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Household Food Insecurity and its Association with Nutritional Status among Women of the Reproductive Age Group, in Kirkos sub-city, Addis Ababa

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BAHIR DAR INSTITUTE OF TECHNOLOGY
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FACULTY OF CHEMICAL AND FOOD ENGINEERING
APPLIED HUMAN NUTRITION

MSc thesis on

**Household Food Insecurity and its Association with Nutritional Status
among Women of the Reproductive Age Group, in
Kirkos sub-city, Addis Ababa**

By

TARIKU CHANIE

February, 2021
Bahir Dar, Ethiopia



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TARIKU CHANIE

A Thesis Submitted InPartial Fulfillment of the Requirement for the Degree of Master of
Science in Applied Human Nutrition

Advisor: Endale Amare (PhD)

February, 2021
Bahir Dar, Ethiopia

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DECLARATION

This is to certify that the thesis entitled “Household Food Insecurity and its Association with Nutritional Status among Women of the Reproductive Age Group, in Kirkos sub-city, Addis Ababa”, submitted in partial fulfillment of the requirements for the degree of Master of Science in **Applied Human Nutrition** under **Faculty of Food and Chemical Engineering**, Bahir Dar Institute of Technology , is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.



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Approval of thesis for defence result

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

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As members of the board of examiners, we examined this thesis entitled “**Household Food Insecurity and its Association with Nutritional Status among Women of the Reproductive Age Group, in Kirkos sub-city, Addis Ababa**” by Mr. Tariku Chanie. We hereby certify that the thesis is accepted for fulfilling the requirements for the award of the degree of Masters of Science in “Applied Human Nutrition”.

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ABSTRACT

Introduction: - The major problem that currently faced urban areas is the increased population, which resulted in lack of sufficient food for the community. Therefore, understanding the determinants of HFI is important to design interventions for ensuring food security in cities like Addis Ababa. Poor nutritional status of children and women is also problem in Ethiopia. Thus, it is also crucial to generate evidence about the nutritional status of women to reduce maternal mortality and morbidity.

Objective: -To assess household food insecurity and nutritional status of women of the reproductive age group, in Kirkos Sub-city, Addis Ababa.

Methods: - Community based cross sectional study was conducted among Women of Reproductive Age Group in October 2020. A multiple stage sampling procedure was used and at first, five of sub-city's woredas were selected through random sampling technique. Secondly, the calculated sample (532) was proportionally allocated to all the selected woredas. Finally, eligible women were selected from the sampling frame using systematic random sampling. Data were collected through questionnaire and by measuring the height and weight to calculate BMI. Multiple binary regressions was used to quantify the association between household food security and nutritional outcomes of women, while considering other covariates potentially associated with the outcome variables of interest.

Results: Four hundred eighty seven women were involved with a response rate of 91.54 % and it was found that 80.9% households were food insecure while 12.9% women were underweight. Households headed by female were less likely to be food secured compared with male headed households (AOR= 0.09, 95% CI= 0.03-0.29). Women aged 20-29 years were more likely to be food secured compared with women belong to the age group 15-19 years,(AOR= 7.42, 95% CI= 1.59-14.50). Households with > 2 children of under 5 years were more food insecure than households with no children <5 years (AOR= 0.04, 95% CI; 0.02-0.13). Besides, the likely of underweight for a woman is higher for food insecure households than the secured ones

Conclusion and recommendation: Woman's age, number of children < 5 years and family size were having strong association with food insecurity. Whereas, food security status, and number of children < 5 years were strongly associated with women's nutritional status. Policy makers should address the challenges of food availability through subsidizing of common food items and reducing poverty among the community.

Key words: Food insecurity; BMI; logistic regression; Kirkos

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ABBREVIATIONS

AFDB	African Development bank
AOR	Adjusted Odds Ratio
BDU	Bahir Dar University
BMI	Body Mass Index
CAADP	Comprehensive Africa Agriculture Development Programme
CI	Confidence Interval
COR	Crude Odds Ratio
ECSA	Ethiopian central Statics Agency ICF
EDHS	Ethiopian Demographic and Health Survey
EHNRI	Ethiopian Health and Nutrition Research Institute
EU	European Union
FANTA	Food and Nutrition Technical Assistant Project
FAO	Food and Agriculture Organization
FEWS	Famine early warning systems
FFQ	Food Frequency Questionnaire
FI	Food insecurity
FMoH	Federal Ministry of Health
HFI	Household Food Insecurity
HFIAS	Household Food Insecurity Access Scale
HFS	Household Food Security
HH	Households
IFAD	International Fund for Agricultural Development
MoA	Ministry of Agriculture
NGO	Non Governmental Organization
NNP	National Nutrition Programmes
NYCW	Nutrition for young children and women
OR	Odds Ratio
SD	Standard Deviation
SDG	Sustainable Development Goal

UN	United Nation
UNICEF	United Nations International Children’s Emergency Fund
UNSSCN	United Nations System standing committee on Nutrition
UNSWFS	United Nations World Food Summit
USAID	United States Agency for International Development
WFP	World Food Program
WHO	World Health Organization
WPP	World population prospects

1. INTRODUCTION

1.1. Background

Nutrition is a cornerstone that affects and defines the health of all people, whether they are rich or poor, adults or children, and urban or rural dwellers. In other words, undernutrition exposed everyone more vulnerable to disease and premature death which is a serious problem especially for the poor as poverty is a fundamental cause of household food insecurity. Consequently, nutrition continues to be one of the major and most pressing health problem in the world which affects specifically woman and children (Pinstrup-Andersen et al., 2012).

Most of the world's poor people live in rural areas; however, the numbers of urban poor are also substantial and cannot be ignored; however, still many argue that urban poverty is underestimated (Mitlin & Satterthwaite, 2013). Urbanization is increasing globally, based on current trends; by 2030 about 5 billion of the projected totals of 8.1 billion people will live in urban areas (Chiplunkar et al., 2016). Thus, raising the topic and understanding of poverty with food security in urban contexts are becoming increasingly urgent. Food access for the urban poor is strongly conditioned by access to housing, transport and time, in addition to income. Urban food insecurity in low-income countries is higher (50%) than levels in rural areas (43%). In urban slums, it is estimated that food insecurity is reached up to 90 percent (Tefft et al., 2017).

Women's nutrition has significant impact on health and social issues, including family care and household food security (FMoH/UNICEF/EU, 2016). In developing countries, social and biological factors are responsible for women being susceptible to undernutrition throughout their lives. A chronically undernourished woman is likely to have a major impact on their own health as well as their children's health, which perpetuates malnutrition between generations (Bhandari et al., 2016). Factors at individual, household and community level, or a combination thereof, also contribute to women's health status (Bitew & Telake, 2010).

In Ethiopia, undernutrition is a serious problem and women and children are the most affected segments of the population (Bitew & Telake, 2010). In addition, urban food security is an emerging area of development concern, and it is fundamentally different from questions of food security within the rural and agricultural sectors. As there is no sufficient information about the determinant of food insecurity and nutritional status specially for children and women in the city of Addis Ababa, making it difficult for development practitioners and policy makers to quantify the challenge and to proactively plan to reduce the food gap that exists in urban areas (Sisay & Edriss, 2012).

Situational analysis conducted in city of Addis Ababa indicated that Kirkos sub-city is the most densely populated sub-city and its dwellers are characterized by low income or poor households living in Keble administered houses (UN Habitat, 2007). The mere observation also tells that the sub-city is one of the most deprived and poorest places found in Addis Ababa city. In this regard, households and women living in Kirkos sub-city are the most likely to be food insecure and undernourished of any sub-cities in Addis Ababa respectively.

1.2. Statement of the problem

Household food insecurity (HHFI) has a significant effect on health outcomes, on the inception of diseases and its impacts in later life (Seligman et al., 2010). Food insecurity is a critical health problem of developing countries and it is associated with poorer health outcome (Ashabi & O'Neal, 2007), poor child growth (Mutisya et al., 2015) and birth defects (Carmichael et al., 2007).

Globally, undernourishment, or chronic food deprivation, is estimated to be 690 million people which is equal to 8.9 percent of the world population. This estimate is based on new data on population, food supply and more importantly, new household survey data that enabled the revision of the inequality of food consumption for 13 countries, including China (FAO, 2020).

Ethiopia has the highest proportions of undernourished women, and according to the Demographic and Health Survey (EDHS) report of 2016, 2% of women age 15-49 are of short stature (below 145cm) and 22% are found to be undernourished (BMI less than

18.5). Hence, under nutrition is still a major public health problem and indicates a considerable need for intervention.

The nutrition status of individual HH members is the product of food security status, access to health and environmental sanitation services, and maternal and child caring practices. Within the HH, women are especially vulnerable as they are usually the first to make sacrifices when things get deteriorated. A woman's nutritional status is both an important indicator of a woman's overall health and a predictor of pregnancy outcome. Women who are underweight prior to pregnancy and who gain little weight during pregnancy face an increased risk of complications and death(Shrimpton et al., 2008) .

In order to identify and avert the devastating risk of food insecurity and under nutrition the government of Ethiopia developed Nutrition Strategy and Programmes among which maternal nutrition is one of the priority areas. The second phase of National Nutrition Programmes (NNP II), which covers the period from 2016 to 2020, addresses the multi-sectoral and multi-dimensional nature of nutrition, and guides policies, strategies, programmes, and partnerships that deliver evidence-based, cost-effective nutrition interventions (FMoH/UNICEF/EU,2016).

However, there is no sufficient evidence about the level of HH food insecurity and nutritional status of women of the reproductive age group in Addis Ababa, which makes it difficult for the planners and policy makers in tackling the problem of food insecurity and under nutrition.

This research tries to fill the gap by indicating the determinant factors including its extents for household food insecurity and nutritional status of women of the reproductive age group. The study also wants to show the coping strategies and the effect of household food insecurity on women's nutrition for the urban population specifically for Kirkos sub-city.

1.3.Objective

1.3.1. Main objective

The objective of this study was to examine the household food security and its association with nutritional status among women of the reproductive age group(15–49 years).

1.3.2.Specific Objectives

The specific objective of the study was:

- I. To determine level of household food insecurity.
- II. To determine the nutrition status of women of the reproductive age
- III. To determine the relationship between household food insecurity and women under nutrition.

1.4. Justification of the study

Currently, some of the challenges requiring policy responses in the urban population of Ethiopia are food and nutrition security, poverty, population growth and unemployment. As a result, scientific evidences about urban food insecurity and nutrition status and how people in the urban areas are managing these problems need to be identified and gathered to deal with these problems. As to the researcher’s information, there is no recent data regarding household food insecurity and nutritional status of women of the reproductive age group in the city of Addis Ababa.

The study is designed to assess the level of HH food insecurity, and its effect to women’s nutrition, and coping strategies in Addis Ababa. This research is believed to help the government and other interested parties to design effective interventions to assure household food security and women nutrition in urban areas. As, area specific identification of the challenges of food insecurity and woman nutritional status will ensure on time implementation of various development projects in the Addis Ababa city. This study will also help as a reference material for related researches to be conducted in the future.

1.5. Strength and limitation of the study

The sampling procedure, community based nature of the study and high response rate can be considered as strength for the study.

As the design of the study was cross-sectional, its ability to draw cause-effect relationship was limited. Since the analysis was based on the data that was collected in the previous one month, the status of nutritional and household food insecurity may vary at different seasons of the year, thus data which shows seasonal variations may be required to properly understand household food insecurity and its association with nutritional status.

2. LITERATURE REVIEW

2.1. Concepts and definitions food insecurity

Many people around the world are affected by hunger and malnutrition. One of the major causes for this global problem is food insecurity. Food insecurity by its nature is flexible and has passed through generations for years in research and policy usage. Even though the definition of food security has evolved widely over the years, the formal definition of food security was given in the international arena some fifty years ago, when global food crises occurred in the early 1970s. The concept of food security was initially focused on ensuring food supply and price stability of basic foods, due to the extreme volatility of agricultural commodity prices and mess in the currency at that time (Berry et al., 2015).

The new definition of food security was then forwarded at the World Food Conference in 1974 as “[the] availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices”. This definition gave due consideration on the need for improved food production as protein-energy deficiency in 1970 was believed to affect more than 25% of the world population (WFC, 1975).

This concept totally ignored the multiple causes that affect food access, because food insecurity at that time was understood as merely inadequacy of food availability at global and national levels. It was observed that food production has been increasing during the mid 1970s, however; huge amount of food at global level does not ensure food security at national or household level. This unexpected occurrence of widespread food insecurity when there is sufficient supply of food in the world stimulated the research for the nature and causes of food insecurity (Barrett, 2011).

Regarding the definition of food insecurity paradigm shift has occurred in the early 1980s that food insecurity is more of an access concern than availability of food at the national level. Since then, food insecurity is being seen as the effect of a problem for access to food (Sen's, 1981).

The next development in the field food insecurity came in 1986 when the World Bank published its report on Poverty and Hunger(WB, 1986).This introduced temporal dimensionscale for food insecurity by distinguishing between chronic food insecurity, which is a long-term or persistent inability to meet minimum food consumption requirements and associated with poverty; andacute (transitory) food insecurity, which is a short-term or temporary food deficiencycaused by natural or man-made disasters(Hoddinott, 1999). These were reflected in a further extension of the concept of food insecurity to include: “noaccess of all people at all times to enough food for an active, healthy life” (Berry et al., 2015).

The other concept evolution happened in 1994, when due consideration was given for the requirements of human security following the UN Development Program’s Human development Report (UNDP, 1994). At this time, food security, which was within the larger framework of social security, entered the discussion of human rights(Rajaonarison, 2014) .The high burden of malnutrition and its consequences, initiates the Sustainable Development Goals (SDGs) to focus on food security as a human right that needs to be addressed with urgency(UN-DESA, 2015).

The studies on food insecurity are often context specific, depending on which of the many technical perspectives and policy issues are applicable,and hence it was impossible to come up with coherent definition. In an attempt to bring about a common understanding on this issue , a redefinition of food security was conducted through international consultations in preparation for the World Food Summit held in 1996 (Shaw, 2007), reflecting the complex interaction among, and between, individual, household, even to the global level. Food security, at all different levels, is achieved “when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life”(FAO, 1996).

The most widely used definition of food security is the one forwarded by the Food and Agriculture Organization (FAO, 2002) and broadly set as “Food insecurity is a situation that exists when all people, at all times, have no physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for

an active and healthy life''. The last amendment to this definition was made at the 2009 World Food Summit in which 'stability' was added as a fourth dimension of food security for short-term time indicator of the ability of food systems to withstand shocks, whether natural or man-made(FAO, 2009b). Food is here defined as any substance that people eat and drink to maintain life and growth. As a result, safe and clean water is an essential part of food commodities.This definition integrates availability of nutritionally adequate food, access to food, and the biological utilization of food (WFS, 2007).Currently, there are approximately 200 definitions and 450 indicators of food security(Hoddinott, 1999).

The concepts of food and nutrition security are different but closely interrelated to each other which results in for some researchers to apply the two concepts interchangeably(Patric L. Engle,Purnima,Menon, 1999).The nutrition focuses on the aspects of caring practices, health services and healthy environments in addition to ensuring food security. This aims at what is more precisely called 'Nutrition Security', which can be defined as adequate nutritional status in terms of protein, energy, vitamins, and minerals for all household members at all times (Quisumbing Agnes R. at al, 1995).

2.2.Dimensions of household food security

Four dimensions of food security have been identified according to the definition(FAO, 2009a)The four pillars that highlight food security are food availability, food accessibility, food utilization and food stability.

2.2.1.**Food availability** refers to the physical existence of food; on the national level food availability is a combination of domestic food production, commercial food imports, food aid, and domestic food stocks, as well as the underlying determinants of each of these factors(Olayiwola et al., 2016).The term availability is often confusing, since it can refer to food supplies available at the household and at a more aggregate (regional or national) level. However, the term is used most commonly in reference to food supplies at the regional or national level (Riely et al., 1999).

2.2.2. Food access: refers the ability of households to have adequate economic and physical resources to acquire and consume a nutritious diet, including the capacity to buy and transport food, the knowledge and skills to make appropriate choices and time and mobility to shop for and prepare food(Lawlis, 2017).

Sufficient access of food can be ensured with no households being self-sufficient in food production. The most important is the ability of households to generate sufficient income which, together with their own production, can be used to assure the required food needs(Riely et al., 1999).

Food access is influenced by the physical, social and policy environments which determine how households are able to utilize their resources to achieve their food security objectives. Changes in these conditions, such as during periods of drought or social conflict, may seriously affect production strategies and threaten the food access of affected households. These shocks often lead to the loss of productive assets such as livestock, which have severe implications for the future productive potential of households and, therefore, their long-term food security (Riely et al., 1999).

2.2.3. Food utilization: refers to a proper biological use of food to obtain an appropriate energy and it is affected by access to nutritious diet, potable water, and adequate sanitation. Food utilization, which is typically reflected in the nutritional status of an individual, is determined by the quantity and quality of dietary intake, general childcare and feeding practices, along with health status and its determinants(FAO, 2014).

Utilization of food by the body indicates the health status of individuals. In general, it is agreed that, if there is good utilization of food eaten in the body, then the individual is free of diseases. Loss of appetite and poor absorption of important nutrients from food are usually caused by illness and disease. Therefore, food utilization is largely determined by the health status of individuals. Poor access to services, including primary health care and education, as well as potable water, sanitation systems and general environmental conditions influence the health status of individuals and leads to poor utilization of food by the body(Kennedy, 2004).

2.2.4. Food Stability: it is determined by the stability of the above three dimensions over time, that is, everyone, at the population, community, household and individual levels, must have sustained access to adequate and nutritious food at all times. Stability deals with the ability of the nation/ community/(household) person to withstand shocks to the food chain system when natural disasters (climate, earthquakes) or those that are man-made calamities (wars, economic crises) occurs (Lawlis, 2017).

Thus, it may be understood that food security exists at a number of levels. Availability - National; Accessibility – Household; Utilization – Individual; Stability – may be considered as a time dimension that affects all the levels. All four of these dimensions must be intact for full food security (Peng & Berry, Elliot M, 2018).

2.3. Food Security in the Urban Setting

The 2020 forecast shows that around half of the population is expected to live in cities and urban areas including an impromptu township (Napoli et al., 2011). Food and nutrition insecurity have been on the rise in low income countries of Sub-Saharan-Africa owing to rapid urbanization. Urban net food buyer population has been challenged by the rapid increment of food price when compared to rural populations and for some developing countries the impact of inflation has also been one key element that has resulted in increased food insecurity in urban areas (Braun, 2008; FAO, 2015)

Urban food insecurity problems in Africa receive little attention partly because it tends not to be linked to seasonal or community wide process and partly because of a long held belief that urban populations are better off but urban food insecurity is directly linked to urban poverty and inequality and for this reason research on urban food security must focus on the question of access to food (D. G. Maxwell, 1999). The reason that the rural case has been given due consideration is because of its acute nature. The rural population is vulnerable to natural shocks, as its livelihood is primarily dependent on it. Therefore, food security in rural areas is closely tied with rainfall variation (Garrett & Ruel, 1999).

A number of factors affect the shape of urban food and nutrition security. As the urban population must buy most of their food, urban food security depends mostly on whether

the household can afford to buy food, given prices and incomes. High food prices result from inefficient urban food-marketing systems would make the poor to buy only small quantities of food at a time rather than in bulk. Macroeconomic policies such as, inflation, depreciation in the exchange rate, and the removal of key consumer or producer subsidies can all push prices up (James L. Garrett, 2000). For the urban poor, financial assets are very important, whereas for the rural poor, natural assets are very decisive (Degefa, 2008).

2.3.1. Dimensions of food security and the urban setting

Each of the four dimensions of food security can be analyzed in terms of the urban setting:

2.3.1.1. Urbanization and Food Availability

Urbanization is a serious challenge to food availability in terms of evolving consumption patterns and food production and supply processes. Rapid urban growth implies that more food will have to be available to people who live in an environment that has traditionally been perceived as inappropriate for agriculture (FAO, 2011). Most urban dwellers are net buyers of food. It is indicated that, at the city scale, it has been suggested that to meet basic daily needs, modern cities “almost exclusively” rely on imported foods (Grewal & Grewal, 2012).

Even though urban growth was faster in the least developed countries, the increase in their agricultural yield (measured as cereal yield in kilograms per hectare) is very low compared with the developed nations (FAO, 2020).

The cost of healthy diets is unaffordable for more than 3 billion people in the world (WB, 2013). The number of middle players usually determines the price of food in urban centers. The urban dwellers are forced to buy food from small neighborhoods, because wholesalers prefer to sell food items to retailers than individual purchasers. This has swollen the price of food in urban centers (FAO, 2003).

2.3.1.2. Urbanization and Food Access

Access to food is another very important factor for food security for urban areas. By access to food, it is to mean the household's ability to buy food. In most of the urban

cities of Africa, the poor spend most of their income on food than the rich. A study made in Accra, Ghana indicated that average urban dwellers spend 54% of their income on food, while the lowest income group spends up to 60% of their income on food items(D. Maxwell et al., 2000). In addition to the ability of households to buy food,there are other reasons that inhibit people from getting proper dietary patterns. It was indicated that shortage of time to prepare meals because of physical exhaustion, walking for long distance till reaching the nearest shop, long distance from work to home and uncongenial living places with outdoor cooking places are some of the reasons for poor access to food(Kennedy, 2003) . Street foods are other commonly used food types, because of inaccessibility of food items. A study made in Kenya discovered that people living in urban slums consumed more street foods than those with low or middle income people(Van 'T Riet et al., 2001).

2.3.1.3. Urbanization and Food Utilizations

Urban growth can have an important impact on food utilization. Because urban residents as largely net buyers of food are particularly vulnerable to volatile food prices, they are often forced to reduce other expenditure in order to meet their basic food requirements. In the context of developing countries, poor urban dwellers are thus at risk of consuming insufficient and low-quality food, including street food, which may be unhygienic, exposing them to health risks (Matuschke & Qaim, 2009). The informal food sector can contribute to food insecurity because of the low quality of the food sold and lack of hygiene during food preparation and sale(Mensah et al., 2002). As a result, similar to amongst the rural poor, many city dwellers incur infections, and are at risk of life-threatening diseases. Recognizing the importance of sanitation for food security outcomes, FAO included the percentage of population with access to sanitation facilities as an official indicator of food security(FAO-ONU, 2002).

A crucial aspect of food consumption in both developing and developed countries pertains to the quality of food, which is linked to the food supply system. Amongst the consequences of rapid urbanization, there has been a shift in production patterns of food. It has been shown that urbanization is highly correlated with access to processed foodstuffs, which have higher sugar levels(Popkin et al., 2003). In addition to sugar and

artificial sweeteners, processed food tends to contain artificial coloring agents, hydrogenated fats, preservatives and chemical pesticides. In the contemporary world, processed food is often the most accessible type of food, both in terms of physical proximity as well as price. The urban poor also tend to consume high-energy processed food due to its affordability and accessibility. Although the obesity epidemic was traditionally considered to be a health concern of developed countries, today the overall burden of obesity and chronic diseases is greater in developing countries (Malik et al., 2012).

2.3.1.4. Urbanization and Food Stability

Finally, stability of food supplies can constitute a serious concern for urban residents. Whereas in developed countries, cities are likely to be well organized and thus disaster preparedness is generally quite normal, while in the developing world the urban poor are at risk of food insecurity caused by extreme weather events, natural hazards and disasters (Deely et al., 2010). Transient challenges with access to food can be the results of disastrous events including war, or may be linked to other unforeseen occurrences. The case of Burkina Faso is a pertinent example of the challenges related to food stability. Over the last several years, Burkina Faso has suffered from food shortages, which affected household food security and hindered the country's socio-economic development (FSIN, 2020). Most recently, in 2012, the Sahel food and nutrition crisis contributed to the urbanization of poverty in the region in at least two ways. First, large urban populations' access to food was reduced due to food shortages and high food prices. Second, the crisis triggered population movements because many households—mainly in rural areas—were unable to sustain their livelihoods and so migrated to cities in search of alternative income. Because of the economic and environmental vulnerability of the region, out-migration has become an important adaptation strategy amongst farmer communities, thus further contributing to a largely uncontrolled urban sprawl (FSIN, 2020).

Because of the increasing urbanization of poverty and reliance of urban dwellers on purchased food, many food insecurity risks, in particular financial access to food and food availability, are expected to continue to be greater in urban areas than in rural

communities. This could be especially the case if food commodity markets are not adequately regulated, potentially leading to even more price volatility as exemplified by the food crisis in 2007–2008 (FAO, 2013). The risk of increasing food insecurity in urban areas will continue to be especially high in slums and informal settlements where, in many cases, socio-economic development is already lower than in rural areas (UNICEF, 2010). However, the urban–rural differentials as well as intra-urban disparities are likely to become less stark as a country progresses in terms of its human development level. Consequently, some aspects of food insecurity can be expected to be greater in urban than rural areas, but lessening so that countries become more developed (Szabo, 2016).

2.4. Food security in the Ethiopian case

Ethiopia is one of the most food-insecure and famine affected countries. A large segment of the country's population has been suffered from both chronic, long-term food insecurity and the regular incidence of severe food insecurity crises, often associated with drought events (AfDB, 2014). Food insecurity is still the major factors that hinder 'Human Development' of the country. Food insecurity and poverty in Ethiopia are attributed to the poor performance of the agricultural sector, which in turn is attributed to both policy and non-policy factors. Among the non-policy factors, recurrent drought, combined with human population pressure, environmental degradation, technological and institutional factors have led to food shortage and famine in the country. The problem is worsening, despite massive resources invested each year into humanitarian aid and food security programs (Girma & Temesgen, 2018).

Poverty and food insecurity is still a big challenge to tackle in Ethiopia. Over 30% of the population Ethiopia is below the poverty line, and a vast majority depends on subsistence agriculture. Food insecurity with erratic cases of chronic and acute food insecurity are quite prevalent, especially among rural populations and smallholder farmers. Nearly 10 percent of Ethiopia's citizens are chronically food insecure, and this figure rises above 15 percent during recurrent drought years. The long-term effects of chronic malnutrition cost Ethiopia approximately 16.5 percent of its GDP (Button et al., 2014). In addition, under-nutrition has been a serious problem in Ethiopia as the

prevalence of stunting in of children was 44%, while the prevalence of wasting and underweight in children were 10% and 29% respectively (ECSCA, 2011).

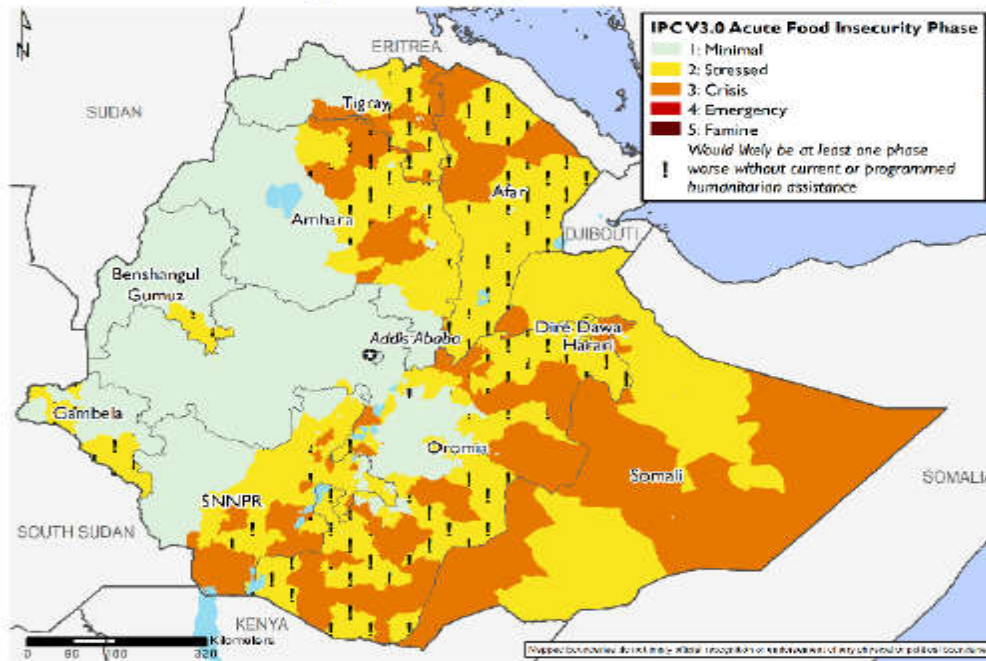
Ethiopia which is Africa's second most populous country next to Nigeria has a critical challenge of food insecurity. Over 80 percent of Ethiopian population live in rural areas and are heavily dependent on rain-fed agriculture in which the country is vulnerable to weather related shocks; this makes climate as an important resource both for crop and livestock productions as farmers depend largely on rain fed agriculture that rain varies greatly by region and is particularly unpredictable (Endalew et al., 2015). The El Niño drought conditions in August, 2015 led to a sharp deterioration in food security; the estimated number of food insecure people was 4.5 million due to this vulnerable shock and by the end of the same year (2015/16) this figure had increased to 10.2 million (FAO, 2016),

Drought-initiated production failures were occurred in Ethiopia in the 1984/85, and 1989/90s. The 1984/85 drought affected over eight million people and causes the death of one million Ethiopian's (USAID, 1987). It was reported that the 2015 El Niño drought is one of the strongest droughts that have been recorded in Ethiopian history, in which more than 27 million people become food insecure and total population of 18.1 million people were forced to lend hand for food assistance in 2016 (Abdulahi Mohamed, 2017).

Furthermore, there is evidence that climate is already changing leading to serious drought. The drought pattern has been 10 years in case for Ethiopia, but at present time the cycle period is becoming shorter and shorter which leads to serious food security problems in every three years (Mohamed, 2017).

Currently, despite favorable rainfall over the past year across the country, humanitarian assistance needs are atypically high, with many poor households having difficulty meeting their minimum food needs in eastern parts of the country. This is driven by the continued slowdown of the economy, impacts of desert locusts on pasture and crops, and the indirect effects associated with COVID-19, including significant reductions in remittances and labor income (Messages, 2021).

According to (Messages, 2021), generally there are four key drivers of the acute food insecurity situation in Ethiopia at this moment. The first factor is the COVID-19 pandemic; COVID-19 affects most the urban areas compared to rural areas. Many poor households are gradually involving in income-generating activities as measures to take control the spread of COVID-19 are loosen. However, the economic slowdown has greatly affected the community in their capacity to earn income. The other key factor that causes acute food insecurity is flooding, due to high rainfall in the highlands of Ethiopia. According to the report of the National Meteorological Agency, it was indicated that for June to September 2020 the Meher rainfall-receiving areas (including in the highlands of Tigray, Amhara and Oromia) experienced average-to-above average rainfall, resulting in flash floods and the over-flooding of rivers. The rainfall between July to September has already been mostly positive, resulting in better crop harvests in many parts of the Meher-producing areas. However, excessive rainfall has also led to flash floods in areas of Afar, Eastern Oromia, Amhara, Somali and SNNPR in August and September (Messages, 2021). The third key drivers for the acute food insecurity in Ethiopia are insufficient rainfall. In parts of Tigray (Central, Eastern and North Western zones), food availability was compromised by the late onset and early cessation of rains for the Meher season, resulting in poor production of barley and sorghum estimated to be about 34% and 10% respectively (Messages, 2021). The last key factor for acute food insecurity in the country is desert locusts. Preliminary reports from FAO and the Ministry of Agriculture (MoA), as of October 2020, shows that about 98 districts were affected by desert locusts (Messages, 2021). According to (FAO, 2019) the acute (current) food insecurity distribution in 2019 Ethiopia is presented with figure 1.



Source: FEWS NET

Figure 1 Current food security outcomes in June 2020

2.5. Measurements of food security

Situations of excessive food price volatility, financial crises, and climate change and related weather shocks threatening food production has made food security a top priority at the national levels and on the global development community. Along with the discussions on how to feed the growing population in the next decades has come heightened awareness of the need to improve our understanding and measurement of food security. For this reason, different people on the field around the world have come across for the best measurement; scale, while others have devised their own (Leroy et al., 2015).

The first standard measure of food security was based on the level of consumption of dietary energy compared with determined minimum cut off point. The minimum dietary energy level (2,200 kilocalories/adult equivalent/day), required to meet the energy expenditures necessary to maintain the lowest acceptable body weight per attained heights and commensurate with light activity levels typical of a sedentary life style was set in a FAO/WHO/UNU Expert Consultation on Energy and Protein in 1981 (WHO, 1985). The household dietary diversity score was another method used to indicate nutrient adequacy that has been found by some studies to be associated with both

foodsecurity and nutritional outcomes (FAO, 2007). The measurement method is based on a simple sum score of the number of food groups consumed by members of a household over a recall period –usually ranging from one day to one week and analyze each type of food item mentioned with respect to dietary energy and micronutrient contents (FAO, 2007; IFPRI, 2002). Anthropometric results of food nutrition are sometimes used as an indicator for food security. But since food security is not the only cause to determine nutritional status, this technique is used with caution (Daniel Maxwell & Wiebe, 1998).

Food security metrics may comprises all or some combination of the food security dimensions of food availability, access, utilization, and stability over time. These measures may draw from data at national, regional, household, or individual levels. Such tools may vary from easy and uncomplicated indicators towards more comprehensive measures that demands a detailed, time and resource intensive data collection and advanced analytic skills to yield results (Jones et al., 2013).

The food insecurity assessment based on the availability dimension is widely used and for the most part guides the responses to food insecurity (Barrett, 2010). However, it fails to capture the unequal distribution of food and is also unable to guarantee the utilization of food in a given population. An assessment of food insecurity based on the utilization dimension is well captured through various anthropometric indicators, e.g., underweight, stunting, and wasting. Food access, which reflects the demand side of food security, has recently been designated as one of the major contributors to food insecurity (Moore & Sen, 1982).

In 2007, the USAID-funded Food and Nutrition Technical Assistance Project, through the Academy for Educational Development, published a tool (HFIAS) that measures the access component of household food insecurity. The HFIAS is a continuous measure for investigating the incidents of household food insecurity in the previous month (Coates et al., 2007).

The tool was developed to be simple, easy to use, and applicable, with only minor adaptations to different sociocultural contexts. The tool captures three domains: i) anxiety

and uncertainty about food access, ii) insufficient quality (variety, preferences, and social acceptability), and iii) insufficient food intake and the physical consequences (Moore & Sen, 1982). The HFIAS has been shown to measure food insecurity with an acceptable standard in a few developing countries (Becquey et al., 2010). Even so, a lot has been done on measurements of the access component of food insecurity in developed countries such as the US (Gundersen, 2013), the Core Food Security Module (CFSM), which has a similar structure with that of the HFIAS, is currently being used to measure the access component of food insecurity in the US. The CFSM is based on a set of 18 questions for households with children and 10 questions for households without children, and the frequencies of affirmative responses to these questions are used to discriminate households food insecurity levels (Coleman-Jensen et al., 2014).

2.6. Effects of Food insecurity and under nutrition

Food insecurity may lead to serious social, psychological and behavioural repercussions such that at an individual level it could manifest with feelings of alienation, powerlessness, stress and anxiety potentially leading to not only reduced productivity, but also reduced work and school performance, and reduced income earnings (Rosenthal, 2009). Households and communities who encountered acute food shortages are obliged to adopt coping strategies to meet the immediate food requirements of their families. These extreme responses may have adverse long-term impacts on households' ability to have sustainable access to food as well as the environment (Rosenthal, 2009) (Adams et al., 2003).

As a key to social and economic development, good nutrition is the solution to mitigate intergenerational cycles of poverty, because good maternal nutrition produces healthier children, who grow into healthier adults. Good nutrition improves health, labour productivity and incomes of the community (FAO, 2013). Poor nutritional status of women has been a serious problem in Ethiopia for many years and requires greater multi sectoral efforts (FAO, 2014). Food insecurity and under nutrition in adolescent and pregnant women, compounded with gender discrimination, lead to an inter-generational cycle of nutritional problems (Shekar., 2006). One consequence is lowering of birth

weight due to malnutrition in pregnancy, which perpetuates malnutrition between generations. Generally, it is well understood that nutritional status of a woman of a reproductive age group is a significant indicator of her overall health, productivity and pregnancy outcome for both mother and child(Elshibly& Schmalisch, 2008).

2.7. Predictors of Women's Nutrition

In developing countries women with a body mass index (BMI) below 18.5 showed a progressive increase in mortality rates(Martorell et al., 1998). Women of reproductive age group, specifically pregnant women, are found to be at risk of under nutrition, which causes high adverse health effects on the mother and pregnancy outcomes(Workicho et al., 2019). Some of the socioeconomic and demographic factors that determine women's nutrition are:-

2.7.1. Household income

Family income is one of the factors that influence the BMI of women. The household income is an indicator for adequate food access, use of health services, and availability of safe drinking water, sanitation, and hygiene (WASH) that are vital in determining maternal nutritional status(UNICEF, 1991). The study made in some developing countries showed that women from low economic status households were affected consistently by malnutrition(Asfaw, Samson;Goitom, 2000). The study conducted in Bangladesh indicated that women from poor households were more likely to be underweight compared with those not from poor households ($P < 0.001$)(Islam et al., 2016). The study made in Nepal also showed that there was a significant positive relationship between income and the nutritional status of women (P -value 0.002). Women who had poor nutritional status have low family income compared to women who have family income of moderate and above(Acharya et al., 2017).

The study made in Ethiopia showed that for urban women, wealth was significantly associated with under nutrition: rich women were less likely ($OR = 0.6, 0.4$) to be affected by chronic under nutrition than their non-rich counter parts(Bitew& Telake, 2010).

2.7.2. Educational status

The study made in Indonesia showed that household head education has a positive relationship with house food security ,as heads of households who have higher education have plenty of choice of work, as well as high productivity compared to heads of households who have low education(Mutihah& Istiqomah, 2017).The research conducted in Babile district of East Hararghe zone also indicated that the households to be food insecure decreases when the household heads keep in upgrading their educational status (Tilksew & Fekadu, 2014).

Women who have a minimal education are generally more conscious than those who had no education of how to improve of their own nutritional status and that of their families(Gebre, 2012).

According to the study made in Bangladesh uneducated mothers were 4.169 [95 % CI: 2.10–8.26; $p < 0.01$] times more likely to be underweight compared to educated mothers, and those with only secondary education were 2.997 times [95 % CI: 1.57–5.72; $p < 0.01$] more likely to be underweight compared to mothers with higher levels of education(Islam et al., 2016).

The study done in Nepal indicated that there was a significant relationship between the educational level of the respondents and the general nutritional status (P -value 0.006). Respondents who attained a higher level of education beyond secondary level had a higher probability of having good nutritional status than those who never attended school at all(Acharya et al., 2017).

According to the study in urban communities of Nigeria, nutritional status of mothers was significantly related to level of education of mothers ($\chi^2 = 15.4$, $p < 0.001$)(Senbanjo et al., 2013).

The study in Ethiopia shown that women with no education were also more likely to be underweight (31 percent) compared to those with a secondary or more (17percent)(EHNRI, 2010).

2.7.3. Place of residence

The study made in Bangladesh showed that women from the rural areas were more likely to be underweight compared to those from urban areas ($P < 0.001$) (Islam et al., 2016). As to the research made in Ethiopia the risk of being undernourished was also significantly higher for rural women than their urban counterparts (Bitew & Telake, 2010).

2.7.4. Age of women

Women's age is an important factor that affects maternal nutrition especially in high fertility countries (ECSA, 2011). DHS surveys conducted in Burkina Faso, Ghana, Malawi, Namibia, Niger, Senegal, and Zambia shown that a high proportion of women aged 15-19 and 40-49 exhibit chronic energy deficiencies (CED). According to the study made in Nepal it is also revealed that women with the age group 15 - 24 were found to be about three times more likely to be malnourished than women of age group 35 - 49 (AOR = 2.7, 95 % CI = 2.5-3.0) (Bhandari et al., 2016).

A study in Ethiopia has also indicated that women belong to the age groups (15-19) were found under nutritioned compared with women of the other age group (30-39) (Abdu et al., 2018).

2.7.5. Marital status of women

A study conducted in Nepal showed that marital status has a significant effect on the nutritional status of women of reproductive age group. As compared to married women the risk of undernutrition is higher for unmarried and divorced/separated women (P-value 0.008) (Acharya et al., 2017). According to the study made in Guatemala it is also indicated that the odds of underweight for unmarried women were higher than women who were married (Chaparro, 2012a).

In Ethiopia, women that were never - married are found to be the most affected by under nutrition, followed by divorced/separated/widowed women (Bitew & Telake, 2010).

2.7.6. Household size

The research made in Nepal showed that there was a significant relationship between the family size and the nutritional status (P -value 0.001). Households that had fewer individuals were more likely to have good nutritional status(Acharya et al., 2017).

According to the study made in Ethiopia households with more than 7 family members were about 13 times (AOR = 13.23, 95% CI: 6.18- 28.32) more likely to be food insecure than those house households with family size 1-2 which implied that household size is significantly associated with women underweight(Endale et al., 2014).

2.8. Determinants of House hold Food Security

In Africa 19 countries are found with dietary energy consumption per capita below the minimum level for optimal health (less than 2,200 Kcal per capita per day)(AU/UNICEF, 2009).

Food insecurity is also a challenge for Ethiopia which is Africa's second populous country after Nigeria. The food insecurity situation in Ethiopia is related with severe, recurring food shortage and famine, which are associated to recurrent drought(MoA, 2009).Several researches have been made on various developing countries about determinants of household food security and documented in some literatures.

The survey made in South Africa showed that household income, household size, marital status, employment status, age and gender of the household head as important determinants of household food insecurity. The educational attainment of the household head was not important in explaining the variation in household food security status(T. J. Sekhampu, 2013).

The study made in Malaysia showed that the food-secured group had significantly fewer children and smaller household sizes than the food-insecure groups ($P < 0.05$). The mean household income, income per capita, and food expenditure significantly decreased as food insecurity worsened ($P < 0.001$)(Pei et al., 2018).

A study made in Assyita, Afar Regional state indicated that the number of children ever born (parity) was found to significantly affect household food insecurity. Women who

have never had a child (parity 0) were less likely to be food insecure when compared with women with at least five children (parity 5+) (COR = 10.56, 95% CI: 1.62- 68.88). Households with <5y children ≥ 2 were 2 (COR = 5.96, 95% CI: 3.55-10.01) times more likely to be food insecure when compared to households with no <5y children. On the other hand, household heads who were uneducated were more than 3.1 times more likely to be food insecure when compared with household heads with primary education (COR = 3.10, 95% CI:1.64-5.69)(Abdu et al., 2018).

A study conducted in Addis Ababa showed that lower monthly income was independently associated with high food insecurity. It is also indicated that household heads who were uneducated, daily laborers and government employees were more likely to have higher food insecurity status. However, those households living in government rental houses were less likely to be food insecure, compared to other residential houses (AOR = 0.34, 95% CI = 0.1-0.95). Sex and age of household head and family size did not show significant associations with household food security status(Birhane et al., 2014).

2.9. Association between food insecurity and women's nutritional status

Under nutrition is one of the major and most pressing health problems in Ethiopia. Even though, there is some progress in reducing under nutrition in recent years it is still a major public health problem and remains a serious concern(CAADP, 2013).

The study made in Brazil, has indicated that men with severe food insecurity presented lower mean weight (-7.0 kg), and lower mean BMI (-1.6 kg/m²) than the secure ones, all with significant differences. In addition, it is also shown that men who presented underweight had a 2.64 times greater chance (AOR=2.64, 95%CI=1.32-4.14) of experiencing severe FI, in comparison with those with normal BMI. However, Women did not present significant differences in body composition or BMI according to FI levels(Godoy et al., 2017).

The research made in Nepal indicated that food insecurity was significantly associated with acute undernutrition but not with overweight among married women of reproductive age. Women from severely food-insecure households were 1.50 (95% CI, 1.17-1.92) times as likely as women from food-secure households to have a BMI below 18.5 kg/m².

Similarly, women from moderately food insecure households were 1.35 (95% CI, 1.07-1.71) times as likely as women from food-secure households to have a BMI below 18.5 kg/m²(Mutisya et al., 2015). It has also been shown in the study made in Malaysia that there was an association between food security status and BMI after controlling for age ($P < 0.01$)(Pei et al., 2018).

Association between household food access and maternal nutrition has been documented in some literature in Ethiopia. A research conducted in Assyita District of Afar Regional State showed that food insecurity was significantly associated with nutritional status of woman. In this study, severely food insecure women were more than 6 times likely to be underweight when compared with food-secure women (AOR = 6.99, 95% CI: 2.66-18.38)(Abdu et al., 2018). However, the study made in Addis Ababa showed that there is no significant association between women's nutritional status and HHs' food access(Birhane et al., 2014).

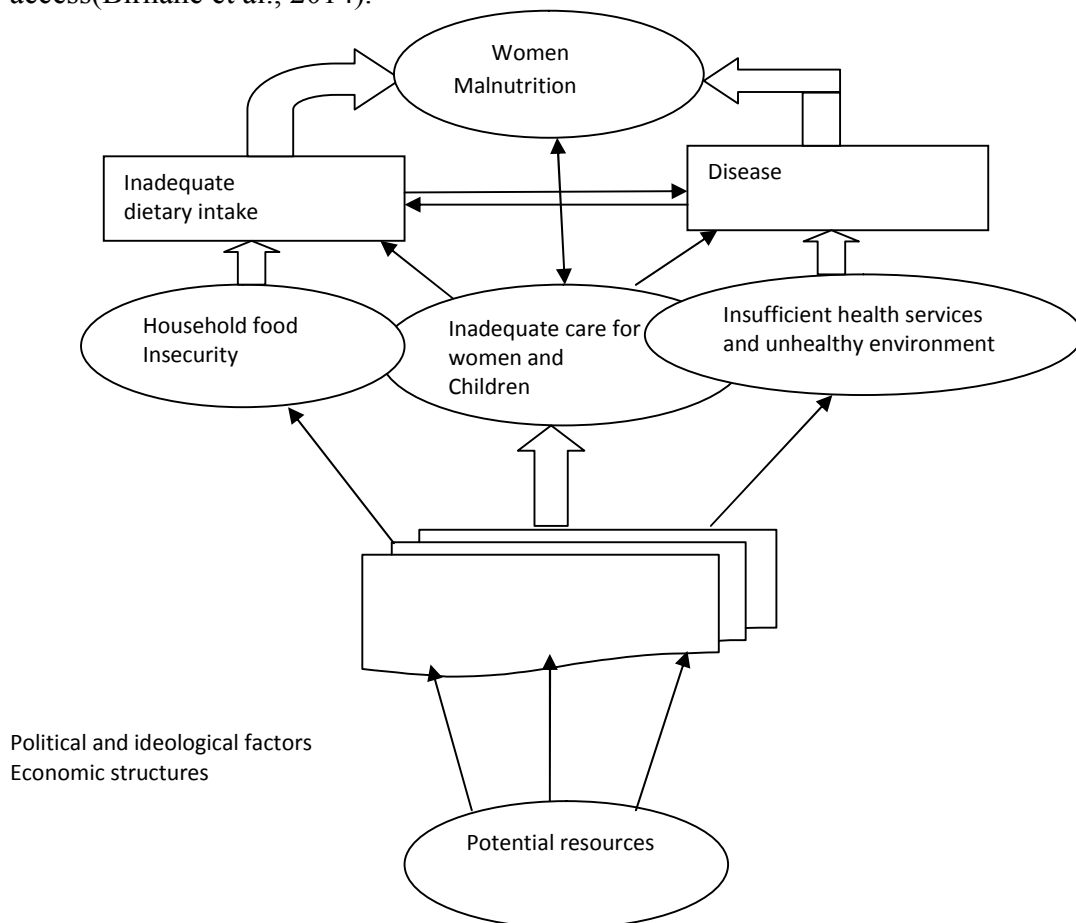


Figure 2. Conceptual framework for food insecurity and women's malnutrition (UNICEF, 1990)

3. MATERIALS AND METHODS

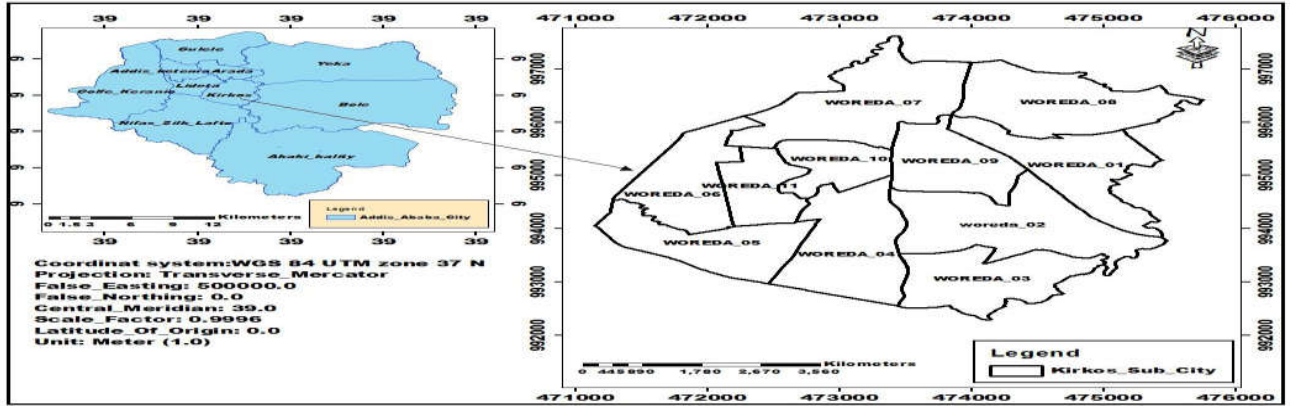
3.1. Study design

A community based cross-sectional study was applied.

3.2. Study Area and Period

The study was conducted in Kirkos sub-city, one of the ten sub-cities of Addis Ababa in October, 2020. Kirkos sub-city is chosen purposively because the site observation in area tells that the sub-city holds Woredas (like woreda 7) which are severely hit by poverty. In addition, according to the research made (Tsfazghi, 2009) in the sub-city it was indicated that all the residents were dissatisfied or worst feeling with their income, and it is also indicated on the same research in 2006 and 2008 residents were found to be dissatisfied with their life at 51 % and 74 % respectively.

Kirkos sub-city is located at the centre of Addis Ababa. National sport and cultural facilities such as Addis Ababa stadium and Meskel square are located in the sub-city. The sub-city also hosts international offices such as the office for Organization for African Union (OAU) and the United Nations Economic Commission for Africa (ECA). Kirkos sub-city covers a surface area of 1,464.72 hectare. According to the 2017 population projections for Ethiopia (CSA, 2013), the population of Addis Ababa was forecasted to increase to 3,435,028 and at the same time the population of Kirkos sub-city is also estimated to be 277,503. The sub-city is one of the densely populated sub-cities in Addis Ababa with a population density of 150 persons per hectare. Kirkos sub-city is characterized by a combination of modern building and old residential settlements. External observation of the residential areas suggests that it is inhabited by residents with high difference in income.



(A) (B)
Figure 3 Study area (A).Kirkos sub-city boundaries, (B).Kirkos sub-city woredas boundaries

Table 1. Population of Kirkos sub-city in each woreda (2017census)

Woreda	Population size (forecasted to 2017)	Woreda	Population size (forecasted to 2017)
1	22,887	7	21,350
2	31,382	8	26,978
3	16,053	9	25,814
4	35,725	10	28,489
5	26,276	11	28,683
6	13,866		

3.3. The source population

All HHs’women located in the selected woreda at Kirkos sub-city of Addis Ababa City Administration.

3.4. Study Population

All randomly selected household’s women in selected woredas within the sub-city.

3.5. Inclusion and Exclusion criteria

Inclusion criteria: all households occupied by Ethiopians and having at least one woman in the reproductive age group were included in the interview and BMI measurement. Where more than one eligible woman were available in one HH, the one who was responsible for family care and/or HH head was selected.

Exclusion Criteria: pregnant women were excluded in measurement of weight and height due to obstetric weight gain.

3.6. Sample size calculation

The actual sample size of the households needed for this study was calculated using single proportion formula for the first and second objectives based on the prevalence of national food insecurity which was estimated at 35% (EHNRI, 2010) and national prevalence of undernourished women estimated at 22% (EDHS, 2016) with 95% confidence level, 5% tolerable errors described below.

$$n = \left(\frac{Z}{d}\right)^2 p(1 - P)$$

Where n = sample size, Z = Z score at 95% $Z = 1.96$, and
 d = marginal error = 0.05

The sample size computed for the first objective is 349.

$$n_1 = \frac{(1.96)^2 * 0.35(1-0.35)}{(0.05)^2} = 349$$

The sample size computed for the second objective is 246.

$$n_2 = \frac{(1.96)^2 * 0.20(1-0.20)}{(0.05)^2} = 246$$

The sample size needed for third objective was calculated using double proportion formula. As the main aim of this objective is to compare the nutritional statuses of women between food secure and food insecure households, a two-population-proportions formula was used to determine the sample size, with 95% confidence interval, and power of 80% as shown below.

$$n = \frac{(P_1(1-P_1) + (P_2(1-P_2))) \left(\frac{Z_{\alpha}}{2} + Z_{\beta}\right)^2}{(P_1 - P_2)^2}$$

Where n = sample size, $Z_{\alpha/2}$ = Z score at 95% = 1.96, Z_{β} = Z score for a power of 80% = 0.84, and P_1 and P_2 are the expected sample proportions of the two groups.

Based on the study conducted in 2018 in Assyita of Afar regional state it was indicated that the proportion of 5.9% households were underweight from the food secured households and 35.1% households were underweight from food insecure households (Abdu et al., 2018). Similar study made in Nigeria also showed that the

proportion of underweight in food secure and food insecure household was 8.3% and 17.2%, respectively (Ajao et al., 2010).

The prevalence which gives larger sample size was taken, that is, proportion of underweight in food insecure household $p_1 = (17.2\%)$ and proportion of underweight in food secure households $p_2 = (8.3\%)$ iie-ife, Nigeria.

$$n_3 = \frac{(0.172(1-0.172) + (0.083(1-0.083))(1.96+0.84)^2}{(0.172-0.083)^2} = 242$$

By taking 1:1 ratio, the number of households that are included in the study area was 484(2*242).

From the above calculated sample size n_1 , n_2 and n_3 which are 349, 246 and 532 respectively plus 10 % non responsive rate *i.e.* the total sample size for each was $n_1 = 385$, $n_2 = 271$ and $n_3 = 532$. Therefore, the largest sample size which is $n_3 = 532$ was taken for the study.

3.7. Sampling Technique/ Procedure.

A method used for sampling procedure was a multiple stage sampling and at the first stage, 5 of sub-city's woredas were selected through random sampling technique. Finally, the calculated sample (532) was proportionally allocated to all the selected woredas. After allocated this sample size to each woreda, sample households with eligible women was selected from the sampling frame using systematic random sampling.

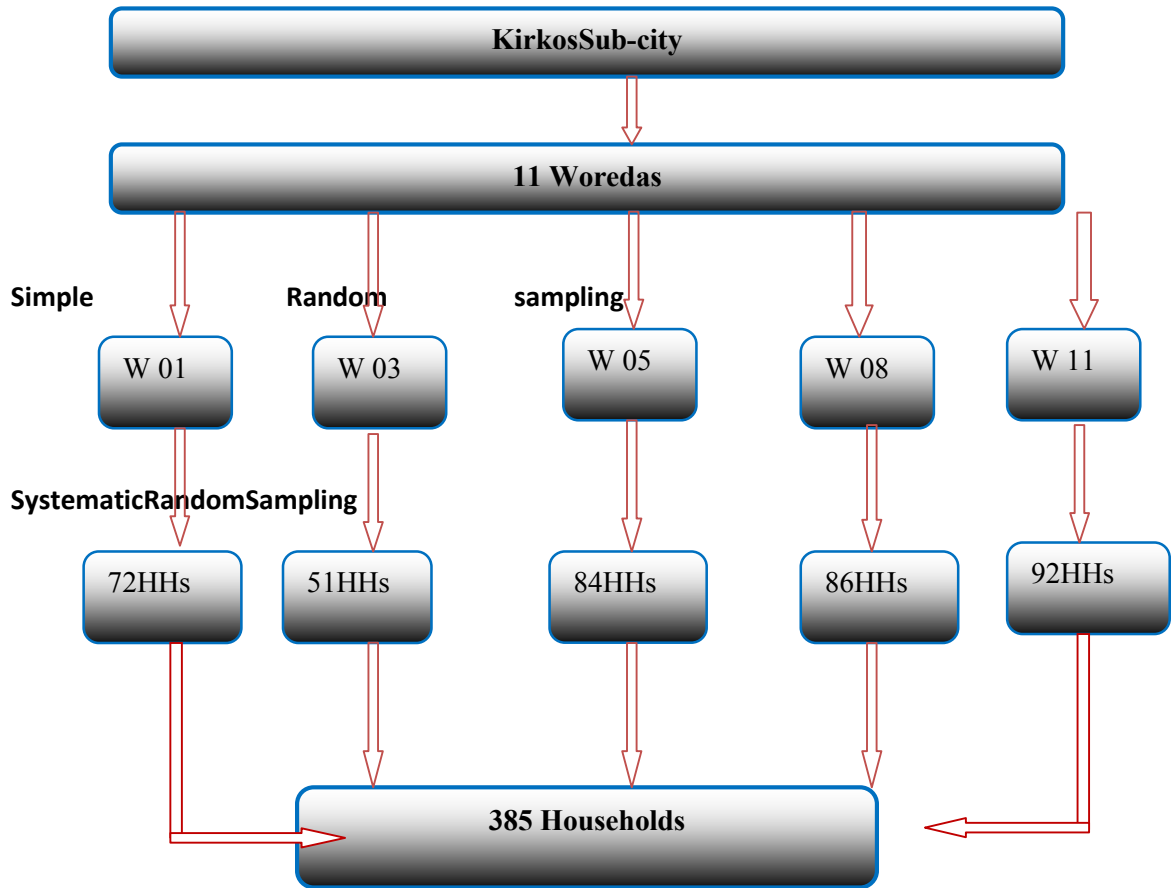


Figure 4 Diagrammatic representation of sampling procedures

3.8. Data collection procedures and measurement tools

Data was collected through interviews and anthropometric measurements. The interview consisted of a structured questionnaire on a household food insecurity measurement and households general economic and demographic characteristics. Household food insecurity level was measured using set of questions derived from the Household Food Insecurity Access Scale (HFIAS) measurement guide which was developed by the Food and Nutrition Technical Assistance (FANTA) project (Coates et al., 2007). The guide consists of nine occurrence questions, and each of the questions was asked with a recall period of four weeks (30 days). The questionnaire was initially prepared in English and then translated into Amharic.

3.8.1. Assessment of household food insecurity

The household food insecurity access scale (HFIAS) is one of the commonly used methods to measure the HFI in developing countries. The HFIAS consists of two question types. The first is an occurrence question type consists of nine questions that helps to identify specific conditions related with food insecurity ever occurred during the past four weeks (yes or no). While the second one is a frequency question type and when the answer is “yes” to an occurrence question, a frequency-of-occurrence question is followed to determine whether the condition happened rarely (1 or 2 time), sometimes (3 to 10 times) or often (more than 10 times) in the past four weeks. If the respondent answer is ‘no’ to the occurrence question it is necessary to skip the related question and look for the next question.

The maximum score for a household is 27 (the household response to all nine frequency-of-occurrence questions was “often”, coded with response code of 3); the minimum score is 0 (the household responded “no” to all occurrence questions, frequency-of-occurrence questions were skipped by the interviewer, and subsequently coded as 0 by the data analyst.) The higher the score, the more food insecurity (access) a household experienced. The lower the score, the less food insecurity (access) a household experienced(Deitchler et al., 2010).Therefore, HFIAS score of 0–1 is categorized as food secure, 2 and above were considered as food insecure. Households scored 2–7, 8–14 and 15–27 were categorized to be mildly, moderately and severely food insecure households, respectively (Table 2).

Table 2 Household Food Insecurity Access Scale (HFIAS) score and categories of food securities

No.	Household Food Insecurity Access category	HFIA score measurement	HFIAS measurement tool questions
		Coded values	
1	Food Secure	if [(Q1a=0 or Q1a=1) and Q2=0 and Q3=0 and Q4=0 and Q5=0 and Q6=0 and Q7=0 and Q8=0 and Q9=0]	Q1: Worry about food Q2: Unable to eat preferred foods
2	Mildly Food Insecure Access	if [(Q1a=2 or Q1a=3 or Q2a=1 or Q2a=2 or Q2a=3 or Q3a=1 or Q4a=1) and Q5=0 and Q6=0 and Q7=0 and Q8=0 and Q9=0]	Q3: Eat just a few kinds of foods Q4: Eat foods they really do not want eat
3	Moderately Food Insecure Access	if [(Q3a=2 or Q3a=3 or Q4a=2 or Q4a=3 or Q5a=1 or Q5a=2 or Q6a=1 or Q6a=2) and Q7=0 and Q8=0 and Q9=0]	Q5: Eat a smaller meal
4	Severely Food Insecure Access	if [Q5a=3 or Q6a=3 or Q7a=1 or Q7a=2 or Q7a=3 or Q8a=1 or Q8a=2 or Q8a=3 or Q9a=1 or Q9a=2 or Q9a=3]	Q6: Eat fewer meals in a day Q7: No food of any kind in the household Q8: Go to sleep hungry Q9: Go a whole day and night without eating

3.8.2. Anthropometric measurements

Measurements of weight and height were taken from all the subjects to determine impact of HFI on the nutritional status of women of the reproductive age group.

Weight was measured using a weight scale. Height was measured to the nearest centimetres using a tap meter. Body mass index (BMI), which defined as weight in kilograms divided by the square of height of subject in meters ($BMI = \text{kg/m}^2$) is a measuring tool to assess the nutritional status of women. A BMI less than 18.5 kg/m^2 was used to define underweight or under nutrition for women and is further categorized by WHO standards to mild underweight (BMI 17 - 18.5 kg/m^2), moderate underweight (BMI 16.0 - 16.99 kg/m^2), and severely underweight (BMI $< 16 \text{ kg/m}^2$) (Tefft et al., 2017).

3.8.3. Operational definitions

Anthropometry: Underweight defined as $BMI < 18.5 \text{ kg/m}^2$, normal weight $18.5 < BMI < 25 \text{ kg/m}^2$ and overweight $BMI > 25 \text{ kg/m}^2$ (Philip & James, 1988).

Food secure Household: Household experiences none of the food insecurity (access) conditions, or just experiences worry, but rarely (Coates et al., 2007).

Mildly food insecure (access) Household: worries about not having enough food sometimes or often, and/or is unable to eat preferred foods, and/or eats a more monotonous diet than desired and/or some foods considered undesirable, but only rarely. But it does not cut back on quantity nor experience any of three most severe conditions (Coates et al., 2007).

Moderately food insecure household: sacrifices quality more frequently, by eating a monotonous diet or undesirable foods sometimes or often, and/or has started to cut back on quantity by reducing the size of meals or number of meals, rarely or sometimes. But it does not experience any of the three most severe conditions (Coates et al., 2007).

A severely food insecure Household: has forced to cutting back on meal size or number of meals often, and/or experiences any of the three most severe conditions (running out of food, going to bed hungry, or going a whole day and night without eating), even as infrequently as rarely (Coates et al., 2007).

Household Asset: It is the number and types of Household furniture and asset materials.

Head of Household: A head of a household is a person who economically manages or helps the household or for reasons of age or respect, is considered as head by members of the Household.

Coping strategies: These are mechanisms employed by households to tolerate or minimize the negative impacts of alterations in their food security status.

3.9. Study variables

3.9.1. Dependent variables:

Household food insecurity status (Secure, Insecure) and Nutritional status among women of reproductive age (underweight, normal, overweight, and obese).

3.9.2. Independent variables:

Socio economic and demographic factors like, age, educational level, sex, family size, number of children, marital status, employment status, educational status, height, weight, dietary intake and health service.

3.10. Data Analysis procedures

After checking the completeness of the all questionnaires, the collected data was entered into Epi-Data 7 and exported to SPSS version-20 software for further analysis. The socio-demographic characteristics against household food insecurity and nutritional status were determined using descriptive analysis with categorical frequencies and percentages. Bivariate analysis was conducted to identify candidate variables for multivariable logistic regression model. Those explanatory variables with p-value of <0.25 in the binary analysis were selected for multivariable logistic regression. Multicollinearity between different predictor variables was also checked using variance inflation factor ($VIF > 10$). Finally, multiple logistic regressions was used to identify determinant factors for household food insecurity and nutritional outcomes including their associations established at $P < 0.05$ with 95 % confidence interval.

3.11. Data Quality Assurance

Data collectors were given training on procedures, techniques and skills of collecting the data. The Amharic version of the questionnaire was tested in community, who have similar characteristics to the study population. Each question was coded, and supervision was done during data collection period. Completeness and consistency of recording on the questionnaire sheets was evaluated by the investigator at the end of each working day.

3.12. Ethical Considerations

Ethical clearance was obtained from Addis Ababa public health research and emergency management directorate and this was communicated to the Addis Ababa Administrative city Health Bureau. After obtaining the permission, the data collection process was commenced. The purpose and importance of the study was explained to the study participants and written consent was obtained from all participants before starting the interviews or taking body measurements and also they were informed about their right to stop or refuse participation at any time of data collection process, code numbers were assigned to the study participants without mentioning their names.

3.13. Dissemination of results

The finding of this study will be presented to the Addis Ababa public health research and emergency management directorate, BDU, MoH and other governmental and Non-governmental organizations to take appropriate interventions based on recommendation. Efforts will be made to publish the findings in journals.

4. RESULT AND DISCUSSION

4.1. Outcome of the study

4.1.1. Demographic and Socioeconomic Characteristics of respondents

From the total 532 sampled households, only 487 were participated in the study. Twenty five (25) subjects who were not able to respond to questionnaire due to their health conditions were excluded from the study due to confounding challenges related with BMI and the other 20 were refused to participate in the study because of Covid-19 stress

The socio-demographic profiles of the study participants were shown in (Table 3). The mean age of the HH head were 34.23 (± 10.3 SD). The average family size was 3.36 (± 1.8 SD) with minimum and maximum size of 1 and 12 respectively. The mean age of the women was 30.7 y with a standard deviation of (± 8.3 SD).

The distribution on educational status of the HH heads indicates that 74 (15.2%), were uneducated, 152 (31.2%), and 143 (29.4%), have attended elementary and secondary schools respectively, while 118(24.2%) of HH heads have completed diploma and above. Eighty seven (17.9%) household heads were unemployed, 163 (33.5%), were self employed while 195 (40.0 %) HH heads were government and NGO employed, 6(1.2%) were pensioners and 36(7.4%) were daily laborers.

Table 3 Demographic and Socioeconomic Characteristics of respondents in Kirkos sub-city, October 2020 (n+487)

Variables	Category	Frequency	Percent
Gender of house hold head	Male	345	70.8
	Female	142	29.2
Occupation house hold head	Unemployed	87	17.9
	self employed	163	33.5
	Governmental/(NGO) employed	195	40
	Pensioner	6	1.2
	Others	36	7.4

Marital Status	Married	402	82.5
	Unmarried	32	6.6
	Widowed	35	7.2
	Divorced	18	3.7
Educational Status house hold head	Uneducated	74	15.2
	Elementary school	152	31.2
	Secondary School	143	29.4
	Diploma and above	118	24.2
Age of house hold head	20 - 30	191	39.2
	31-40	181	37.2
	41-50	89	18.3
	>50	26	5.3
Family size	1-2	59	12.1
	3-4	248	50.9
	5-6	113	23.2
	>6	67	13.8
Parity (ever born children)	0	66	13.2
	1-2	259	53.2
	3-4	127	26.1
	>4	35	7.2
Number of children age less than 5	0	137	28.1
	1-2	263	54.0
	3-4	84	17.2
	>4	3	6

4.1.2. Prevalence of household food insecurity

According to the responses to the occurrence and frequency questions, the mean score of households food insecurity was found 4.96 and among the total of 487 households, 394 (80.9%) were classified as food insecure. Accordingly, 71 (14.6%) households were severely food insecure while 174 (35.7%) and 149 (30.6%) households were moderately

and mildly food insecure respectively (Figure 4). These results were based on the calculation of outcomes of frequency questions as that of indicated by Household Food Insecurity Access Scale (HFIAS) guide (Coates et al., 2007).

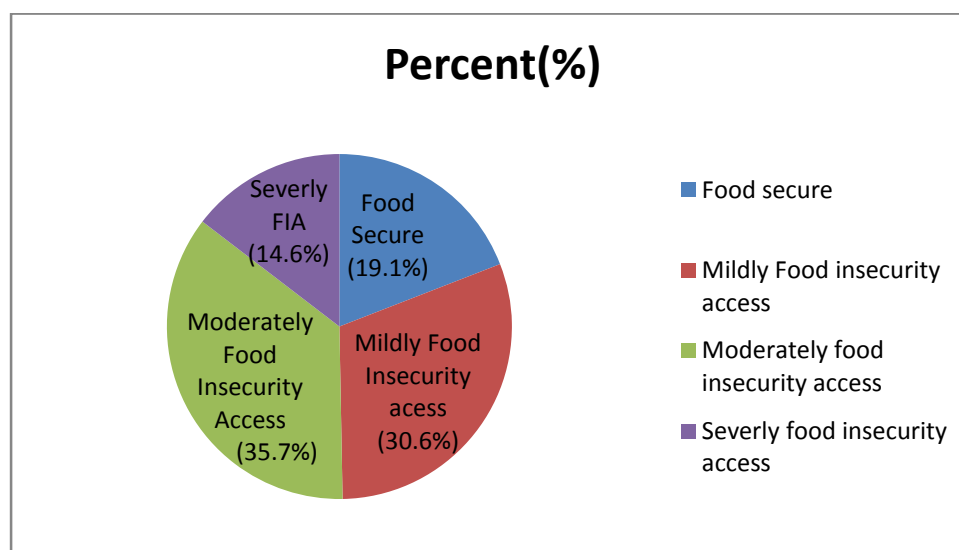


Figure 5 Diagrammatic representation of food insecurity status in Kirkos sub-city, October 2020 (n=487)

The study finding revealed that 293 (60.2%) of respondents worried about not having enough food in the household and 307 (63%) households were unable to eat what they preferred. Around 293 (37.1%) eat just a few kinds of foods because of lack of resources. 184 (37.8%) eat foods they really do not want eat and 203 (41.7%) ate small amount meal. On the other hand, 51 (10.5%) households experienced to go to sleep hungry during night and 27 (5.5%) had family members that go a whole day and night without eating.

Table 4 Response to HFIAS questions, Kirkos sub-city, October, 2020 (n=487)

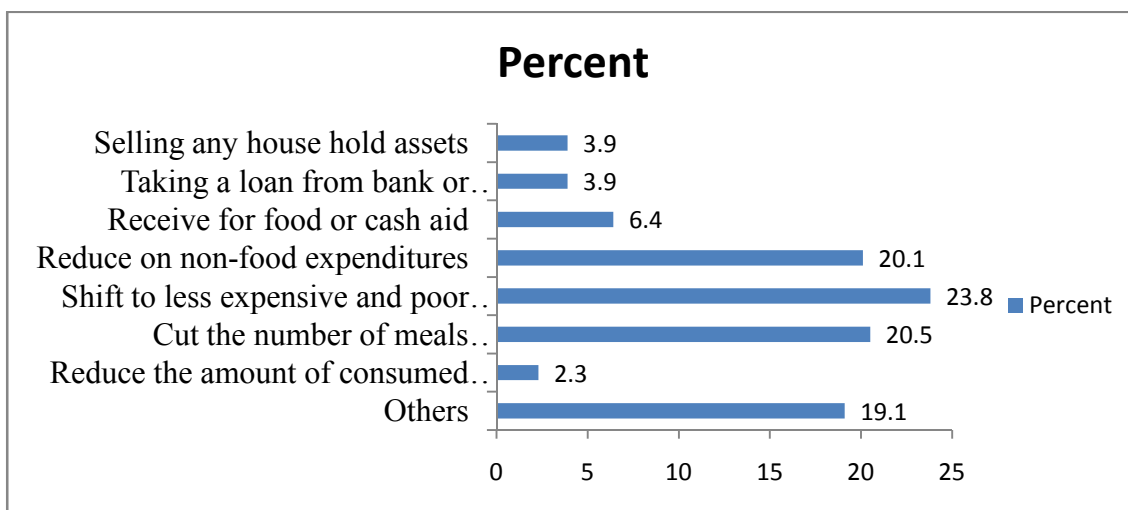
HFIAS questions	No. of households	Percent (%)
Worry about not having enough food	293	60.2
Unable to eat preferred foods	307	63
Eat just a few kinds of foods	293	60.2
Eat foods they really do not want eat	184	37.8
Eat a smaller meal	203	41.7
Eat fewer meals in a day	117	24.0

No food of any kind in the household	56	13.6
Sleep hungry	51	10.5
Not eat the whole day and night	27	5.5

4.1.3. Household Coping Strategies

Households usually take a range of measures to cope with the challenges during food crises. In the study area, 11(2.3%) have reduced the amount of consumed diet per meal, 100(20.5%) cut the number of meals consumed per day, 116 (23.8%) Shifted to less expensive and poor quality diet, 98 (20.1%) have reduce on non-food expenditures and 93(3.9%) have sold different house hold assets.

Figure 6 Household coping strategies of food shortages in Kirkossub-city, October 2020 (n=487)



4.1.4. Nutritional Status of Women by BMI

In this study the main indicator for nutritional status of non- pregnant women is the body mass index (BMI) and the cutoff point (BMI<18.5 kg/m²) shows under nutrition. The mean weight and height of women under investigation were 53.6 kg and 1.52 m respectively, while the mean value of BMI was 24.30. In addition, 50(10.3%) are obese, 159(32.6%) were overweight, 214(44.2%) were normal, and 63(12.9%) of women were underweight, (Table 5).

Table 5 Nutritional Status of Women by BMI, Kirkos sub-city, October 2020 (n=487)

Category	BMI(Kg/m ²)	Frequency	percent
Obese	>30	50	10.3
Overweight	25- 29.9	159	32.6
Normal	18.5 – 24.9	214	44.2
Underweight	<18.5	63	12.9

4.1.5. Bivariate analysis

4.1.5.1. Factors associated with household food insecurity

As shown in table 6, using the binary logistic regression analysis the candidate variables selected for multivariable logistic regression were: gender of the household head, age of household head, age of woman, family size, number of ever born children (parity), and number of children under 5 age, occupation and level of education.

Table 6 Binary logistic Regression analysis of household food insecurity in Kirkos sub-city, October 2020(n=487)

Variables (n=487)	Food security status [Frequency]		COR (95% CI)
	Food Secure	Food Insecure	
Gender of HH head			
Male	84	261	1.0
Female	9	133	4.76 (2.32-9.56)**
Age of the HH head			
20 - 30(*Ref)	50	141	1.0
31-40	33	146	1.48 (0.91- 2.42)*
41-50	6	83	4.91(2.02 -11.94)**
>50	2	24	4.26(0.97-18.66)*
Age of woman			
15-19 (*Ref)	3	66	1.0
20-29	53	99	0.09 (0.03-0.28) **

30-39	34	118	0.16 (0.047-0.53)**
40-49	3	111	1.68 (0.33-8.57)
Family size			
1-2(8Ref)	36	23	1.0
3-4	42	206	7.68 (4.13-14.27)**
5-6	9	104	18.09 (7.66-42.69)**
>6	6	61	15.91(5.92 -42.76)**
Parity			
0	40	26	1.0
1-2	40	219	8.42 (4.63-15.31)**
3-4	11	116	16.22 (7.35-35.79)**
≥4	2	33	25.39(5.61-114.94)**
Children under 5 y,			
0	74	63	1.0
1-2	13	250	22.59 (11.78-43.31)**
3-4	6	78	15.27(6.24- 37.39)**
Education			
Uneducated	2	72	1.0
Elementary	21	131	0.17(0.04-0.76)**
Secondary	42	101	0.07(0.02-0.29)**
Diploma and above	28	90	0.09(0.02-0.39)**
Occupation			
Unemployed	8	79	1.0
Self employed	24	139	0.59(0.25-1.37)*
Government/NGO	60	135	0.23(0.10-0.50)**
Others	1	35	3.54 (0.43-29.43)*

** P< 0.05 and * P < 0.25

4.1.5.2. Factors associated with women's nutritional status

The assessment of the potential predictors of nutritional status of women was based on the body mass index (BMI) with the cutoff point (BMI<18.5 kg/m²) which shows under nutrition. Family size, parity, children under five years old, education and food insecurity status were found to be a significant predictor of underweight and these variables were selected for multivariable logistic regression analysis (Table 7).

Table 7 Binary logistic regression analysis of women nutritional status in Kirkos sub-city, October 2020(n=487)

Variables (n=487)	Nutritional Status [Frequency]		COR (95% CI)
	BMI <18.5	BMI >18.5	
Family size			
1-2(Ref)	36	76	1.0
3-4	48	188	3.18(1.55-6.55)**
5-6	28	83	3.52(1.46–8.42)**
>6	11	17	2.19(1.13-5.48)*
Parity			
0	33	75	1.0
1-2	56	209	2.53(1.26-5.09)**
3-4	30	78	2.19(0.99-4.83)**
>4	4	4	10.0(1.26- 79.27)**
Children under 5 y,			
0	32	105	1.0
1-2	20	243	3.70(2.03-6.78)**
3-4	6	78	3.96 (1.58- 9.94)**
Education			
Uneducated	36	38	1.0
Elementary	50	102	0.94(0.34-2.59)
Secondary	21	122	0.49(0.19-1.26)*

Diploma and above	16	102	0.52(0.19-1.39)*
Food insecurity status			
Food secure	34	59	1.0
Mild food insecure	7	142	11.69 (4.91-27.89)**
Moderate food insecure	11	163	8.54 (4.07-17.94)**
Severe food insecure	6	65	6.24 (2.45-15.93)**

****P< 0.05 and * P< 0.25**

4.1.6. Multivariate analysis

Multiple logistic regressions was used in order to identify key predictors of household food security status and in the variables with analysis p value of less than 0.25 in the binary logistic regression was considered of multivariable logistic regression.

4.1.6.1. Predictors associated with household food insecurity

Female headed households were 0.09 times less likely to be food secured when compared with male headed households (AOR=0.09, 95% CI= 0.03-0.29). While women with age groups 20-29 years were more likely to be food secured compared with women aged 15-19 years, (AOR=7.42, 95% CI= 1.59- 14.49). Women that had 1-2 children of less than 5 years were 0.04 times less likely to be food secured compared with those women who had no children with the same age level. Similarly the risk of being food secured for women who had 3-4 children of under five years ages were lower than those women who had no children of less than five years age (AOR= 0.03, 95% CI; 0.05-0.19). Besides, households whose HH heads had no formal education were more likely to be food insecure compared with those household whose heads had educational level were secondary and above (AOR=21.5 95% CI=2.9-58.7).

Table 8 Multivariate regression analysis of factors associated with households food insecurity status in Kirkos sub-city, October 2020 (n=487)

Variables (n=487)	Food security status [Frequency]		COR (95% CI)	AOR(95%CI)
	Food Secure	Food Insecure		
Household head gender				
Male(*Ref)	84	261	1.0	
Female	9	133	4.8(2.3-9.76)**	0.09(0.03-0.29)**
Age of the HH head				
20 – 30(*Ref)	50	141	1.0	
31 – 40	33	146	1.48 (0.91-2.42)*	0.42(0.13-1.33)**
41-50	6	83	4.91(2.02 -11.94)**	0.69(0.11-4.51)
>50	2	24	4.26 (.97-18.66)*	0.90(0.08-1.27)
Age of woman				
15 – 19 (*Ref)	3	66	1.0	
20 - 29	53	99	0.09 (0.03-0.28) **	7.42(1.59-14.49)**
30 – 39	34	118)	0.16 (0.047-0.53)**	4.47(0.69-28.53)*
40-49	3	111	1.68 (0.33– 8.57)	0.29(0.02-3.66)
Family size				
1-2(8Ref)	36	23	1.0	
3-4	42	206	7.68 (4.13 - 14.27)**	0.22(0.04-1.37)*
5-6	9	104	15.09 (7.66 - 42.69)**	0.78(0.07-9.32)
>6	6	61	10.91 (5.92 - 42.76)**	1.09(0.06-9.59)
Parity				
0	40	26	1.0	
1-2	40	219	8.42 (4.63-15.31)**	0.64(0.12-3.49)
3-4	11	116	16.22 (7.35- 35.79)**	0.92(0.08-9-10.13)
≥4	2	33	25.39(5.61- 114.94)**	1.9(.09-4.11)
Children under 5 y,				
0	74	63	1.0	
1-2	13	250	22.59 (11.78- 43.31)**	0.04 (0.02-0.13)**
3-4	6	78	15.27(6.24 - 37.39)**	0.03 (0.05-0.19)**

Education				
Uneducated	2	72	1.0	
Elementary	21	131	0.17(0.04-0.76)**	5.36 (0.76-8.01)*
Secondary	42	101	0.07(0.02-0.29)**	21.52(2.92-58.66)**
Diploma and above	28	90	0.09(0.021-0.39)**	13.81(1.88-101.62)**
Occupation				
Unemployed	8	79	1.0	
Self employed	24	139	0.28(0.03-2.34)*	1.28(0.41-2.45)
Government/NGO	60	135	0.17(0.02-1.27)**	2.37(0.81- 1.24)*
Others	1	35	1.03(0.12-2.05)	0.27(0.03-2.65)
Pearson Chi-square	145 (P<0.0001)			
-2 Log likelihood	139.4			
Sensitivity	67.7			
Specificity	96.2			
Percent correctly predicted (Count R ²)	89.9			
Sample size	487			

****P < 0.05,*P < 0.25**

4.1.6.2. Predictors associated with women's nutritional status

As shown in (Table 8), based on the multiple logistic regression analysis the factors that were significantly associated with female under nutrition were number of children under 5 years old, and household food insecurity status. The risk of underweight was higher for the house hold with 3-4 number of children under 5 years old compared with those households who had no child under the same age group(AOR= 7.45,95%CI=1.45-38.3).The risk of being underweight for women increase as the status of food insecurity rises. For mild food insecure households the risk of being underweight is 8.17 times higher than the food secured households. While the odds of underweight for moderate households is 6.97 times higher compared with food secured households (AOR= 6.97, 95%CI= 2.29-21.18).

Table 9 Multivariate regression analysis of factors associated with women's nutritional status in Kirkos Sub-city, October 2020 (n = 487).

Variables (n=487)	Nutritional Status [Frequency]		COR (95% CI)	AOR (95% CI)
	BMI <18.5	BMI >18.5		
Family size				
1-2(*Ref)	15	44	1.0	
3-4	24	22.4	3.18(1.55-6.55)**	4.8(0.49-46.28)*
5-6	10	103	3.52(1.46–8.42)**	2.13(0.15-31.08)
>6	9	58	2.19(1.13-5.48)*	0.49(0.03-8.59)
Parity				
0	15	51	1.0	
1-2	27	232	2.53(1.26-5.09)**	0.20(0.02-1.80)*
3-4	15	112	2.19(0.99-4.83)**	0.21(.02-3.05)
>4	1	34	10.0(1.26- 79.27)**	3.01(0.09-44.12)
Children under 5 y,				
0	32	105	1.0	
1-2	20	243	3.7(2.03-6.78)**	2.68 (0.91-7.95)
3-4	6	78	3.96 (1.58- 9.94)**	7.45(1.45-38.21)**
Education				
Uneducated	6	68	1.0	
Elementary	13	139	0.94(0.34-2.59)**	1.65(0.51-5.34)
Secondary	22	121	0.49(0.19-1.26)**	0.104(0.33-3.37)
Diploma and above	17	101	0.52(0.19-1.39)**	0.98(0.29-3.24)
Food insecurity status				
Food secure	34	59	1.0	
Mild food insecure	7	142	1.54 (2.45-15.93)**	8.17(3.07-21.72)**
Moderate food insecure	11	163	7.9 (4.07-17.94)**	6.97(2.29-21.18)**
Severe food insecure	6	65	11.5 (4.91-27.86)**	2.51(0.7-9.01)

****P < 0.05, *P < 0.25**

4.2. Discussion

This study revealed that among the total of 487 households, 394 (80.9%) experienced some degree of food insecurity in the four weeks preceding the study. Accordingly 71 (14.6%) households were severely food insecure while 174 (35.7%) and 149 (30.6%) households were moderate and mild FI respectively. However, these findings are much higher than the magnitude of the national food insecurity (35%) reported by Ethiopian Health and Nutrition Research Institute in 2010 which indicates an urgent need of intervention. The status of household food insecurity (80.9%) found in this survey was comparable with studies done in Assyita (70.4%), Addis Ababa (75%), Sudan (91%) and South Africa (74%) (Abdu et al., 2018; Birhane et al., 2014; OA Bushara & HH, 2017; T. Sekhampu, 2013). However, the state of food insecurity in this finding was much higher than the studies done in Wolita Sodo (37.6%), Dire Dawa (43%), Harar (57%), Gambela (59.5%) and Nepal (51%) (Feleke & Bogale, 2009b; Singh et al., 2014; Tadesse Tantu et al., 2017; Tilksew & Fekadu, 2014; Town et al., 2016). The higher prevalence of food insecurity could be explained by the increased food price, population growth, and negative effects of Covid-19 and high cost of living which causes to some extent for the economic slowdown in the city. Unlike the national survey (35%) this study was specific to the urban life of Addis Ababa and the possible implication may be absence of safety net programs and market dependent food supply in the city which makes the community exposed to high food price than the rural once (Birhane et al., 2014). The survey showed that socioeconomic factors contributed a role for the high prevalence of food insecurity in the area and this was consistent with the previous studies made (Abdu et al., 2018; Birhane et al., 2014; Dastgiri et al., 2011). This entails that there is an imperative need for a close collaboration among the stakeholders to identify and implement the key interventional programmes to overcome the challenge. Although there was subsidization of common food items in the city in order to avail lower cost food for the poor, it was not sufficient to mitigate the problem of food insecurity as it may be affected by various factors. These issues should be given due considerations in order to ensure food security across the community.

Due to the social problems occurred as a result of drastic rise in food inflation, policy intervention measures were tried to be taken by the Ethiopian government including price fixing of common food staples. The policy makers strongly believed that staple foods cannot be left to market systems alone and took several measures to stabilize food prices and to improve the purchasing power of the population, mostly the urban poor. The government took measures on trade policy. This was being actualized by passing a bill in parliament in 2008. The Ethiopian government took several measures on the domestic market. One of the most direct interventions was the price control, where the government decided the maximum prices to be charged for selling grains and the restrictions put on private traders. The directive also required merchants to use price tags on each of goods and to post the list of their goods for sale with the corresponding prices. Traders were warned not to hoard any grain. However; implementing of this bills will backfire the market liberalization principles and may have a negative impact in the long run (Admassie, 2013).

Regarding the maternal nutritional status, about 12.9% of women were underweight, 44.2% were normal, 32.6% were overweight and 10.3% are obese. The prevalence of maternal underweight was almost similar to the previous study made in Addis Ababa (12.7%) and lower than with the result (14.4%) reported in EDHS 2011. However, the value of overweight (32.6%) and obesity (10.3%) are higher than the survey made in Addis Ababa (overweight = 20.9, Obese = 5.8%) and the 2011 EDHS findings (overweight = 15.8, Obese = 4.0%) (Birhane et al., 2014; EDHS, 2011). These results are higher than the magnitude of the 2011 and 2016 Ethiopian demographic and health survey reports indicating an increasing trend in the prevalence rates of overweight and obesity in Ethiopia (EDHS, 2011, 2016). The possible reason for relatively high prevalence of overweight and obesity may be related to consumption of cheap foods that are typically lower in nutritional quality and contain higher levels of calories (sugar, fat and lower intake of fruits and vegetables). It is believed that, lower quality of diet (higher intake of fat and lower intake of fruits and vegetables), with low or no physical activity may lead to high prevalence of overweight and obesity (Mohamadpour et al., 2012). Women from the food-insecure household group used less diet quality food as a coping strategy by cooking and consuming whatever food is available in the household, such as

fried chips with oil or fat. The other possible reason could be that low-income households usually promotes binge eating (overeating when food is available and restriction at the time of food insufficiency) and contributes to alternative weight gain and weight loss, which could contribute to development of overweight and obesity(Pan et al., 2015).During a time of high food prices, climate change, and economic crisis access to food is not sufficient and the household may experience food insecurity(Gustafson, 2013). However, when household food supply is adequate, individuals binge due to perceived anxiety about future food shortages. Anxiety, depression, and a disrupted eating pattern due to seasonal changes in household food insecurity can put food-insecure women at risk of weight gain and obesity(Hadley & Patil, 2008).This implies that the increment of overweight and obesity through time needs awareness creation campaigns and situation-based and context-specific preventive policies and strategies to reduce the burden of overweight and obesity in the country(Kassie et al., 2020).

In the previous studies made in Malaysia and Iran, it is reported that the prevalence of overweight were 39.1% and 41% respectively which higher than in this study findings. These variations in results may be due to differences in the study population and the developmental level of these countries(Mohamadpour et al., 2012; Salimi et al., 2019).

In this study it was found that shifting to less expensive foods and cut the number of meals consumed per day were the commonly used mechanisms employed by households in order to manage food insecurities which is consistent with findings from Addis Ababa(Birhane et al., 2014) and Bangladesh(Dil Farzana et al., 2017).This implies that reducing both quality and quantity of meals, as the primary coping mechanisms for food insecure households, further impoverished the already poor diet diversity for the urban households. In addition, these coping mechanisms are indications of under nutrition and may cause obesity problem(Isanaka et al., 2007) .This study showed that the coping strategies used by the households were consisted of financial (asset selling and bank loan) and compromising food quality/amount. Hence, it indicates the need for the government and the NGOs to modify their existing food insecurity mitigation through safety net programs and incorporate financial systems such as cash/asset transfer or small loans alongside with food transfer(Isanaka et al., 2007).

In this study it was found that shifting to less expensive foods and cut the number of meals consumed per day were the commonly used mechanisms employed by households in order to manage food insecurities. This finding is similar with that reported in Addis Ababa (Birhane et al., 2014) and (Dil Farzana et al., 2017). This implies that reducing both quality and quantity of meals, as the primary coping mechanisms for food insecure households, further impoverished the already poor diet diversity for the urban households. This study result showed that the coping strategies adopted by the households were a mixed approach consisting of selling assets, taking loans and compromising of food quality/quantity. Hence, it indicates that the government and the NGOs should modify their existing food insecurity alleviation oriented safety net programs and incorporate financial modalities such as cash/asset transfer or small loans alongside with food transfer(Dil Farzana et al., 2017).

Multiple regression analysis revealed that, the variables that significantly associated with female under nutrition were number of children <5 years, and food insecurity status of the household. However; under nutrition is assumed to be influenced by both health and food security status of the individual and the evaluation of under nutrition needs to be viewed with respect to these two pillars(Bitew& Telake, 2010).

One of the important factors that significantly affect women's nutritional status was the number of children < 5 years old. The odds of under nutrition for women with 3-4 under five year old children were higher than those women who had no children of < 5 years old.This implies that family planning is not still addressed properly in the nation. This result is consistent with the previous studies made in Afarand Guatemala (Abdu et al., 2018; Chaparro, 2012a).This is because of having more under five years old and a relatively higher-level parity(more children ever born), could obligate them to take care of their children rather than protecting their own health and nutritional status, given limited household resources(Bitew& Telake, 2010). In addition, the number of children may contribute to women under nutrition because having more children will increase not only expenses on child day care and healthcare but also general expenses in a household. Due to the limited resources, an increase of household size could lead to household food insecurity as food requirement increase linearly with the number of members in a

household, thus causing the family to be at greater risk of under nutrition(Shariff & Khor, 2008).This implies that the government should take measures for the proper implementation of family planning within the community. Based on the study made in Ethiopia it was indicated that the overall prevalence of unmet need for family planning (34.(%) among fecund women in Ethiopia was high(Worku et al., 2020).

In this study, the food insecurity status was found to be one of the determinant factors that affected the nutritional status of women. The other factor that affects women under nutrition was household food insecurity. Women from food-insecure households were more likely to have a BMI less than 18.5 kg/m² than women from food secure households. This finding is consistent with other studies that have also showed a significant association between household food insecurity and nutritional status of women(Abdu et al., 2018; Bitew & Telake, 2010; Ferede et al., 2017; Singh et al., 2014).The same conclusion was also made on the survey made in Nepal and Trinidad and Tobago that women from severely food-insecure households were more likely to have a BMI less than 18.5 kg/m² than women from food secure households(Gulliford et al., 2003; Singh et al., 2015).This implies the importance of following up the prevalence of food insecurity and the orders of its associations with health and nutritional outcomes over time, including changes in the prevalence of underweight, the prevalence of micronutrient deficiencies, and the incidence of infectious morbidities. However; the study made in Addis Ababa showed a different result that household food access was found to having not associated with women under nutrition. This may be due to that data on household food security status was collected only for four weeks period and variation in the availability of food in the HHs may not determine nutritional status of women within such narrow period (Birhane et al., 2014). It has to be noted that to have a better understanding of the association between household food insecurity and under nutrition of women, there have to be a regular monitoring and analysis of food insecurity and malnutrition of women at a regional level in addition to the national and the state level. This would require collection, compilation, and generation of data at regular intervals at the national and state levels(Birhane et al., 2014).

The results of the multiple regression analysis suggest that gender, age of the household head, age of women, number of children <5 years old, and education status were the factors influencing household food insecurity.

This study showed that female headed households were more likely to be food insecure compared with male headed households, this is in agreement with the study reported in Benu state ,Nigeria (Soom, 2016)and Tigray(WFP, 2009).This may be due to that most of the female headed households are widows, divorced and never-married single parents. It was shown in the study made in Dire Dawa and South Africa that single household heads were more likely to be food insecure than married households, This may be due to that low family income and low purchasing power(Feleke& Bogale, 2009a; T. J. Sekhampu, 2013).However; opposite to this research were reported in South Africa (T. Sekhampu, 2013) and Tanzania (Katapa, 2006)which women headed households were found to be food secured than male headed household. This implies that in Ethiopia, women experience gender inequalities as well as economic marginalization. Women empowerment through land ownership as well as financial, extension, and training services is not yet fully implemented and to improve their economic capabilities and participation(IDRC, 2020).

The age of the household head was positively associated with food insecurity. This was in agreement with the study made in Pakistan, Indonesia and Nigeria(Bashir et al., 2012; Bhanbhro et al., 2020),which stated that an increase of the age of household head decreases the chances of a household to become food secure. The possible explanation could be as the person gets older the chance of involving in a variety of income generating activities decreases; in other words the younger people are strong enough to perform tougher jobs in field. However, the study made by Arene and Anyaeji(Arene & Anyaeji, 2010) on the other hand concluded that the increased age of the household head had a positive effect on food security status. Hence the expected effects of age of household head on food security could be positive or negative(Soom, 2016).

Women who have ≥ 2 children below five years of age were at a higher risk of food insecurity than women who have no children under five years of age and this was consistent with the study made in Afar (Abdu et al., 2018) and Guatemala (Chaparro,

2012b).The reason could be that women who have ≥ 2 children below five years of age may belong to households with relatively poor economic status, which may also make it more difficult to obtain sufficient food(Bitew& Telake, 2010) .In general, the increase of dependents in the household, lowers the income generated to purchase food items to fulfil all family needs. Thus, a lower household income and increased family size tend to worsen household food insecurity(Tadesse Tantu et al., 2017).

Educational status of household head is another important predictor that significantly affects household food insecurity status. Households headed with relatively better education were more likely to be food secured than those households headed by uneducated individuals. The possible explanation could be education contributes working efficiency, competency, diversify income and creates chance to educate dependants to ensure better living condition(Sisay& Edriss, 2012). The result is also in agreement with the study made(Bhanbhro et al., 2020; Birhane et al., 2014; Godoy et al., 2017) .Household heads with low education levels are more likely to be in the state of food insecurity. This is because, household heads with lower education status have no access to formal, higher-income jobs such as employees at factories, hospital, and school employees, while most household heads with low education work in the informal sector such as daily and weekly laborers (Bhanbhro et al., 2020).

This survey was not able to predict significant association between occupational status and food security. However; the studies made in South Africa, WolitaSodo, Nigeria reported opposite results. This may be due to the presence of small number of daily laborers and pensioners(Muhammad & Sidique, 2019; T. Sekhampu, 2013; Tadesse Tantu et al., 2017).

5. CONCLUSION AND RECOMMENDATIONS

The objectives of the study were to show the determinants and extent household food insecurity and nutritional status of women of the reproductive age group in Kirkos sub city in Addis Ababa, In addition, assessment of the association of the household food insecurity and nutritional status women was also the other purpose of the research. The following are the major findings of the research.

The present study concludes that the prevalence of household food insecurity (80.9%) was very high which explains the high extent of food insecurity in the sub- city. The maternal nutritional status (12.9%) was a bit higher than the prevalence of underweight in Addis Ababa. Different strategies like reducing non-food expenditures, shifting to less expensive diet and cutting the number of meals consumed per day were the major coping mechanisms exercised by the households in the study area. The study has established that the method of livelihood strategy varies along with the gender of the household heads. For male headed households, shifting to poor quality diet is found to be the most frequently used strategy followed by reducing of non-food expenditures. While cutting the number of meals consumed per day followed by shifting to less expensive diet are the predominant strategies used by the female headed households.

Gender, age of women, number of children under five years and educational status were the factors influencing household food insecurity status. It was observed that there was a statistical association between gender of the household head and food security status in the area. However; the problem of food insecurity is severe among female headed households than those households headed by males. Women with age groups 20-29 years were less likely to be food insecure compared to women aged 15-19 years. The sample survey shows that food insecure households have high number of children of age less than five years than the secured once. From this study it can be concluded that households with high dependency ratio are more likely to be food insecure than those with low dependency ratio. Besides, households whose HH heads had no formal education were more likely to be food insecure compared with those households' heads whose educational levels were secondary and above. In this study it was found that

occupational condition of the house hold heads has no effecton the status of food security of the household.

Similarly, the variables that significantly associated with female undernutrition were number of children <5 years and food insecurity status of the household. The risk of women underweight was higher for households who had > 2 number of children less than 5 years compared with those households who had no child under the same age level. In addition, it was also found that the risk of women being underweight was higher food insecured households when compared with secured once. From this study it is concluded that women under nutrition is directly related with household food insecurity, even though further longitudinal studies is required to generalize facts on causality relationship between nutritional status and food insecurity of women of the reproductive age group.

Understanding the causes and magnitude of food insecurity and nutritional status would help policy makers to design and implement more effective policies and programs for the women of the reproductive age group to improve their food security and nutritional status in the area.

The Addis Ababa City Administration Health Bureau and other stakeholders are recommended to take the following actions for improving household food security and nutritional status in the study area. Actions should focus on: strengthening subsidization of common food items to avail lower cost food for the poor, encouraging micro-finance and other small business enterprise to supply food items with reasonable prices, design social welfare strategies such as the Productive Safety Net Programme (PSNP) for households with food insecurity; encouraging households to practice family planning methods, stabilization of food prices and income generating activities should be encouraged. In addition, saving of the necessary food items should be practiced to ensure resilience for food insecure households. Further longitudinal studies should be conducted in order to generalize facts on causality relationship between nutritional status and food insecurity of women of the reproductive age group.

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ANNEXES

Annex I: Study information sheet (sis) & consent form

Good morning/good afternoon. My name is _____. I am working with Mr. Tariku Chanie who is doing a research as partial fulfillment of master's degree in human nutrition at Bahir Dar University, Institute of Technology School of Chemical and Food Engineering. We would like to ask you few questions about your household food security situation and related factors affecting your nutritional status. We will also take weight and height measurements from you. The study is aimed to fulfill the information gap and provide evidence for program planners, implementers and decision makers for their intervention in preventing the problem. It also assists to identify the factors that affect nutritional status of women based on your answer to our questions.

You have right to refuse, withdraw or completely reject part or all of your participation in the study. Your responses to this [survey] will be anonymous. Every effort will be made to preserve your confidentiality.

Please be assured that your responses to this survey will be confidential. Any of your information you provide will be used only for the research purpose. We would like to assure you that your participation on this research will not have any negative effect on your interest but the information you give is very important for the study.

We would be thankful if you spend some time with us answering questions and taking some measurements from you. The questions and measurements will take 30-40 minutes.

Do I have your agreement to participate?

1. YES / continue

2. No/ Stop

Data collector's
Name _____
Signature _____

Supervisor's
Name.....
Signature.....

Annex II: English Version Questionnaires:

To Assess Household Food Insecurity and its Association with Nutritional Status of Women in the Reproductive Age Group, in Kirkos sub-city, Addis Ababa, October, 2020.

Questionnaire serial number (code): _____ Date of data collection: _____

Kebele _____ Wereda _____ House hold number: _____

Section 1: Economic and Demographic Characteristics of households

R.No	Questions	Respond options	Code
1.1	Sex of Household head	1. Male 2. Female	<input type="checkbox"/>
1.2	What is the Age of Household head?	1. _____ years	<input type="checkbox"/>
1.3	Marital status	1 Married 3 Widowed 2 Divorced 4 Others	<input type="checkbox"/>
1.4	What is the family size of your Household?	_____	
1.5	How many living children's did you have in the household?	_____	
1.6	How many under five children's did you have in the household?	_____	
1.7	What is the educational status of household head?	1. Uneducated 2. Elementary school 3. Secondary school 4. Diploma and above	<input type="checkbox"/>
1.8	What is the occupation of household head?	1. Unemployed 2. Self employed 3. Government (NGO) employed 4. Pensioner 5. Other (specify): _____	<input type="checkbox"/>

Section 2: Occurrence and Frequency of Household Food Insecurity

S. NO	Questions	Response options	Code
2.1.	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1=Yes	<input type="checkbox"/>
2.1.a	How o often did this happen?	1 = Rarely (once or twice in the last 4 weeks) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	<input type="checkbox"/>
2.2.	In the past four weeks, were you or any HH member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1=Yes	<input type="checkbox"/>
2.2.a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	<input type="checkbox"/>
2.3.	In the past four weeks, did you or any HH member have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q4) 1 = Yes	<input type="checkbox"/>
2.3.a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	<input type="checkbox"/>
2.4.	In the past four weeks, did you or any HH member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0 = No (skip to Q5) 1 = Yes	<input type="checkbox"/>

2.4.a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	<input type="checkbox"/>
2.5.	In the past four weeks, did you or any HH member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q6) 1 = Yes	<input type="checkbox"/>
2.5.a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	<input type="checkbox"/>
2.6.	In the past four weeks, did you or any other HH member have to eat fewer meals in a day because there was not enough food?	0 = No (skip to Q7) 1 = Yes	<input type="checkbox"/>
2.6.a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	<input type="checkbox"/>
2.7.	In the past four weeks, was there ever no food to eat of any kind in your HH because of lack of resources to get food?	0 = No (skip to Q8) 1 = Yes	<input type="checkbox"/>
2.7.a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	<input type="checkbox"/>
2.8.	In the past four weeks, did you or any HH member go to sleep at night hungry because there was not enough	0 = No (skip to Q9) 1 = Yes	<input type="checkbox"/>

	food?		
2.8.a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	<input type="checkbox"/>
2.9	In the past four weeks, did you or any HH member go a whole day and night without eating anything because there was not enough food?	0 = No (skip to section 3) 1 = Yes	<input type="checkbox"/>
2.9.a	How often did this happen?	1 = Rarely (once or twice) 2 = Sometimes (3-10 times) 3 = Often (more than ten times)	<input type="checkbox"/>
2.12	Different people take different actions to cope with food insecurity, what about you and your family member did?	1. Reduce the amount of consumed diet per meal 2. Cut the number of meals consumed per day 3. Shift to less expensive and poor quality diet 4. Reduce on non-food expenditures 5. Receive for food or cash aid 6. Taking a loan from bank or other person 7. Selling any house hold assets 8. Others (specify)_	<input type="checkbox"/>

Section 3: Assessment of maternal nutritional status and Anthropometric measurement in Kirkos Sub-city, Addis Ababa Administrative City, November 2019.

S. No	S. No Questions	Value	Code
4.1	Mothers age	_____ years	____
4.2	Weight	_____ kg	
4.3	Height	_____ m	

I have finished my interview and if you have any question or suggestion you can raise, if not I ask you to put your signature confirming that this data represents you and your household.

I confirm that this data is mine: date _____ Signature _____

Annex III: Consent information sheet (Amharic version)

እንደምንደረሩ/ዋሉ.፡፡ ስሜ _____ ይባላል፡፡

በአሁኑ ሰዓት በባሕር ዳር ዩኒቨርሲቲ የቴክኖሎጂ ኢንሱቲትዩት የኬሚካል እና የምግብ ህንጻ ስናት ምህርት ክፍል የማስተር ስዲ ግሪዮ መመሪያ ጽሑፋቸውን ከሚያዘጋጁት ከአቶ ታኩጫ ኔጋር በመሆን በሰው ስነ ምግብ ዘርፍ የሰሚደረገው ጥናት መረጃ በመሰብሰብ ላይ እገኛለሁ ፡፡

የሴተሰብ ምግብ ምጣኔ በእናቶች አመጋገብ ላይ ያለውን ተፅዕኖ ለማየት ጥቂት ጥያቄዎችን ልንጠይቀዎት እንወዳለን። ከጥያቄዎቹ በተጨማሪ ክብደት ዎንና ቁመት ዎን እንለካለን

፡፡ የዚህ ጥናት ዓላማ በመስኩ ዘርፍ ያሉትን የመረጃ ክፍተቶችን ለመሙላትና ለፕሮግራም አውጪዎች

አስፈጻሚዎች እንዲሁም ወሳኔ ሰጪዎች አስተማማኝ መረጃ በመስጠት ለችግሩ መፍትሔ እንዲሰጡ ለማድረግ ነው፡፡ ጥያቄዎቹን በመመለስ ዎን እና ቶች አመጋገብ ላይ ያሉ ችግሮችን ለይቶ ለማወቅ ይረዳናል። በቃለ መጠይቁ በከፊል ወይም ሙሉ ለ ሙሉ ያለ መስተፍሙሉ መብት አለዎት።

በቃለ መጠይቁ ገቢ ለሚሰጡን ምላሽ ሚስጥራዊነቱ የተጠበቀ እንደሚሆን ከወዲሁ ቃል እየገባን፤ የሚሰጡንን ማንኛውም አይነት መረጃ ለጥናታዊ ፅሁፍ ጥቅም ብቻ እንዲውል ይደረጋል፡፡ ሌላው የምናረጋግጥለዎት ነገር በዚህ ጥናታዊ ፅሁፍ በመሳተፍ ዎን እርስዎ ላይ ምንም አይነት ጉዳት ምንም ሌለው ሲሆን ለጥናቱ ግንኙነት ምንም ጥያቄ የሆነ ጠቀሜታ አለው።

በመጨረሻ ምጥያቄዎችን ለመመለስ እንዲሁም ቁመት ዎንና ክብደት ዎን ለመለካት የተወሰነ ጊዜ ሰጥተውን አብረውን ለመቆየት ስለፈቀዱ ከፍተኛ ምስጋና እና ቀርባለን። ጥያቄዎችን ለመመለስ እንዲሁም ቁመት ዎንና ክብደት ዎን ለመለካት 30 እስከ 40 ደቂቃ ሊፈጅ ይችላል።

ወደ መጠይቁ መቀጠል እንድንችል ፈቃደኛ ነዎት?

ፍቃደኛ ነኝ 1_ ይቀጥሉ
ፍቃደኛ አይደለሁም 2_ ያቁሙት

የመረጃ ሰብሳቢ ስም _____ ፊርማ _____

የመስክተቆጣጣሪ ስም _____ ፊርማ _____

Annex IV: Questionnaires (Amharic version)

ክፍል 1: ስለቤተሰብአጠቃላይሁኔታለመዳሰስየተዘጋጀመጠይቅ2012 ዓ.ም

ተ.ቁ	አማራጭ	መልሶች	ክድ
101	የቤተሰብሐላፊዎቻ	1 ወንድ 2 ሴት	<input type="checkbox"/>
102	የቤተሰብሐላፊዕድሜ	-----ዓመት	<input type="checkbox"/>
103	የጋብቻሁኔታ	1 ያገባችንን ባሏቸው ባሉት 2 ያገባችንን የተለያዩት	<input type="checkbox"/>
104	የቤተሰብደብዳህትሰንትነው		
105	በቤተሰብደብዳህትሰንትነው የተወለዱ ሰንት ልጆች አለዎት	
106	በቤተሰብደብዳህትሰንት አሉት በታች የሆኑ ሰንት ልጆች አለዎት		
107	የቤተሰብሐላፊዎን ያህል ተምረዋል	1- ምንም ያልተማረ 2- 1ኛ ደረጃ የተማረ 3- 2ኛ ደረጃ የተማረ 4- ዲፕሎማና ከዚያ በላይ	<input type="checkbox"/>
108	የቤተሰብደብዳህት ስራ ምን ድነው	1- ሥራ የሌለው 2- በግሉ የሚሰሩ 3- የመንግሥት ተቀጣሪ 4- ጥሮተኛ 5- ሌላ--	<input type="checkbox"/>

ክፍል 2: የቤተሰብ የምግብ ወርቀት ስርዓት ማረጋገጫ ስልጠና 2012 ዓ.ም

ተ.ቁ	አማራጭ	መልሶች	ክፍ
201	ባለፈው አንድ ወር ውስጥ በቤት ያደረገው ስራ ስንት ነው? ግብአት ለማድረግ ያገለገሉት ስራ ስንት ነው? ያውቃሉ?	0-አላውቅም (የለም ካሉ ጥያቄ 201a ይዘለሉት) 1-አዎ	<input type="checkbox"/>
201a	መለስዎ አዎ ከሆነ ይህ ስራ ስንት ነው? ስታል?	1- አልፎ አልፎ (አንድ ወይም ሌላ) 2- የተወሰነ ጊዜ (3-10 ጊዜ) 3- ብዙ ጊዜ (ከ10 ጊዜ በላይ)	<input type="checkbox"/>
202	ባለፈው አንድ ወር ውስጥ እርሶ ወይም ሌላ የቤተሰብ አባል ስራ ስንት ነው? የሚፈልጉትን ስራ ስንት ነው? የሚመገቡትን ስራ ስንት ነው?	0-የለም (የለም ካሉት ጥያቄ 202 a ይዘለሉት) 1-አዎ	<input type="checkbox"/>
202a	መለስዎ አዎ ከሆነ ይህ ስራ ስንት ነው? ስታል?	1- አልፎ አልፎ (አንድ ወይም ሌላ) 2- የተወሰነ ጊዜ (3-10 ጊዜ) 3- ብዙ ጊዜ (ከ10 ጊዜ በላይ)	<input type="checkbox"/>
203	ባለፈው አንድ ወር ውስጥ እርሶ ወይም ሌላ የቤተሰብ አባል ስራ ስንት ነው? የሚፈልጉትን ስራ ስንት ነው? የሚመገቡትን ስራ ስንት ነው?	0-አላውቅም (የለም ካሉ ጥያቄ 203 a ይዘለሉት) 1-አዎ	<input type="checkbox"/>
203a	መለስዎ አዎ ከሆነ ይህ ስራ ስንት ነው? ስታል?	1- አልፎ አልፎ (አንድ ወይም ሌላ) 2- የተወሰነ ጊዜ (3-10 ጊዜ) 3- ብዙ ጊዜ (ከ10 ጊዜ በላይ)	<input type="checkbox"/>
204	ባለፈው አንድ ወር ውስጥ እርሶ ወይም ሌላ የቤተሰብ አባል ስራ ስንት ነው? የሚፈልጉትን ስራ ስንት ነው? የሚመገቡትን ስራ ስንት ነው?	0-አላውቅም (የለም ካሉ ጥያቄ 204 a ይዘለሉት) 1-አዎ	<input type="checkbox"/>
204a	መለስዎ አዎ ከሆነ ይህ ስራ ስንት ነው? ስታል?	1- አልፎ አልፎ (አንድ ወይም ሌላ) 2- የተወሰነ ጊዜ (3-10 ጊዜ) 3- ብዙ ጊዜ (ከ10 ጊዜ በላይ)	<input type="checkbox"/>
205	ባለፈው አንድ ወር ውስጥ እርሶ ወይም ሌላ የቤተሰብ አባል ስራ ስንት ነው? የሚፈልጉትን ስራ ስንት ነው? የሚመገቡትን ስራ ስንት ነው?	0-አላውቅም (የለም ካሉ ጥያቄ 205 a ይዘለሉት) 1-አዎ	<input type="checkbox"/>

205a	መልሶአዎክሆነይህለምንህልጊዜተከስቷል? ል?	1- አልፎአልፎ(አንዴወይሁለቱ) 2- የተወሰነጊዜ(3-10ጊዜ) 3- ብዙጊዜ(ከ10 ጊዜበላይ)	<input type="checkbox"/>
206	ባለፈውአንድወርውስጥበምግብእጥረትምክኒያትእርሶወይምሌላየቤተሰብአባልበምግብእጥረትምክኒያትበቀንምግብየሚበሉባችውጊዜያቶችቀንሰዋል?	0-አላውቅም (የለምካሉጥያቁ206 a ይዘለሉት) 1-አዎ	<input type="checkbox"/>
206a	መልሶአዎክሆነይህለምንህልጊዜተከስቷል? ል?	1- አልፎአልፎ(አንዴወይሁለቱ) 2- የተወሰነጊዜ(3-10ጊዜ) 3- ብዙጊዜ(ከ10 ጊዜበላይ)	<input type="checkbox"/>
207	ባለፈውአንድወርውስጥበምግብእጥረትምክኒያትማንኛውምየሚበላምግብከቤትጠፍቶያውቃል?	0-አላውቅም (የለምካሉጥያቁ207 a ይዘለሉት) 1-አዎ	<input type="checkbox"/>
207a	መልሶአዎክሆነይህለምንህልጊዜተከስቷል? ል?	1- አልፎአልፎ(አንዴወይሁለቱ) 2- የተወሰነጊዜ(3-10ጊዜ) 3- ብዙጊዜ(ከ10 ጊዜበላይ)	<input type="checkbox"/>
208	ባለፈውአንድወርውስጥእርሶወይምሌላየቤተሰብአባልበምግብእጥረትምክኒያትእየተራቡምግብሳይበሉተኝተውያውቃል?	0-አላውቅም(የለምካሉጥያቁ208 a ይዘለሉት) 1-አዎ	<input type="checkbox"/>
208a	መልሶአዎክሆነይህለምንህልጊዜተከስቷል? ል?	1- አልፎአልፎ(አንዴወይሁለቱ) 2- የተወሰነጊዜ(3-10ጊዜ) 3- ብዙጊዜ(ከ10 ጊዜበላይ)	<input type="checkbox"/>
209	ባለፈውአንድወርውስጥማንኛውምየቤተሰብአባልበምግብእጥረትምክኒያትእየተራቡቀንኖለሉትሙሉምግብሳይበሉቀርተውያውቃል?	0-አላውቅም(የለምካሉጥያቁ209a ይዘለሉት) 1-አዎ	<input type="checkbox"/>
209a	መልሶአዎክሆነይህለምንህልጊዜተከስቷል? ል?	1- አልፎአልፎ(አንዴወይሁለቱ) 2- የተወሰነጊዜ(3-10ጊዜ) 3- ብዙጊዜ(ከ10 ጊዜበላይ)	<input type="checkbox"/>

2.12	<p>እርሶናቤተሰቦቻችን የምንጠይቅት በሚያጋጥሞት ጊዜ ምን አይነት መቋቋሚያ ስልቶች ተጠቅመው ያውቃሉ? (ከአንድ በላይ መልስ መስጠት ይቻላል)</p>	<p>1- የምንመዘኑትን የምንጠይቅ መንገድ 2- በቀን የሚመዘኑበት ጊዜ መቀነስ 3- ጥራታቸውንና ዋጋቸው የቀነሱ ምግቦችን ጠቀም 4- ተጨማሪ ስራ በመስራት ገቢን በመጨመር 5- ምግብ ክፍያ ለሆነ ነገር ችግር ወይንም መቀነስ 6- የቤት እቃዎችንና ንብረቶችን በመሸጥ 7- የምግብ ወይም የገንዘብ እርዳታ በመቀበል 8- ከባንክ ወይም ከሌላ ብድር በመውሰድ 9- ሌላ ካለ ይጠቀሱ-----</p>	
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ክፍል 3:

የእናቶች የምግብ ሁኔታ ለመዳሰስ እንዲሁም ቁመትና ክብደት ለመለካት የተዘጋጀ ቃለ መጠይቅ 2012 ዓ.ም

ተ.ቁ	ጥያቄዎች	አማራጭ መልሶች	ኮድ
4.1	የእናት እድሜ	እድሜ _____	__
4.2	ክብደት	_____ ኪሎ ግራም	
4.3	ቁመት	_____ ሜትር	

ጥያቄዎን ጨርሻለሁ ጥያቄዎ ይህን ደብዳቤ ለማንሳት ይችላሉ::

ጥያቄ ከሌለዎት እባክዎን ከላይ የሰጡት መረጃ የርሶናቤተሰቦቻችን የሚወክል መሆኑን በፊርማዎ ያረጋግጡልን::

ከላይ የሰጠሁት መረጃ የኔላ መሆኑን በፊርማዎ አረጋግጣለሁ::

ቀን _____ ፊርማ _____