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ADDIS ABABA UNIVERSITY



COLLEGE OF DEVELOPMENT STUDIES
CENTER FOR FOOD SECURITY

**FOOD INSECURITY AND COPING STRATEGIES DURING OF
COVID-19 PANDEMIC AND ASSOCIATED FACTORS AMONG
WORKERS IN INFORMAL SECTORS IN ADDIS ABABA,
ETHIOPIA**

BY

GEMECHU AMEYA

SEPTEMBER, 2021

ADDIS ABABA, ETHIOPIA



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GEMECHU AMEYA

THESIS ADVISOR:

DESALEGN YAYEH (Ph. D)

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF DEVELOPMENT STUDIES CENTER FOR FOOD SECURITY STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN FOOD SECURITY AND DEVELOPMENT

SEPTEMBER, 2021

ADDIS ABABA, ETHIOPIA

DECLARATION

First, I declare that this thesis is the result of my original work and that all sources or materials used for this thesis have been appropriately acknowledged. This thesis is submitted in partial fulfillment of the requirements for Master's degree at Addis Ababa University. This thesis has not been submitted to any other institution and anywhere for the award of an academic degree, diploma, or certificate.

Declared By: **Gemechu Ameya**

Signature

September, 2021

Date:

Place: Addis Ababa University College of Development Studies, Center for Food Security Studies, Addis Ababa, Ethiopia

APPROVAL

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This is to certify that the thesis conducted by Gemechu Ameya entitled “Food Insecurity and Coping Strategies During COVID-19 Pandemic among workers in informal sectors in Addis Ababa, Ethiopia” and submitted in partial fulfillment of the requirement for the degree of master of science in food security and development studies complies with the regulations of Addis Ababa University and meets the accepted standards with respect to originality and quality.

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Name of Candidate: _____ Signature _____ Date _____

Name of Advisor: _____ Signature _____ Date _____

External Examiner: _____ Signature _____ Date _____

Internal Examiner: _____ Signature _____ Date _____

Name of Chairman _____ Signature _____ Date _____

Head, CFSS: _____ Signature _____ Date _____

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List of Abbreviations

AAU	Addis Ababa University
BMI	Body-Mass Index
CGIAR	Consultative Group on International Agricultural Research
COVID-19	Corona Virus Disease-2019
CSA	Central Statistical Agency
EVD	Ebola virus disease
FANTA	Food and Nutrition Technical Assistance Project
FAO	Food and Agriculture Organization
HDDES	Household Dietary Diversity Score
HFIAS	Household Food Insecurity Access Scale
rCSI	reduced Coping Strategy Index
SPSS	Statistical Package for Social Sciences
UNDESA	United Nations Department of Economic and Social Affairs
UPSNP	Urban Productive Safety Net Program
WFP	World food program
WHO	World Health Organization

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ABSTRACT

COVID-19 pandemic is a serious biological hazard that could cause a simultaneous systemic failure. It is disturbing the livelihoods and food security of a large number of people living in developing countries. The far-reaching adverse impact of the pandemic is particularly reflected on the workers in informal sectors' food security. This paper examines the workers in informal sectors food insecurity situation, food coping response, and associated factors during the COVID-19 pandemic. In this study mixed explanatory research design was applied to frame the research activities and processes. A pre-tested questionnaire survey was used to collect data from 347 participants at their work place. Accordingly, participants' food security status was determined using the household food insecurity access scale (HFIAS), household dietary diversity score, and reduced coping strategy index methods. Besides, various statistical methods such as percentage, mean, standard deviation, and bivariate logistic regression analysis methods were applied. Thematic content analysis method was used to analyze data collected from key informant interview. The study revealed that 16.1% of participants were food secure, while 83.9% were found to be food insecure. Among food insecure participants about 22.3% 56.4% and 21.3% were mildly, moderately, and severely food insecure respectively. The study shows that the workers in informal sectors have been commonly employing food coping responses such as reduced portion size of meals at meals time, reduced number of meals eaten per day, and relied on less preferred and less expensive food. Gender, age, monthly income, distance from workplace, COVID-19 related economic crisis, and COVID-19 prevention protocols were significantly associated with food security of the workers in informal sectors. Socio-economic, demographic characteristics, and COVID-19 prevention protocols were associated with food insecurity, dietary diversity, and coping strategic index. It seems clear that the COVID-19 pandemic is a clear danger to informal selectors' food security situation and coping response. We argue that different concerned stockholders' concentrated effort is required to address the impact of the COVID-19 pandemic on the informal sectors' food insecurity problem.

Keywords: *Coping strategy; COVID-19 Pandemic; Dietary diversity; Food security; Workers in informal sectors*

CHAPTER ONE: INTRODUCTION

1.1. Background of the study

The novel coronavirus (COVID-19) was first reported officially in Wuhan City, China at the end of 2019 (Chang *et al.*, 2020) while the case is first officially reported in Ethiopia on March 13, 2020 (Abate, 2020). The pandemic is severely affecting the transportation, tourism sectors, import-export systems and aggravating poverty that further exacerbated the level of food insecurity in developing countries (FAO, 2020d). These problems have a direct effect on workers in informal sectors food security at most due to their economic vulnerability. Assessing the impact of the pandemics on the food security of workers in informal sectors is very important to identify the magnitude of the problem and intensifying factors the problem (Lina *et al.*, 2020).

Food security is the ability of all people to have access to sufficient, safe and nutritious food for an active and healthy life at affordable prices at all times, including emergencies and crises time like COVID-19 pandemics (FAO, 2002). Different efforts have been under taken by countries to minimize the spread of COVID-19 and these efforts have unintended consequences on availability, access, utilization and stability of food supplies almost at all levels. The human right to food must be safeguarded in a context of potential food shortages and problem in food disruptions. Policy makers are struggling with suspicions impacts of the virus on food supply, demand and trade in order to prevent its translation to food crisis. The food supply and demand can be affected by the pandemic through various mechanisms. One of the mechanisms is by reducing labor force which includes seasonal and migrant workers. The other is by affecting agricultural activities (land preparation, planting, crop maintenance and harvesting) (Gunjal & Senahoun, 2016). It can also affect employment in labor intensive industries and cause the shifting of production from cash to food crops (FAO and UNAIDS, 2003). Household incomes and food security can be seriously affected especially in workers in informal sectors (United Nations, 2004).

This study was conducted among workers in different informal sectors such as street vendors, waiter, artisans, private business, house servant, daily laborer and construction workers were targeted. Workers in informal sectors hired without an established working agreement and their work hours are not constant (Hussmanns, 2004). Most of informal worker need to get their daily income to eat and as a result they are vulnerable to food insecurity at a time of disaster such as COVID-19. There is a trade-off between public health containment measures and food security. To combat the spread of the virus

countries are restricting the activities of their people and recommending staying at home as a better containment option. Although this recommendation is very important in reducing the spread of the disease, it has a serious effect on the income and food access ability of people particularly workers in informal sectors. Vulnerable people and poor may not be capable to cope with these second-order effects (FAO, 2020a; Sileshi *et al.*, 2019).

Work in the informal economy is often characterized by small or undefined work places, low levels of skills and productivity, unsafe and unhealthy working conditions, low or irregular incomes and long working hours. Workers in informal sectors lack access to information, finance, training, markets, and access to technology. Workers in the informal sectors are not recognized, registered, regulated or protected under labor legislation and social protection. Informal economy is a major challenge for the rights of workers and decent working conditions and has a negative impact on enterprises, government's scope of action, public revenues, soundness of institutions and fair competition. The expression informal economy encompasses a huge diversity of situations and phenomena (International Labor Organization, 2015).

People across Africa are urbanizing and cities act as magnets that attract poor migrants from rural areas looking for better life and employment. The study showed that women who work in the informal economy in South Africa as a group are particularly neglected in maternal and child health programs, and there have been no attempts to address their particular needs. Informal workers face barriers that may prevent their seeking antenatal, immunization or reproductive health care services, but no provision is made for them to attend outside of working hours or be fast-tracked so they can return to work (Bhan *et al.*, 2020). Study conducted on informal worker women in South Africa shown to be vulnerable with low incomes and high rates of food insecurity, thus increasing the risk for poor maternal health. Levels of depression risk were low compared to previous estimates in South Africa, suggesting that informal workers may have high levels of resilience (Horwood *et al.*, 2021).

Informal sector has been growing fast in Addis Ababa city due to the influx of many young workers into the sector who come from rural areas the expectation of a better life in the city. It is believed that informal sectors are playing an important role in food security as it provides jobs, bolsters economic activity, reduces unemployment, and helps alleviate poverty. The study showed that the workers are forced to consume less food or poor-quality food. The vulnerability analysis of informal worker showed that

informal activities in the study area serve migrants only as temporary safety nets, not as sustainable earnings/livelihood strategies (Seleshi *et al.*, 2013).

The problem of COVID-19 pandemic is coming at a time when significant number of people (820 million people) are suffering from chronic hunger and malnourished people exceeded 2 billion globally (FAO, 2020f). Before the COVID-19 pandemic come, the plan laid out by the sustainable development goals was going to ask for rigorous effort to keep on way. The pandemic has fundamentally changed the hope of achieving the settled agenda until 2030. Food security is sensitive issue that could be affected by various factors (FAO, 2020f).

The numbers of workers in informal sectors are outnumbering the formal worker in the big city of developing country like Ethiopia (Seleshi *et al.*, 2013). This predominance of informal employment among the poorest implies less access to social protection. In low income and fragile countries social protection need to be expanded in terms of coverage and amount in response to COVID-19 in order to protect lives and livelihoods as well as safeguard ongoing access to food and for resilience of food systems (FAO, 2020e). UNDESA (2016) stated that social exclusion manifests primarily through unequal access to resources, restricted political participation and repudiation of opportunities. A number of factors associated with inequality among workers in informal sectors. Some of them are social, psychological, cultural structures, discrimination based on ethnicity and gender, weak institutions and insufficient self-esteem. Fragile social networks increase vulnerability in times of crisis such as pandemics, due to the existing informal mutual mechanisms is unable to provide support (FAO, 2019).

Different coping strategy is applied during such food insecurity period among workers in informal sectors. Identifying the major coping strategy of informal worker for food insecurity due to COVID-19 is very important to evaluate the effect of the strategy on the livelihood of the individual as well as the positive coping strategy could be taken as the good experience for other areas. A number of factors are associated with inequality among workers in informal sectors. Some of them are social, psychological, cultural structures, discrimination based on ethnicity and gender, weak institutions and insufficient self-esteem. In fragile social networks increase vulnerability in times of COVID-19 cause short- and long-term crisis on livelihood of society (FAO, 2020c).

One of the purposes of conducting this study is to provide valuable and up to date information for different concerned bodies of about impact of COVID-19 on food security of workers in informal sectors. The experience of the workers in informal sectors was observed from the current study and this

information may be used for planning implementation activities in future similar outbreak of the pandemics. The study is also used to give valuable information and experience from other countries that help to maintain the food security status of people during the pandemic period. The coping strategy assessment in this study will be used to reveal the level of severity of the food insecurity among workers in informal sectors during COVID-19. It also helps to estimate the amount of food stock needed in this time, plan the other alternative way of obtaining fast growing foods. COVID-19 is the newly emerged pandemic and previous study on the topic and its impact on food security is limited. The study will provide baseline information for further investigation of the problem.

1.2. Statement of the Problem

COVID-19 pandemic may have short- and long-term impact on food security of developing country like Ethiopia (Wolfson & Leung, 2020). There are a number of reasons why this would probably happen. One aspect that worsens the food insecurity may be related to the limitation of agricultural input. Agricultural input like fertilizer and pesticide are mainly imported in most of developing country like Ethiopia and the import rate could be reduced to reduction of the input in manufacturing countries. This also affects the food availability of the countries and it worsens the food insecurity. The global production is expected to be reduced and this slow-downs or declines in the provision of humanitarian assistance may result in disastrous condition (FAO, 2020c, Wolfson & Leung, 2020; Abay *et al*, 2021).

In Ethiopia, the ability of informal workers to feed themselves is heavily dependent on their daily income. Social activity restriction has significant effect on the survival of this people. During the time of early onset of the pandemic there were some social supports for economically disadvantaged segment of the people but the frequency and level of support may not continue in similar manner. When the amount of available food is depleted the price of food will increase and this also became another challenge for this group of people (Ouma & Brown, 2020; FAO, 2020a). Low-income households and those working in the informal economy face disruption of livelihoods and inability to access markets due to the burden of movement restrictions and lockdowns. Most of informal workers need to get the daily income to eat and for this reason it is difficult to stay home and expose them to the infection. On the other hand, the morbidity, mortality and the gross economic effect of the virus results in poverty. There is a trade-off between public health measures, the likely heavy economic, and food security impacts. Vulnerable people and poor may not be capable of coping with these second-order effects (FAO, 2020a).

Previous study conducted in Addis Ababa showed that despite subjective income measures suggesting a large proportion of households have been exposed to job loss or reduced incomes. In a survey conducted in August and September of 2019, food consumption and household dietary diversity are largely unchanged or slightly increased by August 2020. Some changes in the composition of food consumption, but they are not related to shocks found in previous phone surveys conducted with the same households. This finding may be affected by the types of subjective questions about income typically being asked in COVID-19 phone surveys may not appropriately reflect the magnitude of such shocks (Hirvonen *et al.*, 2021).

In other study conducted in Addis Ababa among 839 public participants and 420 service providers enrolled in the study. The public in Addis Ababa had moderate knowledge, an optimistic attitude and descent practice. The majority of the respondents (58.6%) had moderate knowledge about COVID-19, whereas 37.2% had good knowledge. About 60.7% and 59.8% of the participants had a positive attitude towards preventive measures and good practice to mitigate the pandemic, respectively. There was a moderate positive correlation between knowledge and attitude. With regard to service providers' preparedness, 70% have made hand-washing facilities available. A large majority of the respondents (84.4%) were using government-owned media followed by social media (46.0%) as a main source of information (Desalegn *et al.* 2021)

COVID-19 impacts most on the lives, livelihoods and food security of very poor people, including daily wage earners, street vendors, homeless street persons, and temporary migrant workers. such workers have either go out for their daily subsistence thereby running the risk of contracting the virus or die of hunger at home. At the early time of the COVID-19 pandemics, Ethiopia established Food Banks in major cities and towns and introduced meal sharing, which seems like a brilliant idea (Mulugeta, 2020).

In Addis Ababa city there is high number of COVID-19 reports as compared to other areas of the Ethiopia. In addition to this majority of Addis Ababa people are working in the informal sectors (Headey *et al.*, 2020). COVID-19 has significant impact on the food security of this population. Addis Ababa city is overpopulated and life style of the people living in the city makes them more vulnerable to the problem. The long-term impact of COVID-19 is its impact in reducing food production that may cause raising in food price. When the amount of available food is depleted the price of food will increasing and this also became another challenge for this group of people (FAO. 2020a; Wolfson & Leung, 2020). So far there is limited empirical evidence on the effect of COVID-19 on the food security and coping

strategy of workers in informal sectors of Addis Ababa city. Understanding this problem in Addis Ababa city is very important for now and for possible similar pandemic problem in future. Therefore, the aim of this study is to assess the COVID-19 pandemic impact on food security and their food coping strategy of workers in informal sectors in Addis Ababa city, Ethiopia. So far there is limited study conducted on impact of COVID-19 on food security among workers in informal sectors of Addis Ababa city and similar study was also not conducted in Ethiopia. Therefore, identifying the level of food insecurity and associated factors with their coping mechanism is very important. By considering this the current study is aimed to assess the COVID-19 pandemic impact on food security situation of workers in informal sectors in Addis Ababa city, Ethiopia.

1.3. Objectives of the Study

1.3.1. General objective

To explore food security status and coping strategies during COVID-19 pandemic among workers in informal sectors in Addis Ababa, Ethiopia.

1.3.2. Specific objective

More specifically the research is intended to:

1. Examine the food security situation of workers in informal sectors during COVID-19 pandemics in Addis Ababa, Ethiopia.
2. Determine factors affecting the workers in informal sectors food security during COVID-19 in Addis Ababa, Ethiopia.
3. Identify the food insecurity coping strategies of workers in informal sectors during COVID-19 pandemics in Addis Ababa, Ethiopia.

1.4. Research Questions

1. What is the status of food security among workers in informal sectors during COVID-19 pandemics in Addis Ababa, Ethiopia?
2. What are the determinants of food insecurity among workers in informal sectors during COVID-19 pandemics in Addis Ababa, Ethiopia?
3. What are the main food coping strategies of workers in informal sectors during COVID-19 pandemics in Addis Ababa, Ethiopia?

1.5. Significant and limitation of the study

This study has a number of benefits for people at risk especially informal worker or for policy maker for implementation activities. The study gives valuable information that help to improve the food security status of people during this time. The study also aimed to assess the coping strategy of workers in informal sectors and this help to predict the long-term effect of the pandemic on the food security and livelihood of the Addis Ababa city people. The study is important in giving information for designing mitigation plan for future possible effect pandemic on food security. In addition to this, the study provides a base line information on food security status of workers in informal sectors during the period of similar pandemic and used for future prevention and mitigation activity. The study has benefit even after the COVID-19 is already controlled in order to building back different aspect of the society and to developed recover and rehabilitation strategy.

This study is also used as a literature review for similar study. It is used to fill a knowledge gab about food security of informal worker during COVID-19 pandemic. The livelihood of workers in informal sectors is more vulnerable for the virus and infection prevention policies. This study will give important information regarding food security status of informal worker of Addis Ababa city.

1.6. Scope and limitation of the study

This study is mainly limited to selected sub-city of Addis Ababa city. The food insecurity scope is also limited to workers in informal sectors and may not use for general population. The study focused on determination of food insecurity and coping strategy among workers in informal sectors. In this study the data collection was carried out by validated tool. The data collection tools are in use by different organization to assess food security status. In addition to this pre-test was conducted on similar setup before the actual data collection time to test internal consistency and if modification is required, it was done accordingly. The content validity of the data collection tools was checked and confirmed.

One of the limitations is related to cross-sectional design that conducts the study at one time in the time. There may be social desirability bias, and recall bias that might have affected this study. To minimize recall bias, the study used a multiple food security analysis including tool which use only one month duration such as HFIAS, week duration CSI & and 24hours HDDS. To minimize social desirability bias, the purpose of the study was well explained to the participants. The other potential limitation would be related to inability to conduct focus group discussion due to risk of transmission of COVID-19 and

challenge to collect study participants at one place. Variation of type of work that the study participant had may affect the livelihood status and food security status. There is no study conducted so far and this may also limit the comparison with the other study in discussion section and in literature review.

1.7. Ethical consideration

The data was collected according to the recommended institutional research ethics and guideline. After the purpose of the study was explained, verbal consents were obtained from study participants before data collection. Participant was informed that participating in the study was based on voluntary and as refusal to participate would be possible. The right to withdraw from the study at any time during the interview was assured. The interviews were conducted in a private to ensure privacy. Data collectors gave psychological support to those participants who experienced hopelessness. In general, the study was conducted according to AAU ethical policy.

1.8. Outline of the Thesis

This thesis paper is organized into five chapters. Chapter one encompasses the introduction of the research including of the background of the study, statement of the problem, research questions, and research objectives of the paper, significance, ethical considerations and scope and limits of the thesis. The second chapter deals with literature reviewed from various sources. The third chapter provides about the research methodology including study area description, the type of research design used the sampling techniques, the data collection toll and methods and data analysis methods. Chapter four consists of the main studying findings and discussions. Finally, chapter five is conclusion and recommendations the thesis.

CHAPTER TWO: RELATED LITERATURE REVIEWS

This section tries to deal with the literature part of the study. It presents an overview of the theoretical literature of food security, basic concept of food security, food security measurement tools, related empirical studies, and the conceptual framework of the study.

2.1. Theoretical literature review on food insecurity

There are different theories developed to explain cause to food insecurity. One of the theories is climate theory which explains food insecurity as caused by climatic phenomena. The theory with the concept of “famine belt” stated by Cox (1981) is directly links climate condition to food insecurity. Climate linked phenomena such as drought, floods and others are a major factor causing food insecurity according to this theory (Cox, 1981).

The other theory is food availability theory which argued that food scarcity occurs when the availability of food is less than the food necessity of the population. Adam Smith and Malthus were the primary developers of this approach who were argued that famines are primarily caused by a sudden decline in food availability. The developers of the theory consider natural drivers as the main causes for food insecurity and analyses their influence on harvest failures and advances in prices. The theory is vulnerable to criticism because it confined on food availability at local levels. The theory argued that the crop failures due to natural disasters often result in high food prices, increased demand to deal with uncertainties. Decline in purchasing power affects the poor and those who are in trouble by bad weather to become food insecure (Lin and Yang 2000).

The other well-known food insecurity theory is food entitlement decline theory that has been criticized for its focus only on the economic aspect of famine and its failure to recognize the social and political aspect. It fails to recognize individuals as socially embedded members of households, communities and states. It also fails to recognize that famine causes by political crisis as much as it is the result of economic shocks or natural disasters (Devereux, 2001). The scholars believe that importing food in a situation of existing insecurity could be the answer to minimize the food problem and to save lives and criticized Sen (Leach et al., 1999; Steven Engler et al, 2014)

Composite theories on food security opposed Sen’s analysis of food security in terms of food access through entitlements rather than food availability (Woldemeskel 1990). He argued that the entitlement

approach is narrow because it dwells on only possession, while food security attainment is contingent upon four determinants: availability, institutional elements, market forces, and possessions. Thus, the entitlement approach recognizes the contribution of food availability to food security but dismisses it, and completely ignores institutional elements and market forces (Woldemeskel 1990).

The other theory is Malthusians and anti-Malthusian contentions theory. Malthusians state that food insecurity occurs when there is imbalance between population amount of food produced. Malthusians stated that “Population when unchecked increases in a geometrical ratio while subsistence food production increases only in an arithmetical ratio”. He was specific on the negative impact of population growth on food production. The core principle of Malthus was that food is necessary for human existence even if human population tends to grow faster than the power on the earth to produce subsistence (Dyson, 1996).

2.2. Basic Concept of food security

Food security implies the availability of adequate supplies at a global and national level in one segment while it is the concern of adequate nutrition and well-being at individual level in the other segment. Availability is still very uneven; in sub-Saharan Africa calorific intake is still only 2,150 kcal/day compared to 2,050kcal/day thirty years earlier while the average calorie consumption in South Asia rose from 2,000 kcal/day to 2,350 kcal/day in the same period. But, during the 1990s per capita growth of world agricultural production slowed (Morrison & Pearce, 2000; FAO. 1999).

According the United Nations’ Committee on World Food Security, food security is defined as meaning that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life. Household is considered food secure when its occupants do not live-in hunger or fear of starvation. Stages of food insecurity range from food secure situations to full-scale famine. It is also defined as when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life. Food security also broadly refers to the ability of individuals to obtain sufficient food on a day-to-day basis (FAO, 2014).

Whenever we think about food security the four pillars should be considered to fully evaluate its status. Paarlberg states that food importing countries often do better overall when world grain prices are high,

because prices often rise under conditions of rapid international growth. Some poor countries have come to rely on food imports to a greater extent during the last three decades. Sub-Saharan Africa's reliance on imports including food aid and commercial imports it was 13.6% in 1993 which is up from 10% twenty years earlier (Paarlberg, 1999). However, the notion of household entitlement to food derived from the work of Amartya Sen is now widely used to assess issues related to food and nutrition security. The word entitlement refers to "households avail themselves of food, whether through household production, or through other income-generating activities such as the sale of labor or participation in trading." Besides, transfers from sources external to the household such as from the state or relatives is also add to household entitlement (Drèze & Sen, 1989).

One of the four important pillar is food availability that plays a prominent role. Sufficient quantities of food of appropriate quality, supplied complete domestic production or import. It refers to the physical existence of food, whether from the household own farm or garden production or from domestic or international markets. Food availability combined with food access leads to food security at the individual household level (FAO, 2014).

The second important pillar of food security is food access which refers to the individual access to adequate resources for obtaining appropriate foods for a nutritious diet. It is about the physical and economic access of sufficient food. The property of a household, including income, land, and crop of labor, inheritance, and aid can manage a household's right to use to food. The ability of access to sufficient food may not lead to the acquisition of food over other materials and services (Morrison & Pearce, 2000).

The third important pillar food security is utilization complete adequate diet, clean water, sanitation, and health care to reach a state of nutritional well-being where all physiological needs are met proper biological use of food (Hoddinott, 1999). Right to use to healthcare is additional issue of food use, since the health condition of individual's member of households controls how the food is make use of for example, intestinal parasites can take nutrients from the body, and decrease food utilization. Food utilization refers broadly to the actual food that is consumed by individuals; how it is stored, prepared, and consumed; and what nutritional benefits the individual derives from consumption (USAID, 1992)

Food stability is the fourth component of food security that cuts across the other three. Stability refers to the temporal dimension of food security as implied by the wording. Stability is defined as the ability to access and utilize appropriate levels of nutritious food over time. It is important distinction is made

between chronic food insecurity and transitory food insecurity. A chronic food insecurity is the long-term or persistent inability to meet food needs, whereas transitory food insecurity is a short-term food deficit. Temporary food insecurity occurs for a limited time due to unforeseen and unpredictable circumstances (Drèze & Sen, 1989).

The issue of guaranteeing adequate food security depends on the ability to identify household's vulnerability. Vulnerability refers to the full range of factors that make people food insecure. The extent of vulnerability of household is determined by their level of exposure to the risk factors and ability to cope with or mitigate shock. Vulnerability of households could be observed in different direction. Some households are vulnerable under any circumstances. For instance, if the adults are unable to provide an adequate livelihood for the household for reasons of illness, age or for other circumstance, the household became vulnerable any time. The other vulnerability is associated with resource endowment which is inadequate to provide sufficient income from any available source. Lastly vulnerability would be come in association with the context of social and economic shocks. In this case people may find it hard to adapt to sudden changes in economic activity brought about by economic policy (Sileshi *et al.*, 2019). Therefore, in this study context vulnerability due to COVID-19 could be an example of this type of vulnerability.

2.3. Empirical Related Literature

2.3.1. Pandemics impact on food security

The relationship between food insecurity and pandemics has been observed so far during the Ebola virus disease outbreak of West Africa (Fallah *et al.*, 2015; Bucchianeri, 2010). Provision of basic service is poor while needs are already extremely high during food crisis. While health care need is the primary concern, the issue of livelihood and food security need to be considered. Food supply chain from production to processing, from packaging to transporting, from marketing to consumption is disturbed due to movement restrictions that necessary to halt the spread of the virus. These problems are always followed by shortages food which affect availability pillar of food security, curtailed incomes and high food prices that affect accessibility pillar while this results in food insecurity that have immediate and long-term effect on livelihood of the household. This would further affect the already vulnerable populations and diminish the hope of improvement. During this time workers in informal sectors are seriously affected (Fallah *et al.*, 2015; Bucchianeri, 2010).

The 2014 West Africa Ebola virus disease (EVD) outbreak had important implications for food security in that region. During this outbreak, the containment measures taken particularly quarantines and public gatherings restrictions, limitation of movements of goods significantly affected agricultural market supply chains. Many farmers were unable to cultivate or sell crops due to lack of inputs and labor. Food production is considerably affected (Fallah *et al.*, 2015). In Liberia 47% of farmers were unable to cultivate farmland due to the EVD outbreak. In addition, the price of key commodities was raised following the international flows restriction due to border controls. Market is disrupted due to restriction of trade flows of food commodities and other necessities. The households' purchasing power considerable affected (Bucchianeri, 2010). The lesson from this pandemic helps us to invest on the safeguarding livelihoods, food production and access at the early onset of the outbreak is important to mitigate the secondary impacts of the current novel coronavirus pandemic and other related containment efforts (Fallah *et al.*, 2015; Bucchianeri, 2010, FAO, 2020d).

Mexico pork meat export is significantly reduced following the H1N1 influenza pandemic due to the mere public perception about the pandemic. Consumer response to the increasing incidence of avian influenza also reduced demand and prices for poultry in 2005–2006. Change in diet preference was observed on consumers, and mostly they shifted to other livestock products. Limitations imposed on the animal-human interface may have negative consequences for livestock foods (AED, 2008). Ebola outbreak caused severe food shortages in low-income countries up to 150% higher prices than before. The impact also contributed to reduce food security, including poorer infant and young child feeding practices and nutrition status reduced. Mostly in low-income countries food chains tend to rely more on local food production than imports and if these local food chains are disrupted, imports may not be able to fill the gap (Huff *et al.*, 2015; Kodish *et al.*, 2019).

The experience from the global health impact of an influenza pandemic showed as it affects transportation systems, workforces, and supply chains. The impact of the virus in other areas of the world that experiencing a food crisis before the outbreak further affected and it cause severe health problems. Some of the first things that noticed as it causes a food security problem are: food supplies are hard to get locally; industries that rely on import and export are struggling; economic activities are disrupted (Ekici *et al.*, 2010). The food security risk due to the impact of a pandemic varies within a population; some groups was more at risk than others. Group at risk in most emergency situations are those that are already struggling with hunger, poverty and health problem. Many households are

vulnerable to the impact of a severe pandemic because of the way it may affect economic and social systems. Workers in informal sectors household that has no stock and not taken necessary actions to prepare for a severe pandemic will face greater difficulties in coping with the impacts of spreading disease (AED, 2008).

2.3.2. COVID-19 pandemics impact on food security

World Food Program (WFP) anticipates that food assistance requirements will likely be increased attributable to COVID-19 spread. There are indications that the urban poor and those in informal sectors will face food consumption gaps as a result of the pandemic spread. The Food Cluster provisionally estimates that an additional 9 million people in rural and urban areas will require cash or food transfers as a result of COVID-19. A substantial portion of additional food assistance requirements caused by COVID-19 was in urban contexts (WFP, 2020).

On 14 May 2020 the World Health Organization (WHO) expressed concern at the potential impact of COVID-19 on food security, which is likely to exacerbate the already considerable burden of malnutrition in Africa. The impact of the disease is expected to be greater among those grappling with food shortage and malnutrition, while widespread food insecurity will likely increase due to movement restrictions. In Africa, it is estimated that one in five people is undernourished, and that 30% of children under five (approximately 59 million children) have stunted growth, nearly triple of the global average of 21.9%. Wasting happens in approximately 7.1% of children in the continent. Africa has the highest burden of malnutrition compared with other parts of the world. Although there has been little study on malnutrition as a co-morbidity for COVID-19 so far, people with weakened immune systems due to undernourishment are at high risk of serious illnesses than the others (WHO, 2020).

When governments rush to respond to COVID-19 pandemics, there is an urgent need to confirm that the measures taken are sensitive to the needs of poor and most vulnerable people. Containment and mitigation policies need to cover everyone to minimize the transmission of the virus, governments must also be sensitive to the immediate and longer-term impacts of the livelihood of the people. Poverty can be the cause and the consequence of the viral infection and containment activities. Due to their life style poor people are at risk for the virus. A COVID-19 pandemic is serious problem for workers in informal sectors. For them issue of maintaining containment is a matter of live or death. Those individuals are without savings and with little recourse to insurance or alternative sources of income. Existing

inequalities in access to income, health, assets, formal employment, education and social protection, access to information, equal opportunity and public services will magnify the direct and indirect impacts of COVID-19. This inequality within a society and within households is strongly linked to gender and women are affected more in this time. The coping strategy may affect the immediate and the future livelihood. Inequality from COVID-19 will have long-term consequences by reduces the impact of economic growth and rate of poverty reduction. During this time, economic recovery may have less impact on the informal worker poor and worse-off than before (Olinto *et al.*, 2014; UNDESA, 2020; Bonds *et al.*, 2009; FAO, 2020e).

In study done in Myanmar showed that the COVID-19 pandemic had negative impacts on income of households in both urban and rural areas mainly associated with losses of jobs or other income. A poverty of people with income of less than USD 1.90 per day was increased by 27 percent from January to June. Self-reported food insecurity experiences and inadequate dietary diversity was more common in the urban household. Self-reported losses of income and jobs were associated with food insecurity and inadequately diverse diets (Headey *et al.*, 2020).

The impact of the COVID-19 has a multiple impact on USA according to a number of studies conducted so far. New York City has named a Food Czar to oversee all relief efforts in the city during the COVID-19 pandemic in order to provide a more centralized, efficient response to food insecurity (Kirker & Max, 2020). Regardless of different struggle to alleviate the impact of the pandemic crisis on the food security, the problem has profound effects on the food and financial security for years to come. In the pandemic schools was closed and families were out of work. As a result, the food insecurity rates are expected to be high. Short term food insecurity is expected during this time which has significant impacts on children's health, emotional and behavioral changes, and nutritional defect outcomes. On the other hand, lack of balanced diet has been linked to risk of obesity (Metallinos-Katsaras *et al*, 2012). This could be further associated with the long-term consequences for chronic disease morbidity. During COVID-19 pandemics, the common food insecurity coping strategies such as seeking resources from the charitable food sector are challenged. Availability and accessibility pillar of the food security is affected during this time. For instances, online purchasing technology may take several months in many states and suitable stores with required safety may be insufficient.

Study conducted among 3219 respondents of United State showed that there was about one-third increase in household food insecurity since COVID-19. Of the study participants about 35.5% of food

insecure households were classified as newly food insecure. The study participants experiencing a job loss were at higher odds of experiencing food insecurity (OR 3.06; 95% CI, 2.114–0.46). Multiple physical and economic barriers, and concerns related to food access during COVID-19 was reported in the study. Two-thirds of households were eating less since COVID-19 pandemic and the respondents were experiencing food insecurity which is related to access challenges and utilizing coping strategies. The study also showed the significant differences in coping strategies between respondents in newly food insecure and household consistently food insecure. These have important potential impacts on individual health, malnutrition, including mental health and as well as on future healthcare costs (Niles *et al.*, 2020).

Study conducted in China showed the aspect of Chinese policies around food security during COVID-19 in Wuhan and Nanjing. The aspects of food security in this study include agricultural production, stabilization of food prices, transportation of food, and the use of contactless methods in purchasing foods. The study showed that the country policies consistently emphasized the importance of collaboration across different levels of government. But a major gap identified was the lack of focus of policy responses on food utilization and food access at a household level (Chang *et al.*, 2020).

The study showed that women who work in the informal economy in South Africa as a group are particularly neglected in maternal and child health programs, and there have been no attempts to address their particular needs. Informal workers face barriers that may prevent their seeking antenatal, immunization or reproductive health care services, but no provision is made for them to attend outside of working hours or be fast-tracked so they can return to work (Bhan *et al.*, 2020). Study conducted on informal worker women in South Africa shown to be vulnerable with low incomes and high rates of food insecurity, thus increasing the risk for poor maternal health. Levels of depression risk were low compared to previous estimates in South Africa, suggesting that informal workers may have high levels of resilience (Horwood *et al.*, 2021).

Nations with high poverty rates like Ethiopia and countries with weak governance and institutions are much vulnerable to the present and the future negative socio-economic impacts from COVID-19 pandemics. Countries with high number of unemployment and workers in informal sectors challenged due to lack of previous stock and the coping mechanism may further deteriorate social and economic aspect of the county. Weak governance may find it mainly difficult to deliver basic services including healthcare and during crises these fragile systems can depreciate or collapse. Risk profiles-based

countries' coping capacities is developed by using some indicators such as strength of institutions and infrastructure. The risk model and database of 191 countries identifies those at risk of humanitarian crises also determine national-level coping capacities of a country (Diwakar, 2020).

To cast light on how households in Addis Ababa, Ethiopia, are reacting to the crisis, international food policy research institute's Ethiopia strategy support program, with the support of the CGIAR research program on agriculture for nutrition and health, has begun a series of monthly phone surveys. Initial data demonstrate that poorer households are taking a greater economic hit than those with higher incomes, and that dietary diversity has declined. The results suggest the food security situation in Addis Ababa could sharply deteriorate in the coming weeks if disease transmission and social distancing measures continue (Hirvonen, 2020).

A phone survey conducted in Addis Ababa showed that during the pandemic, households are less frequently consuming expensive but nutritious foods including fruit and dairy products. During the data collection period in May, overall food security status in Addis Ababa is not *yet alarming*. This may be because many households have been using saved to buffer food consumption. However, the study was conducted in the early stage of the pandemics and this makes difficult to assess the full impact of the pandemics on food security (Abate *et al*, 2020).

Study conducted in Arsi showed that COVID-19 reduced food security while at the same time adversely affected employment and schooling. The impact was significantly higher in reducing household's food security more than the other considered indicators. The study also showed that impacts vary disproportionately by different household groups, and each restriction is not equally important in affecting welfare (Habtewold, 2021).

The study conducted in Jimma revealed the existence of a high prevalence of acute stress reaction syndrome during the COVID-19 outbreak among different groups of the community. Acute stress reaction syndrome was detected in 44.1% of hospital visitors. Among the participants, 38.5%, 17.4%, 8.5% and 35.6% had a minimal, mild, moderate and severe psychological impact, respectively. Associated factors with acute stress reaction syndrome were individuals who perceived that COVID-19 leads to stigma, mild insomnia, moderate to severe insomnia, low social support and governmental employees (Yitayih *et al.*, 2021).

2.4. Analytical framework

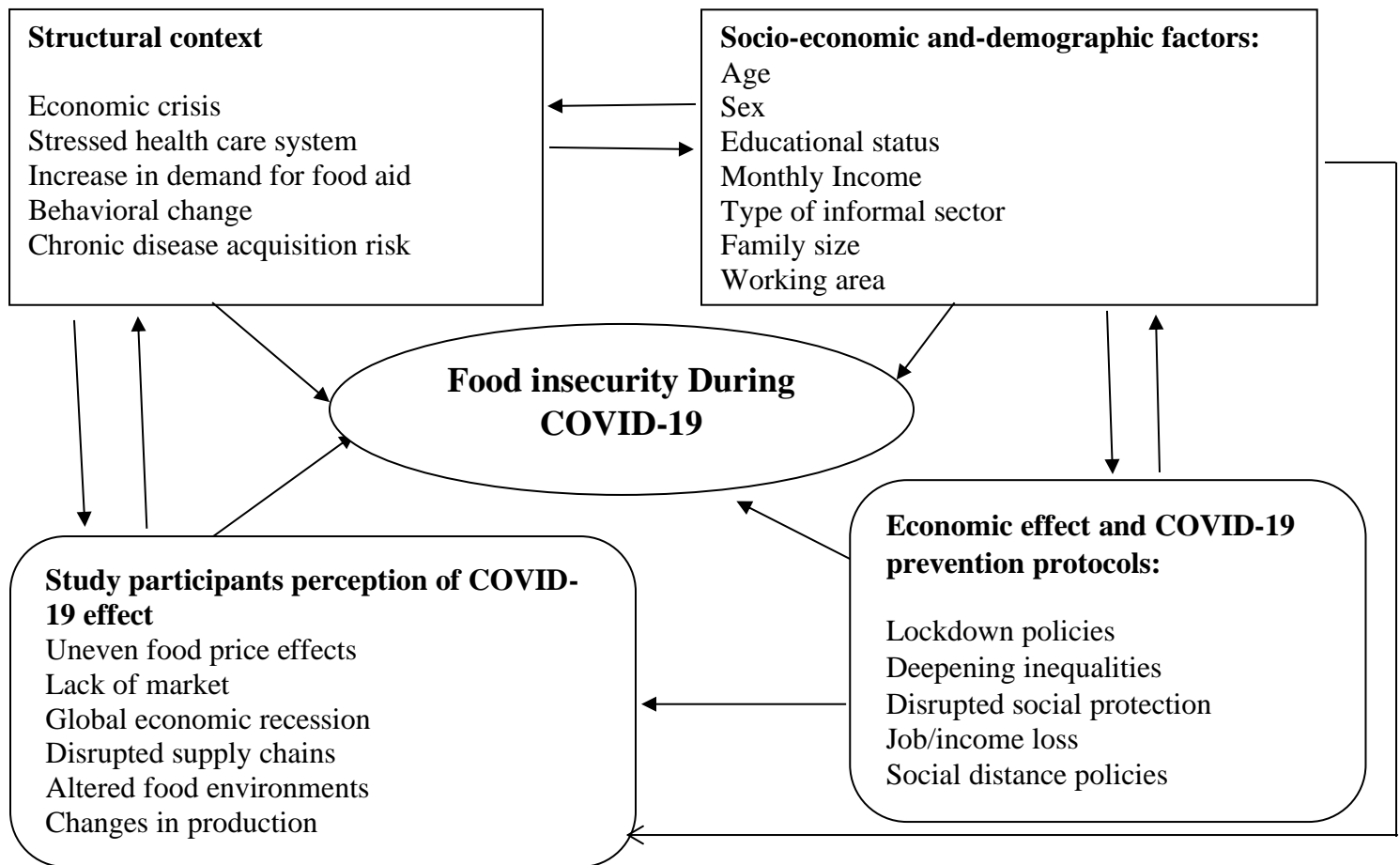


Figure 2.1:-Analytical framework of the study (WFP, 2020, Olinto *et al.*, 2014; UNDESA, 2020; Bonds *et al.*, 2009; FAO, 2020e).

Food insecurity during COVID-19 could be affected by different factors. One of the factors that affect the situation is socio-demographic characteristics of study participants. The other potential factors that affect food security of workers in informal sectors is effect of supply chain that affected due to various reasons. Under this category different variable such as uneven food price effects, lack of market, global economic recession, disrupted supply chains, altered food environments and changes in production are the major potential factors that affect the food security. Structural factors can also affect food security of the workers in informal sectors during COVID-19. The potential variables under this category are economic crisis, stressed health care system, increase in demand for food aid, behavioral change and chronic disease acquisition risk. Finally, some policy and COVID-19 prevention protocols may have significant effect on the food security status of the workers in informal sectors during COVID-19 pandemics.

CHAPTER THREE: DESCRIPTION OF THE STUDY AREA AND RESEARCH METHODOLOGY

3.1. Description of the Study Area

The study was conducted in randomly selected sub-city of Addis Ababa. Addis Ababa is the capital city of Ethiopia. The city lies at an elevation of 2,355 meters and is a grassland biome, located at 9°1'48"N 38°44'24"E. The city forms part of the watershed for the Awash. From its lowest point, around Bole International Airport, at 2,326 meters above sea level in the Southern periphery, Addis Ababa raises to over 3,000 meters in the Entoto mountains to the North. The city is divided into 11 sub-cities and 99 woredas. Addis Ababa has a subtropical highland climate with precipitation varying considerably by the month. The city has a complex mix of highland climate zones, with temperature differences of up to 10°C depending on elevation and prevailing wind patterns (CSA, 2018b).

The city has the estimated population of 3.8 million in 2016. Of this 16.8% had levels of consumption below poverty line. Nearly 44% of households in city are headed by women. The average household family member was four (CSA, 2018a; CSA, 2018b). According to the 2020 World Bank report, almost all households have access to 24-hour electricity, in excess of 90% are connected to piped water and access to improved sanitation accounts more than half (World Bank 2020). According to 2016 Ethiopia Demographic and Health Survey data, chronically undernourished of children under five years of age was about 15 percent while 13 percent of women and 18 percent of men between the ages of 15 and 49-year-old were less than 18.5 kg/m² body-mass index (BMI) (CSA & ICF 2016). There is high number of workers in informal sectors. The city has high number of COVID-19 cases in Ethiopia. Over 75% of coronavirus cases of Ethiopia are located in Addis Ababa at the time when this study was conducted (Kassahun, 2020).

According to the 2018 survey of the Central Statistical Agency (CSA), about 20% of the working age population in Addis Ababa city is unemployed and of the employed nearly one third of them were self-employed. The wholesaler and retailer account one fifth of the employer, 13% working in manufacturing work, 8% in construction and 5% in food and accommodation service work. About 10% employed people were working in households as house servant or guard while nearly same proportion works in the informal sector (CSA 2018b). As of 2014, Addis Ababa had 52 hospitals, 12 of them state run, and more than 40 private (Ejigu, 2014). More than 100 state health centers are currently giving service in the city.

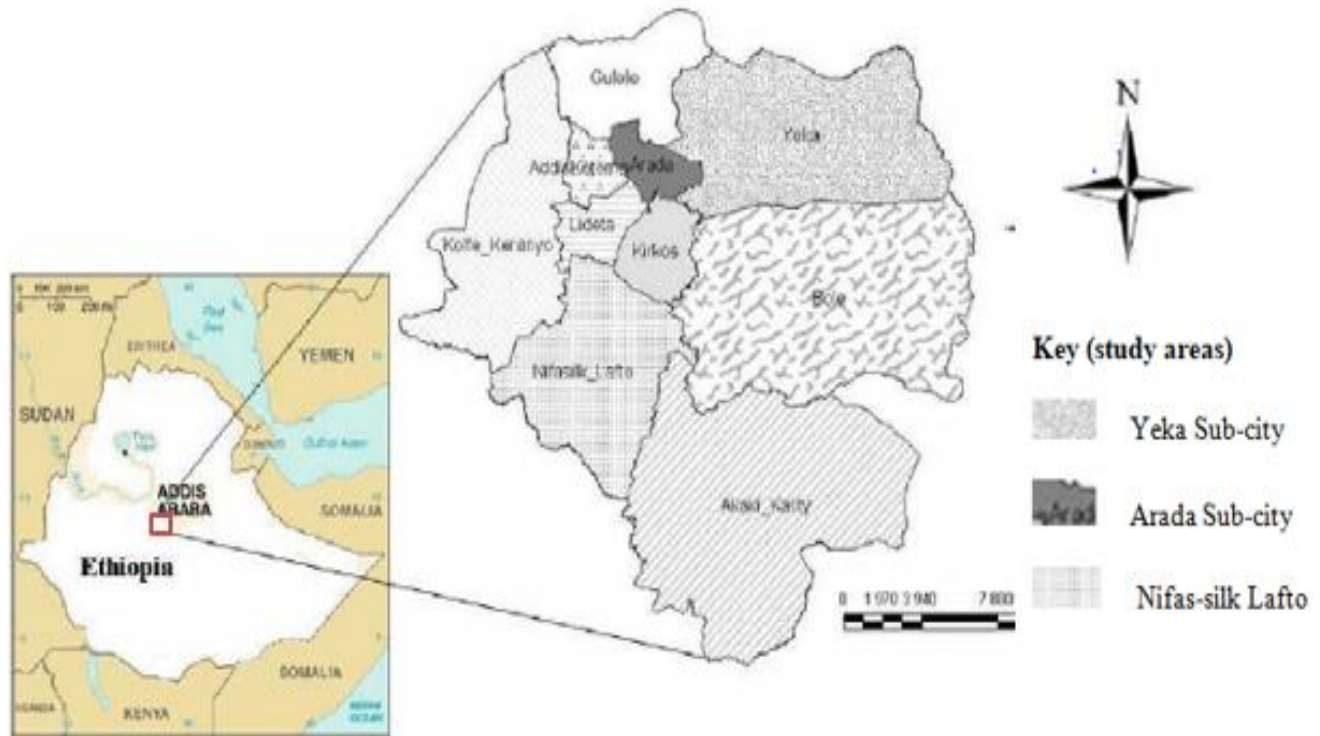


Figure 3.1. Map of the study area Addis Ababa city (Source: [Mapping of Plantation Forest in the Upper Catchment of Addis Ababa \(researchgate.net\)](#))

3.2. Research Method

3.2.1. Research Design and approach

A mixed explanatory research design was used to determine the magnitude of food insecurity, their food coping strategy, and associated factors among workers in informal sectors. Thus, mixed research approach enables the researchers to best explore and explain such study (MacDonald and Headlam, 1986). The impact of COVID-19 pandemic on food insecurity and the main associated factors among Addis Ababa city informal works was identified using this research design and approach.

3.2.2. Data type and source

Quantitative and qualitative data was collected in the study. This study was conducted among workers in different informal sectors such as street vendors, waiter, artisans, private business, house servant, daily laborer and construction workers were targeted. For quantitative study, data was collected by using

pretested, semi-structured face to face interview-based questionnaire which consists of socio-demographic characteristic of workers in informal sectors, question related to factors aggravating food insecurity during COVID-19. Food security status of the informal worker was conducted by using Household Food Insecurity Access Scale (HFIAS). The Food and Nutrition Technical Assistance Project (Coates *et al.*, 2007; Maxwell *et al.*, 2014) developed HFIAS to determine food insecurity in developing country. In order to determine the coping mechanism of the workers in informal sectors, reduced Coping Strategy Index (rCSI) was applied (Maxwell *et al.*, 2014). The questionnaire was prepared in English then translated to local language (Amharic for most speak the language).

For qualitative study, 13 in-depth interview was employed for key-informants. Purposive sampling technique was used to select the key informants during data collection of the qualitative study. The key informants are selected from the community by considering different Woreda involved in the study. Workers in informal sectors in different informal sector were considered to assess the qualitative study.

3.2.3. Sampling techniques and sample size determination

This study was conducted in Addis Ababa city. The city is selected because of its overpopulated and there are also large number of workers in the informal sectors. The prevalence of COVID-19 in the Addis Ababa city is high in Addis Ababa city compared to other cities in the country. Yeka, Arada and Nifas Selk sub cities were randomly selected to minimize biased in selection.

Then workers in informal sectors in Addis Ababa city were collected from randomly selected three sub-cities and their participation was based on their voluntary at their work place. Stratified sampling techniques based on the available sub-city and different type of workers working in informal sectors was employed to select the study participants. This technique is used when the population is known to be having heterogeneity with regard to some factors and those factors are used for stratification. A separate sample is taken independently from each stratum. Then any of the sampling methods can be used to sample within each stratum (Igwenagu, 2016). In this case, stratification was done based on the sub-city. This technique is used when the population has a known to be having heterogeneity with regard to some factors and those factors are used for stratification. In our case different type of occupation and variation in the sub cities was the point of stratification. A separate sample is taken independently from each stratum. Then any of the sampling methods can be used to sample within each stratum.

For quantitative study, single population proportion was used to calculate the number of individuals participated in the study. It is calculated by the following formula. $n_o = \frac{(Z_{\alpha/2})^2 \times p \times q}{d^2}$. P= proportion from previous study, q=1-p, d=marginal error, $Z_{\alpha/2}=1.96$, (95% confidence interval) (MacDonald and Headlam, 1986). Due to the absence of previous study conducted on the topic, 50% proportion is obtained to calculate the sample size and 5% degree of precision is used.

Then: p=0.5; q= 1-p (1-0.5) = 0.5; d=margin of error (5%); 95% confidence interval = 1.96.

$$n_o = (1.96)^2 \times 0.5 \times 0.5 / (0.05)^2 = 0.9604/0.0025 = 384.16$$

Then the final sample size was **384**.

For qualitative study, the data was collected until thematic saturation was reached. A total of 13 in depth interview was used in the qualitative study.

3.2.4. Method of data Collection

The data for the study was collected using interview administered question. The key informants were selected based on their experience and by considering the variation in the in different sociodemographic characteristics off the respondents. A semi-structured interview guide was developed from literature review and held with workers in informal sectors to explore and identify factors aggravating food insecurity of the workers in informal sectors during COVID-19 pandemics. The interview was facilitated by investigator using a guide and tape recorded. In-depth interview was conducted until thematic saturation was reached.

3.2.5. Eligibility criteria (inclusion and exclusion criteria)

The data was sourced from Addis Ababa city selected workers in informal sectors whose age was greater that 18-year-old during the data collection period. The exclusion criteria were informal worker who works participates in Urban Productive Safety Net Program (UPSNP) and informal worker resident for less than 6 months in the city. Those individuals who have additional residence outside of Addis Ababa also excluded.

3.2.6. Data analysis Method

For quantitative study, data was first checked manually for completeness then coded and entered in to Epi Info version 7.0 and exported to SPSS version 20.0 for analysis. For the descriptive study statistical

analysis method such as percentage, standard deviation, and mean was used. Exploratory data analysis was done to check missing values and outliers. Bivariate logistic regression analysis was used to see the association between each of the independent variables and food insecurity. Thereafter, independent variables with $P \leq 0.20$ in univariable analysis was transferred to multivariable logistic regression model together, and analyzed using backward stepwise logistic regression analysis. Hosmer and Lemeshow goodness of fit of the model was used. The statistical significance was declared at p value less than 0.05. The results were reported using adjusted odds ratio (AOR) with their 95% confidence interval.

For the qualitative data, the recorded data was transcribed verbatim and then translated into English word-for-word. ATLAS.ti version 7 was used to analyze the qualitative data. Thematic content analysis was used by sorting information, looking for similarities and differences, and developing appropriate codes. Then, similar codes were used to make categories. The qualitative data was summarized and direct quotations was used to present the data along with the quantitative findings.

Food security status of the house-hold was assessed by using Household Food Insecurity Access Scale (HFIAS), reduced coping strategic index, and household dietary diversity scale. In HFIAS, there are nine occurrence questions ask whether or not a specific condition associated with the experience of food insecurity ever occurred during the previous 4 weeks (30 days). If the respondent answer 'Yes' of the questions the frequency was assessed using the Likert scales including rarely (if the household exposed 3-10 days to the particular occurrence question), sometimes (if the household exposed once or twice to the particular occurrence question), and often (if the household exposed more than 10 days to the particular occurrence question). Finally, after assessing all the nine questions, households are categorized into four levels of household food insecurity: (1) food secure, and (2) mild, (3) moderately and (4) severely food insecure based on Maxwell *et al.*, (2014) classification. Households are categorized as increasingly food insecure as they respond affirmatively to more severe conditions and/or experience those conditions more frequently (Maxwell *et al.*, 2014).

Household Dietary Diversity Score (HDDS) was assessed to determine utilization component the food security. To better reflect a quality diet, the number of different food groups consumed is calculated, rather than the number of different foods consumed. The following set of 12 food groups is used to calculate the HDDS: Cereals, Fish and seafood, Root and tubers, Pulses/legumes/nuts, Vegetables, Milk and milk products, Fruits, Oil/fats, Meat/poultry/offal, Sugar/honey, Eggs, and Miscellaneous consumption in 24 hours. Any increase in household dietary diversity reflects an improvement in the

household's diet (Swindale & Bilinsky, 2006). A response with 0–4 different food groups was considered as low dietary diversity score while the response with 5 or more food groups were considered as good dietary diversity scores (Woldemariam *et al.*, 2015).

In order to determine the coping mechanism of the workers in informal sectors, reduced coping strategy index (rCSI) was used. A series of questions about how households manage to cope with a shortfall in food for consumption results in a simple numeric score with universal weight score. There are five reduced questions with universal weight for the questions. Then rCSI score was the sum of the frequency of each strategy multiplied by its severity. The higher the frequency, the higher the score; and the greater the severity the higher the severity weighting. Finally, the calculated value was interpreted for the workers in informal sectors according to the method stated in Maxwell *et al.*, (2014).

3.2.7. Reliability and Validity of Data and Technique

Reliability refers to the consistency of a measure. In this study the measurement was carried out by data collection tools that used for a long time frequently. The data collection tools are in use by different organization. In addition to this pre-test was conducted on similar setup before the actual data collection time to test internal consistency and if modification is required, it was done accordingly. Therefore, the generated data was hope fully reliable.

Validity is the extent to which the scores from a measure represent the variable they are intended to. The content validity of the data collection tools was already checked and confirmed. At the same time for the statistical analysis of logistic regression model, Hosmer and Lemeshow goodness of fit of the model was used. So, the validity of the test was maintained.

3.2.8. Description of study variables

3.2.8.1. Dependent variable

Food security: In this study food security is determined using a multiple analysis tool. One of the dependent variable outcomes (food security status) was measured using HFIAS. The quantitative value of this variable was determined based on the study participants response to nine standard questions. The determination of the dependent variable was done as per the method described in section 3.2.6 of this thesis. Then in order to assess the factor associated with food security status using HFIAS, the four-category outcome was dichotomized in to the first category (food secure and mild food insecure) and

the second category (moderately and severely food insecure). During coding of the variable, 0 is coded for the first category (food secure and mild food insecure) and value 1 was coded for the second category (moderately and severely food insecure). The second tool used to determine the outcome variable was Household Dietary Diversity Score (HDDS). The outcome of this assessment was also dichotomized to poor HDDS with is coded with 1 and good dietary diversity coded with value of 0 during the analysis of bivariate logistic regression. The third tool used in the is evaluation of food security status among the workers in informal sectors was coping strategic index which was assessed using reduced coping strategy index (rCSI) as discussed in section 3.2.6 of this thesis. To identify factor associated with this outcome variable, the four-outcome status was dichotomized into two group and coded as discussed above in the HFIAS method. We preferred to dichotomizing the outcome variable because workers in mild food insecure status had almost related food security status with food secure groups while the moderately food insecure and severely food insecure had related food security characteristics as compared to the previous one.

3.2.8.2. Independent variables

Socio demographic factors: In this group of variables different socio-demographic such as age, sex, educational status, income status, type of informal sector, working area, and family size are used to determine the association with dependent variable. This variable can affect food security and also affected by other factors such as structural context, COVID-19 policy and prevention protocol, and food availability and access related factors.

Age of the respondents could be of the associated factor with food security status of the workers working in informal sectors. Age of the study participants can affect the work behavior and the COVID-19 prevention habit. Age is continuous variable that grouped into different range in descriptive and inferential presentation in this study. The sex of study participants was assessed to test the presence of association with the workers food security study during COVID-19 pandemics. It is a categorical variable grouped in to male and female. The type of works may varies based on the gender of the study participants and the level of care for COVID-19 may also different based on the sex of the study participants. The other variable in the sociodemographic characteristics of the study participants was educational status. This variable is categorical variable which was categorized in to illiterate, primary school, secondary school, and college and above. It is well known that education can affect food security,

COVID-19 prevention, and work habit. The income status of the study participants was also assessed. The income status was grouped in to three categories. It has a direct relationship with economic status of the study participant which can directly affect the food security. The type of workers in informal sector of the study participants was another factor that associated with the food security. The following are the type of worker involved in the study street venders, waiter, artisans, private business, house servant, daily laborer, and construction workers. Distance from the working area is also the other factor that affect the food security status of the study participants. COVID-19 prevention protocol in transportation can affect the work of informal sectors and the variable is categorized based on the distance of the work place from the study participants' home. Finally, family size is the other factor that may affect the food security of the study participants. the family size was assessed based on the number of household member permanently live in the house of the study participants and the variable is categorized in to three group in our study.

Structural context: different factors related to structural context are also believed as it affects the food security status of the workers in informal sectors during COVID-19. Some of the structural context considered in this study are economic crisis, stressed health care system, increase in demand for food aid, behavioral change, and chronic disease acquisition risk were asked by interview of study participants. This factor can affect by social-demographic factor, and food availability and access while it can be faceted by social-demographic factor as well.

The variables under the structural context listed above were categorical variable that all assessed based on the study participants response. The question was collected by Yes/No format and all variables stated in this category have a potential association with the dependent variable as we try to show in the conceptual framework.

Study participants perception of COVID-19 effect: availability and access of food is the other factors that affect food security. The following are some of the factors that affect food security related to the availability and access uneven food price effects, lack of market, global economic recession, disrupted supply chains, altered food environments and changes in production were collected by self-response of study participant.

To assess the link of between study participants perception of COVID-19 effect and food security 5 scale Likert scale was used that range from strongly disagree to strongly agree. Then the variable is

dichotomized to agree and disagree during factor analysis. Similarly, all variables stated in this category have a potential association with the dependent variable as we try to show in the conceptual framework.

Policy and COVID-19 prevention protocols: the other factors that affect the food security of the workers in informal sectors during COVID-19 is the policy and prevention strategy. In this study, variables such as lockdown policies, deepening inequalities, disrupted social protection, job/income loss and social distance policies was considered.

The variables under the under this category were categorical variable that all assessed based on the study participants response. The question was collected by Yes/No format and all variables stated in this category have a potential association with the dependent variable as we try to show in the conceptual framework.

CHAPTER FOUR: RESULTS AND DISCUSSION

This chapter presents the finding of the research obtained from descriptive and factor analysis. Socio-demographic and economic characteristics of the study participants were assessed. Household food security status and dietary diversity of the study participants were presented in this section. Furthermore, factors associated with food security of the household of workers working in informal sectors. The associated factors were assessed using Multivariable logistic regression model and AOR with 95%CI was used to show the presence and strength of the association. The qualitative study finding and the discussion of the findings were indicated in this study.

4.1. Socio-economic and -demographic characteristics of the study participants

A total of 347 workers in informal sectors with 90.4% response rate were participated at their work place. Of the total study participants, slightly more than three-fifth (62.5%) of the study participants were male. The age of the study participants ranged from 18 to 55-year-old. The mean and standard deviation of the study participants were 30.3 ± 8.4 -year-old. Nearly two-third of the study participants were married while one-fourth of them were never married. One in ten participants were illiterate with the same proportion complete tertiary education. In our study, workers in informal sectors including street vendors, waiter, artisans, private business, house servant, daily laborer, and construction workers were participated. According the study participants self-report nearly half of them had monthly income of less than 3000 Ethiopian Birr while majority of them had family size form 2-4. Slightly more than the study participants were working in near to their living home (**Table 4.1**).

Table 4.1: Socio-demographic and socio-economic characteristics of the study participants with food security status (n=347)

Variables	Categories	Moderately and severely FIS	FS & Mild FIS	Total N(%)
Age	≤ 25	76	40	116(33.4)
	26-35	94	60	154(44.38)
	$\geq 36-45$	56	21	77(22.19)

Sex	Male	139	78	217(62.53)
	Female	87	43	130(37.46)
Month Income	≤3000	122	43	165(47.55)
	3001-5000	99	46	145(41.78)
	≥5000	5	32	37(10.66)
Education	Illiterate	22	14	36(10.37)
	Primary school	103	53	156(44.95)
	Secondary school	90	30	120(34.58)
	College and above	11	24	35(10.1)
Marital status	Married	150	68	218(62.82)
	Separated	11	11	22(6.34)
	Divorced	14	5	19(5.47)
	Never Married	51	37	88(25.36)
Type of workers working in informal workers	Street Venders	59	24	83(23.91)
	Waiter	22	18	40(11.52)
	Artisans	26	23	49(14.12)
	Private business	25	26	51(14.69)
	House servant	16	4	20(5.76)
	Daily laborer	69	5	74(21.32)
	Construction workers	9	21	30(8.64)
Family size	Live alone	42	28	70(20.17)
	2-4	162	78	240(69.16)
	>4	22	15	37(10.66)

4.2. Food insecurity and dietary diversity of workers in informal sectors during COVID-19 pandemics

Food security of the study participants were assessed using multiple method. One of the methods used to assess the food security status of the study participants was household food insecurity access scale. The study revealed that 16.1% of participants were food secure, while 83.9% were found to be food insecure. Among food insecure participants about 22.3% 56.4% and 21.3% were mildly, moderately, and severely food insecure, respectively. Of the total study participants, about half of the respondents (164 (47.3%)) were moderately food insecure while mildly food insecure and severely food insecure were 65 (18.7%) and 62 (17.9%), respectively (Figure 4.1).

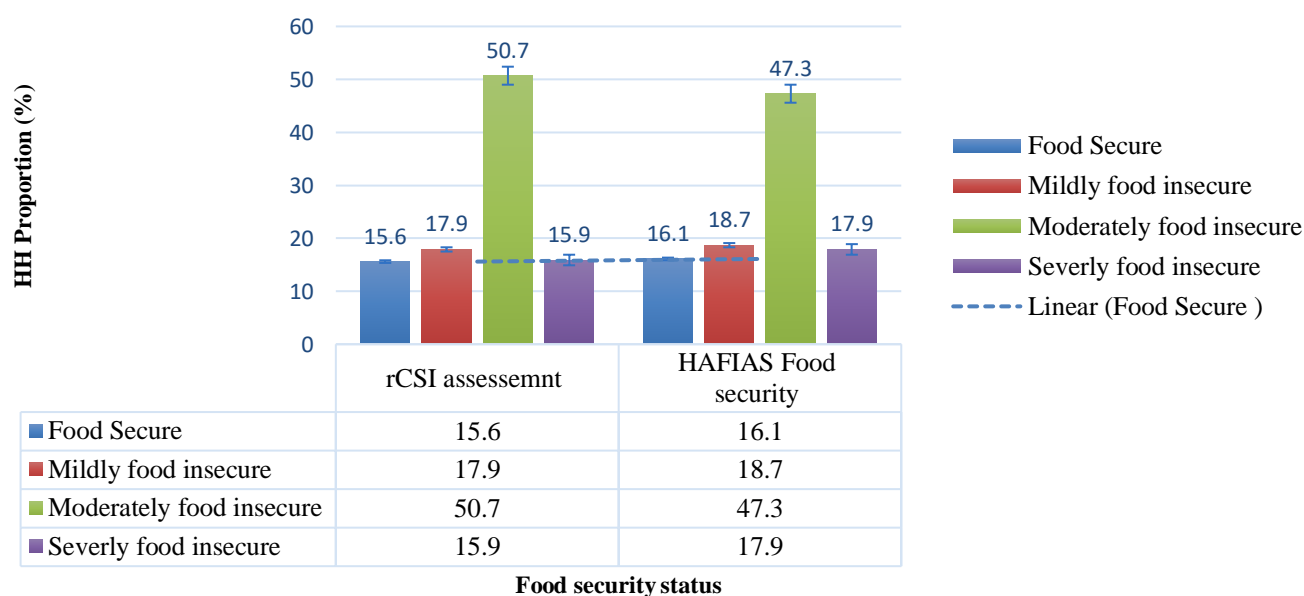


Figure 4.1: Food security status of workers in informal sectors of Addis Ababa (n=347)

In order to triangulate the quantitative finding, the qualitative analysis was done using in depth interview as discussed in the method section. A total of 13 in depth interview was done and thematic saturation was reached. Five sub-team including the extent of COVID-19 effects on workers in informal sectors livelihood and food insecurity, the effect of the pandemic on food availability and accessibility, food consumption pattern changes, and food insecurity coping strategy were used in the qualitative study.

Majority of the workers in informal sectors participated in the interview believe that COVID-19 affects the work of the workers in informal sectors. The respondents stated that the livelihood of the workers in informal sectors was mainly affected due to the COVID-19 prevention protocol. The COVID-19

prevention protocol affects the food security of the workers in informal sectors. This is shared by most of the study participants. The extent to which the food security of the informal worker affected varied among the respondents.

“It is a long time since I lost my work. Basically, the problem is due to the COVID-19. The production inputs are not available like previously. The poor/workers in informal sectors are more affected. Contractors and rich person afraid of the virus and they stay at home. They hold their money.there is no work...feeding myself become difficult... there is few construction work and people like me are engaged according to their relativeness to each other.....” (A 27-year-old contraction worker)

“Our work is our everything.... unless we work, we can't feed ourselves. Especially during early reported time of COVID-19, the prevention protocols severely affected street vendors. For us [workers in informal sectors] everything linked to our food...” (A 23-year-old street vender)

The coping strategy of the study participants were assessed using reduced coping strategic index (rCSI). The coping strategy was categorized into different food security or insecurity level similar to the HFIAS. In this method the proportion of respondents who were food secured and severely food insecure were almost the same 15.6% and 15.9%, respectively. Half of the study participants were moderately food insecure while 17.9% of the participants were mildly food insecure (Figure 4.1).

The food insecurity in our study was assessed by using household food insecurity access scale (HFIAS) as stated in method section of this thesis. Only 16.1% [95% CI (12.3% - 20%)] of the study participants were food secured while 18.7%, 47.3%, and 17.9% were mildly moderately, and severely food insecure, respectively. The level of severely food insecurity is higher in study conducted in Jordan which accounts 23.1% of the participants. The level of moderately food insecure participants was lower in Jordan's study (36.1%). On the other hand, the proportion of food secured participants in Jordan were higher (40.7%) than our study (Elsahoryi *et al.*, 2020). In the other study conducted in Nigeria, the level of severely food insecure participants were much higher (58%) than our study while the number of food secure participants were almost in line with each other (Ibukun and Adebayo 2021). In previous study conducted in Addis Ababa reported food consumption and household dietary diversity are largely unchanged or slightly increased by August 2020 (Abate, 2020). The observed difference may be due to the difference in the study participants occupational status. Our study was conducted on informal sectors

workers. Study in Jordans were conducted mainly on employed participants. The income level of participants and severity of the disease may vary in the study areas.

Table 4.2: Frequency of reduced coping strategy index question

Household Coping Strategies	Frequency	Percent
Relied on less preferred less expensive food	263	75.8
Borrowed food or relied on help from friends or relatives	97	27.9
Reduced the number of meals eaten per day	267	76.9
Reduced portion size of meals at meals time	273	78.7
Restrict consumption by adults in order for young children to eat	95	27.4

The coping strategy of the five universal accepted questions frequency were assessed. Reduced portion size of meals at meals time (78.7%), reduced the number of meals eaten per day (75.8%), and relied on less preferred less expensive food (75.8%) were the most frequent coping strategy while borrowed food or relied on help from friends or relatives (27.9%) and restrict consumption by adults in order for young children to eat (27.4%) (**Table 4.2**).

The workers in informal sectors were also asked for their coping strategy for the food insecurity they faced during the pandemics. The response of the workers in informal sectors varied. Reducing the consumption pattern, skipping meal pattern, sale some materials from home, and borrow from friend were the most common stated strategy. A 28-year-old single male working in construction site said that

“I sold my mobile phone to feed myself and currently I have only few moneys in pocket just for transportation... in case if somebody called me for work... as a coping strategy, I move a distance from my living home to forget everything and I skip the common meal pattern most of the time.... Previously I was carpenter, but now if I got work, I can work as a day laborer to feed myself”

In our study, coping stratrgy of informal worker was assessed using reduced coping stratagic index (rCSI). The rCSI was categorized into 4 different categories according to Maxwell *et al* (2014). In this method, the proportion of respondents who were food secured and severely food insecure were almost the same 15.6% and 15.9%, respectively. Half of the study participants were moderately food insecure. In our study reduced portion size of meals at meals time, reduced the number of meals eaten per day, and relied on less preferred less expensive food were the most frequent coping strategy. Similar to our

study, study conducted in Pakistan the most common coping strategy was dietary change (97%). But unlike our study, increase in short-term household food availability (79.6%), and decrease in the number of people to feed (85.6%) were also the most common coping strategy in the Pakistan’s study (Shahzad *et al.*, 2021). In study conducted in Uttar Pradesh, India borrowing money to buy food was one of the coping strategy (Nguyen *et al.*, 2021). But this is less frequent in our study.

The household dietary diversity of the study participants was assessed using 12 different food items in 24 hours period. The overall mean HDDS of workers in informal sectors was 4 ± 1 . The dietary diversity was categorized in to two groups good HDDS (if consumed 5 and more food groups) and poor HDDS (if consumed less than 5 food groups) based on the number of food group consumed. Two hundred and fourteen (61.7%) [95%CI: (56.6 – 66.8)] of the study participants were in poor dietary diversity status (Figure 4.2).

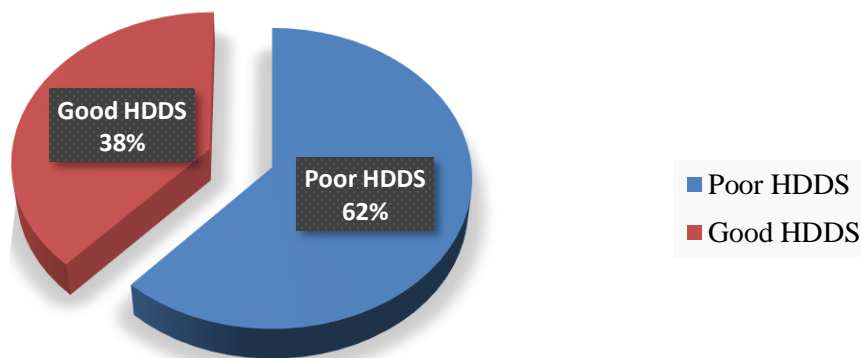


Figure 4.2: Household dietary diversity of the workers in informal sectors of Addis Ababa (n=347)

Majority of the study participants agree that COVID-19 affected food consumption pattern of the people. They also agree that economic impact of the pandemics has effect on every individual. According to the response of the study participants, food accessibility is change, food price is also elevated unexpectedly and this problem is still affecting the food security of the informal worker. They stated that the feeding patter was changed and, in some respondents, they experience behavioral change in food consumption pattern. A 36-year-old married female study participant stated as follow:

“I am a mother of three children, my husband is also working informal work similar to me. Before the current disease outbreak [COVID-19], both of us work and feed our children like other

family. Even though the our life was not the same to formal workers who get their salary monthly from government, we didn't that much blame our God..... but when the current disease [COVID-19] come to us we understand how much our life is vulnerable. For people working in formal sector the problem may not be well understood....but for us things were very hard.... I think this disease is 'curse'the food price elevated and it will not return to its original price, but our income is reduced and we will not afford to buy food”

In this study, the household dietary diversity score (HDDS) of the workers in informal sectors were assessed using the tool stated in Food and Nutrition Technical Assistant (FANTA) HDDS guide (Anne and Paula, 2006). The 12 food items were used whether the study participants consume in the 24 hours during the data collection period. The interpretation of the finding was done following Woldemariam *et al* (2015). Then the dietary diversity was categorized in to good HDDS and poor HDDS. About 61.7% [95%CI: (56.6 – 66.8)] of the study participants were in poor dietary diversity status. In our study, poor dietary diversity was those individuals who consumed less than five different food group in 24 hours. The observed low dietary diversity among the workers in informal sectors may be associated with the impact of COVID-19 on the socio-economic status of the workers in informal sectors.

The overall mean of the HDDS in our study was also low as compared to other study. In our study the overall mean HDDS of workers in informal sectors was 4 ± 1 . This finding is lower than study conducted in China that counts 9.7 ± 2.1 (Zhao *et al.*, 2020). The observed difference may be due to difference in the study participants. In our study we only included workers in informal sectors while the study conducted in China was in general population. In addition to this, there is cultural diversity and socio-economic status difference between the two population.

In our study associated factors were identified using bivariate logistic regression after dichotomizing in to poor HDDS and good HDDS. Sex, age, month income, distance from work place moderate distance and far distance related economic crisis and the pandemic prevention protocol were significantly associated with poor dietary diversity of the workers in informal sectors. Similar to our study, study conducted in China showed that age, and income was significantly associated with lower HDDS (Zhao *et al.*, 2020).

4.3. Effect of COVID-19 pandemic on socio-economic status of workers in informal sectors of Addis Ababa city

According to the study participants about 91% of the study participants reported that COVID-19 cause economic crises to the livelihood. The health impact of the COVID-19 was also observed in 11 (3.2%) of study participants. Majority (70.3%) of the study participants believe that the pandemic cause food shortage and about two-fifth of the study participant experienced behavioral change due to the pandemic. Two-third of the study participants reported that COVID-19 caused food access inequality. COVID-19 pandemic affects the social protection of the study participant. About 68% of the study participants conveyed that COVID-19 prevention affects informal work while half of the study participants were believed as COVID-19 prevention protocol such as social distancing affect food security (**Table 4.3**).

Table 4.3. Effect of COVID-19 on socio-economic status of the workers in informal sectors

Variables	Frequency (n=347)	Percentage (%)
Economic crises	315	90.8
Health impact	336	96.8
Food Shortage	244	70.3
Change in eating pattern	140	40.3
Household food security affected	302	87.0
Cause food access inequality	234	67.4
Affect social protection	273	78.7
COVID-19 prevention affects informal work	237	68.3
Social distancing affect Food security	174	49.9

The impact of the COVID-19 on food security is varies among the workers in informal sectors. Some of the workers in informal sectors were severely affected. It may depend on the type of informal work. A 30-year-old mother of two children working as house servant explain the impact of COVID-19 as follow:

“I am a mother of two children. I am separated from my husband and I feed my children by washing clothes for others. Before the pandemics I work in three different household and I got enough money and food to feed my children. But when the current disease [COVID-19] comes all the household prohibit me to go to their home....because, they fear of the disease transmission. The money I have at hand finished in few days.....I suffered a lot to feed my children.... Only God knows how I reach today.... but currently people are not frustrated like in the beginning”

On the other hand, very few of the respondent believe that COVID-19 has a minor impact on their life. Even though they belief the inflation of some food price, they didn’t associate it with the pandemic. A 50-year-old male respondent who live on private business say that

“COVID-19 is not new disease. Previously there was a common cold, the current one is also common cold. It has no significant effect on my life. Even though there is inflation in the food price, it is not associated with the disease. The inflation is manmade. The problem is also not as stated on media.”

4.4. Perception on COVID-19 effect on food security

The study participants have different perception on impact of COVID-19 on food security. Majority of the study participants believe that COVID-19 cause fluctuation in food price. On the other hand, only 7% of the respondent disagree with the idea that say uneven food price is as a result of the pandemics. Similarly, majority of the participants believe that the COVID-19 affect the food access and it disturbed food supply chain. The large proportion of the respondents also believe as food availability is affected by the pandemics including the food production pattern. About two-third (64.2%) of the study participants stated that COVID-19 results in difficult in feeding household. The study participants agree that food preference of the household and the amount of food needed by the household is reduced during COVID-19 pandemics. Nearly two-third of the study participants feels discomfort to feed out of their home (**Table 4.4**).

Table 4.4. Workers in informal sectors perception on COVID-19 effect on food security (n=347)

Perceived impact of COVID-19	Disagree n(%)	Neutral n(%)	Agree n(%)
Affect food production pattern	55 (15.9%)	91 (26.2%)	201 (57.9%)

Disturb food supply chain	44 (12.7%)	120 (34.6%)	183 (52.7%)
Alter food availability	26 (7.5%)	136 (39.2%)	185 (53.3%)
Limit food aids	10 (2.9%)	161 (46.4%)	176 (50.7%)
Affects food access	56 (16.1%)	79 (22.8%)	212 (61.1%)
Cause discomfort to feed out of home	66 (19%)	66 (19.0%)	215 (62%)
Cause fluctuation of food item price	24(6.9%)	21 (6.1%)	302 (87%)
Limit food preferences	70 (20.1%)	46 (13.3%)	231 (66.6)
Affected the amount of food needed	34 (9.8%)	94 (27.1%)	219 (63.1%)
Results in difficult in feeding household	65 (18.7%)	59 (17.0%)	223 (64.2%)

4.5. Factors Associated with Food Insecurity Situations

4.5.1. Factors associated with household dietary diversity of workers in informal sectors of Addis Ababa

Factors associated with food insecurity of the Addis Ababa city workers in informal sectors were identified using bivariate logistic regression analysis. For each food security assessment technique, a separated model was prepared to identify the associated factors. The household dietary diversity was dichotomized into poor HDDS and good HDDS based on the food group that household consumed with in the 24 hours during the data collection as stated in method section. In univariable analysis sex of respondents, age of respondents, monthly income, family size, distance from the work place, chronic disease, economic crisis and COVID-19 prevention effect on work were entered in to multivariable analysis. Male workers in informal sectors were about three times at risk for the poor dietary diversity as compared to female workers in informal sectors were [AOR= 3.22, 95%CI: (1.7 – 5.9)]. This may be due to male workers in informal sectors spend much of their time in outdoor activities than female. Workers in informal sectors with age range between 26-35-year-old were about 74% less likely encountered poor dietary diversity as compared to those in age group above 45-year-old [AOR= 0.26, 95%CI: (0.1 – 0.8)]. Similarly, workers in informal sectors with age range between 36-45-year-old were about 88% less likely encountered poor dietary diversity as compared to those in age group above 45-year-old [AOR= 0.22, 95%CI: (0.1 – 0.8)]. Workers in informal sectors who earn monthly income \leq 3000 ETB were about 92% more likely experienced poor dietary diversity as compared to those who earn $>$ 5000 ETB [AOR= 0.08, 95%CI: (0.03 – 0.2)] and workers in informal sectors who earn monthly income of 3001-5000 ETB were about 62% more likely encountered poor dietary diversity than those

who earn >5000 ETB [AOR= 0.38, 95%CI: (0.2 – 0.9)]. Workers in informal sectors who move a 3 - 10Km distance for work were about 64% more likely face poor dietary diversity than who move less than 3Km [AOR= 0.36, 95%CI: (0.2 – 0.7)] and workers in informal sectors who moved more than 10Km distance were about 85% less likely good dietary diversity than who move less than 3Km [AOR= 0.15, 95%CI: (0.05 – 0.5)]. Workers in informal sectors who responded as they encounter COVID-19 related economic crisis were about nine time more likely face poor dietary diversity than their counter part [AOR= 9.13, 95%CI: (2.9 – 29.0)]. Workers in informal sectors who responded as the pandemic prevention protocol affected their work were about three times more encountered poor dietary diversity than their counter part [AOR= 3.13, 95%CI: (1.7 – 5.7)] (Table 4.5).

Table 4.5. Factors affecting dietary diversity of the workers in informal sectors of Addis Ababa.

Variables	Categories	Poor HDD	Good HDD	COR (95%CI)	AOR (95%CI)	P-value
Sex	Male	119	98	2.23 (1.4 – 3.6)	3.22 (1.7 – 5.9)	<0.001*
	Female	95	35	1	1	
Age	≤ 25	72	44	0.45 (0.2 – 1.2)	0.36 (0.1 – 1.2)	0.085
	26-35	100	54	0.41 (0.2 – 1.0)	0.26 (0.1 – 0.8)	0.022*
	36-45	33	23	0.52 (0.2 – 1.4)	0.22 (0.1 – 0.8)	0.016*
	≥ 46	9	12	1	1	
Month Income	≤3000	120	45	0.14 (0.1 – 0.3)	0.08 (0.03 – 0.2)	<0.001*
	3001-5000	84	61	0.27 (0.1 – 0.6)	0.38 (0.2 – 0.9)	0.038 *
	>5000	10	27	1	1	
Family Size	Live alone	35	35	1	1	
	2-4	162	78	0.48 (0.3 – 0.8)	0.6 (0.3 – 1.4)	0.220
	>4	17	20	1.17 (0.5 – 2.6)	1.49 (0.5 – 4.2)	0.441
Distance from work place	< 3Km	103	83	1	1	
	3 – 10Km	93	44	0.59 (0.4 – 0.9)	0.36 (0.2 – 0.7)	0.001*

	>10Km	18	6	0.41 (0.2 – 1.1)	0.15 (0.05 – 0.5)	0.002*
Chronic Disease	Yes	26	6	2.9 (1.2 – 7.3)		
	No	188	127	1		
COVID-19 related economic crisis	Yes	207	108	6.84 (2.9 – 16.3)	9.13 (2.9 – 29.0)	<0.001*
	No	7	25	1		
COVID-19 Prevention effect on work	Yes	161	76	2.27 (1.4 – 3.6)	3.13 (1.7 – 5.7)	<0.001*
	No	53	57	1		

Where; COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; CL: Confidence Interval; *: Significant association

4.5.2. Factors associated with household food insecurity (HFIAS) among workers in informal sectors of Addis Ababa

Household food insecurity access scale (HFIAS) was used to assess food insecurity and classified in to 4 Likert scale as presented in method section of this thesis. To assess factor associated with the food insecurity the four category was dichotomized in to food secure and mild food insecure in one category and moderately and severely food insecure in the other category. A separate model was developed to identify factors associated with food insecurity of workers in informal sectors working in Addis Ababa city. To identify factors associated with food insecurity during COVID-19 among the workers in informal sectors age of respondent, monthly income, educational status, presence of chronic illness, COVID -19 related economic crisis, effect on social protection and COVID-19 prevention protocol effect on the informal work were became eligible as per the method stated in method section. Workers in informal sectors with age ≤ 25 -year-old were about 62% less likely food secure than those with age ≥ 36 -year-old [AOR= 0.38, 95%CI: (0.2 – 0.8)]. Similarly, workers in informal sectors between age 26-35-year-old were about 52% less likely food secure than those with age ≥ 36 -year-old [AOR= 0.48, 95%CI: (0.2 – 0.9)]. Workers in informal sectors who earn monthly income ≤ 3000 were about 24 times more likely faced food insecure as compared to those who earn >5000 ETB [AOR= 24.41, 95%CI: (8.2 – 72.7)] and workers in informal sectors who earn monthly income between 3001-5000 were about five times more likely faced food insecure as compared to those who earn >5000 ETB [AOR= 13.9, 95%CI:

(4.8 – 40.6)]. Workers in informal sectors who responded as they encounter COVID-19 related economic crisis were about 20% less likely food secure than their counter part [AOR= 0.8, 95%CI: (0.02 – 0.2)]. Workers in informal sectors who responded as they lack of social protection due to COVID-19 were about 3.66 times more likely food insecure than their counter part [AOR= 3.66, 95%CI: (1.9 – 6.9)]. Workers in informal sectors who responded as the COVID-19 pandemic prevention protocol affected their work were about 46% less food secure than their counter part [AOR= 0.54, 95%CI: (0.3 – 0.9)] (Table 4.6).

Table 4.6. Factors associated with food insecurity of workers in informal sectors working in different sectors of Addis Ababa

Variables	Categories	Moderately and severely FIS	FS & Mild FIS	COR (95%CI)	AOR (95%CI)	P-value
Age	≤ 25	76	40	0.71 (0.4 – 1.3)	0.38 (0.2 – 0.8)	0.018*
	26-35	94	60	0.58 (0.3 – 1.1)	0.43 (0.2 – 0.9)	0.026*
	≥36	56	21	1	1	
Month Income	≤3000	122	43	18.19 (6.6 – 496)	24.41 (8.2–72.7)	<0.001*
	3001-5000	99	46	13.77 (5.0 – 37.6)	13.91 (4.8–40.6)	<0.001*
	>5000	5	32	1	1	
Education	Illiterate	22	14	3.43 (1.3 – 9.1)		
	Primary school	103	53	4.24 (1.9 – 9.3)		
	Secondary school	90	30	6.54 (2.9 – 14.9)		
	College and above	11	24	1		
Chronic Disease	Yes	25	7	0.49 (0.2 – 1.2)		
	No	201	114	1		
COVID-19 related economic crisis	Yes	221	94	0.08 (0.03 – 0.2)	0.08 (0.02 – 0.2)	<0.001*
	No	5	27	1	1	
Social protection	Yes	192	81	1		
	No	34	40	2.78 (1.6 – 7.7)	3.66 (1.9 – 6.9)	<0.001*
	No			1	1	

COVID-19 Prevention effect on work	Yes	170	67	0.41 (0.2 – 0.6)	0.54 (0.3 – 0.9)	0.040*
	No	56	54	1	1	

Where; COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; CL: Confidence Interval; *: Significant association

4.5.3. Factors associated with reduced coping strategy index among workers in informal sectors of Addis Ababa

The coping strategy of the workers in informal sectors was assessed using reduced coping strategic index (rCSI). In this technique universal weight was used as stated in the method section of this thesis. The four Likert scale category of the rCSI was dichotomized for the purpose of identifying the associated factor. Among the independent variables, monthly income of the respondents, educational status, marital status, and COVID-19 prevention effect on informal work were became eligible for multivariable analysis as per the criteria stated in method section. Workers in informal sectors who earn monthly income ≤ 3000 were about five times more likely faced food insecure in terms of coping stratagem as compared to those who earn >5000 ETB [AOR= 5.3, 95%CI: (2.3 – 12.1)]. Similarly, workers in informal sectors who earn monthly income between 3001-5000 ETB were about four times more likely faced food insecure in terms of coping stratagem as compared to those who earn >5000 ETB [AOR= 4.24, 95%CI: (1.8 – 9.8)]. Married workers in informal sectors were about three times more likely food insecure in terms of coping strategy than never married workers [AOR= 3.26, 95%CI: (1.2 – 9.2)]. Separated workers in informal sectors were nearly four times more likely food insecure in terms of coping strategy than never married workers [AOR= 3.79, 95%CI: (1.6 – 8.8)] while divorced workers were about seven times more likely food insecure in terms of coping strategy than never married workers [AOR= 7.3, 95%CI: (3.0 – 17.9)] (**Table 4.7**).

Table 4.7. Factors associated with coping strategy of workers in informal sectors working in different sectors of Addis Ababa

Variables	Categories	Moderately and severely FIS	FS & Mild FIS	COR (95%CI)	AOR (95%CI)	P-value
	≤ 3000	121	44	6.5 (2.9 – 14.2)	5.3 (2.3 – 12.1)	$<0.001^*$

Month Income	3001-5000	99	46	5.08 (2.3 – 11.2)	4.24 (1.8 – 9.8)	0.001*
	>5000	11	26	1	1	
Education	Illiterate	23	13	4.42 (1.6 – 12.0)		
	Primary school	103	53	4.86 (2.2 – 10.8)		
	Secondary school	95	25	9.5 (4.0 – 22.3)		
	College and above	10	25	1		
Marital status	Married	153	65	1.48 (0.9 – 2.5)	3.26 (1.2 – 9.2)	0.025*
	Separated	11	11	0.63 (0.2 – 1.6)	3.79 (1.6 – 8.8)	0.002*
	Divorced	13	6	1.36 (0.8 – 3.9)	7.3 (3.0 – 17.9)	<0.001*
	Never Married	54	34	1	1	
COVID-19 Prevention effect on work	Yes	166	71	0.62 (0.4 – 0.9)	0.61 (0.4 – 1.0)	0.054
	No	65	45	1	1	

Where; COR: Crude Odds Ratio; AOR: Adjusted Odds Ratio; CL: Confidence Interval; *: Significant association

Factors associated with food insecurity was also identified in our study. Age, monthly income, COVID-19 related economic crisis, lack of social protection due to COVID-19 and COVID-19 prevention effect on the informal work were significantly associated with the food insecurity of workers in informal sectors. Similar findings were observed in study conducted in Jordan. Monthly income per capita below the poverty line was significantly associated with food insecurity (Elsahoryi *et al.*, 2020). In the other study conducted in Pakistan, households with a large family size were more food insecurity during the COVID-19 pandemic (Shahzad *et al.*, 2021).

The workers in informal sectors perception on impact of COVID-19 on their livelihood was assessed in our study. The study participants agree that the pandemic affected from food production to consumption. They believe that food availability, access, and utilization is affected by the pandemic. The effect of COVID-19 pandemic on livelihood of workers in informal sectors of Addis Ababa city was also assessed in our study. Majority of the participants agree that the pandemic cause economic crises. Two-third of the study participants reported that COVID-19 caused food access inequality. This impact cause food

shortage that directly cause food insecurity. COVID-19 pandemic also affects the social protection of the study participant. The economic effect of the pandemic is across countries and communities in all nation. The COVID-19 prevention protocol and social distancing measures is recommended to decrease the spread of the virus but this caused a production slowdown and a reduction in consumption. In developing countries lives and livelihood of millions of people are heavily affected. This impact is intensified in workers in informal sectors who depend on the daily income. This is also supported by FAO of the united nation on a press released on impact of COVID-19 on workers in informal sectors (FAO, 2020g).

The qualitative study and the workers in informal sectors perception on COVID-19 effect on food security supported the other finding in our study. Behavioral change was observed during coping with the food insecurity. Most of the respondent agreed that the COVID-19 has significant effect on their livelihood and food security. The COVID-19 prevention protocol has effect on the food security of the workers in informal sectors. This is shared by most of the study participants. In general, impact of the pandemic on food security varies among the workers in informal sectors; some of the workers in informal sectors were severely affected while the other even didn't realize its effect.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.1. Conclusion

The aim of this study was to assess the COVID-19 pandemic impact on food security and their food coping strategy of informal workers in Addis Ababa city, Ethiopia. The study gives valuable information that help to maintain the food security status of people during this time. Food insecurity during COVID-19 was high among Addis Ababa city workers in informal sectors. Food security status using HFIAS revealed that 16.1% of participants were food secure, while 83.9% were found to be food insecure. Among food insecure participants about 22.3% 56.4% and 21.3% were mildly, moderately, and severely food insecure respectively. In the HDDS assessment, three fifth of the study participants were in poor dietary diversity status. Food security status using coping strategic index also showed food secured and severely food insecure were almost the same which account nearly fifteen presents. Half of the study participants were moderately food insecure. Poor dietary diversity was observed among the workers in informal sectors. The common coping strategy among the workers in informal sectors during COVID-19 were reduced portion size of meals at meals time, reduced the number of meals eaten per day, and relied on less preferred less expensive food. Socio-economic and demographic characteristics, and COVID-19 prevention protocols were associated with food insecurity, dietary diversity, and coping strategic index. It seems clear that the COVID-19 pandemic is a clear danger to informal selectors' food security situation and coping response. We argue that different concerned stockholders concentrated effort is required to address the impact of the COVID-19 pandemic on the informal sectors' food insecurity problem. The COVID-19 prevention protocol has effect on the food security of the workers in informal sectors. Impact of the pandemic on food security varies among the workers in informal sectors; some of the workers in informal sectors. Urban policy may need to give due consideration to informal sector employment in order to address food insecurity problem.

5.2. Recommendation

The following are a number of recommendations for different concerned stockholders to minimize the observed problem in our study.

For National Disaster Reduction Management Commission

- By considering the severity level of the food insecurity providing cash grants and food distribution for vulnerable groups, and temporary employment schemes for workers in informal sectors is very important in collaboration with other governmental sectors.

For non-governmental organizations

- Concerned NGOs need to work with government to support the design of policy measures that address the needs of workers in informal sectors as part of the COVID-19 response.

For Addis Ababa city administrations

- Provide temporary compensation in the form of in-kind food to workers in informal sectors who are not able to work.
- The city administration needs to introduce and expand job opportunity for workers in informal sectors and enhance access to affordable price foods for workers in informal sectors.

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Annex

Information Sheet

My name is _____. I am here to collect information from you.

Title of the research Project: Food Insecurity and Coping Strategies During COVID-19 Pandemic and associated factors among Workers in informal sectors in Addis Ababa, Ethiopia

Principal Investigator: **Mr. Gemechu Ameya**

Advisor: **Desalegn Yayeh (Ph. D)**

Name of the organization: Addis Ababa University

Introduction

My name is Gemechu Ameya and I am a student at Addis Ababa University. I am doing a research on food security and coping strategy during COVID-19 as a part of my study course. I am going to give you information and invite you to be part of this research. Before you decide to be part of this research you can talk to me if there is anything you are not comfortable with about the research. If there is any word that you don't understand while I am giving the information, please stop me and ask me, I will explain to you.

Purpose of the Research

The aim of this study is to assess the COVID-19 pandemic impact on food security and their food coping strategy of workers in informal sectors in Addis Ababa city, Ethiopia. This study has a number of benefits for people at risk especially informal worker or for policy maker for implementation activities. The study gives valuable information that help to maintain the food security status of people during this time.

Voluntary participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive as any member of this community

will continue and nothing will change. If you choose not to participate in this research, you will not be affected. You may change your mind later and stop participating even if you agreed earlier.

Confidentiality

The information that is collected for this research was kept confidential. It was stored in a file using codes, without your name. And it is not being exposed to anyone. In addition, it is being used only for this particular research but no other purposes.

Benefits

Your participation in this research may not directly provide you a certain benefit as an individual. But it helps us in assessing food security and coping strategy during COVID-19.

Risks and Side effects

There are no side effects and known risks related with this kind of research so far. The only discomfort you might feel was giving us your precious time for interview which is about 20 minutes.

Who to contact?

This is research reviewed and approved by Addis Ababa University Institutional Ethical Review Committee. If you wish to ask questions now or later you can use the contact addresses below.

1. Mr. Gemechu Ameya: E-mail: gemechuameya@gmail.com
Mobile: 0917837681

Informed consent

Greeting:

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive as any member of this community will continue and nothing was changed. Any information you give was kept confidential. Your participation in this research may not directly provide you a certain benefit as an individual. There are no side effects and known risks related with this kind of research so far and it takes only about 20 minutes of participation.

Up to now you have been given all information that I feel you should know regarding this study that you are being asked to participate in. I think you have understood the issues in detail. Thank you for your cooperation and listening!!!

Are you willing to participate?

Yes continue

No (stop the interview)

Name of Data collector _____ date collected-----Signature ____

Quantitative data collection tool

Part I. Socio-demographic characteristics of study participants

S.N	Question	Response	Remark
101	Age	-----years	
102	Sex	1. Male 2. Female	
103	Educational status	1. Unable to read or write 2. Primary school 3. Secondary school 4. College and above	
104	Type of informal sectors you are working	1. Street vendors 2. Waiter 3. Artisans 4. Private business 5. House servant 6. Daily labourer 7. Others(specify)_____	
105	Current marital status	1. Married 2. Separate 3. Divorced 4. Never married	If, not married skip to 108
106	Husband/wife educational status	1. Unable to read or write 2. Primary school 3. Secondary school 4. College and above	
107	Husband's/wife's working sector	1. Formal sector 2. Informal sector 3. Job-less	
108	Your household family size	-----	

109	Monthly income	-----	
110	How far is your work place from your living place?	-----Km	
111	Do you have any chronic diseases	1. Yes 2. No	
112	Body Mass- Index (BMI)	-----Kg/m ²	

Part II. Structural context of the study participants

201	Did you encounter economic crisis during COVID-19?	1. Yes 2. No	If No skip the next question
202	If yes to question No. 201, what type of economic crisis you had encountered?	1. Losing job 2. Asset depletion 3. Take unusual credit 4. Start begging	
203	Did you or your household members ever sick due to confirmed COVID-19 case?	1. Yes 2. No	
203	Did you encounter any health care problem due to COVID-19 pandemics?	1. Yes 2. No	
204	Did you encounter shortage of food during COVID-19?	1. Yes 2. No	
205	Did you demand for food aid due to COVID-19?	1. Yes 2. No	
206	Did you or any of your household member experienced food utilization related behavioural change	1. Yes 2. No	
207	If your response is 'yes' for the above question specify the behavioural change	----- ----- -----	

Part III. COVID-19 prevention protocols and regulation related factors

301	Did you and/or your household food security status was affected due to COVID-19 lockdown policy	1. Yes 2. No	If No skip the next question
-----	---	-----------------	------------------------------

302	If your response is 'Yes' for the above question, how do you rate the effect	<ol style="list-style-type: none"> 1. Very low 2. Low 3. Neutral 4. High 5. Very high 	
303	Did you experience food access inequality during during COVID-19	<ol style="list-style-type: none"> 1. Yes 2. No 	If No skip the next question
304	If your response is 'Yes' for the above question, how do you rate the inequality	<ol style="list-style-type: none"> 1. Very low 2. Low 3. Neutral 4. High 5. Very high 	
305	Did the social protection was affected in your area during COVID-19	<ol style="list-style-type: none"> 1. Yes 2. No 	If No skip the next question
306	If your response is 'Yes' for the above question, did this affect your food security status	<ol style="list-style-type: none"> 1. Yes 2. No 	
307	Do you think that COVID-19 prevention protocol affect work in informal sector	<ol style="list-style-type: none"> 1. Yes 2. No 	If No skip the next question
308	If your response is 'Yes' for the above question, how do you rate the effect	<ol style="list-style-type: none"> 1. Very low 2. Low 3. Neutral 4. High 5. Very high 	
309	Did the social distance protocol affected your food security status	<ol style="list-style-type: none"> 1. Yes 2. No 	If No skip the next question
310	If your response is 'Yes' for the above question, how do you rate the effect	<ol style="list-style-type: none"> 1. Very low 2. Low 3. Neutral 4. High 5. Very high 	

Part IV Workers in informal sectors perception on COVID-19 effect on food security

Rate the following question accordingly (1 = Strongly disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree)

S.No.		1 = Strongly disagree	2 = Disagree	3 = Neutral	4 = Agree	5 = Strongly Agree
401	During COVID-19 there was uneven food price					
402	During COVID-19 there was lack of market to access food					
403	During COVID-19 there was limited food Aids					
404	During COVID-19 food supply chains disrupted					
405	During COVID-19 food environments were altered					
406	During COVID-19 Food production pattern was changed					
407	During COVID-19 feeding your household be came difficult					
408	During COVID-19 there is shortage of kind of food preferred by family					
409	During COVID-19 can not find amount or kind of food for your household					

410	During COVID-19 you feel discomfort to eat food out of home					
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Questionnaire for Qualitative study

S.No.	Questions	Prob
01	As you think to what extent the COVID-19 affected the life of workers in informal sectors during the pandemics	<ul style="list-style-type: none"> • Does the livelihood of the workers in informal sectors change during COVID-19? Why and how? <ul style="list-style-type: none"> ○ Examples of expenditure categories: food (specify); fuel; household items (soap, clothes); transport fees; school fees; housing (rent) and etc
02	As you think to what extent the COVID-19 affect the food security of the informal worker of the Addis Ababa city.	<ul style="list-style-type: none"> • In a normal year, how do people obtain their food? • Does this change during COVID-19, why and how?
03	What do you think about the food availability and accessibility during COVID-19?	<ul style="list-style-type: none"> • Do you see any strong trends of market price during COVID-19? Why? • Do you think the prices will fall or rise? Why? • How is the access to market? • Have there been any changes in people selling or buying? Why?
04	As you think is their change in consumption pattern during COVID-19?	<ul style="list-style-type: none"> • Are there shortages of food in the household during COVID-19? What do people do to meet their food needs then? • Has there been any change recently in the workers in informal sectors diets during COVID-19? Why? • What do people do to avoid food shortage?
05	What were the main Coping strategy	<ul style="list-style-type: none"> • What are the short- and medium-term effects of coping strategies on people's financial and other assets? • How long do you estimate they can last with these coping strategies? • Have any other organizations been in the community to do an assessment? If so, who, when and did they provide aid?

Reduced Coping strategic index analysis tool (Source: Maxwell *et al*, (2014); and 2nd edi. Field method manual of the coping strategies index)

HOUSEHOLD COPING STRATEGIES	
During the <u>last 7 days</u> , were there days (and, if so, how many) when your household had to employ one of the following strategies (to cope with a lack of food or money to buy it)?	Frequency (number of days from 0 to 7)
1. Relied on less preferred less expensive food	_
2. Borrowed food or relied on help from friends or relatives	_
3. Reduced the number of meals eaten per day	_
4. Reduced portion size of meals at meals time	_
5. Restrict consumption by adults in order for young children to eat	_

Household Food Insecurity Access Scale (HFIAS) Measurement Tool (source: Coates J, *et al*, 2007)

No	Question	Response Options	CODE
1.	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q2) 1=Yes __
1.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) __
2.	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q3) 1=Yes __
2.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) __
3.	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q4) 1 = Yes __
3.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) __
4.	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources	0 = No (skip to Q5) 1 = Yes __




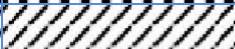





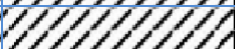




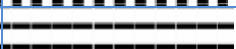



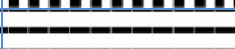
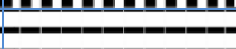






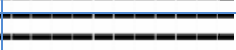
	to obtain other types of food?		
4.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) __

No	Question	Response Options	CODE
5.	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q6) 1 = Yes __
5.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) __
6.	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0 = No (skip to Q7) 1 = Yes __
6.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) __
7.	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No (skip to Q8) 1 = Yes __
7.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks) __
8.	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q9) 1 = Yes __

8.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	... _
9.	In the past four weeks, did your any household member go awhole day and night without eating anything because there was not enough food?	0 = No (questionnaire is finished) 1 = Yes	... _

No	Question	Response Options	CODE
9.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	... _

Household Food Insecurity Access Scale (HFIAS) interpretation guide (source: Coates J, *et al*, 2007).

Question	Frequency		
	Rarely	Sometimes	Often
	1	2	3
1a			
2a			
3a			
4a			
5a			
6a			
7a			
8a			
9a			



- food secure



- moderately food insecure



- mildly food insecure



- severely food insecure

Household dietary diversity scale (HDDS) analysis

The following 12 food groups are used to calculate the HDDS indicator (Source: Swindale and Bilinsky, 2006)

A.	Cereals
B.	Roots and tubers
C.	Vegetables
D.	Fruits
E.	Meat, poultry, offal
F.	Eggs
G.	Fish and seafood
H.	Pulses, legumes, nuts
I.	Milk and milk products
J.	Oil/fats
K.	Sugar/honey
L.	Miscellaneous

Each food group is assigned a score of 1 (if consumed) or 0 (if not consumed). The household score will range from 0 to 12 and is equal to the total number of food groups consumed by the household: