGERE-MARIAMNA KESSEM WOREDA, NORTH SHEWA, ETHIOPIA.**

**BY
EDENGENET FELEKE**

**A THESIS SUMMITTED TO CENTER FOR FOOD SECURITY STUDIES,
COLLEGE OF DEVELOPMENTAL STUDIES, ADDIS ABABA UNIVERSITY**

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**ADDIS ABABA UNIVESITY
COLLEGE OF DEVELOPMENTAL STUDIES
CENTER FOR FOOD SECURITY STUDIES**

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BOARD OF EXAMINERS

This is to certify that the senior essay prepared by Edengenet Feleke, entitled `` Role of Social determinants on dietary habit and nutritional status of primary school students in selected schools in hagermariam-enakessem woreda, North Shewa, Ethiopia`` and submitted in partial fulfillment of the requirements for MSc Degree in Food Security complies with the regulations of the university and meets the accepted standards with respect to originality and quality

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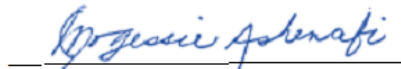
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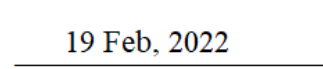
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This thesis is my original work, and it has not been submitted for a Master's degree at any other institution, and all sources and materials utilized in the thesis have been properly acknowledged.

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List of acronyms and abbreviation

BMI: Body Mass Index

CBN: Community Based Nutrition

CDC: Communicable Diseases Control

CSA: Central Statistical Agency

DD: Dietary Diversity

EDHS: Ethiopia Demographic Survey

ICRW: International Center for Research on Women

JMP: Joint Monitoring program

INDDEX: International Dietary Data Expansion project 2018

NCD: Non-Communicable Diseases

UNICEF: United Nation International Children Education Fund

WHO: World Health Organization

Abstract

Nutrition is a significant aspect of adolescent, since it is the time of rapid growth and maturation in human development that requires additional nutrients and energy to support growth. Focus on adolescent nutrition breaks the intergenerational cycles of malnutrition. This study aimed to examine the determinants of nutritional status of adolescents (both sexes) in primary schools (11-14 age range) living in three different agroecological zones in Hagera-Mariamna Kessema woreda, North Shewa, Ethiopia. Institutional based cross-sectional study was conducted among randomly selected 264 adolescents. With the help of a structured questionnaire, the necessary information was collected from the respondents and interviews with key informants were also carried out. Adult BMI and anthropometric measurement were collected using appropriate equipment and following standard procedures. Data was entered into SPSS model 22 and anthropometric measurements were transformed into Z-scores through WHO Anthro-plus model 1.0.4 software. It was then exported to STATA 16 and analyzed using descriptive and inferential statistics; An ordered logit model was used to analyze the nutritional determinants of adolescents. The nutritional status was determined using Height for age (HAZ), BMI for Age (BAZ) and Weight for Height (WHZ) as a measure of growth, underweight and wasting, respectively. Based on the results, the prevalence of underweight (59%) and wasting (36%) was found to be 59% and 36%, respectively. Sex of adolescent, age of adolescent, number of children in the family, mother's educational level, culture, social context and social class were found to be significantly associated with adolescent wasting and malnutrition. The findings recommend effective culturally sensitive intervention targeted at alleviating problems related to food restriction in Hagera-Mariamna Kessema woreda.

Keywords: Social determinants, Adolescent, Culture, Social context, social class, Nutritional Status,

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The existence of underweight and undernourished among people in developing countries has been high and relatively constant for the last three decades, specifically in rural communities (Cordero et al,2017). Globally the increment of food production has been exhibited to ensure food security at all. Despite of this emphasis, the existing data indicate many people around the world lack adequate food and about one billion have been suffered by the absence of inadequate calories required nutrients both underweight and undernourished (Misselhorn et al, 2012). In Ethiopia, at national level food security has been raising since 1970Th despite a lot of humanitarian food aids ongoing involvement existed (FAO.2014).

Being underweight does not occur simply due to the absence of inadequacy or availability of food at acceptable levels, but generally occur due to combined factors of food security pillars including food quality, utilization and access. So, malnutrition can occur even when the adequate amount of food is available if that food is not socially appropriate and culturally acceptable (context specific) by the local society and ethnic group. As a result it is inaccessible. Furthermore, food has significant social and cultural uses and is seen as important to maintain interactive community. The social cultural norms see food to vary across culture means food can be different between each culture. Social and cultural circumstance such as human values, belief, attitude control what people eat in general (Abraham ,1968).

Man is a social being means man lives and conducts different activities in social relationship, as a result of which man varies in habitual consumption of different foods and tradition of preparation. However, having good nutrition status is important to maintain and promote good health throughout the entire life of individuals. Nutrition status of individuals is entirely associated with social determinants that affect their consumption, preparation restriction or exclusion of some foods in to their diet (Fathauer, 1960).

Furtherly, food culture in many western societies has ceremonial and social role. Certain foods are highly prized and others reserved for special holidays or religious feasts, others mark social position (class). Also, there is food restriction classified as edible or inedible, heavy or light according to their culture and way of life as a group. The way they do things in general passes

from previous to the next generation (Abreham,1968). This practice also has been exhibited in some sub-Sahara African countries including Ethiopia. Young children are restricted to consume certain food groups such as protein-rich meat, fish, eggs, legumes, milk and any dairy products due to societal assumptions and misconception. (Martinez et al.,2013). This leads to double burden of malnutrition and is responsible for more ill- health than any other cause. Obesity, under and overweight are causes of 45% of death among children (WHO,2019).

In Ethiopia, only 18% of the population lives in urban areas. The country is, thus, considered as least urbanized. Most of the population are traditional societies, highly influenced by cultural norms (JMP/WHO &UNICEF,2014). These cultural norms include diet restriction. The unique feature of the nation's is that it is composed of 80 different ethnic groups with cultural diversity. Each group has varied cultural norms and owns cultural manifesto with wide diet practice (national foods), ways of living as well as others cultural traits (Gashaw Kebede, 2010). As a result, this cultural diversity makes difference in the habitual consumption of certain foods, traditions of preparation (context specific) and set of restriction (Gibney,2004).

So many studies have been conducted and majority of them focused on the determinant factors related with prevalence (Amha, Aregawi, 2018), factors related to food insecurity (Delelegn, Yilma 2018), factors related with socioeconomic (Huruy Assefa et al.,2013). But this study reviewed influence of social determinant on adolescent nutritional status (being under weight and wasting).

1.2 Statement of the problem

All humans need balanced nutrients for proper functioning of the body system. Human nutrition is the fundamental pillar of individual life and scientific discipline which is concerned with both health and development throughout the entire life extent (Lean, 2015). However, having good nutritional status is essential to own good mental development, physical growth to be productivity, health and wellbeing of individual. It is strongly required to have dietary variety such us consuming different food groups or foods in a given specific period with respect to age, gender and when the time of different physiological changes occur. In spite of these, cultural norm diet restriction and misconception ban some food groups from consumption during adolescent (Fathauer, 1960).

Adolescent is a period of critical physical growth and development with sensitive to malnutrition regarding to increased physiologic need for nutrition. The occurrence of malnutrition on adolescent goes to their future generation. Undernutrition on adolescent is wide spread in developing countries including Ethiopia with the high prevalence of 32%in girls and 36% in boys and increases over time, according to the 2005 and 2011 local demographic survey report. Overweight or obesity among adolescent is rare in current data. Among most common causes adolescent being underweight micronutrient deficiencies is frequently mentioned as result of inadequate nutrition (CSA,2012).

Accordingly, the researcher had been working in the area and through repeated field experience she could observe the existence of gender and age-based food restrictions among adolescent. Food restrictions is the one and most common among adolescents in the study area (Hagere-Mariamna Kessew woreda). Adolescent were restricted to consume some food groups without considering nutritional value due to social cultural norm. Dietary restriction are caused by social determinants such as Culture, Social context and social class. First Social class, refers to hierarchical social stratification in class, because of this in the area highly energetic fat and protein foods are considered as high-class diet for adults but restrict for adolescent. The second one is culture, which monitors dietary habit, restriction and preparation of food. Everything must be culturally appropriate and culturally acceptable among all group members. Thus, adolescent are restricted from the consumption of food unknown in their culture. The Third one is social context, a factor which influences daily diet in direct and indirect ways. The direct one is by making food unavailable through activities like buying and preparing food in a culturally appropriate way. The indirect one involves influence on an individual's eating habit and dietary preference by restricted others edible substance available out of home, such as at school, work and restaurant in the given society (Shepherd ,1999). Other existing factors that aggravating malnutrition are lack of educational attainment, poor access to safe water and sanitation, lack of health services targeted for adolescent .

This Cultural diet restriction highly practiced in developing countries including Ethiopia without considering the issues of malnutrition restricts diet that has essential nutrients (Keys, 1950). Much attention is given to children under five years of age but expos many adolescents to death and others consequences of illness caused by being underweight due to inadequate food consumption.

1.3 Objectives of the study

1.3.1 General objectives

This study aims to assess the social determinants of dietary habit and their influence on nutrition status of primary school children (11-14 Adolescent) in selected primary school Hagera-Mariamna Kessema woreda.

1.3.2 Specific objectives

- To investigate the existing social constructed cultural norms dietary restriction practice influence on nutrition of adolescents.
- Investigate the social constructed dietary pattern and nutritional status of Adolescents
- Analyze social economic (Socio class or status) determinant of Adolescent nutritional status.

1.4 Research Questions

This research will answer the following questions.

1. What are socially constructed norms dietary habit in the study area?
2. What types of the dietary pattern practiced and influence adolescent nutrition status?
3. What is the social economic determinant of influence on adolescent nutrition status?

1.5. Significance of the study

The study's findings will serve as a ground for further research into the impact of diet on adolescents by launching and inspiring researchers to conduct other studies. In addition to the health state, adequate and unambiguous information on the prevalence and factors affecting nutrition status is required. Furthermore, the findings of this study will aid in the development of appropriate nutritional and health programs as well as successful adolescent interventions at the policy and program level. Also, the findings of this study will help to determine the scope of the problem in relation to the importance of enhancing dietary advice and supplementation in the study region. Finally, the findings of the study will be useful to scholars, policymakers, and governmental and nongovernmental groups working in the field.

1.6 Scope and limitation of the study

This study was conducted on determinants of nutritional status among adolescents (11 – 14 years) who were living in the study area. Nutritional status was indicated by being underweight

and wasting including their determining factors. Those determining factors considered in this study were demographic, care giver socio economic factors, social context - environmental factors, cognitive and health related factors, dietary diversity and supplements (multivitamins).

Due to time and resource limitations the study did not assess minerals and micronutrients deficiencies like iodine, iron, zinc, and daily caloric intake as well as side effects in food intake and psychosocial problems related to being underweight. Also, Due to time, resource and COVID- 19 constraints this study did not assess adolescent household dietary diversity, minerals, and micronutrients deficiencies.

1.7 Ethical Consideration

As a scientific research, all ethical issues were taken accordingly since the subject is human. Ethical clearance was obtained from Addis Ababa University College of development studies, center of food security. The permission obtained from Hagera-Mariamna Kesseworeda administration and education bureau and others concerned bodies including three schools directors were informed about the purpose of the research. In addition to these, the following issues were explained to all respondents, on group and individual bases: the purpose of the study, objectives of the study, confidentiality of obtained information, right not to answer, the study did not offer any incentives, not mentioned their name while presentation, and the purpose of answering all questions. After obtained consent from the respondents' all-research involvements were dependent with mutual respect and voluntary manner without obligation or any inducement just on their onset. Finally, all discussion and explanation were made in common language without any language barriers.

1.8 Definition of Terms

Social determinants: refers social class, culture and social context.

Dietary habit: individual food choice in a daily base.

Nutrition: is the study of components of foods, the way how ingested, digested, absorbed, transported and used including store and extracted as whole.

Nutrition status: Individual health condition that influenced by intake (food consumption) and utilization named Nutritional status.

Wasting: is a condition in which a child becomes too thin for his or her height because of weight loss or failure to gain weight.

A Z-score: is a numerical measurement that describes a value's relationship to a group of values the mean of.

Standard deviation: Statistical tool that measure amount of variation or dispersion of the set of values called Standard deviation.

BMI :(Body Mass Index) a simple calculation by using individual height and weight (BMI= kg/m²) to identify individual healthy weight from the range (over weight is 25.0 or more, healthy range also 18.5 to 24.9).

Menarche: is the one and crucial change adolescent girls' life it's the first occurrence of menstrual period. Usually start at the age 11-14 or early 9th of late 15

CHAPTER TWO: RIVIEW OF RELATED LITRATURE

2.1 The Social determinants of dietary habit: (social class, culture, and social context)

2.1.1 Social class

As humans, globally, are different and have different food choice regarding to their social class which guides them to have over and under nutrition. For instance, higher class people have healthier diets like fruit, lean meat, oily fish, whole meal product, and raw vegetables. They are, most of the time, educated, more health conscious and have healthy life style. The others are considered to have low-class life style. Finally, social class difference in diet is concerned particularly with respect to health inequalities and financial capability and education (Shepherd, 1999).

2.1.2 Culture /Cultural influence /

It is an umbrella term which includes the social behavior and norms that originate in human societies, in different ways for instance the knowledge, customs, beliefs, laws, arts, capabilities, and habits of individuals and groups. It also has influence on dietary habit such us food choice and food preparation. Several studies have shown that traditions, beliefs and values are among the main factors influencing preference, mode of food preparation, and nutritional status (Fathauer, 1960). Plus, culture highly influences human perceptions: the five senses; touch, sight, sound, smell, and taste. Also it includes pro-preconception required to process information, through the perceptual process, we gain information about the properties and elements of the environment that are essential to our survival and how the human brain recognizes and differentiates objects from one another. Likewise, it groups them into categories according to common features as investigated in cognitive neuroscience. In general culture highly controls human mind (Shepherd, 1999).

2.1.3 Social Context

In social context generally all things must be context specific. People have an influence on individual and group diet including eating behavior and consumption. Social context influences an individual's food choice directly by buying foods on behalf of the person and indirectly by

banning other foods (which are uncommon) on the given society by restriction from school, work, restaurant and home (Shepherd, 1999).

2.2 Dietary habit

Different scholars and organization defined and reviewed the term dietary habit. It refers to individual food preference often related to culture, education, health and socioeconomic status. It may influence and change through human development cycle including physical exercise and social engagement. Dietary habit is defined as a visible action or behavior including good dietary practice and poor dietary practice (Barker et al., 2018).

Dietary habit (eating habit) is conscious, collective and repetitive behaviors which guides people to consume certain foods or diet under the influences of social and cultural response. Human beings pass different developmental stages and Dietary habit as well as nutrition conditions are also modified respectively. Among these stages, sometimes due to life schedule, one may face unhealthy food habit and social condition. Dietary habit, nutrition status and individual health are highly interconnected and characterized by diversified food consumption. Unhealthy dietary habit, stress, short sleep durations, economic limitation lack of time and life style related changes are some affecting factors of dietary habit. These sometimes expose people to poor dietary habit including under or over eating, not having enough healthy daily food or consuming foods and drink which are low in fiber or high in fat, salt and sugar (Barker et al.,2018).

2.3 Assessment of Nutrition status

It is the condition of health which is influenced by nutrient that consumption and utilization by the body as an individual. It plays vital role to lead healthy life in different human development cycles as child hood protection from malnutrition, as an adolescent tackles growth retardation, and helping adult to have good working, social, mental capacity and development (Sridhar et al.,2014).

Also, the nutritional status assessment is a key indicator of nutrition and health assessment that measure the extent which individual physiology needs nutrients (Srivastava et al., 2012). So that, individual nutrition status as community focused particularly the improvement of vulnerable

groups including children, expect and mother and lactating mothers has been recognized as important indicator of national development (Frye,2013). To sum up, assessment of individual nutrition status involves in two ways, direct and indirect methods. The direct methods are Anthropometric methods, biochemical, dietary evaluation methods, laboratory methods and clinical methods. On the other side the indirect one-use community health guides that reflect nutritional influences. These are: ecological variation including crop production, economic factors such us per capital income, population density and social habits, vital health statistics (Nabag et al., 2011).

2.3.1. Anthropometric methods

Anthropometry is the measurement or assessment of the size, proportion, and composition of the human body, reflecting both health and nutritional status and predicting performance, health and survival (NACS, 2014). It includes weight, height, and mid upper arm circumference (MUAC). And body mass index (BMI), weight -for -height are anthropometric measurements obtainable as indexes for acute malnutrition whereas, height for -age (HFA) is an index for chronic under nutrition and weight -for-age (WFA) is a cumulative measure of underweight or wasting and stunting. Every single index is registered as a Z-score and measured in standard deviations (SD) that describe how far and in what direction an individual anthropometric measurement diverges from the mean for a healthy person of in respect to same age and sex. Each of these indexes is recorded as a z-score. Z-scores are measured in standard deviations (SD), which describe how far and in what direction an individual's anthropometric measurement diverges from the mean for a healthy person of the same age and sex (NACS,2014).

Weight: is prerequisite for finding weight- for height z-score (WHZ) for children and adult BMI it is usually the first step in anthropometric assessment and strongly associated with the existence and development of disease. So that, unintentional weight loss can consider, as poor health and exposed individual to have less ability to fight infection. Weighing clients requires a functioning weighing scale that measures weight in kg to within the nearest 0.1kg. Finally, correct weight measurement is very important because small errors can lead incorrect classification of nutritional status and wrong care as well as treatment (NACS, 2014).

Length / height: There is some requirement to measure length or height it is a well-prepared height board or measuring tape which marked in centimeters (CM). It measures height for children 2 years and older or adult who are more than 87 centimeters tall.

For children the Nutritional indices commonly calculated the following:

- Weight – for height (WFH) – a measure of wasting or acute malnutrition.
- Height-for-age (HFA) – a measure of under nutrition status stunting or chronic.
- Weight- for -age (WFA) – a measure of stunting combined and underweight or wasting.
- MUAC- a measure of acute malnutrition or wasting.

Weight -for – height: it measures of body weight relative to height. Low weight - for height in children reflects that wasting (too thin). High weight – for height is described as “overweight.” weight - for height z-score (WHZ) it is nutritional index which describes how a child’s weight compare to the weight of others who have the same height and sex according to WHO growth standards. As a result, inadequate weight for height explaining acute malnutrition this defined by WHZ z- score $< - 2$ in children. So that, z – score as an individual can be determine how she or he malnourished, and a mean z-score determined and calculated the nutritional status of a given population (NACS, 2014).

Height – for age z -score (HAZ): If the number standard deviation of the height of a child from the median height of others children with same age and sex according to WHO growth standards, the result will be HAZ is a measure of stunting of chronic malnutrition. Thus, Insufficient height in respect to their age resulting from chronic under nutrition which defined by height-for-age-z-score (HAZ) $< - 2$ (NACS, 2014).

Weight – for – age: A measure of body mass in respect to age. Low weight – for -age in children reflects underweight. Weight -for age z -score (WAZ) is a nutritional index that shows how a child weight compares to weight of others children with same age and sex according to WHO growth standards. Insufficient weight relative to age, reflecting that both chronic and acute malnutrition is defined by WAZ z -score < -2 (NACS,2014).

Mid -upper arm circumference (MUAC): In the right-handed people, the circumference of the mid -upper arm a straight left arm between shoulder and elbow around the center. For children 6-

59 months old, MUAC is a best indicator of mortality risk due to acute malnutrition than weight-for-height z -score (NACS, 2014).

Body mass index (BMI): based on weight – to – height ratio BMI is one of anthropometric indicator but it is not an accurate indicator for pregnant woman nutritional status or adult with edema. Whose weight gain is not directly linked with their nutritional status, using MUAC for these groups is more useful. BMI it is simple calculation using person weight in kg by the person's height in meters. The formula is $BMI = \frac{kg}{m^2}$ where kg is a person's weight in kilogram and in m² is their meters squared. Overweight score of individual fail to 25.0 or more and healthy range is 18.5-24.9(FSAU/FAO, 2005; NACS, 2014).

BMI is also used as indicator of nutritional status for adult over 18 years old who have completed their physical development, but for older children and adolescents who are still growing and developing, age and sex must be considered when using BMI. The preferred indicator of body thinness used to categorize malnutrition in children and adolescents 5-19 years old. Below is the WHO BMI- for – age classifications of malnutrition in adolescents '5-19 of age (NACS,2014). WHO cutoffs indicate a need for nutrition interventions to slow or reverse weight loss.

2.3.2 Biochemical assessment

It is specific measure of nutrients in human blood, urine and other biological specimen; for instance serum retinol levels to assess vitamin A status. Among others methods, biochemical nutritional assessment gives the most objectives and quantitative data on nutritional status but it is generally expensive, time consuming and not apply in an emergency situation. It also exhibited in indication of nutritional deficits long before clinical manifestation (FSAU/FAO,2005; NACS,2014).

2.3.3 Clinical assessment

It is essential feature of all nutritional survey. It is the simplest and most practical method to know group and individual. Also, it uses a number of physical signs (specific and nonspecific), that are related with malnutrition and deficiency of vitamins as well as micronutrients. Generally, this examination, with special devotion to organs for instance hair, angles of the mouth, gums,

nail, skin, eyes, tongue, muscles, bones and thyroid gland. Discovery of relevant signs helps in establishing the nutritional diagnosis and treatment. Clinical assessment includes checking for visible signs and symptoms of nutritional deficiencies such as bilateral pitting edema (Fluid retention on both sides of the body), emaciation 9 a sign of wasting, which is loss of muscle and fat and tissue as a result of low energy intake and / or nutrient loss from infection), hair loss, and change in hair color (NACS,2013).

2.3.4. Dietary evaluation methods

Another essential part of nutritional assessment is assessing food and food fluid intake that gives information on dietary quantity and quality. The result is compared with recommended intake for instance recommended dietary allowance and dietary diversity scores based on the food group's classification in addition to other standards. So that, some of most common ways of dietary intake assessment for individual are described below parallel with the major strength and limitation of each (Roohani, 2012).

Food records: It records food consumption that involves one-to-seven-day food and beverage also named food journals. And all amounts of each food items take and recorded accurately as possible it is essential to calculate nutrient intake this determined by weighing or by estimating volumes. Under some situations, only some food interests are particular recorded depends on the objectives. For instance, if researcher estimate intake of food component found only in animal products will assesses food records that containing meat, poultry, fish, eggs, or dairy products. Even though, if total energy intake requires all records food consumed by individual (Roohani, 2012).

24 -hour dietary recall: it refers to the past 24-hour previous dietary recall of previously consumed food and beverage before the interview. Foods and its amount are remembered from memory under the help of interviewer who has been trained in requesting dietary information. This interview usually conducted face to face, possible in telephone also self-administered in some situation by the subject. Finally, a brief activity history incorporated in to the interview to help searching for all foods and beverages which consumed (FSAU/FAO, 2005).

Food frequency questionnaire: it is designed to acquire information on overall dietary quality instead of nutrient composition and consumption. It also considers and examines how often someone eats certain foods, and sometimes the size of the portions. This method is quick and inexpensive but it is common under -reporting (NACS,2013).

Dietary histories: The meal-based intake history is designed to assess usual individual consumption. It consists of a detailed listing of the types of foods and beverages commonly consumed at each eating occasion over a defined time period which is often a "typical" week. A trained interviewer probes for the respondent's customary pattern of food intake on each day of the typical week. The reference time frame is often the past month or the past several months, or may reflect seasonal differences if the time frame is the past year (NACS, 2013).

Food habit questionnaires: It is designed to collect general or specific information, such as food perception and beliefs, likes and dislikes foods, method of preparing foods, uses of dietary supplements, social surrounding which associated eating occasion. This kind of information is frequently included along with the other four methods and also considered as sole data collection method. As result, these approaches are commonly used in rapid assessment procedures the questioners may be open ended or structure, self or interviewer administered, and add any number of questions depends on the required information (NACS, 2013).

2.4 The purpose of nutritional assessment

The ultimate purpose of nutritional assessment is to identify people at risk of malnutrition for early intervention or referral before the occurrence of malnutrition and to identify malnourished clients for the treatment. Untreated malnourished people at early age have longer hospital stays, slow recover from infection and it is complication, with high morbidity and mortality. Nutritional assessment used to investigate individual practices that expose them in malnutrition and infection. Also, identify individual who needs nutritional education and counseling particularly to improve using local food sources. Therefore, nutritional assessment used, established and appropriate nutritional care plan, that help individuals or population to identify risk before the occurrence or who already malnourished. Finally, it needs to develop health care programs that meet community need based on the defined assessment and measure the effectiveness of the existing program and intervention (Ismail &Mustique, 2013).

2.5 School children and their nutritional

School age is one of the growing phases of childhood, it is an energetic period as a child for physical growth and mental development (Begum, 2008; Amare et al.,2013). Demand established nutritional dietary habit, increased in consumption due to rapid growth and body development. Also, a primary time to hold nutrients to build body for the next life cycle adolescence which occurred in rapid growth. However, nutrition contributes a vital role, in contrast, in adequate nutrition during child hood lead malnutrition and exposed growth retardation, reduced work capacity and poor mental as well as social development (Sridhar et al.,2014). To sum up, health problems caused by reduced nutritional status in primary school - age children are among the most common causes of low school enrolment, high absenteeism, early dropout and unsatisfactory class room performance (Jarotimi&Ijadunola,2007).

Nutritional status of children not always straight reflect the socioeconomic situation of the parent and guardians as well as social wellbeing, but also the effectiveness of the health care system, and the influence of the surrounding environment (Vinod et al., 2011; Singh et al., 2013). As glob the best indicator of children's wellbeing is growth. These are poor growth associated with overall living standards and ability of the population to meet their basic needs, such as accesses to food, housing and health care. Thus, assessment of growth is the single measurement which fairly defines the nutrition and health status of children as well as provides a measurement of the quality life of the entire population (Joshi et al ,2011).

2.6. Nutrition and cognition

One of the utmost effects of nutrition is on brain functioning which is human cognition (thinking). The influence of poor diet is in different ways like on sleeping pattern, energy and mood, all indirectly affect day to day functioning of the brain at work or school. Cognition is also affected indirectly by the development and other brain functions, for instance nutrition is vital for the development the whole sensory systems like hearing and vision as well as the combination of these processes, that is sensory motor system. Sensor motor system is the synchronization between sensory function and motor movement functions. Theses process developed before cognition as they are vital components needed for learning and memory. So

that, without full and healthy proper development of these systems ideal cognitive maturation is not achieved (Georgieff, 2007).

Fatherly, direct effects of nutrition on cognition are seen much in neurodevelopment, nutrients are trigger for the brain development process without this development is stunted and brain physiology and structure are impaired. This impairment can be temporary if the availability of essential nutrients deprived or ban for short period of time. Though, in critical periods of development it may only require deficiency of essential nutrients for short time before the occurrence of permanent damage. So that, it requires proper nutrition throughout the pre-, neo-, and postnatal stages influence immediate and long -term cognitive maturation. Also, performance the synaptic connections made during this time impact the way the brain is structurally and functionally organized (Cortical organized) through life (Georgieff, 2007).

In conclusion, although nutrients can be causes temporary and permanent cognition impairment also affect neuro anatomy as well as neurochemistry and neurophysiology in general. Neurophysiologic variations reflect changes in metabolism and signal propagation. The changes across all these three venues ultimately result in altered neuronal performance at the time that the nutrient status is altered. So that all types of nutrients are very important for neuronal cell growth and development. Including protein, iron, zinc, selenium, iodine, folate, vitamin A, choline, and long-chain polyunsaturated fatty acids to overcome cognition related consequences. (Georgieff, 2007).

2.7 Malnutrition and its consequences

According to World Health Organization's (WHO) description, malnutrition is the cellular inequity which occurred between the supply of nutrients and energy. It means human body demand them to ensure growth, maintenance and specific functions. Malnutrition as an alternative commonly used under or over nutrition. So that, individual is malnourished if their dietary intake did not provide adequate nutrients for growth and body maintenance or if they are unable to fulfill what their body need essentially (under nutrition). Also malnourished by taking too many calories (over nutrition). Another existence of malnutrition consuming to many calories (overnutrition). Under nutrition is the result of insufficient food consumption, insufficient care and infectious disease, that includes underweight, stunting, wasting and

micronutrient deficiencies (Ismail & Suffla, 2013). As a global problem, under nutrition among school age children is a major health problem also in Africa (Lee & Wan, 2014). The impacts of malnutrition extend till adulthood and it is severe, on children high nutritional risk being malnourished due to physiological demand according to their age (Intiful et al, 2013). As a result, under nutrition is the most serious children health problem and main causes of child mortality (Roy et al, 2007).

Further, malnourished children experience frequent, long lasting and severe illness than children who consumed proper nutrition. Development as a child without proper nutrition has so many consequences like delayed motor skills, lower enrollment in school, low cognition and school performance as well as harmful effects on intelligence. It also exposes for mineral and vitamin deficiencies that impair growth of children, resulting in stunting (indicative of chronic malnutrition), wasting (indicative of acute malnutrition) as well as protein-energy malnutrition. An adult who suffered from malnutrition as a child as a result, will face reproductive difficulties, diminished work performance and potentially unhealthy offspring (Alderman et al., 2004).

Finally, malnutrition among school age children is becoming a major global health concern. Despite the economic growth observed in developing countries, malnutrition and mainly under nutrition is still highly prevalent. In addition to physical and cognitive consequences, malnutrition can have devastating effects on the economy (Frye, 2013; Lwanga et al., 2012). As the World Bank stated, malnutrition negatively affects the economy of a country in the following three ways, First, the direct ways through a loss of productivity, Second, the indirect ways through a loss of cognitive function, and third, losses caused by a buildup health care cost. So that, the loss of productivity can cost an individual suffering from malnutrition 10% of his or her lifetime earnings directly and indirectly, which can translate into a 2-3% loss in GDP. On the other side, decreasing the occurrence of malnutrition can have the reverse effect; a 1% decrease in stunting can increase wages by approximately 1.4% (Roy et al, 2007; Arimi, 2013).

2.8. Culture and Social conformity theory

Characteristics and knowledge of a particular group of people and encompasses language, religion, cuisine, social habits, music, and the arts is called culture and also referred to as attitudes and patterns of behavior within that group. 'Norm' refers to attitudes and behaviors that are considered normal (expected set of roles), typical or average in a group. All societies have cultural norms that is set of the standards they live by, and both are shared expectations and rules

that guide behavior of people within social groups. Cultural norms are learned and reinforced from parents, friends, teachers and others while growing up in a society. In other words, it is reflecting Cultural tightness refers mutually support one another all kinds of interaction with fellow members more formal in nation with tight cultural norms situations at home, the workplace, school, places of worship, parks and others (Schwartz,1999).

Cultural practices are shared perceptions of how people routinely behave in a culture (similar terms used are intersubjective perceptions or descriptive norms). Norms define how people are thinking (shared reality), behaving and control the behavior of people (Shteynberg et al., 2009),Therefore they are conceptually related to cultural practices (Chiu et al., 2010). Norms are both input as well as output variables in the development of practices. Norms prescribe certain behaviors, and once these behaviors are socially reutilized, they become practices. Thus, cultural norms lead to cultural practices and vice versa as well as inferred by perceptions of common behavior of others “how do people think and behave around there (Gelfand et al.2011).

2.8.1 Theory of Conformity

It is a type of social influence or pressure, involving individuals by changing their belief and behavior in order to fit within a group. The intent of this change is to protect them and free from group pressure. Individual simply need conformity to resilience the group pressure (Crutchfield, 1955). Group pressure in society may take different forms, in urban and rural context in urban area persuasion, bullying, teasing was considering as the most common and in rural area it means a lot, regarding to essential characteristics of the community for instance ,density of the community, size of the community, close contact with nature ,homogeneity of the population , most importantly social interaction , social mobility and social solidarity (in sadness and happiness like wedding and funeral ceremony) are mentioned .If agriculture is the main occupation in the time of harvesting, the absence of modern storage, human labor when needed, for exchanging and borrowing agricultural materials seeds, ox ,to practice barter system and others . In addition to this, to overcome the following issues Poor infrastructure, Illiteracy, Ignorance, none application of government policies, the absence of modernization and mechanization, Loss of land to natural disaster, lack of funds and others under the practice of strong social commonality and grouping (Kelman ,1958).

There three types of conformity namely compliance, Internalization and Identification.

2.8.1.1. Compliance (group acceptance)

Compliance conformity refers to when a person accepts all pressure due to hopes, assumed that he or she may achieve rewardable action from another person or the group. Then, adopts the encouraged behavior by expecting to earn specific rewards or approval, so that avoid specific punishment or disapproval by conformity (Kelman ,1958). In other words, conform publicly (majority), means not really agreeing with them privately but it is temporary behavioral change to stop group pressure.

2.8.1.2 Internalization (genuine acceptance of group norms)

This occurs when a person accepts all pressure due to the contents of adopts behavior ideas and action collected essentially rewarding. This adopted behavior is consistent with his/her value system (Kelman, 1958). Internalization at all times performs public and private conformity when a person agrees privately and changes publicly their behavior to fit with the group. These types of conformity considered the deepest level, the beliefs of the group become part of individual belief system. This means it change their behavior permanently. It occurs mostly when majority have greater knowledge and member of the minority have little knowledge to challenge the majority position.

2.8.1.3 Identification (group membership)

When a person accepts pressure due to his interests to establish or maintain a satisfying self-defining relation with another person or group. It also refers, individual conforms to the expectation of social role Eg, police, Officers, and Nurse does not have to be a change in private opinion (Kelman, 1958). Also, Kelman in (1969) identified another additional conformity. It is ingratiation, refer when a person conforms to impress or gain favor (acceptance) from others. It similar to normative influences, but is motivated by the need for social rewards rather than the threat of rejection so that, group pressure does not enter the decision to conform.

Why people need to be conformed the following two Normative and informational Conformity identified reasons by the given authors (Deutsch and Gerrard 1955).

1. Normative conformity

Because a person wants to fit in the group and they succumb to peer pressure. Consider the Asch Line Study because the individual is afraid of being rejected by the group, he or she need to conform. Compliance is a type of conformity in which a person outwardly accepts the opinions of a group but privately rejects them(Kelman, 1958).

2. Informational

This frequently happens when a person lacks expertise and seeks direction from the others. When a person is in an ambiguous (unclear) circumstance, they may socially compare their behavior to that of the group. Sherif's study, for example internalization is a form of conformity in which a person accepts the opinions of a group and adopts them as his or her own (Kelman, 1958).

2.9 Empirical related review.

This section provides empirical related review on the nutritional status of adolescent.

2.9.1 Social determinates influence on consumption

A descriptive cross-sectional study conducted among 16 countries, on society and cultural motivator that drive food prime and others namely health, emotion, price and availability society and culture, environmental and politics, marketing and commercial. It involved non probable sampling 11960 participants from 16 countries the objectives were validate the questioners and six scales was considered by conformity factor and analysis with structural equation modeling. The obtained result chi-square ratio values were 0.987 (environment), 6.921 (for health), in emotion 0.610 and 0.000 the outstanding cases. The final result of this work permissible the validation of the following six scales, and assess different kinds of factors that influenced individual food selections and eating behaviors, namely in the categories; emotions, health, society and culture, price and availability, environment and politics, and marketing and commercials (Corina et al.,2015 &CI et al ,2019).

A study conducted in Ethiopia at Jimma Zone , to assess socioeconomic factors related with underweight and stunting among adolescent indicated that age of adolescents, gender,

educational status, employment status, and type of last school attended were related with underweight. Gender, place of residence, household income, house hold size, education status, previous school attendance experience and abdominal pain were associated with stunting and finally the findings reflected that socioeconomic characteristics were related with underweight and stunting (Huruy et al.,2013).

2.9.2 Malnutrition and its consequence in Adolescent

Earlier experiences and trends 1975 to 2016 in BMI, underweight, overweight and obesity among over 31 million children and adolescent age 5-19 years in 200 countries showed mean BMI and the prevalence of overweight and obesity in most region of the world is increasing. Despite this increment, more children and adolescent moderately or severely underweight than obese. But South Asia and central east west Africa challenges by underweight burden its increasingly concentrated while BMI has plateaued at high level in many high -income countries and is accelerating in part of Asia (Abarca et al.,2017).

Chronic undernourishment is commonly related with poverty in adolescent which result in poor maternal health and nutrition, recurring illness, or inappropriate infant and young child diet and care in early life (WHO,2017). In some countries due to malnutrition, equal to half of all adolescents are stunted (Black et al., 2013). In 2015, there were 1.2 million largely preventable adolescent deaths globally. Malnutrition factors into many of the causes of mortality in adolescence, either as a determinant or exacerbating factor. In middle income countries the majority of adolescent death occurred in Africa (45%) and Southeast Asia (26%), the regions hosting 19% and 30% of the world's adolescent population, respectively (UNICEF, 2018).

In the issues of mortality rate due to the lower age group, adolescents are not typically prioritized for public health interventions (UNICEF ,2011). As a group, adolescents also are less in under nutrition than infants and preschool aged children, historically making the establishment of standardized anthropometric meanings less of a pressing concern for young people of this age (WHO, 2007). Thus, the rapidity of adolescent growth, different in timing of sexual maturity, genetic factors which impose variability on adolescent height and weight all these make maternal and chronological age discordant establishment of international standards as result adolescent growth difficult (WHO,2005).

Stunted or impaired linear growth in adolescent is caused by long term nutritional deficiency. Being stunted has consequences in adolescent. These are greater risk of obstetric complications, obstructed labor and diminished physical capacity in among adolescents in both sexes. Studies suggest that stunting remains prevalent in developing countries throughout the world. All of these studies defined stunting as height -for – age less than 2 standard deviation less than WHO (1995) reference median, a more stringent definition than that used in the international center for research on women (ICRW) studies. In contrast to the findings in the ICRW studies in Nepal and Ecuador, the prevalence of stunting apparently declines with age across the adolescent years in some studies without intervention (Leenstra et al., 2005; Kurtz, 2012). For instance, the cross-sectional study in Kenyan schoolgirls exposed that the prevalence of stunting declined from approximately 20% among 12-year-olds to 2% among 16-year-olds, as the mean height-for-age z-score converged toward the US reference median (Leenstra et al., 2005).

During Adolescent, approximately 20% of individual gain height. Being gained onsite at rapid rate during a period of 1 to 2 years at earlier stages of sexual maturity, it typically is marked by menarche in female or attainment in male voice. In the context of undernourished population menarche or onset of puberty is often delayed and took longer period of time to catch up growth. (Kurtz,2012). Aside, if individual change stunted environment, as families or parents migrate from rural to urban or in the case of internationally adopted children the catch up of growth may be so rapid and speed up the onset of puberty, thus shortening the period of most rapid growth & limiting adult height (Leroy et al.,2015).

The food intervention aimed at alleviating adolescent stunting may not spur heigh gain beyond increases, which occur naturally beyond increases that occur naturally during the adolescent growth spurt and may in fact promote excess weight gain in populations in which concurrent underweight is not prevalent. Instead, the prevention of adolescent stunting ideally being with intervention much earlier in development, stunting during adolescent reflect early age 2 or3 occurrence of chronic undernourishment (Kurtz,2012).At this age ,food scarcity and inadequate nutrient intake limit growth , frequently infections and diarrhea caused by malabsorption of critical nutrient .young children more likely respond well to food interventions, It serve to optimize not only height , but also over all cognitive development and also completely attain physical capacity. Aside from food intervention, promotion of breastfeeding and the intake of

nutrient-dense foods, and prevention of infectious diseases through use of clean water are key in optimizing the nutritional status as well as growth of young children (UNICEF,2011), under this, optimized early growth is critical for the prevention of impaired linear growth in adolescence.

BMI -for age less than – 2SD identified by WHO (2007) expert committee as the indicator of thinness in adolescence. Even though, the term underweight often explains thinness in adolescents with low BMI for age, the indicator of weight -for age typically defines underweight. In the case of Adolescent not always weight indicate height but weight change dramatically with height, Adolescent height largely determined by genetic factors. So that, various definition makes assessment of the public health burden and its targeting of intervention. Nevertheless, thinness pattern among adolescents which existed in developing countries can be review and described according to the international center for research on women (ICRW) studies and others more recent research. To sum up, these patterns include a declining prevalence of thinness and increasing BMI throughout their age, weight and gender, among adolescent boys and girls, boy's greater prevalence of thinness than girls.

2.9.3 Determinants of Nutrition status in Adolescent

A lot of studies have made in the area of determines of adolescent nutrition status and some of them are reviewed below in respect to their methodology and the finding. In south western Uganda at Rakia district a community based cross-sectional survey was conducted the country used a questionnaire that focused on demographic and economic characteristics. The result of this study showed that 47% of orphan had malnourished and also mentioned their nutritional status as an outcome of factors for instance environment, economic status, education and culture. Additionally, widespread lack of resources to meet big family needs contributed to malnourishment, low level of caretaker, family and parents education, large household size and orphanage also played a major role in nutrition status (Kikafunda et al ,2006).

A cross-sectional school-based survey by using multistage sampling techniques was conducted to assess determinates of underweight, impeding and wasting among 450 school children between (7-14 years), in Dale woreda, Southern Ethiopia. The result showed that house hold food insecurity situations, low maternal education and infection with Trichuris Trichra were some of the major factors contributing to under -nutrition in the study area (Mekides Wolde et

al., 2015) .Also another community based cross sectional study performed at Amhara region in five(5) major community based nutrition (CBN) implementing woreda as are Wogera, Ebnat, Walda, Chilga and Dembecha to assess BMI level among adolescent girls ,BMI for age and height for age and associated factors. The finding indicated that prevalence of adolescents with low BMI -for age- and low height -for age z score< -2 were high. Also, others dietary diversity score and community -based nutrition service utilization were factors affecting low BMI- for -age in adolescent girls, food insecurity and nutrition and heal the information were factors affecting low height -for- age in adolescent girls (Molla Mesele et al.,2015).

Similarly, Cross-sectional study conducted in Adama review adolescent mother and father education level, occupation of their father, their consumption and pattern of meal diversity to have an influence for under nutrition. The result of this study showed that, girls from daily laborer fathers were twice more venerable than who has merchant father. In respect to their mother due to lack of education undernourishment was severe on girls (Roba et al., 2016).

Another cross -sectional study conducted by Yeshalem Mulugeta et al .,(2018) to assess associated factors of under nutrition among school adolescents in Dangila town, Northwest Ethiopia, analyzed using multivariable logistic regression showed that stunting and thinness were prevalent in 24.8% and 7.1 % respectively. Male gender, frequent food intake, the absence of latrine, and poor sanitation for instance hand washing performance were autonomous predictors of stunting and associated factors for thinner were being male, illness in the last two weeks and have more than five family members. Male gender, infrequent food intake, unobtainability of latrine, and poor hand washing experiences were independent predictors of stunting. Factors associated with thinness were being male, illness in the last two weeks and having more than five family members.

2.9.4 Dietary diversification

It is the most significant factors that affect child nutrition and health outcomes in general (Annim, 2014). The significance of variety consumption known very long and all individuals must have variety foods to meet their essential nutrients. So that, consuming more diverse diets assist to meet their nutrient needs. In addition to this nutrition status of children is influenced by diet and both under and over nutrition problems reduced by increasing the consumption of

variety foods (Hooshmand & Udipi ,2013).

The indicator of dietary of diversity measure are relatively simple and give an information the adequacy of nutrient it often called dietary diversity scores which recently become more Preferable study method to measure dietary adequacy in developing countries. The dietary diversity scores consist of different lists of foods or food groups that contribute to the diet in a particular period, also all are correlated with child nutrient intake and various anthropometric measurement. Both measurements have been used to evaluate and study diet in both early childhood and adulthood with its simple to collect and easily to adapted diet in a various setting (Hooshmand & Udipi ,2013).

2.9.5 Research gap

Accordingly, based on the above literatures several studies conducted and showed different determining factors on adolescent nutritional status and also adolescent who is living in rural Ethiopia. But there is a gap in investigating, identifying and documenting the problem. Furthermore, there is the absence of adequate research conducted to quantify the problem of nutrition status in adolescents from the points of social determinant factors. Despite of the fact, overall, of primary school students (adolescent)t due to rapid physically and physiological change such us body weight and height also prepare them for adulthood this growth highly demands and depend on their nutrition. Therefore, there is a gap of investigating and detecting problem associated social determinants factors on adolescent nutrition status. So that, this study tries to fill the gap and come up with some evidences.

2.10 Conceptual Frame work

The conceptual frame work below shows social determinant factors of adolescent living in Hagere-Mariamna Kesseworeda. Some of negatively or positively the affecting factors are demography, sex of adolescent, Age of adolescent, family size, number of children in a single house, birth order of adolescent; Socio-economic factors adolescent parent education status, employment status, adolescent health status; Environmental drinking water, food storage, toilet, garbage disposal ,Social determinants Culture , Social context Social class; Culture refer as an umbrella encompass everything monitor individual belief values by set of eating habit and Social context ,affect all cooking ,production and consumption must be culturally appropriate ; Social

class labeling the existing food by class and individual ability. These three called social determents and cumulative effect set cultural norm diet restriction food to be consumed and not consumed as result variety affect and nutrition deficiency then adolescent all these are directly affect adolescent nutrition status.

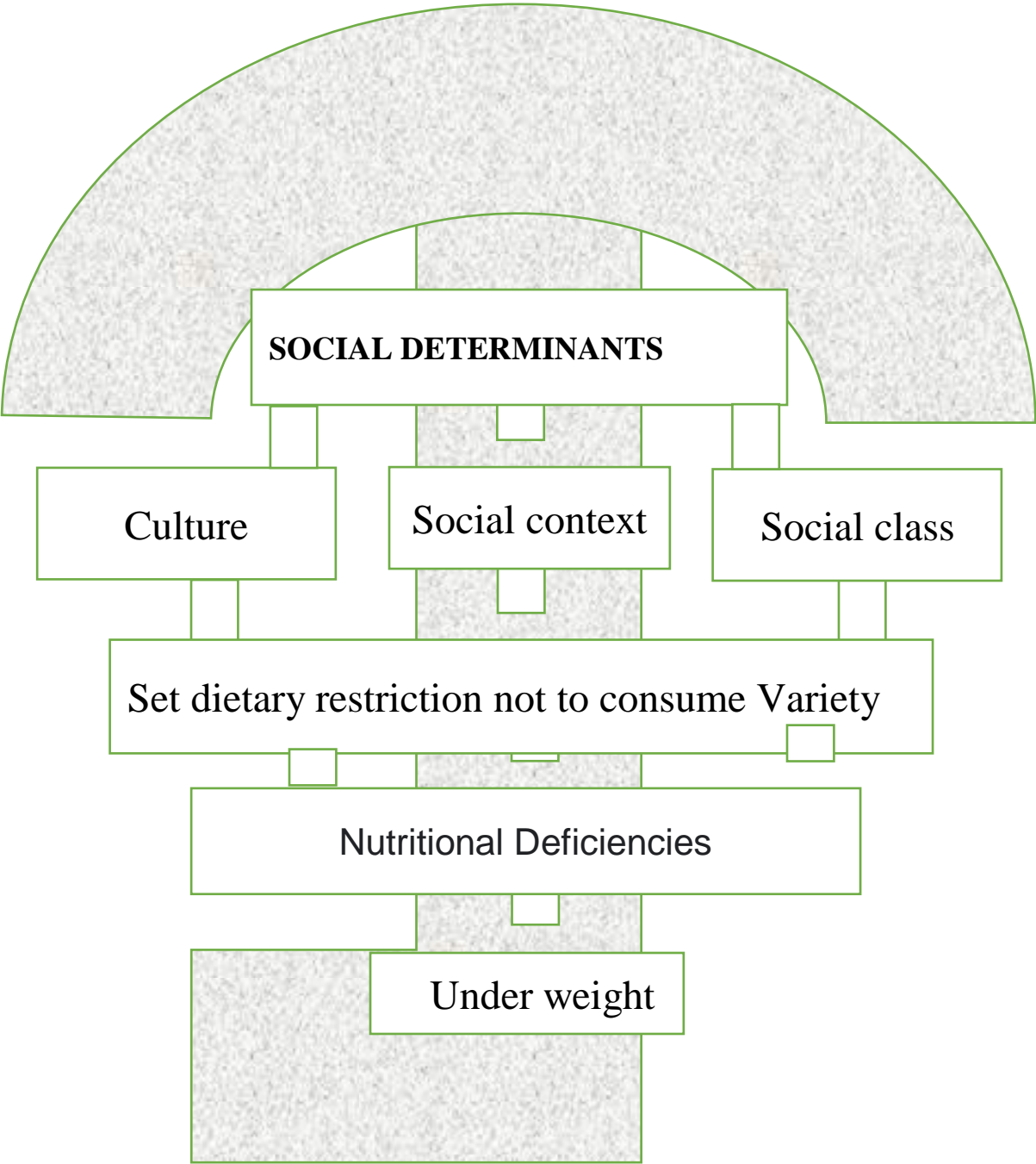


Figure 2: Conceptual frame work for social determinants of Adolescent nutrition status, (Source: own constructed)

CHAPTER THREE: DESCRIPTION OF THE STUDY AREA AND THE RESEARCH METHDOS

3.1 Description of the study area.

This study was carried through in Hagere-Mariamna Kessem, one of the woredas in North Shewa, Amhara National Reginal State, which is located at 9°19'60.00 N and 39°14'60.00 E with altitude range 2620-3190 m above sea level. The woreda has a total area of 1509.93 km² (582.99 sqm). It shares borders south, west, north and east respectively the Germama (or Kassem) river which detached it from Menjarnashenkora, Oromia region, Angolalla Tera, Asagirt and by Bererhet. The study area consisted twenty-one kebeles and thirty-four schools. In the context of topography, it divided into three agroecology's, namely, 15% Highland, 40% Midland and 45% Lowland with two rainy seasons, called 'Belg' (February - April) and 'Meher' (June - September). The average annual rainfall ranges from 1400 to 1600 mm and while mean annual temperature varies between 15 and 19 o C per annum, (CSA, 2007). Total population 64,802.00, Rural population 62,445.00 96.36%, Urban population 2,357.00 3.64 %, Female population 31,961.00 49.32%, Male population 32,841 50.68% (CSA,2017).

In the study woreda (Hagere-Mariamna Kessem) Amharic is spoken as a first language by 96.74%, and Oromiffa is spoken by 3.17%; and others 0.13% spoke all other primary languages. Majority of the population practiced Ethiopia Orthodox Christianity, with 99.87%.

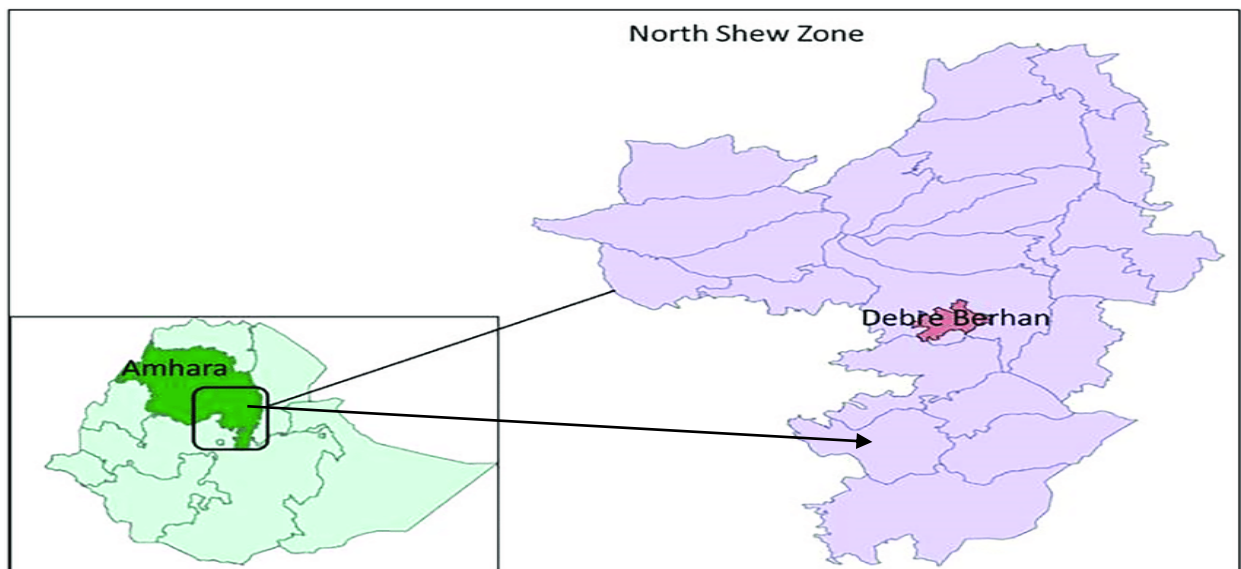


Table 1) Number of Students in Table (2020-2021) Academic year

Number of Students in table (2020-2021) Academic year				
No	Grade	Male	Female	Total
1	1-4	4,099	3,783	7,886
2	5-8	944	1,152	2,060
3	9-10	630	832	1,462
4	11-12	275	350	625
		5,948	6,117	12,033

Source:

In the study woreda (Hagere-Mariamna Kesseme) there are 21 kebeles and 30 schools with a total number of students of 12,033. Of these, 2060 adolescent boys and girls of 11-14 age were considered as study population.

3.2 Research design

Institution based cross-sectional study design was applied in the study to take Body Mass Index (BMI) measurement for 11-14 years of adolescent and assess the effects of social determinates on nutritional status of among primary school children (adolescent) from April 14 –May 22,2021.

3.3 Source population

The study population source was households who had adolescent child in the study area.

3.4 Study population

The study population was primary school students. According to the Ethiopian education and training policy, Elementary education is a level of education that ranges from grade 1 through grade 8. This level of education is divided in to the first cycle (grade1-4 with the age range 7-10) and second cycle (grade 5-8 with the age range11-14) education. Usually, the age of students in primary school grade 5-8 has between 11-14. So that, the study subjects were primarily school age children of 11 to 14 years old ,According to Education Statistics Annual Abstract (ESAA,2003). Individual Was determine by inclusion and exclusion criteria.

3.5 Eligibility criteria Inclusion and exclusion criteria

All primary school students from purposively selected schools with three-agroecological background, and who have been learning at primary schools between 11-14 age range were included in the sample and took BMI from them. In contrast, others who were out of these age ranges who were ill or had been suffering under some health issues were not included in this study.

3.6 Study Variable

There are two variables in this study dependent and independent, the dependent variable is nutritional status.

Independent variable consisted demographic, socio-economic (social class), cultural influence, environmental factors and food habit (social context).

3.7 Sampling techniques and Sample size

The subject of the study were adolescents (primary school students age 11-14) and two techniques of sampling stages were used, purposive and random sampling. Due to the practice of food taboos and restriction in some food groups on adolescent, plus from most cost and time effectiveness the study area selected purposively (Black,2010). Adolescent who was volunteer added as study population and were selected randomly to be participants. To give equal chance for each respondent simple random sampling technique applied during structured questioner were conducted.

The sampling techniques contained two sampling stages,

To determine the primary school students to be include in the study, Yamane (1967) sample size determination for finite population formula was applied in order to get representative sample size for the study.

Thus,

$$= \frac{N}{1+Ne^2} n$$

Where,

n= sample size

N = Population

e = is level of precision

$$\frac{N}{1+Ne^2} n \quad n = 600/1+600(0.05)^2 \quad n = 600/2.5 = 240$$

By adding 10% to the sample size for expected non -response rate, the final sample size of primary school students (11-14) who was living in to three different agro ecology areas to participate in the study was:

$$nf = 240 \times 10\% = 24 \text{ will be } 189.2 \text{ primary students were } 240 + 24 = 264$$

3.8 Types and Sources of data

All reliable primary and secondary sources of data were considered in this study. Primary data raw information, which obtained through direct observation and structured interview and Secondary data was collected from journal articles, reviews, books, others researches, published and unpublished work of others on adolescent nutrition status and social issues.

3.9 Data collection Technique and Tools

3.9.1 Household survey

Household survey was conducted in households to collect accurate comprehensive information. These included diverse socio demographic related to circumstances under which people live their welfare, demographic characteristics and cultural factors which impact behavior, as well as social and economic change. Also, government departments and organizations used this

information on a range of topics concerning households for monitoring and policy purpose (Groves, 1989 & Couper, 1998). Accordingly, to have reliable information face -to- face interview using structured questioners were used to collect household socio demographic characteristics in the study area including the existence of respondent adolescent.

After an orientation was given to data collectors by the researcher, structured questioner was administered from eligible respondents (adolescent and their parents or care giver) to collect quantitative data. It was collected by six school teachers from three primary schools from different agroecological areas and two of them were assigned for each school. For FGD, six individuals two women and four men were involved. Also, key informant was collected from some school teachers, children's parents, woreda extension health officer and adolescent themselves were interviewed.

3.9.2 Anthropometric /Body max Index (BMI) It needs modification

Anthropometric (weight for height and weight for age) evaluation is highly reliable, an essential geriatric nutritional evaluation to determine malnutrition, obesity and being overweight, muscular mass loss, all over fat mass gain and tissues redistribution. It has the following future Anthropometric values closely related to nutrition and genetic makeup, provides detailed information on different body structure. Major tools are Height, Weight, mid-upper arm circumference (MUAC) and Age (Villareal, et al., 2005).

However, Anthropometric evaluation could not be applied due to COVID-19, instead MUAC and BMI were used. BMI is a measure to define overweight and thinness, weight in kilograms divided by the square of height in meters. In developing countries, mostly used with age independent cutoffs to identify chronic energy deficiencies in adults. BMI calculation uses height in meter and weight in kilograms. BMI values determined as follow, underweight (BMI values < 18.5), normal or desirable weight (BMI values 18.5 -24.9), Overweight (BMI values 25.0-29.9), obese – class I (BMI values 30.0-34.9).

3.9.3 Individual dietary diversity scores (IDDS)

As FANTA (2006) stated, if the research objective assessed nutrient adequacy of the population, dietary diversity should be collected by using its indicators as individual level, not as household minimum diversity (MDD-W and MDD). Plus, dietary diversity has been validated as substitution measure for macro and micronutrient appropriateness of the diet for several age and, or sex. All scores have been absolutely correlated with enough micronutrient contained foods for new born and young children (FANTA,2016).

Individual dietary diversity score (IDDS) was collected by using standard questionnaire, as proposed by Swindale and Bilinski (2006) and consisted the following seven food groups to measure dietary diversity; (i) grains, roots or tubers; (ii) fruits and vegetables; (iii) meat, offal and fish; (iv) eggs; (v) pulses and legumes; (vi) milk and dairy product; (vii) food cooked in oil or fat. Accordingly, the range of dietary diversity scores from 0-7 respectively indicates whether has been consumed any or all of the food groups in the last 24 hours. This index was selected as it is specifically validated to provide a proxy of nutritional status of children and adolescents in low and middle-income countries recommended by Aurino, (2016). Each respondent was asked food consumed by the last 24 hours inside and outside their home. From these 7 food groups who consumed at least 4 food groups in 24 hours recall obtain as minimum dietary diversity (MDD).

3.9.4 Food Composition score

The Vulnerability Analysis and Mapping (VAM) platform, which is a main source of food security monitoring data and analysis, is managed by the World Food Program. Users can use the platform's various features to display and download data on commodity prices and predicted food security indicators, such as the Food Consumption Score (FCS). It is a more complicated indicator of a household's food security status, since it considers not only dietary diversity and frequency, but also the relative nutritional importance of different food groups (INDDEX, 2018).

Food composition score was collected by using standard questioner which consists the following 9 food group food security with systematic assessment nutrition diversity (1). Maize, maize porridge, rice, sorghum, millet, pasta, bread, and other cereals, cassava, potatoes and sweet potatoes other tubers, plantains (2) Beans, peas, groundnuts and cashew nuts (3) Vegetables, leaves (4) Fruits (5) Beef, goat, poultry, pork, eggs and fish (6) Milk, yogurt and other dairy (7)

Sugar and sugar products honey (8) Oils, fats and butter (9) Spices, tea, coffee, salt, fish powder, small amounts of milk for tea. Accordingly, the range of the scores the second cut off for sugar and oil consumer 0.-28 poor, 28.5-42 Borderline food secured, >42 Acceptable used each respondent was asked what they consumed the last 7 days from these 9 food groups and obtained the result based on the cut off (INDDEX, 2018).

3.10 Technique Data Analysis

In this study the data was analyzed in respected to their uses, Quantitative data which obtained through questionnaire was, coded and prepared to enter to computer for analysis by using Statical packages for Social Science (SPSS version 22).

In addition to these different tests were employed to analysis mean, percentage, frequencies and the statical significance finally to estimate relationship between nutrition status and social determinant factors as well as their influence on the diversity score outcome variables, Cross tabulation was used to analyze the association between dependent and independent variables by Chi-square test at 0.05 level of significance.

CHAPTER FOUR: RESULT AND DISCUSSION

In this chapter all data collected from questionnaire, anthropometric measurement, focus group discussion, key informant interview and observation were analyzed and interpreted throughout the following four main sections. The first section provides background information about respondents, in the second section all the existing social contracted cultural norms dietary habit presents, next review social context dietary pattern influence adolescent nutrition status, analyze social economic (social class difference) influence on nutrition status, reviewed as third and fourth section and finally, general summary was provided.

4.1. Response Rate

Two hundred sixty-four (264) questioners collected (contained with anthropometric measurement, Individual dietary diversity standard questioners and Food composition sores) have been administered on three different agroecological primary schools' student from age group 11-14 (adolescent) with parent and caregiver. Also, key informant interview was conducted from both school directors and three school teachers from each school, selected parents during the parent days (a total of 9 interviewees), it was on April 15 May for the two consecutive weeks due to covid they were invited them in two days to avoid social contact and suffocation. Plus, focus group discussion was applied with four adult men, two adult women, woreda health extension worker. All total 264 questioners were returned and used as sources of primary data for this study

Table 2, Cross tabulation on Adolescent Age with sex

Gender	Age of Adolescents				Total
	11	12	13	14	
	11	12	13	14	11-14
Male	28 (47 %)	29 (48 %)	32 (47 %)	37(49 %)	126(48 %)
Female	32 (53 %)	31 (52%)	36 (53 %)	39(51 %)	138(52 %)
Total	60 (100 %)	60 (100 %)	68 (100 %)	76 (100 %)	264 (100 %)

Source: Analyzed based on own data set (2021).

According to WHO (2007), of the appropriate nutritional indicators for adolescent nutrition status the most common one is weight for height (wasting) and adult BMI needed for children more than ten years. Also, determinants of adolescent nutritional status were adopted from similar studies on adolescent nutritional status (Amha Aregaw, 2018, Delelegn Yilma , 2018 & Huruy et al.,2013). And both social determinates were reviewed below according to mixed research methods Qualitative and Quantitative with the give data required. Demographic, Socio economic, Environment and health, Dietary habit and Social Determinants (Culture, Social class, and social context) considered as determinant variables in this study.

4.2 Nutrition status and demographic background of the study Area

In this study adolescents within 11-14 age range with their mothers were considered as respondents from their closeness and ability to answer properly, questions regarding with nutrition. Several studies have been exhibiting that, socio demographic factors have influence on food consumption since earlier (Axelson et al., 1986). Plus, Age as shown in the table 3, below majority of respondents (n= 138, 52.3%) were female and (n=126 ,47.7 %) were males. This indicates that the number of male students in the school were less. In the context of student sex was concerned, they have close difference in participation of primary students from the sample schools. So that, as majority of the student were female this indicates female participation of primary school was high.

In the context of sex difference regarding underweight, female adolescent girls were more likely underweight as many similar studies mentioned (Cordeiro, 2006). It is global health concerns which affect mainly low- and middle-class income countries and mostly occurred as result of inadequate macro and micronutrient consumption and manifests in four forms namely wasting, Underweight, growth stunting and nutritional deficiencies. Adolescents (10-19) account for a quarter of the global population. At this time of life is significant because rapid growth and development occurred and requiring larger nutrient intakes by adolescents. They are more prone to health and nutrition difficulties than other age groups since their health and food behaviors are shaped during this time. (Cordeiro, 2006).

Table 3, Total summary for underweight and wasting

Total summary of Adolescent underweight & wasting			
Age	Sex of Adolescent	Total Under weight	Total Wasting
11-14	Female	85 (62%)	46(33%)
	Male	71(56%)	44(35%)
	Sum	156 (59%)	90 (34%)

Source: Analyzed based on own data set (2021)

Based on the above table 3, indicates majority of adolescent girls were 62% underweight and 33% wasted regarding to male adolescent boy’s majority of them were 56% underweight and 35% wasted, as the finding result showed the prevalence of underweight more on female adolescent girls compare to adolescent boys those were the study population of this study. The reason behind this more importantly, adolescent girls require a sufficient supply of high-quality nutritious means getting the right balance of food rich in whole grains, fruits and vegetables, fair fat milk product, beans, fish, nuts, eggs and lean meats. With required quantity to meet the increased nutritional demands associated with maturation, menstruation, and participation in various physical activities, as well as to reduce health risks and break the intergenerational cycle of malnutrition (Cordeiro, 2006). In addition, this, both were underweighted with close difference in percent and number this also indicates the existing of aggravated issues which affect both sex with different level.

Religion of adolescents was (98.9%) Orthodox Christian and who have been participating in all annual fasting since they were seven year old (n=202; 76.5%). Majority of adolescent had five siblings (24.6%) and more (39%) dependent children, making the household own eight and more family members (34.8%). Plus, Of the adolescents who were living with their parent (84.0%), majority of them were farmers who interrupted their education at elementary school level (41.3%) and their mothers (50.8%) never attend any level of training and education. Rural people are culturally sensitivity towards consuming nutritious foods. In addition, rural household usually have significant numbers of dependent children. Poor education of mothers would not enable them to earn income (IFPRI, 2020). The low level of mother education in addition to

seasonal diet restrictions, frequent fasting, and practice of eating one or two meals a day indicated that the majority of adolescents were underweight, even though the respective households (n=185,70%) had acceptable food security status in the study area .

Table 4. Socio demographic status of study area

Variable	Category	Frequency	%
Sex of students	Male	126	47.7%
	Female	138	52.3%
Age of students	11	60	22.7%
	12	60	22.7%
	13	68	25.8%
	14	76	28.8%
Number of children in the house	Two	7	2.7%
	Three	43	16.3%
	Four	62	23.5%
	Five	65	24.6%
	Six	49	18.6%
	➤ Six	38	14.4%
Religion	Orthodox Christian	261	98.9%
	Protestant	1	0.4%
	Other	2	0.8%
Adolescent father level of education	None	72	27.3%
	Elementary education	109	41.3%
	Secondary education	38	14.4%
	Technical Vocational	10	3.8 %
	College University	14	5.3%
	Others spiritual education (for reading & writing purpose)	21	8.0%

Adolescent father Employment status	Farmer	180	68.2%
	Formal employment	3	1.1%
	Merchant	18	6.8%
	Both farm & off-farm	30	11.4%
	Others	33	12.5%
Adolescent mother level of education	None	126	47.7%
	Elementary education	87	33.0%
	Secondary education	23	8.7%
	Technical Vocational	15	5.7%
	College University	8	3.0%
	Others spiritual education (for reading & writing purpose)	5	1.9%

Source: Analyzed based on own data set (2021).

4.2.1 Nutrition Status and Socio-economic Characteristics of the respondent

The socio-economic status of adolescent parent and care givers as table 19, indicated that 68.2% of fathers were farmers. The rest were involved in off farm and non-farm activities. According to boservations from FGD, about 76, % parents own 4 to 12 hectares of land. Each household produced food for consumption and sales, 95.5% owned livestock and 60% owned sheep, goats and poultry. Households had enough livestock for sale and consumption. Nevertheless, over 71.2% parents did not give varieties of food for to children due to the existing social and cultural norms of diet restriction to adolescents. In addition to this, several studies suggest that individual nutritional knowledge and health-related attitudes are more closely associated with dietary intake. Also, mother education and willingness to variety consumption were contributing factors to improve nutrition status (Wyatt et al., 2006). Furthermore, social cultural norms, diet restriction and socio economic at household level made different influences on food consumption. Mother's education status increased the ability to obtain sufficient number of nutritious foods (Axelson et al., 1986).

Consequently, so many research findings mentioned that, household nutrition status is highly dependent on individual socio-economic status, i.e., purchasing power, the affordability of

buying necessary materials for consumption, further production and storage, or produce food items by employee and others laborer (paying capacity) (Axelson, 1986). In contrast, the study area with so many resources which mentioned on the above and others rural assets what they use as resilient. Nevertheless, 66% of adolescent were underweight this indicates others findings were not considered the theory of food entitlement which refers the social arrangement of the community (Sen,1999).Social cultural beliefs and values which control all human perception (control five sense organ of human). So that, since the country has 80 different ethnic groups with cultural diversity ,each group has their own cultural norm , belief and dietary practice .As result this cultural diversity grouped food consumable or not and banned verity consumption as result adolescent under weighted occurred.

4.2.2 Adolescent Nutrition status

All the necessary anthropometric measurement were taken from adolescent of age groups 11-14 years who lived in the study area and attended primary school. As shown in table 5 below, 59% of adolescents were under weight and 36% were wasted. Under nutrition reflects failure to receive essential or required nutrition. Low weight for age (WFA) and the existence of different consequences such as delayed growth, retarded intellectual development, goiter, increase risk of infection, blindness, anemia, inadequate bone mineralization and reproductive outcome have adverse effect on girls (WHO,2 000 & UNICEF, 2008). Wasting also occurred. It is the occurrence of low weight for height and recent and severe weight loss which can be persistent for long time. It usually occurs when individuals do not have adequate quality and quantity of foods or due to continued illness (WHO,2000 & UNICEF, 2008).

According to Ethiopian demographic health survey report under central statics Agency (EDHS ,2016), The prevalence of under nutrition during adolescent 10 % of children were wasted (30% Severely wasted). And others regional studies showed Gojjam 46%, Benishangul-Gumuz 43%, Afar 41%, Dire Dawa 40%, Tigray 39%, SNNPR 39%, Oromiya 37%, Harari 32%, Somali 27%; and Addis Ababa and Gambela had 15% and 24%, 43 respectively (CSA 2016). But in the current study as table 5 exhibited, below 66% underweight and 36% wasted found this indicates there is the existing of other aggravated factors which reviewed in this study was social cultural diet restriction practice . As table 6 showed (n=188,71.2%) adolescent parents were not willing to give variety food appropriate to their age and health due to social cultural norm diet

restriction. This restriction extended any combination of food mix with prohibited one as table 7, indicates (n=235,89%). So that, nutrition status of adolescent girls and boys might be affected.

According to the Adult anthropometric resulted 66% of adolescent were under weight, 36.9% were normal and 4.92% were overweight. Weight trends, linked to the Body Mass Index (BMI), persist throughout life, with overweight children becoming overweight adults, resulting in large percentages of overweight people of all ages. Despite the continuance of large percentages of overweight people, researchers have yet to identify the root of unhealthy adolescent weight gain. Overweight has been connected to a range of social, environmental, and genetic factors, but no study has shown how teenage and adult weight development differs. The goal of adult BMI Assist sometimes to identify inherent issues (Wyatt et al.,2006).

Table 5, Weight-based anthropometric evaluation of children (11-14 years), in Hagere-Mariamna Kessew woreda primary school, N=264, 2021.

Age	Sex	Number	Median Weight, (Kg)	Median Height (Cm)	Weight for age Underweight (<-2 score)	Normal	Weight for height (2z score)	Normal
11	F	32	17(28%)	19(32 %)	13(5 %)	15(25 %)	15 (6 %)	17(6%)
	M	28	19 (32 %)	18(30%)	13(5 %)	13(22 %)	11 (4 %)	19(7%)
	Sum	60	36 (60%)	37(62 %)	26(10 %)	28(10.6%)	24 (10%)	36(14 %)
12	F	31	19(66 %)	16(27 %)	16(6 %)	14(23 %)	12 (5%)	19 (7%)
	M	29	21(35%)	15(25 %)	13(5 %)	15(25 %)	9 (3%)	21(8 %)
	Sum	60	40(67 %)	31(52 %)	29(11 %)	29(11 %)	20 (8%)	40(15 %)
13	F	36	22(32 %)	22(32 %)	30(11 %)	5(7%)	14 (5%)	22(8%)
	M	32	17(53 %)	17(25 %)	21(8 %)	10(15 %)	15 (6%)	17(6 %)
	Sum	68	39(57 %)	39(57%)	51(19 %)	15(5.7 %)	29 (11%)	39(15 %)
14	F	39	34(45 %)	28(37 %)	26(10%)	11(14 %)	5(2%)	31(12 %)
	M	37	23(30 %)	26(34 %)	24(9 %)	12(16 %)	14(5 %)	18(7%)
	Sum	76	57(75%)	54(71 %)	50(19%)	23(8.7 %)	19(7%)	57(22 %)
+19+Total		264			156 (59%)	95(36%)	95(36 %)	164(62%)

Source: Analyzed based on own data set (2021).

Many researches reviewed the relationship between adolescent BMI and parental behavior, household conditions, and inherited characteristic. Based on this study, BMI growth rates varied significantly by genetic and environmental characteristics, but racial and ethnic growth lines show significant heterogeneity-both before and after achievement of full growth. Considerable race, sex, and age differences have been shown to exist between overweight individuals and socioeconomic status. Economists found that household characteristics impact BMI through food availability, income expenditure on food, and behavior. Participation in food programs, nutrient intake, and income varies by household, and each of these factors impact weight. Higher weights have been found among rural and urban residents, but they vary by race. While moving to an urban area often results in weight loss, individuals with high BMIs are unlikely to move to, or live within, these areas. Environmental effects are generally small, but neighborhood characteristics can mainly impact a child's weight. Food prices at the local level could impact adolescent weight by altering the household budget constraint. (Wyatt et al., 2006).

Table 6, Adult BMI result

Age	Sex	Number	Under weight (BMI<18.5)		Normal BMI (18.5-24.9)		Over weight (BMI25-29.9)	
11	Male	32	13	4.9%	15	5.7%	4	1.5%
	Female	32	13	4.9%	13	4.9%	2	0.8%
12	Male	28	16	6.1%	14	5.3%	1	0.4%
	Female	32	13	4.9 %	15	5.7%	1	0.4%
13	Male	32	30	11.4%	5	1.9%	1	0.4%
	Female	36	21	8.0%	10	3.8%	1	0.4%
14	Male	37	26	9.8%	11	4.2%	2	0.8%
	Female	39	24	9.1%	12	4.5%	1	0.4%
		264	156	59.1%	95	36.0%	13	4.9%

Source: Analyzed based on own data set (2021)

According to the Adult anthropometric resulted 59.1 % of adolescent was under weight ,36.0% of student was normal and 4.9% were overweight. The high prevalence of underweight was indicator of food problems almost more than the half of student were found under –weight any

one of the food insecurity categories. Under weight of adult was significantly considered and might association the above issues and considered as final which encompass all social and genetic attribute in general.

4.2.3 Nutrition status and Environment and health factors

Accordingly, in the study 39.4% of households get water from pipe water and 66.6% used clean water for drink. About 25% had flush toilets and 69% pit latrine, Storage practice over 80 percent of the household processed 86% not keep as it is. Another concerning factors garbage disposal 92% segregate in different site and finally handwash experience 95.1% were washed their hands with soap. In 2002, around 23% of all global death causes of environmental factors among this 36% of death occurred on children under 15years particularly affected by the environment. This also occurred in developed nation exhibited in large role of disease and 17 % of all death registered due to environmental factors. In the context of environmental health issues sources of drinking water, toilet, food storage, garbage disposal and hand wash practiced raised as most common food and water contamination measure based on the finding result (Burg, at et.,2008).

Table 7, Water ,sanitation and hygiene (WASH) status

Environmental and health issues			
Variable	Category	Frequency	%
Main sources of drinking water	Pipe water	104	39.4%
	Public water	106	66.6%
What types of toilets do you have?	Flush	66	25.%
	Pit latrine	183	69.3%
	Absolute toilets	12	4.5 %
	No facilitates or bush /field	3	1.1%
How do you store perishable foods?	In the refrigerator	10	3.8%
	Covered and protected storage and processed in to butter, others used wind drier.	227	86.%
	Others not specific	27	10.2%

Garbage disposal	Segregated in different site	243	92.%
	Burn without segregation	6	2.3%
	Others not specific	15	5.7%
Hand wash practice	Wash with someone pouring	3	1.1%
	Wash using soap	251	95.1%
	Other not specific	10	3.8%
Did you or other your family member reputedly practice illness?	Yes	199	75%
	No	65	11%

Source: Analyzed based on own data set (2021).

Sources drinking water is imperative for human wellbeing. Water that's sullied with pathogens may cause illness, especially gastrointestinal infection. This water born illness can causes loose diarrhea and vomiting. Drinking water supplies can be treated to evacuate pathogens and make the water secure to drink. These illnesses can all be contracted in a variety way not just drinking untreated water. Other related factors for contracting these illnesses incorporate contact with recreational water, farm animals, sick animals, fecal matter, other symptomatic individuals and consuming contaminated food.

The absence of essential sanitation can result undesirable environment contaminated by human waste. Without the existence of proper sanitation facilities, waste from infected person can contaminate a community land, water, increasing the risk of infection other individual.

The way we store food can affect quality the food quality and reduced the amount of nutrients. Wrong food storage practice exposed individual for harm full bacteria when they consume rather than maintaining body health.

The more emissions that human produce how much leftover individual generate affect us long term. It creates diseases such as asthma, cancer, childhood cancer, birth defect, cardiovascular disease, low birth weight and others infectious diseases. Plus, solid waste pollution mainly caused by through urbanization and industrial waste it also causes for difference diseases in human as bacillary dysentery, diarrhea and amoebic dysentery, plague, salmonellosis, trichinosis, endemic typhus, cholera, jaundice, hepatitis, gastro enteric diseases etc.

Hand washes decrease the rate of respiratory contaminations by evacuating respiratory pathogens from hands and protecting them from entering the body or transmitting to others individual. Study findings suggests that washing hands with soap after defecation and before eating can avoid the respiratory illness rate around 25% (Burg, at et.,2008).

4.2.4 Birth order, large family academic attainment and Adolescent nutrition

Knowingly, educational attainment refers to the successful completeness of highest level of education as individual to meet the learning objectives at required level. This is one of the many ways to address child wellbeing improvement. Which involves to maintain in behavioral functioning, social and cognitive areas integrated with all aspects of child welfare, like child abuse prevention, reducing risks and increasing safety and protective factors of child, youth, parent, and caregiver well-being through marriage, fatherhood, and parenting community improvement (Amato, 1991).

However, this, individual academic attainment highly influenced in both negative and positive ways by the following circumstantial family size, family types, parents' education status and the student self-attitude itself (Jones,1999 & Rosetti ,200). Plus, parental beliefs and behaviors on education attainment is often a stronger predictor for academic success to earn cognitively stimulating activities, transferring skill one generation to the next, for behavioral outcomes parent education and family income is more closely associated with the provision of material and resources skill in general (Davis et al., 2019). As result showed in table 3(68.2% father and 38.8%, mother) majority of adolescent came from uneducated farmer family this exposed them to lose internal academic support from family and affected by its negative out comes.

Another determinant factor is having large family size including 5 siblings 24.6% and eight and more family size 34.8% were living in a single house observed as table 3 showed. So that, as small farm agriculture practice demand in come and intensive labor siblings were unlikely to receive equal share resources devoted by parents to their children's education. In addition to this, As table 8 showed (n=118,44.7%) most of them were middle child and have third birth order in psychology being middle child is the most powerful influence on individual personality how he/she look the world, along with temperamental and parenting style (Bogin ,1997). Plus, the absence of family follows up, treatment and motivation, resource and quality life provision

influenced on child behavior, as result they could not use their potential to attain something also exhibited negative self-esteem (Hanushek,1992). And this exposed majority of them to be low achiever in academic attainment, as table 8 showed (n= 60 ,25%).

Table 8, Birth order large family size and educational attainment.

Variable	Category	Frequency	%
Member of families in the house (Family size)	Three	3	1.1%
	Four	9	3.4%
	Five	41	15.5%
	Six	57	21.6 %
	Seven	62	23.5 %
	Eight and > eight	92	34.8 %
Birth order	First child	21	8.%
	Second child	38	14.4%
	Third child	118	44.7%
	Fourth child	58	22%
	Fifth child	25	9.5%
	Sixth and more child	4	1.5%
Student academic status class repeat and withdrawal	Low grade	66	25%
	Never	60	22.7%
	School discipline	23	8.7%
	Family issues	52	19.7%
	Others	63	23.9

Source: Analyzed based on own data set (2021)

In conclusion, having large family size and sibling, parent education status, birth orders are the most significant factors for educational attainment. In addition to this, educational status of parent, means having educated parents have information about successful child rearing, and capacity to identify evaluate necessary information for child wellbeing, help children to be successful in school, establish modeling positive interaction at home like reading and playing. Highly educated parents mostly act as model and holds high level of educational expectation and push their children to achieve it, in addition to learn complex and rich language skills brought their parent (Hoff,2003).Also, educated parents more informed how time spend together with their children and devote more of on developmentally appropriate activities, provide educational

resource for their children ,spend a large proportion of their budget on enrichment including family trips, computers books, school materials and supplies, and recreational activities (Kaushal et al .,2011).

4.3. Culture, Social constructed cultural norms dietary habit.

The social cultural norms seen foods to vary across culture means food can be differentiate between each culture. Social and cultural circumstance are essential controlled human values, belief and attitude and formed what people eat in general (Abraham ,1968). Based on the finding result in the study area as table 9, indicates below, adolescent parents who had information about the significance of variety consumption and not willing to apply due to social constructed cultural norm diet restriction result were (n=188,71.2%) .Even though, it affects adolescent nutrition status and variety consumption which involves eating different foods from all the food groups to ensure individual required nutrients and protect self from risky repetitive diet like too much some nutrients and not enough of others (Kennedy, 2004). This cultural norm diet restriction on woman and young children (Adolescent) prohibited from eating certain foods due to ethnic or Cultural beliefs. Also, has been practicing in some sub-Saharan Africa countries including Ethiopia. Diet restriction are known from almost all human societies and considered as a systematized set of rules (localized the consumption) about which food and combination supposed to eat or not (Kennedy, 2004&Pascual,2013).

Table 9, Variety consumption restriction result

Variable	Category	Frequency	Percent %
Information about variety consumption	Yes, not applied due to social norms	188	71.2%
	No	76	28.8%

Source: Analyzed based on own data set (2021).

Furtherly, this cultural norm diet restriction as country derived from the unique feature of the nation’s and composed 80 different ethnic groups with cultural diversity. Each group has varied cultural norms one another and own cultural manifesto with wide practice diet (national foods), and ways of living as well as others cultural traits (Gashaw Kebede ,2010). As result, this cultural diversity make difference in the habitual consumption of certain foods, in traditions of preparation (context specific) and set of restriction (Gibney,2004). Since culture can be defined

as the total average of beliefs, values, and traditions that are directly linked to the consumer behavior of a given society and lead person uses to make choices knowingly. So that, culture and knowledge affect the consumption of individual by restricting certain foods (Gibney,2004).

Table 10, Social cultural norm diet restriction and Adolescent Nutrition status,

Variable	Category	Frequency	%
Information about variety consumption	Yes, not applied due to social norms	188	71.2%
	No	76	28.8%
Are you willing if your child consumed restricted food combination others	Yes	29	11.0%
	No	235	89.%
What is your religion	Orthodox Christian	261	98.90%
	Protestant	1	0.4%
	Others	2	0.8%
when did you start fasting	Age 7-8	202	76.5%
	Age 9-10	27	10.2%
	Age 11-12	13	4.9%
	Age 13-14	14	5.3%
	None	8	3.0%
Does dietary restriction practice in your living area (woreda).	Yes, I noticed	245	96%
	No, I didn't notice	19	4%
Which vegetables ban for adolescent	Tomatoes	45	17.%
	Opinions	8	3.0%
	Cabbage	6	2.3%
	Red and green pepper	200	75.8%
	Beetroot, potato, carrot & Others	5	1.9%
Which foods are restricted for adolescent at your age?	Livestock product (Dairy products, meat, eggs and fish).	126	47.7%
	Lentil Grains and Cereals	106	40.7%
	Others	32	12.1%

Source: Analyzed based on own data set (2021).

Based on the finding result as the above table 10, indicates majority of adolescent parents who has information about verity consumption, but not willing to give due to social cultural diet

restriction result were (n=188,71.2%). Adolescent parent and children themselves were not willing to consume restricted food with combination (n=235,89%) . Majority of adolescents were (n=261,98.9 %) Orthodox Christian who has been involving all annual fasting program since their 7 years ,(n=245,96%) of respondents confirmed the existing of dietary restriction practice at woreda level, more than half and large numbers of respondents were also mentioned that the following foods are under restricted food groups vegetables (n=200,75.8%), Livestock product (Dairy products, meat, eggs and fish) (n=126,47.7%) and Lentil (n=106,40.7%).

Cultural norms affect individual food consumption through a set of dietary restriction it may sources food variety. Variety consumption refers eating foods from all the food group (Dairy, Fruit, Grains, Meat, Vegetables, confections and water are the most common) to ensure individual required nutrient (Kennedy, 2004). This Cultural norm diet restriction highly practiced in the study area as table 9 showed on the above (n=188,7.12%) and prohibited adolescent from eating some groups of food for instance, Fruits and vegetables contained vitamins, minerals, fiber and low in fat, large number of naturally occurring substance. These interfere as defense and protect human body from cancer and heart disease and diabetes type 2. Instead of this, some vegetable also restricted for adolescent as table 10 indicates (n= 200,75.8%) and others by misconception assumed that, if someone (adolescent girls and boy) consumed tomato, red and green pepper as result they became sexually aroused and have a desire to have sex at early age (Kennedy, 2004). Both restricted food explained below and confirmed their existence by FGD,

One of Adult man 52 years old, said aggressively “How could you give green and red pepper, sugar, Lintel, meat, egg and other dairy products for young girl and boys! if you do not want fight with your Nabors or villager, this is really unthinkable in our society!”

Whilst, “another man also 61 years old said, there are some cultural norms which were introduced by our ancestors about, which food not supposed to eat in some individual situation at early adolescent, pregnant woman, adult woman till the age of 45 to protect from fatty baby, sexual arousal and early pregnancy. Because, it considered as sources of conflict and assumed that person as who brought harm the community.”

Beans, peas and lentils are considered as good alternative instead of meat. And consists of high in fiber, low in fat, protein, vitamins and minerals (Kennedy, 2004). As table 10, showed adolescent were prefer (n=106, 40.2%) to consume but in the study, area existed as one of restricted food group. This also confirmed by FGD,

One of 47 years old Adolescent father “said that, we are told by our elders consuming lentils and sugars are the main causes of sexual arousal. So that, do not allow your young girl and boy to consume this food during adolescent. And when they become exposed them self or show some symptom put your child in to long-term fasting to hurt his or her self, engaged in agricultural labor force which demand strong labor, send long distance travel by walk to visit family and relatives.”

One adult man 42 years old (woreda health extension worker) “as woreda level said, I have been working since 2001 EC, as woreda extension officer in different Amhara regional states and I have tried to teach health benefits of, Grain like Lentils bean, peas and lentils in Sated of meat to protect themselves from seasonal restriction (fasting time) but they assumed consuming lentil as adolescent and pregnant woman can cause strong sexual desire this is what they are told by their parent.”

Milk and dairy foods such as cheese and yoghurt both are main sources of calcium, Vitamins A and D, B 12, protein and fat. Human body needed calcium to have strong bones, nerve and muscle function. Vitamin D is needed to help absorb calcium and play vital role in strengthening bone. Milk, Cheese and Egg are main sources of protein we use instead of meat Lentils, butter, beans, kidney beans and chickpeas, Bean curd (tofu), Soya protein (textured vegetable protein), Nut, either finely chopped or ground. But this also, as table 8 shown, (n=126, 47.7%) restricted food group (Kennedy, 2004). And their existence confirmed by FGD,,

A 60 -years -Villager adult man said,

Livestock products (Dairy products, meat, eggs and fish) were also as restricted food groups during adolescent special these are Chicken, butter, milk, meat, egg, fish and honey exposed individual unnecessary premature maturity. He was more emphasis on egg also others FGD members

emphasized about egg, “Egg are not supposed consumed by adolescent and pregnant women it will create strong desire to have sex and derived to search it may expose for sudden sex also”

After a while, adult woman (one of another adolescent mother) said “the restriction also extended to the Combination with others food, on the other side it may cause for much menstruation period bleeding, unborn child deafness, and infertility.”

Pasta spaghetti and sugar, both are as sources of energy simple from sugar and majority.

Adult man 71 years old “said again, pasta spaghetti and sugar are restricted especially for adolescent boy. We are told by our elders these two were introduced by the time Ethiopian Italian first war and the one who gave information received these two from Italian Military leaders as reward and now these two foods considered as the food of individual who committed treason and we simply put in the restriction.”

Table 11, Most common restricted food with their assumption in the study area

Restricted food with their cultural assumption			
Food groups	Most common Restricted foods	Assumption	Remark,
<ul style="list-style-type: none"> • Fruit and Vegetables • Milk & Dairy products • Grains • Pasta spaghetti and sugar. • Spice 	<p>Tomato, red and green paper.</p> <p>Meat, milk fish egg and chicken</p> <p>Lentil, burly product</p> <p>Chickpeas and bean</p>	<p>Sexual arousal Exposed Strong sexual till the end Much bleeding during menstruation period,</p> <p>Large baby, Premature Sex before marriage at early age.</p>	<p>Mothers’ roles through feeding to regulate and control puberty through feeding and diet restriction</p>

Source: Analyzed based on own data set (2021).

4.3.1. Culture, Social conformity influence Adolescent nutrition status.

Culture refers to attitudes and patterns of behavior in a given group and encompasses language, religion, cuisine, social habits, music; the arts referred attitudes and patterns of behavior within that group as norm. Norms are stated attitudes and actions that are considered normal (expected set of roles), typical, or average in a group. Cultural norms are a set of standards that all cultures adhere to, and they are both shared expectations and laws that influence people's behavior within social groups. This cultural norm behavioral influence assist individual to have socially approved common behavior and acting socially acceptable ways in some context (father acts like father) and situations (in sadness, happiness) to show appropriate behavior. Also, people learned cultural norms and reinforced from parents, friends, teachers and others while growing up in a society (Schwartz, 1999).

This cultural norm behavioral influence, assist individual to have socially approved consistent behavior and acting socially acceptable common ways in some context (father must be acts like father) and situations (in sadness, happiness to show appropriate behavior) to keep individual in a given social group. Also, it provides order in the society, direct their behavior, to make sense able social relationship and understand each action. With it rewarding nature, it has a power full influence on behavior the reason following or not following standards is related with social judgments means accept and reject by the given social group engaged individual on group pressure (Abrams et al.,1990).

Consequently, to be free from group pressure individual get social regulation by doing this and have social place in a group as well as conformity in particular. The term social conformity is a type of social influence involving individuals by changing their belief and behavior in order to fit within a group. The intent of this change is to protect them and free from group pressure. Individual simply need conformity to resilience group pressure (Crutchfield, 1955). Group pressure in society may have different forms, from urban and rural points of view in urban area persuasion, bullying, teasing was considering as the most common, and in rural area directly related with their livelihood, regarding to essential characteristics of the community for instance ,density of the community, size of the community, close contact with nature ,homogeneity of population , most importantly social interaction , social mobility, social solidarity (in sadness and happiness like wedding and funeral ceremony) if agriculture is the main occupation in the

time of harvesting, the absence of modern storage, human labor when needed, for exchanging and borrowing agricultural materials seeds, ox ,to practice barter system and others . In addition to this, to overcome the following issues Poor infrastructure, Illiteracy, Ignorance, non – application of government policies, The absence of modernization and mechanization, Loss of land to natural disaster, lack of funds and others, there is strong social commonality and grouping for conformity (Schwartz,1999).

To sum up, the finding showed that there was the existence of dietary restriction practice (n=245,96%) according to table 10, on the above, more than half and large numbers of respondents were also mentioned that the following foods are under restricted food groups vegetables (n=200,75.8%), Livestock product (Dairy products, meat, eggs and fish) (n=126,47.7%) and Lentil (n=106,40.7%). Empirical data also conform the existence of social cultural influence of nutritional status commercials and cultural diversity led to difference in the habitual consumption of certain foods, in traditions of preparation (context specific) and set of restriction (Gibney,2004). As result of this adolescent banned from variety consumption the reason why individual engaged in the practice is to be socially confirmed. By doing this they are free from group isolation, pressure and be a member of group and earn all the necessary help as member at this time secured their livelihood which is their existence. This livelihood connection and majority has the same religion (98.8% Orthodox Christian) create cultural tightness refers mutually support one another all kinds of interaction with fellow members more formal in nation with tight cultural norms. Situations at home, in the workplace, school, places of worship and others .Plus, in a given society when majority have common religion it could be the culture of the society since, both culture and religion are ways of life with common traits they become faith-based tradition. As result all the member of the social group perform it with the intent of spirituality (Bellah, 1999). For there, Norms prescribe certain behaviors and once these behaviors are socially routinized, they become practices. Both are inferred by perceptions of common behavior of others “how do people think behave and perceive in general (Gelfand & Harrington, Gao et al.2011). So that it monitors individual how they think prefer and generally how they perceive the out-side world.

4.4. Social context Dietary pattern (context specific) and Adolescent nutrition

The dietary pattern and nutritional status of primary school students in the study area (Hagere-Mariamna Kessema) were assessed by using self-administered questionnaires and interview. Two hundred and sixty-four primary school students (respondents) as table 4, on the above shown both male (n= 126;47.7%) and female (n= 138; 52.3%) participated in the study. All the necessary information socio demographic background data, anthropometric measurement, household dietary diversity scores was obtained. Majority of respondents (n=261;98 %) were orthodox Christians, who has been participating all annual fasting programs since their seven years of age(n=202;76.5%). As table 12 indicates below over half of the respondents skipped breakfast and ate two meal per day (n=136;51.5%). A higher proportion of respondents have more than five siblings (n= 24.6%) including large family size (8 & more 92; 34.8%) individuals living in the same house.

According to USAID (2014), dietary pattern refers frequency, quantity, variety or combination of individuals' habitual consumption from different food and drinks. In the evaluation of nutrition status dietary pattern review relative stability caloric intake from frequency, quantity, variety or combination of food and consumed drinks from it is substitution effects. This means when the existence of high consumption from some food groups associated with lower intake of from others. So that, many researchers' studies about food pattern to examine inter -relations of food cumulative effects on health than single diet contained (Schulze & Hoffmann, 2006). All the important dietary pattern evaluation tools frequency, quantity, Variety or combination and different food and drinks were reviewed below.

4.4.1 Frequency, Quantity, Variety or combination habit in general

Food frequency is types of dietary measurement instrument which assesses individual usual food consumption by enquiring the frequency at which the participant consumed food items. Over half of the respondents skipped breakfast and ate two meal per day (n=168;63.3%) lunch and supper it contained cereal with different vegetables from their homestead (courtyard) half or 75 % of one piece of injera with two and half boiled or raw vegetable homemade sauce or rarely diary product when none fasting time and supper as snack ate two ladle boiled or cooked cereal mostly

due to their fasting pressure lack appetite so that dinner also mostly skipped by the majority , this meal pattern monotonous at some point additionally another most practiced dietary pattern is one meal from 24 hours took their lunch late in the afternoon its mostly 1 pieces of enjera with cooked or raw vegetable with some amount 1 or 2 ladle of cereal . Even though, it is important for adolescent to have well performed body. Breakfast is the one should not miss children and adolescent to be energetic since it demands more energy to do their activities. And it has side effect for instance lead to sudden rise in blood pressure, Lower cognition the absence of a nutrition supply, experience swing mood, Reduce Metabolism, Lowered Immune System, Gastritis, Lowered Heart Performance, Triggering Metabolism Syndrome, Migraine and Menstrual Irregularities (Sugiyama, et al., 2012).Due to their local dietary practice and long term fasting experience (n =202,76.5%) majority of Adolescent exposed to be under weight as table 5 , (n=156,66%) indicates adolescents who are living in the study area did not consumed frequently to meet required nutrient to maintain healthy body weight.

Table 12, Dietary pattern and cultural practice dietary survey result

Variable	Category	Frequency	%
How many times did you take food?	4 times with both meal	10	3.8%
	3 times with both meal	35	13.3%
	2 times & skipped 2 meals	136	51.5%
	1 time late in the afternoon.	71	26.9%
	As needed	12	4.5%
Who was deciding the food type & quantity what you consumed previously?	Mother	162	61.4%
	Father	1	0.4%
	Self	1	0.4%
	Serve as a family	100	37.9%
	Pipe water	104	39.4%

What are the main sources of drinking water?	Public water	160	60.6%
	Unprotected dug well	0	0%
Are you willing if your child consumes new foods?	Yes	43	16.3%
	No	79	29.9%
	Some times	8	3.0%
	Not at all	134	50.8%
Are you willing if your child consumed? Restricted food combination with others	Yes	29	11%
	No	235	89%

Source: Analyzed based on own data set (2021).

4.4.1.2 Food Quantity and Adolescent

In addition to long-term fasting involvement as table 9 showed, (n =202,76.5%). All the time in the study area adolescent consumption quantity and types of consumption depends on what their mother provides (no personal choice) this is one practiced (n=162, 61.4%) and others practice consumed what mothers prepared and served as family (n=100,37.9%) as table 9 indicates. However, Adolescent is the age demands wide variety of healthy foods depends on the child body size and activity. Plus, the purpose of dietary quantity is especially among children and adolescent diet guidelines encourage intake of particular types of foods in an appropriate amount to support growth that minimize the risk of nutritional deficiency and chronic disease (Golley et al.,2011). This involvement goes with the assumption of social cultural norm diet restriction and they assumed that as protect their children from unnecessary consequence which occurred during adolescent.

4.4.1.3 Variety or combined food & drink habit on adolescent nutrition status

Variety consumption refers eating different foods from all the food groups to ensure individual required nutrients and protect self from risky repetitive diet like too much some nutrients and not enough of others (Kennedy, 2004). However this , in the study area variety consumption and eating different combination with banned food was un acceptable due to the existing social

constructed cultural norm diet restriction as table 7, indicates (n=235,89%), and majority of adolescent mother education (n=126,47.7% Never attend any education,87 were elementary school completed) and Father education (n=109,41.3% elementary and ,72 ,27.3% Never attend any education) this showed that adolescent parents did not have proper knowledge to understand the values of nutrition and nutrients effects on child physical and cognitive development . But on the other side at woreda level by the help of health extension worker explained, as table 6, refers adolescent parents got information about the significance of variety consumption and not willing to apply due to social constructed cultural norm diet restriction result were (n=188,71.2%). Even though, it affects adolescent nutrition status and variety consumption.

The study area regular or habitual consumption of adolescent and adult food groups are assessed. And most commonly daily intake of the following food groups from grains and vegetable (enjera, local bread, kollo, firfir,kenche (cereal), cabbage, beetroot, carrot, potato, tomato, lintel ,pea, bean , meat ,chicken , local cheese and pasta Macaroni) Adult from high class family eat dairy product mostly, middle and lower class significantly low in dairy product and take vegetables and grain products with some exceptions . In addition, to consumption habit the study area in the context of drinking adolescent restricted milk and others local made drink (‘korefee’, ‘Shameta’, ‘Beso’ juice) it prepared to build the body after long-term fasting and this restricted for adolescent but due to their assumption the only available drink is clean water. The study area adolescent and their parents water consumption drinking clean water is necessary parts of for staying healthy. The human body largely made of water .So that, people need a lot of fluid to be energetic and relieves fatigue. Also, drinking water helps to think; concentrate, focus and more alert since human brain mostly water (Schulze et al., 2006).

In the context of food pattern specific experience FGD result was.

One of the adult men 52, said that, ‘in our culture there is no these kinds (food pattern) of experience food prepared as whole in the family and we simply eat together except if it was not banned and combined food groups for young children. On the other side, when you have under five children of course they have separate meal. And in the points of local made drink, milk banned for adolescent but others (korefee,shameta, Besa both) most of

them prepared for adult for relaxation and body building after long-term fasting and farming labor because mostly prepared from burley’.

‘Another villager one adult woman, said “Here in Hagera-Mariam we mothers most of the time responsible cooking for the family and if ground parent lost female, we also cook for them this is how we are told by our elder”’.

4.4.2 Individual Dietary Diversity Score (IDDS)

Dietary diversity refers number of foods consumed by adolescent during the last 24 hours from a predefined food groups among the list. Individual dietary diversity is connected with individual nutrient adequacy and is regarded a substitute for macro- and micronutrient adequacy in the diet for many age groups, including adolescents (Mirmiran et al., 2004). There are no precise criteria on which food groups should be included in the score for different sex/age groups, with the exception of women of reproductive age and newborns and young children (Swindle et al., 2006).

Table 13: Overall Individual dietary diversity scores

Individual dietary diversity scores		
Cut off	Frequency	%
<4	156	59.1%
>4	108	40.9.1%
Total	264	100%

Source: Analyzed based on own data set (2021).

According to the findings of the study, only (n=108,40.91%) of the total respondents consumed at least four food groups, this indicates consumed diverse food. However, the majority of the respondents (n=156,59.1%) ate less than four food types, indicating that their diet was not varied.

Table 14 : Individual dietary score(IDDS) by sex

Variables	Category	IDDS				Total	
		>4		<4		N	%
Sex of Adolescent		N		N			
	Male	75	48%	51	47%	126	95%
	Female	81	52%	57	53%	138	76%
		156		108		264	

Source: Analyzed based on own data set (2021).

The findings also revealed that adolescent sex and IDDS have a statistically significant correlation of 5%. Female adolescent result (n=81,52%) of those who consumed a variety of foods in the previous 24 hours, while male adolescents (n= 75,48%). On the other side, adolescent who consumed less than four group, (n=51,47%) most of them were male and (n=57,53%) were female adolescent. Therefore, female adolescent consumed less diversified food compare to male adolescent as result it showed high prevalence of wasting and stunting on female adolescent.

To sum up, since adolescent is one of human development cycle with physical change which affect body nutritional need so that there is a need in dietary pattern. From the study area survey questioner and FGD result adolescent with the range of 11-14 years old existing dietary pattern reviewed according to the dietary pattern concerning areas frequency, quantity, Variety or combination of individual's habitual consumption from different food and drinks, fasting. Frequency it a type of dietary measurement and assess individual daily consumption by questioning the frequency of consumed food items with regarding this over half of respondents skipped breakfast and ate two or one meal per day (lunch and supper it contained cereal with different vegetables half or 75 % of one piece of enjera with two and half boiled or raw vegetable homemade sauce or rarely diary product when none fasting season , supper as snack ate two ladle boiled or cooked cereal mostly) next to this another dietary pattern measurement food quantity or amounts of food also measure appropriate amount to support growth and minimize the risk of nutritional deficiency and chronic disease however this in the study area food quantity decided by mothers with two ways first serve as family consuming as group,

second accept the food what she ordered to eat regarding to the cultural norm what they are told by elders.

In conclusion ,Another dietary pattern measure variety or combination food and drink habit, in the context of variety or combination all these issues stands to ensure individual required nutrients and protect self from risky repetitive diet like too much some nutrients and not enough of others due to cultural norm diet restriction variety consumption and traditional drink it failed with so many restriction as the above tables indicates .So that, from similar studies result (Swindle et al.,2006).And current , since one type of food did not contained all nutrients and minerals ,most available food groups of cereal, low and rarely consumption of fruit, meal skipping practice common practice and some avoid personal dislike all these restriction and limitation put majority of them under weight and according to IDDS result showed also more than half of adolescent were consumed below <4 it means they were not consumed variety food and had (n= 156,66%) BMI result so that cultural norm diet restriction also impact on adolescent dietary pattern and exposed them for unnecessary nutrition deficiency and health issues.

4.5 Social economic (status difference) and Adolescent Nutrition status

Accordingly, as Axelson (1956) stated Education, employment and income are consider as socioeconomic determinant and must be localized (context specific) determinant factors (Miller & Rodgers, 2009).But most of adolescent parents are farmers and both parents education status are follows Father n=72 ,27.3% never attend and any education ,n=109,41.3 % Elementary n=38,14.4% secondary and n=38,14.4% ,Mother n=126,47.7 never attend and any education & ,n=87,33% Elementary n=23,8.7% secondary and on the context of income and employment with unknown income Adolescent father n=180,68.2% farmers n=30,14.4% involves on off farm and non-farm activities where us mother of n=105,39.5% farmer and n=63,23.9% who involves on off farm and non-farm activities.

Table 15, Socio economic background of Adolescent parents and caregiver.

Variable	Category	Frequency	%
Father Employment status	Farmer	180	68.2%
	Employed	3	1.1%
	Merchant	18	6.8%
	Both farm and off-farm	30	11.4%
	Others	33	12.5%
Mother Employment status	Farmer	105	39.8%
	Employed	6	2.3%
	Merchant	30	11.4%
	Both farm and off-farm	63	23.9%
	Others	60	22.7%
Did you involve both off farm & non-farm activates?	Yes	153	58.%
	No	111	42.%
Do own rural and urban area houses?	Yes	42	15.9%
	No	222	84.1%
Do you have farm land? If your answer yes, what is the household farm size (in hectares)?	Small and shared with family	9	3.4%
	20 pair	36	13.6%
	20 and more	6	2.3%
	None	12	4.5
	12 pair	201	76.1%
If your answer for No 15 is no, how your family produce different food items?	Rent	3	1.1%
	From labor wage	15	5.7%
	Others	6	2.3%
	Own land	240	90.9%
Do you have pair of oxen? if your answer yes how many?	One single	12	4.5%
	Two pair	204	77.3%

	Three pair	27	10.2%
	Four pair	9	3.4%
	More	3	1.1%
	None	9	3.4%
Do you have any livestock, poultry or fishpond?	Yes	252	95.5%
	No	12	4.5%
What kind of animals did you keep? (You can choose more than one option).	Sheep & goat	81	30.7
	Cattle	81	30.7
	Poultry	51	19.3
	Both 1-3	45	17.0
	None	6	2.3
Main use of animal produce? (Meat, milk, eggs, fish, etc.)	Mainly own consumption	93	35.2%
	Mainly for sale	6	2.3%
	Both	159	60.2%
	None	6	2.3%

Source: Analyzed based on own data set (2021).

As its complex concept, there is no universally accepted definition of rural space with the great diversity of opinion on definition, scope and components. Also, series difference in particularity and characteristics country to country of each estate. But defined the place communal characteristic rural place are small and medium human settlements, low population density, forestry, fisheries, primary processing of raw materials from the agricultural, forestry and fisheries sectors and the main economic activities depends on agriculture. In addition, mining, tourism, processing and marketing of agricultural product are mentioned as rural area characterized by a great diversity of economic activities (Swindle et al., 2006).

Regarding this great diversity, to determine rural house hold socio economic status (assets) must be context specific determinant factors. Among many others factors Education, Occupation and income are commonly used indicators of socio-economic status. Plus, socio economic differences influenced on food consumption and have been found in many dietary surveys (Axelson, 1986 and Hulshof et al. 1991). Socioeconomic status related to vitamin and mineral

consumption but not fat intake. So that, as context specific rural socio-economic status (asset) determined by Anteneh Mulugeta findings (2020) as regional (Amhara region) level studies these are total family size (number) in a single house hold, land owner ship, distance to market, income from off farm and non -off farm activities, and bad health status of house hold head. Regarding these adolescent parents’ socio-economic status determined as follow in table.

Table16, Study Area Socio economic status measurement scale.

Study Area (rural house hold) socio economic status determinant factors								
House hold Status	Land size	Off and non-off farm activities	Own Rural and urban house	How produce food	Number of Ox	The availability of live stock	Types of Domestic. Animals Sheep and Goat, Cattle, Poultry, all 1-3	Main uses of Kept animals
High status	20 and more (Timad)	Involve in both activities	Own houses both place	Some times by rent Tractors and laborer	3-4 pair ox	kept Sheep and Goat, Cattle, poultry	All types	For sale and consumption
Middle status	12-10 (Tmad)	Sometimes both activities	Sometimes own	Self and Laborer	2 (pair)	kept Sheep and Goat, Cattle, Poultry	All types	Mostly for consumption but less for barter (sale)
Low status	Below 10 (Timad) or No land farm	Sometimes both activities	No	Sale their labor	1(singe ox)	Some times Goat, and sheep but mostly Poultry	mostly Poultry	Mostly for consumption but very little for barter (sale)

Source: Analyzed based on own data set (2021).

As table 9, indicates in North Shewa Hagere-Mariamna Kesseworeda resource from the interview. Accordingly, house hold divided in to three statuses High, Middle and Low. High status household who owns Twenty (“Timad”) and more farm land, involves in both off farm and none activities. Own houses both rural and urban areas, sometimes by rent tractors and employee laborer, have 3-4 pair oxen, keep goat, sheep, cattle and poultry, from kept animals use for sale and consumption proportionally and have enough income. Next to this, Middle status -12 (Timad) land farm, involve in both activities, some of them own houses both rural and urban areas, self and employee laborer, have two pair oxen, keep goat, sheep, cattle and poultry, from

kept animals mostly for consumption but less for barter (sale). Lastly, Low status – 10 (Timad) and below or no land farm, sometimes involve in both activities, not own urban area house, sale their labor, have one single ox, keep goat, sheep, sometimes but mostly own poultry, from kept animals mostly for consumption but very little for barter (sale).

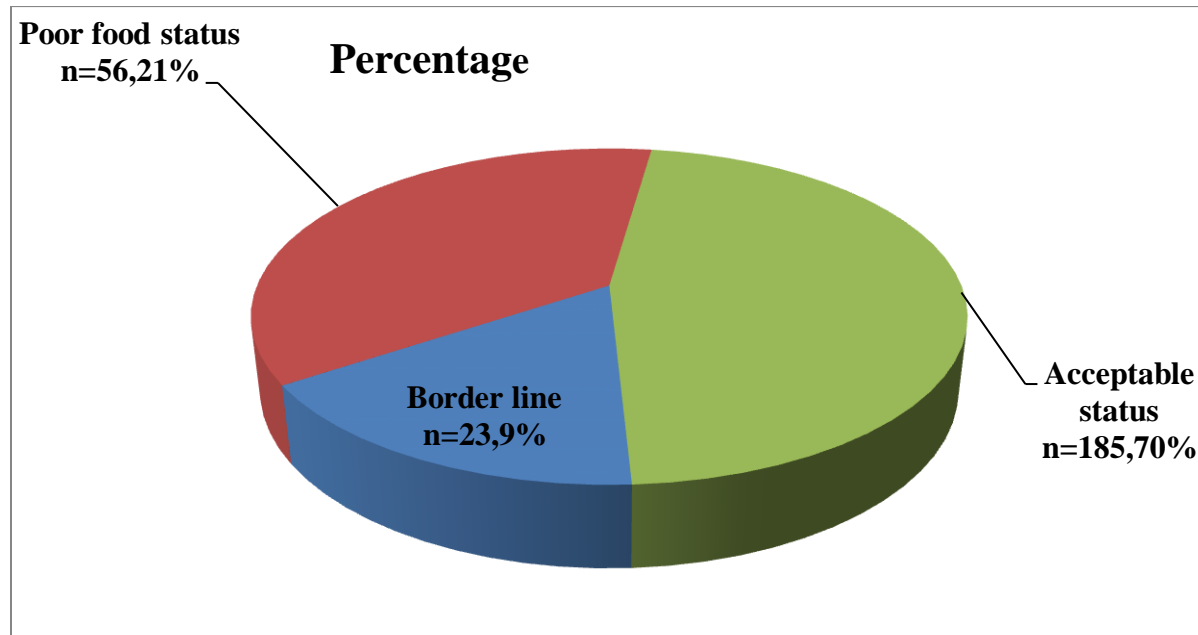


Figure3: Food consumption result Pia-chart (FCS)

4.5.1 Food consumption score

The Vulnerability Analysis and Mapping (VAM) platform, which is a main source of food security monitoring data and analysis, is managed by the World Food Program. Users can use the platform's various features to display and download data on commodity prices and predicted food security indicators, such as the Food Consumption Score (FCS). It is a more complicated indicator of a household's food security status, since it considers not only dietary diversity and frequency, but also the relative nutritional importance of different food groups. On the other hand, it employs a rather lengthy memory span of 7 days. This indicator can be used to categorize and track household food security over time, especially as a proxy for the quantity dimension of food security (caloric adequacy), for which it has been validated. The FCS obtains information about average household diets from respondents who are asked to recollect what they ate in the previous seven days (INDDEX, 2018).

Accordingly, based on the second threshold for sugar and oil consumers 0-28 poor food secure status, 28.5-42 border line food secured and, > 42 acceptable foods secured. According to the findings of the study majority of house hold (n=185,70%) have acceptable food security status this indicates 70% of adolescent parent and care givers food secured. Consequently 9 %, of parents were border line means in between and lastly 21% were poor food security status. Based on this result, the study area adolescent parent and caregiver 70% belongs to acceptable food security status and in contrast BMI result showed 66% underweight .So that ,these two-result exhibited the influence of cultural norm diet restriction which affect adolescent nutrition in the presence of food availability.

According to adolescent sex the prevalence of food security, majority of male adolescent parents were food secured (n=93,74%) and relatively female adolescent parents also secured (n=92,67%). And from the poor food security status female parents result were (n=34,25%) and male (n=22,17%) as result it showed both sexes have relatively close result in this study.

Table 17, indicates majority of adolescent parents

Food Composition scores result				
Sex of Adolescents	0-28 poor food secured status	28.5-42 Borderline (moderately) food secured status	Acceptable	Total
Male	22(17%)	11(9%)	93 (74%)	126
Female	34(25%)	12(9%)	92(67%)	138
Total	56(21%)	23(9%)	185(70%)	264

Source: Analyzed based on own data set (2021).

As table18 , indicates below over half of adolescent parents (n=175,66%) medium from the localized socio economic measurement status grouped in the middle status house hold owned - 12 (Timad) land farm, involve in both off farm and nonfarm activities, some of them own houses both rural and urban areas, self and employee laborer, have two pair oxen, keep goat, sheep, cattle and poultry, from kept animals mostly for consumption but less for barter (sold in kind).Next to this (n=49,19%) high status ,Household own the following determinates Twenty (Timad) and more land farm, involve in both activities, Own houses both rural and urban areas, sometimes by rent Tractors and employee laborer, have 3-.4 pair oxen, keep goat, sheep, cattle

and poultry, from kept animals use for sale and consumption proportionally and have enough income.

Table 18, Socio economic status of adolescent parent and caregiver

Wealth status of Adolescent parents by graph			
Low status	Medium status	High status	Total
40 (15%)	175(66%)	49 (19%)	264

Source: Analyzed based on own data set (2021).

Based on the above local measurement result 85% of adolescent parents medium and high socio-economic status who was food secured and has much rural assets for consumption and others market activities. This indicates majority of adolescent belongs from food secured and between and high socio-economic status parent and guardians.

Table 19, Cross tabulation about socioeconomic status with BMI result.

BMI result	Wealth status of Adolescent parents			Total
	Low status	Medium status	High status	
Underweight <18.5	30 (19%)	105 (67%)	21 (13%)	156 (59%)
Normal weight 18.5-24.9	5 (5%)	66 (69%)	24 (25%)	95 (36%)
Over weight	5 (38%)	4 (31%)	4 (31%)	13 (5%)
				264

Source: Analyzed based on own data set (2021).

In conclusion, based the finding from local socio-economic measurement majority of adolescent parent and care giver grouped with middle and high social status (n=224.85%). This indicates majority of them have enough rural asset and income to provide nutritious food for their children. In addition to this food consumption score result also confirmed 70% of adolescent parents were food secured and free from vulnerability but the anthropometry result was 36% of adolescent wasted it indicates this indicates the incidence of low weight for height, recent and severe weight loss it can be persistent for long time. Which usually occurs when individuals have

not had adequate quality quantity of foods or continued illness (WHO,2000& UNICEF2008). This indicates adolescent who were living in the study area were suffered from chronic energy deficiency and exposed for related problems. Even though their parent has capacity to feed their children and adult BMI result was showed more than 59% of adolescents were underweight so that being middle and high status social economic status negatively correlate with adolescent nutritional notional status.

4.6 Statistical Analysis underweight and wasting

4.6.1 Determinants of underweight

Table 1: Association of Height of students with age of students, mothers' education, individual diet diversity, wealth status, number of children in the same house, and food consumption score.

Variables	Chi-square value	Significance value
Age of student	300.008 ^a	.000
Mother Education	152.851 ^a	.004
Individual diet diversity	62.170 ^a	.000
Wealth status	38.784 ^a	.694
Number of children in the same house	121.053 ^a	0.222
Food consumption score	42.101 ^a	.553

This result has shown that height have an association with age of student, mothers' education, and individual diet diversity because the significance values were less than 0.005 but, there was no association between height and wealth status, number of children living in the same house and food consumption score.

4.6.2 Determinants of Wasting

Table 2 Student Kilo Association with age of students, mothers' education, individual diet diversity, wealth status, number of children in the same house, and food consumption score.

Variables	Chi-square value	Significance value
Age of student	300.008 ^a	.000
Sex	14.039 ^a	.900
Mother Education	152.851 ^a	.004
Individual diet diversity	63.414 ^a	.000
Wealth status	42.936 ^a	.059
Number of children in the same house	121.053 ^a	0.222
Food consumption score	42.101 ^a	.553
Family size	70.789 ^a	.616
Family status	105.442 ^a	.012

Result from table 2 shows that student kilo has an association with age of student, mothers' education, and individual diet diversity because the values of significance were less than 0.005. The others were have no associations with student kilo.

Multicollinearity test

A variable associated with nutritional status has to be checked for a series multi-collinearity problem before entering data in ordinal logistic regression model. If there is series multicollinearity problem, that is, the case in which two or more explanatory variables in the regression model are highly correlated, making it difficult or impossible to isolate their individual effects on the dependent variable (Green, 2007). Therefore, it is necessary to check if there is series

Collinearity problem among predictor variables before applying the ordinal logistic regression model.

Variance inflation factor (VIF) is used to detect multicollinearity problems among predictor variables. Variables having variance inflation factor of less than 5 are believed to have no multicollinearity and those with VIF of above 5 are subjected to the problem and should be excluded from the model. Based on VIF analysis, number of children in the same house and awareness about nutritional status were correlated with other variables. So, they were removed from the final model.

Below are discussions and interpretations of variables which significantly affecting the nutrition status of school age children in the study area.

Table 11: Ordered logit estimations of determinants of nutrition status of school age children

	Coeff.	Std. err	t-value	Marginal effects			
				Malnutrition	Normal	Overweight	Obese
Family size	-1.13	.488	-2.322**	0.016	-0.003	-0.09	-0.014
Birth order	-.63	.444	-1.417	-0.08	0.009	0.028	0.04
parent status	.924	.299	3.09**	0.45	-0.005	-0.015	-0.24
Father education	-.002	.574	-.004	-0.02	0.002	0.009	0.014
Mother education	1.05	.675	3.52**	-0.011	0.061	0.003	0.01
Father Employment	.118	.264	.448	-0.001	0.002	0.006	0.009
Mother Employment	.333	.282	-1.178	-0.025	0.002	0.08	0.013
Involve both off farm & non-farm	3.221	1.256	2.565**	0.08	-0.01	-0.03	-0.04

activities							
House ownership	-.444	.304	-1.462	-0.009	0.001	0.003	-0.005
Farm land ownership	-.213	.888	-.239	-0.15	0.017	0.05	0.081
Livestock, poultry or fishpond	.142	1.234	.115	-0.11	0.005	0.0012	0.03
Information about nutrition	3.527	1.657	2.129**	-0.05	0.005	0.015	0.027
Religion	0.075	2.019	0.037	-0.12	0.014	-0.04	0.06
Involvement in fasting	.736	.936	.786	0.05	-0.004	-0.001	-0.002
Drinking water source	.132	.276	.479	0.017	0.01	0.06	0.009
(Constant)	.068	.467	.009	-.145	.885	.922	1.085
Ordered logistic regression				Number of obs = 263			
				LR chi2(16) = 27.91			
				Prob > chi2 = 0.0324			
Log likelihood = -325.45321				Pseudo R2 = 0.0411			

Family size: The family size is one of socio-demographic determinants of nutritional status of students. It is expected that family size is negatively related to the nutritional status of primary school students. The model result showed that family size is significant at 5% level of significance and family size and nutritional status of students is negative as coefficient is negative (-1.13). The marginal effect result indicates that if family size increases, the likelihood or probability of students' nutritional status in normal category, overweight and obese category decreases by 0.3%, 9% and 1.4% respectively while malnutrition category increases by 1.6%.

Educational level of mother: The educational level of mother is expected as positively related to the nutritional status of primary school students. The model result showed that educational level of mother is significant at 5% level of significance and positively affects the nutritional status as coefficient is positive (1.05). The marginal effect result indicates that if mother's academic level increases the likelihood or probability of normal nutritional status increases by 1.1% however decreases the malnutrition category by 6.1% of high school students.

Father's employment status: The employment level of father is one of socio-economic determinants of primary school students nutritional status and expected that it is positively related to the nutritional status of high school students. The model result showed that employment status of father is significant at 5% level of significance and positively affects the nutritional status as coefficient is positive (0.924). The marginal effect result indicates that if father's employment level increases the likelihood or probability of normal nutritional status increases by 5.2% however decreases the malnutrition category by 4.5% of high school students.

Off-farm and non-farm activities: Involvement in both off-farm and non-farm activities is one socio-economic factor that determine the nutritional status. It is expected that involvement in off-farm and non-farm activities positively determine the nutritional level of primary school students. The empirical results disclosed that involving in off-farm and non-farm activities positively affects the nutritional status. The marginal effect result also reveals that involvement in both off-farm and non-farm activities decrease the likelihood or probability of malnutrition category by 8% and increase the normal nutritional category by 1% of high school students.

Information: It is expected that having information about the consumption and nutritional patterns positively determine the nutritional status of students. The empirical results of disclosed that information about nutrition positively affects the nutritional status of primary school students. The probability of malnutrition category decreases by 5% however the likelihood or probability of normal nutritional category of students increases by 0.5%.

CHAPTER FIVE: CONCLUSION AND RECOMENDATIONS

5.1 Conclusion

In this study, nutrition insecurity is a significant problem among the school age children. Certain demographic and socio-cultural characteristics of the children and their parents and care givers were significantly associated with nutrition pattern and status of the children. The results suggest that societal norms and constructs may be the major risk factors that have unique effect on nutrition status of the children.

It also means that the mechanisms of how societal norms affect nutrition security should be further explored. Future research should consider interactions between culture and other individual influences of food security status that together influence food access, and explore this relationship across geographic contexts, noting social and public mediators of this relationship. Research practice must also better consider experiences of female school age children. This work may consider identifying the role of micro-geographies, and access at different scales, including within the home and broader community areas out of the school ages.

As conclusion this study examined the prevalence of under nutrition among 264 adolescents (primary school students) at Hagere-Mariamna Kesseworeda. Thus 51% underweight and 36% wasted also the finding indicated female adolescent more vulnerable compare to male in this study.

The study result also shows also possible determinates for underweight Height of students with age of students, mothers' education, individual diet diversity, wealth status, number of children in the same house, and food consumption score. Age of students, mothers' education, individual diet diversity, wealth status, number of children in the same house, and food consumption score. Additionally, adolescent parents were poor food security status and 15%. From the individual dietary scores that of the consumed less than the standard (four) food groups within the 24 hours during the time of research period. Based on the finding cultural norms which restrict consumptions of nutritious foods, with adolescent the restriction target meat, egg, vegetables existed.

The finds also present effective culturally sensitive intervention targeted resources aimed at alleviating problems relating to food restriction in Hagere-Mariam. For instance, through specific designed program food culture that impose food restrictions on adolescent systematically discouraged to ensure opportunity for all individual consumption of nutritious foods. One of the

interventions, which tackle both the challenge of nutrition insecurity as result of food restriction. Education on nutritional in general and on the nutritional benefits of traditional practices in particular in Hagere-Mariam. Adolescent boys and girls. It is also likely to be relevant, and benefit more widely in other part of the country.

5.2. Recommendations

According to the study findings the following recommendation forwarded.

- Parent, care giver and the community should educate about how adolescent is crucial age in human development, rapid physical growth and important nutrients for being healthy according to their age required energy.
- All governmental and non-governmental, individuals and adolescent themselves should be focused for daily consumption rather than cultural food taboos and food prohibition.
- Policy makers, teachers and others school community must educate them themselves and adolescent.
- Since adolescent is (10-19) quarter of the global population it needs more attention.
- The issues of Adolescent nutritional must be considered to be global health concern.
- The finds also present effective culturally sensitive intervention targeted resources aimed at alleviating problems relating to food restriction in Hagere-Mariam.

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. vif

Variable	VIF	1/VIF
Family	2.82	0.354647
Children	2.81	0.356281
combination	1.11	0.901633
motheredu	1.08	0.926060
farmland	1.07	0.931981
livestock	1.07	0.934239
culturealp~e	1.06	0.946828
banned	1.05	0.948166
Sex	1.05	0.950528
motherincome	1.04	0.959071
Offfarm	1.03	0.967417
Age	1.03	0.971111
infovariety	1.03	0.971589
Mean VIF	1.33	

Marginal Effect

```

. margins, dydx(*)
Average marginal effects      Number of obs   =      264
Model VCE      : OIM
dy/dx w.r.t. : Sex Age Family Children motheredu motherincome Offfarm farmland livestock culturealpractice infovariety combination banned
1._predict   : Pr(FCS==1), predict(pr outcome(1))
2._predict   : Pr(FCS==2), predict(pr outcome(2))
3._predict   : Pr(FCS==3), predict(pr outcome(3))

```

		Delta-method				
		dy/dx	Std. Err.	z	P> z	[95% Conf. Interval]
Sex	_predict					
	1	.0451544	.0450367	1.00	0.316	-.0433116 .1334247
	2	.0104477	.0105217	0.99	0.321	-.0101744 .0310699
	3	-.0556021	.0552428	-1.01	0.314	-.1638759 .0526718
Age	_predict					
	1	-.0211826	.0195247	-1.08	0.278	-.0594502 .0170851
	2	-.0049012	.0045794	-1.07	0.285	-.0138767 .0040743
	3	.0260837	.0239441	1.09	0.276	-.0208458 .0730132
Family	_predict					
	1	-.0172333	.0303432	-0.57	0.570	-.0767049 .0422384
	2	-.0039874	.0070579	-0.56	0.572	-.0178207 .0098459
	3	.0212206	.037333	0.57	0.570	-.0519506 .0943919
Children	_predict					
	1	.0197082	.0280893	0.70	0.483	-.0353459 .0747623
	2	.00456	.0065294	0.70	0.485	-.0082373 .0173574
	3	-.0242682	.0345223	-0.70	0.482	-.0919307 .0433942
motheredu	_predict					
	1	.0229379	.0117183	1.96	0.050	-.0000296 .0459053
	2	.0053073	.0028447	1.87	0.062	-.0002682 .0108828
	3	-.0282452	.0142521	-1.98	0.047	-.0561787 -.0003116
motherincome	_predict					
	1	-.033968	.0131879	-2.58	0.010	-.0598158 -.0081202
	2	-.0078594	.0032821	-2.39	0.017	-.0142922 -.0014267
	3	.0418274	.0158642	2.64	0.008	.0107341 .0729208
Offfarm	_predict					
	1	.0970467	.0440123	2.20	0.027	.0107842 .1833092
	2	.0224545	.0106613	2.11	0.035	.0015586 .0433503
	3	-.1195011	.0531832	-2.25	0.025	-.2237382 -.0152641
farmland	_predict					
	1	-.0014637	.0187474	-0.08	0.938	-.0382079 .0352806
	2	-.0003387	.0043395	-0.08	0.938	-.008844 .0081667
	3	.0018024	.0230861	0.08	0.938	-.0434457 .0470504
livestock	_predict					
	1	.0428073	.1039733	0.41	0.681	-.1609767 .2465913
	2	.0099047	.0241376	0.41	0.682	-.0374041 .0572134
	3	-.0527119	.1279881	-0.41	0.680	-.3035641 .1981402
culturealpractice	_predict					
	1	-.0849253	.0725767	-1.17	0.242	-.227173 .0573224
	2	-.0196498	.0170667	-1.15	0.250	-.0530999 .0138002
	3	.1045751	.0889516	1.18	0.240	-.0697669 .2789172
infovariety	_predict					
	1	.0311095	.0482208	0.65	0.519	-.0634014 .1256205
	2	.0071981	.0112079	0.64	0.521	-.014769 .0291651
	3	-.0383076	.0592887	-0.65	0.518	-.1545114 .0778962
combination	_predict					
	1	.0300901	.0752179	0.40	0.689	-.1173342 .1775144
	2	.0069622	.0174716	0.40	0.690	-.0272815 .0412059
	3	-.0370523	.0926057	-0.40	0.689	-.218556 .1444515
banned	_predict					
	1	-.0700283	.0342567	-2.04	0.041	-.1371702 -.0028864
	2	-.016203	.0082249	-1.97	0.049	-.0323236 -.0000824
	3	.0862313	.0414832	2.08	0.038	.0049258 .1675369

ANNEX 1.

Consent form

Title: Social determinants of dietary habit and its impact on nutrition status of primary school students in Hagere-Mariamna Kesseworeda

Principal Investigator: Edengenet Feleke

Introduction

As nation identifying the nutritional status of children is a good indicator of health status of a community. Primary school age is (adolescent from age 11-14) active growing phase of adulthood primary school age is a dynamic period of physical growth as well as of mental development of the child. The consequences of malnutrition among school age children streams from severe under nutrition such as underweight stunted and wasted to over-nutrition. Poor nutrition and health among students have been identified to contribute to the general inefficiency of educational systems world-wide.

Procedures

Here, if you agree to participate, we will be asking your students some basic information, measure their weight and height by trained person. Also take selected student past 24 hours food consumption.

Risks

During the anthropometric measurement and the assessment of nutritional status of the primary school students, there is no risk other than voluntarily student will contribute their break time.

Benefits

From the assessment of nutritional status of the primary students, students who are living the study will involve be selected and contacted. And the study is important to identify social determinant factors impact in the study area and to show the gap.

Cost

Nothing will cost you to be participant.

Compensation

As school there will be no financial compensation but you will be able to know your student nutrition status.

Participant Rights

All your participation in the study will based on your voluntary. And if there un clear while in the question you may ask without hesitation and the researcher will answer.

Confidentiality

The nutritional status assessment results and any information about your students will be kept confidential. Only the research team will have access to your students' information. When I write a report, everyone's information will be put together so that information about your students cannot be seen because your students will be coded.

Persons to contact:

If you have any questions, you can ask any time. If you have additional questions or any other concern about the study, you may contact.

EdengentFelek ; Phone Number 0911650480

If you agree your students to participate in the study, please sign at the space provided below. And I thank you for your cooperation!

The study has been explained to me and my questions have been answered to my satisfaction. I agree to participate in this study.

Signature	Name	Date
Signature of study representative	Name	Date

ANNEX 2. For students

Interview-

Student Code: _____

Student Grade: _____

Date of Interview: _____

Starting time: _____

Ending time: _____

SECTION- 2: Demographic Characteristics		
No	Questions	Response
2.1	What is the sex of the student?	1. Male 2. Female
2.2	What is the age of the adolescent?	
2.3	Family size	
2.4	Number of children living in the same house	
2.55	What is the birth order of you among your siblings?	
SECTION- 3: Parents or Caregiver socio- economic / social class /determinant factors		
No	Questions	Response
3.1	Parent status ?	1. Both parents alive and supporting the child together 2. Both parents alive but only one parent supporting the child 3. Mother alive/ Father deceased 4. Father alive/ Mother deceased 5. Both parents deceased 6. Other, specify
3.2	Who is the Primary Caregiver for the adolescent?	1.Mother and Father together 2.Mother only 3. Father only 4. Other family relatives 5. Forster care 6. Other, specify _
3.3	What is the highest-level education for the adolescent Father / Gradians?	1.None 2.Elementary education

		3.Secondary education 4 Technical/Vocational 5.College/University 6.Other, specify
3.4	What is the highest-level education for the adolescent Mother / Gradians?	1.None 2.Elementary education 3.Secondary education 4 Technical/Vocational 5.College/University 6.Other, specify
3.5	Father Employment status (More than one answer is possible)	1.Farmer 2. Employed (formal employment) 3. Marchant 4. Both farm and off farm 5. Teachers 6.Others
3.6	Mother Employment status (more than one answer is possible)	1.Farmer 2. Employed (formal employment) 3. Marchant 4. Both farm and off farm 5. Teachers 6.Others
3.7	Does your parent involve off farm & non-farm activates?	1.Yes 2. No
3.8	Does your parent own rural and urban area houses?	1.Yes 2. No
3.9	Does your parent own a farm?	1. Yes 2.No
3.10	Does your parent own land? If your answer yes, what is the household farm size (in hectares)?	1. Small and shared with family 2. 20 Pair 3. 20 and more 4. 12 pair 5. None
3.11	If your answer for No 15 is no, how your family produce different food items?	1. Rent land 2. From labor wage 3. Family land 4. Others 5. Own land
3.12	Does your parent own pair of oxen? if your answer yes how many?	1. One Single 2. Two pair 3. Three pair 4. Four pair

		5. More 6. None
3.13	Does your parent own any livestock, poultry or fishpond?	1. Yes 2. No
3.14	What kind of animals dose your parent keep? (You can choose more than one option).	1. Shoat (sheep and goat) 2.Cattle 3.Poultry 4. Fish 5.Both 1-3 6.None
3.15	Main use of animal produce? (Meat, milk, eggs, fish, etc.)	1. Mainly own consumption 2. Mainly for sale 3. Both 4. None
3.16	Most of the time what kinds of food preferred to consume?	1. Livestock products (dairy products, meat, eggs and fish). 2.Grains and Cereals. 3. Home grown fruits and vegetables 4.Both with variety

SECTION- 4 Cultural influence /

No	Questions	Response
4.0	Does dietary restriction practice around your living area(Woreda)	Yes, I noticed No, I did not notice
4.1	Do you have any information about variety consumption? And Nutrients?	1.Yes 2. No
4.2	Which food products ban for young children at your age?	1. Livestock products (dairy products, meat, eggs and fish). 2.Grains and Cereals. 3.Fruits and vegetables
4.3	Did you take restricted food combination with others?	1.Yes 2. No
4.4	What is your religion?	1. Orthodox Christian 2. Protestant 3. Catholic 4. Islam 5. Other
4.5	Have you been involving all annual fasting?	1.Yes 2. No
4.6	If your answer is yes, since when?	1. Age 7-8 2. Age 9-10 3. Age 11-12

		4. Age 13-14 5. None
4.7	Does your family grow vegetables at your homestead?	1. Yes 2. No
4.8	Does your family have access (rent or share) to vegetable?	1. No 2. Yes, currently 3. Yes, but not currently 4. Others
4.9	If you answer is “yes” to the previous question, what kind of vegetables dose your grow or are accessible to you? (You can choose more than one option)	1. Tomatoes 2. Onions 3. Cabbage 4. Red pepper 5. Beet root ,Carrots ,Potatoes ,Green pepper o Swiss chard o Lettuce o Kale o o 6. Other, s 7. all
4.10	Which vegetables are ban for young children at your age?	From No- 22 option 1. Tomatoes 2. Onions 3. Cabbage 4. Red pepper 5. Beet root, Carrots, Potatoes, Green pepper o Swiss chard o Lettuce o Kale o o 6. Other, s 7. All
SECTION- 5: Social context and Environmental		
5.1	Who is decide the food what you consumed previously?	1. Mother 2. Father 3. Self 4. Serve as family
5.2	Are you willing to consume available food prepared newly?	1. No 2. Yes 3. Some times 4. Not at all
5.3	Does your parent allow to consume new foods?	1. Yes 2. No 3. some times 4. Not at all
5.4	Does school café sale others (uncommon) food?	1. Yes 2. No 3. Not at all
5.5	Do restaurant owners allow to sale others (uncommon) food?	1. Yes 2. No

		3. Not at all
5.6	What is the main water for drinking?	1. Pipe water 2. Public water 3. Protected dug well / spring 4. Unprotected dug well /Spring 5. Rain water 6. Other, specify
5.7	What types of toilets do you have?	1. Flush 2. Pit Latrine 3. Bucket Toilet 4. Absolute Toilets 5. No facilities or bush / field
		6.
5.8	How do you store perishable foods?	In the refrigerator Covered and protected storage and processed in to butter, others used wind drier Others not specific
5.9	Garbage disposal	Segregated in different site Burn without segregation Others not specific
5.10	Hand wash practice	Wash with someone pouring Wash using soap Wash using soap
5.11	Did you or other your family member reputedly practice illness?	Yes No
SECTION- 6: Cognition problem		
6.1	Have you ever repeated or withdraw from school if yes Why?	1. Low grade 2. Academic issues 3. School discipline

		4. Family issues 5. Other
6.2	Dose your parent prepares separate meal for young children?	1. Yes 2. . No 3. Sometimes
6.3	Did you take any multi vitamins?	1. Yes 2. 2. No
SECTION- 7: Malnutrition		
7.1	Have you ever learned about malnutrition?	1. Yes 2. . No
7.2	If your No 38 yes after you learned could you correct and thought for parents?	1.Yes 2. No
7.3	If your no 39 yes, did they take an action?	1. Yes 2. No
7.4	As wereda and reginal did they teach about malnutrition and its effect?	1.Yes 2.No 3.Yes, but people are not welling to apply. 4./Others reasons

Now I would like to ask you about liquids and foods that consumed yesterday during the day or at night. Please include liquids and foods that consumed outside your home.			
Step 1:		Step2 :	
Food /Drink eaten /drank during the day	Content	Forgotten food	Content
Breakfast			
Snack			
Lunch			
Snack			
Dinner			
Snack			
SECTION- 8 : Individual dietary diversity scores			

No	Questions	Response
8.1	Grains, roots or tubers,	1. Yes 2. No
8.2	Vitamin A-rich plant foods,	1. Yes 2. No
8.3	Other fruits or vegetables	1. Yes 2. No
8.4	Meat, poultry, fish, seafood, Eggs,	1. Yes 2. No
8.5	Pulses/legumes/nuts,	1. Yes 2. No
8.6	Milk and milk products,	1. Yes 2. No
8.7	Foods cooked in oil/fat	1. Yes 2. No

SECTION- 9: Anthropometry Measurement

No	Question	
9.1	Weight of a child	Weight in Kg
	Height of a child	Height in C. m

SECTION-10: Food Composition Sore

10.1	Main Stepless	Number of day
10.2	Pluses	Number of day

10.3	Vegetables	Number of day
10.4	Fruit	Number of day
10.5	Meat, poultry, fish, seafood, Eggs,	Number of day
10.6	Milk and milk products,	Number of day
10.7	Sugar	Number of day
10.8	Oil	Number of day