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FOOD INSECURITY AND MENTAL HEALTH: IMPLICATION FOR SMALLHOLDER RURAL WOMEN FARMERS IN THE EASTERN REGION OF GHANA

BY

ROBERT MATE AZU

10561076

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DECLARATION

I, Robert Mate Azu, do hereby declare that this dissertation with exception of references to other author's work which has been duly acknowledged, is a product of my hard-earned work under the supervision of Dr. Naa Dodua Dodoo and has not been previously submitted or published in part or whole elsewhere by other author(s) either for the award of a degree in this university of another nor for the recognition of a published/and an academic study.

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Robert Mate Azu
(10561076)
(STUDENT)

Dr. Naa Dodua Dodoo
(SUPERVISOR)

Date: 20th December, 2021

Date: 20th December, 2021

DEDICATION

To my family and friends for your immense support, encouragement and always reminding me that life will be better.

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ABSTRACT

The importance of food security and mental health have been duly recognized and highlighted by the SDGs as essentials to attaining development objectives. Studies have acknowledged the influence of food insecurity on mental health of vulnerable populations. However, there is a dearth of empirical data on this association amongst farmer populations. This study adds to the existing literature by examining the relationship between food insecurity and mental health on women farmers in the Eastern Region of Ghana. The study sourced data from the 2020 LinkINg Up: Women's Agripreneurship Sustainability and Scale Up Initiative. The sample size was 165. The Food Insecurity Experience Scale (FIES) and the Self-Reporting Questionnaier-20 (SRQ-20) were used to measure food insecurity and mental health respectively. Social support was used as an intermediary variable. The study found out that, 45% of the women farmers were moderately or severely food insecure ($FI_{mod+sev}$). The prevalence of mental health distress among the respondents was reported to be 57%. The results also indicate that when controlling for all other variables, being moderately or severely food insecure is a significant predictor of mental health distress. Nonetheless, in this study, social support was not a predictor of mental health distress. Based on the findings, the study recommends promoting mental health and related issues as part of public health policy and service to rural poor farmers.

Key words: food insecurity, mental health, social support, FIES, SRQ-20

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LIST OF ABBREVIATIONS

ADB	African Development Bank
ADVANCE	Agricultural Development and Value Chain Enhancement
ARS	Fifth Assessment Report
BMI	Body Mass Index
COVID	Coronavirus Disease
CIDA	Canadian International Development Agency
CMD	Common Mental Disorders
CSDH	Commission on Social Determinants of Health
DFID	Department For International Development
FAO	Food and Agriculture Organization
FASDEP	Food and Agriculture Sector Development Policy
FIES	Food Insecurity Experience Scale
FSNMS	Food Security and Nutrition Monitoring Report
GSS	Ghana Statistical Service
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IBM	International Business Machines Corporation
ICT	Information and Communication Technology
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change
JICA	Japan International Cooperation Agency
LMKD	Lower Manya Krobo District
MDG	Millennium Development Goals
METASIP	Medium Term Agriculture Sector Investment Plan
MMDA	Metropolitan, Municipal and District Assemblies
MoFA	Ministry of Food and Agriculture
MOH	Ministry of Health
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organizations
NRGP	Northern Rural Growth Programme
NRC	National Research Council
PoU	Prevalence of Undernourishment
SDG	Sustainable Development Goals
SDH	Social Determinants of Health
SPSS	Statistical Package for the Social Science
SRQ-20	Self-Reporting Questionnaire SRQ-20
SSA	Sub-Saharan Africa
UMKD	Upper Manya Krobo District
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
UN- HABITAT	United Nations Human Settlements Programme
WFP	World Food Programme
WHO	World Health Organization
YKD	Yilo Krobo District

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The purpose of this chapter is to provide an overview of the background to the thesis, including the problem statement, rationale for the study, the study objectives and research questions as well as the organization of the dissertation.

1.1 Background of the study

For hundreds of millions of people around the globe, agriculture continues to serve as a livelihood strategy to people who have some form of access to land or farm on a limited land size (Cohn et al., 2017). Inarguably, agriculture is one of the most significant sectors in the world of development that drives growth at the regional, national as well as the international levels, building economies while providing food for people (Food and Agriculture Organization FAO, 2021). This is usually the case of many developing countries that rely on agriculture with a high percentage of the population depending on the sector for their livelihood. For instance, in many parts of sub-Saharan Africa (SSA), agriculture is carried out by smallholder households living in rural areas farming on less than 2 hectares (constituting the regional poor and hungry) as a means of ensuring livelihood (Cohn et al. 2017; Fan and Rue, 2020). For these farm families, agriculture is both a means of ensuring food security and livelihood.

The significance of smallholder agriculture can be seen in its extraordinary success to Asia's Green Revolution between the 1960s and 1970s as well as its contribution to food security (Hazell, 2020). Smallholder farmers form the backbone of many rural economies in agricultural food production (Torero, 2020). Traditionally, smallholder farming in SSA is linked to food security and they consist of the largest share of farms, estimated to produce around half of total

food calories in the region (Frelat et al., 2016). However, climate change (CC), poor rural health, conflicts and more recently COVID-19, pose threats to food security affecting vulnerable populations especially in developing countries (Cohn et al., 2017; Wiebe, Robinson, and Cattaneo, 2019; Huss et al., 2021). Again, smallholder farmers in the SSA rely heavily on rain-fed agriculture which further exacerbates this population's vulnerability to food insecurity and thus puts them in the bracket of most food insecure populations (Alpízar et al., 2020). To add on to the challenges, women who contribute a significant share of the agricultural labour force are particularly the most food insecure (FAO, 2016b). These issues will continue to derail the agricultural development agenda within SSA, especially when smallholder farmers have been neglected by development policy (Fan and Rue, 2020).

According to the World Bank (2020) agriculture continues to remain essential in Ghana's economy in the last decade, making a livelihood for 34 percent of labour force and supplying around 70 percent of national food demand. The prevalence of smallholder agriculture in Ghana is no different from the rest of SSA. Characterized by reliance on rain-fed agriculture, smallholder farming is especially susceptible to climate change and variability. Around 80 percent of farmers in Ghana are smallholder families, who contribute to the total agricultural production (World Bank, 2020a). However, with erratic rainfall, high and increasing temperatures, droughts, desertification, pests and disease outbreak among many others, Ghana's agriculture is already faced with challenges and threats posed by CC (ibid). Reports from the Intergovernmental Panel on Climate Change (IPCC) (2020) revealed that West Africa is subject to increased vulnerability to CC. This makes countries in SSA's agricultural system including Ghana vulnerable to the negative impacts (direct and indirect) of climate variability and change. This is especially true for Northern Ghana which is considered a climate change "hotspot" in West Africa (Antwi-Agyei and Nyantakyi-Frimpong, 2021; IPCC, 2020; Yiran and Stringer, 2016). Predominantly, Ghana's staple crops include cassava, plantain, yam, rice,

maize, and cereals; all of which remain pivotal to ensuring food security. However, the impacts of climate variability and change mean that incidence of total crop failure as studies have shown in Upper East Region of Ghana for instance is certain to prevail (Antwi-Agyei et al., 2012). The consequence will contribute to poor agricultural production, further exacerbating the food insecurity situation in the country (World Bank, 2020).

Many studies have demonstrated that women farmers in Ghana, especially in the Northern parts of the country, are most vulnerable to climate variability and change due to; limited access to productive resources, inadequate adaptive capabilities and the unique roles performed by women (Antwi-Agyei and Nyantakyi-Frimpong, 2021; Azumah et al., 2021). Yet, rural women play an essential role throughout the entire agricultural value chain from clearing land until the food reaches the table as well as other rural economic activities. Women contribute to food security and nutrition through their responsibilities domestically at the household and in the community. Irrespective of their roles as farmers, fisher folk and foresters, rural women also play management roles in provision of water, food and fuel at the household (FAO, 2020) in addition to making economic and medicinal remedies from natural products (FAO, 2015). Within the last few decades, the share of women's participation in the agricultural labour force has substantially increased. Typically in developing countries, women account for about 43 percent of the entire agricultural labour force (FAO, 2011). Generally, women are involved in the production of both crops and livestock, and they work either as paid or unpaid labourers on their own farms or on other farms (ibid). Women have the capacity to influence rural and agricultural development, particularly in the areas of food security and nutrition.

Many definitions of food security exist today (Mc Carthy et al., 2018). However, food security has been classically defined to exist when "all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 1996). Based on this definition, the FAO identifies 4 key

dimensions of food security: food availability, food access, food utilization, and stability of the other 3 dimensions over time. Food availability deals with the supply side of food, and it entails food production and its readiness for use through storage, processing, and distribution as well as for sale and/or exchange. Food access involves physical and financial access to obtain food even in the face of fluctuating food prices. Utilization is the benefit one enjoys by consuming food, and it involves the achievement of food potential through nutritious cooking and health. Food stability focuses on the direction of continuous availability and accessibility to food without interference either socially or economically (Mbow et al., 2019). Each of these key dimensions form the basis for defining food security (Mc Carthy et al., 2018).

With the world's population at 7.7 billion in 2020 and projected to increase to 8.5 billion by 2030 and 9.7 billion by 2050 (UNDESA, 2019), there is an urgent need for sustainable ways to eradicate extreme poverty while feeding this growing population. Given these figures, the United Nations 2030 Agenda provides a sustainable means to sustain the carrying capacity of the planet presently and into the future giving rise to the 17 Sustainable Development Goals SDGs. They are designed to end poverty and hunger while ensuring that natural resources are sustainably managed (FAO, 2016). At the same time, they make use of the economic, social and the environmental spheres as closely knit dimensions of sustainable development (ibid). For example, the SDG Goal 2 is intended to "end hunger, achieve food security and improve nutrition and promote sustainable agriculture" which is an economic issue. However, to achieve this goal, the social dimensions of SDG 3.4 need to be put into perspective; reduce by one third premature deaths from non-communicable disease by prevention, treatment and promotion of mental health and well-being. The SDGs do not function in isolation as all the goals require comprehensive and participatory approaches (FAO, 2016). As such, achieving food security and ending hunger will require to some extent, empowering women, typically rural women whose source of livelihood is agriculture (Gil et al., 2019).

One way by which this can be achieved is by considering mental health of women as a public health priority as Kermode et al., (2007) show a strong inextricable linkage between women's empowerment and women's mental health. Generally, agricultural interventions have specifically been designed to empower women, improve income at the household level and reduce hunger and malnutrition, thus making a claim for improving rural health (Malapit et al., 2019). According to Kanamori et al., (2021) farmers form part of the groups known to have health issues relating to mental health, laying claims to structural factors such as economic uncertainty, long working hours, geographical and social isolation related to agriculture. Mental health issues including stress, depression and anxiety collectively regarded as psychological health problems were found to be prevalent among farmers and farm workers (Jones-Bitton et al., 2020; Daghagh-Yazd, Wheeler, and Zuo, 2019). Many studies have however reported women's distress and depressive symptoms regarding their role in agriculture. Interestingly, there is a growing consensus by many authors including (Braun, 2020) who find a close and strong association between agriculture and food security taking into consideration its multiple facets in the global economy, ecology and livelihood for people. It is against this backdrop that this study is set out to explore the more specific linkages between agriculture and food security and mental health of women farmers.

1.2 Problem statement

Currently, SSA is reported to have the highest levels of food insecurity prevalence and the situation has shot up between 2014 and 2019 (FAO, IFAD, UNICEF, WFP, 2020). This condition is expected to continue if the region is confronted with issues such as population growth, internal conflicts, climate change and variability, limited investments in agriculture and economic threats among others. More recently, the advent of COVID-19 means that the issue of food insecurity is further aggravated both globally and locally with ramifications on individual health, including mental health (Niles et al., 2020). Covid-19 pandemic continues to

exacerbate all forms of malnutrition in SSA, especially in vulnerable households through disruption of food supply chains; decrease in agricultural productivity and aggravated poverty levels (World Bank, 2020). Torero (2020) stressed on the need for countries to keep food supply chains operational during the pandemic to prevent adverse impacts on population health.

Over the last few decades, there have been significant efforts that have been made to target hunger and food insecurity on the continent. For instance, the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods together with Africa's Agenda 2063 have expressed commitment to ending hunger by 2025. However, human and economic development in Africa has been threatened with the enormous challenge posed by hunger and food insecurity (New Partnership for Africa's Development (NEPAD), 1988). Food insecurity has been shown to have negative effects on nutrition, growth, and development on people (Weaver and Hadley, 2009). These effects are more prevalent in SSA due to political instability, unsteady economic growth, and other food security-threatening factors in the region. FAO (2015) revealed that one fifth of people living in Africa were undernourished, making it the highest prevalence in the world at the time. This figure is said to be improving although Africa continues to record the highest levels of moderate or severe food insecurity in the world. The number of undernourished people in West Africa is projected to double from 59 million in 2019 to 118 million in 2030 (234 million to 411million in SSA). The situation of food insecurity in Ghana continues to escalate. According to FAO (2019) the proportion of people facing moderate or severe food insecurity increased from 13.7million in 2015 to 14.3 million in 2017. The Covid-19 pandemic will further push vulnerable populations into the poverty trap and expose millions to the triple burden of malnutrition.

Albeit there is knowledge on food insecurity and its impacts on household health particularly that of women and children, few studies have focused on the relationship between food

insecurity and mental health in rural Ghana. Piperata et al., (2017) argue that food insecurity is a critically understudied social determinant of mental health. Atuoye and Luginaah (2017) found food as an important social determinant of mental health in Upper West Region of Ghana and were the first to explore the relationship between food and mental health in Ghana. Other studies on food insecurity and mental health in Ghana have focused on specific groups such as children, pregnant women, women living with HIV/AIDS, among others. A handful of studies have focused on mental health of farmers in Ghana. However, there is little information on studies that have focused on farmers, specifically women farmers who are food insecure in Ghana. In spite of the few studies that have explored the relationship between food insecurity and diet-related challenges, the non-nutritional repercussions of food insecurity, such as its effects on mental health, are less well understood. Atuoye and Luginaah (2017) emphasized the need for the mental healthcare system in Ghana to pay attention to the broader social determinants of health especially food insecurity, gender disparities and social support.

The presence of social support as a mediating factor has also been shown to reduce the severe impacts of food insecurity and mental health distress on vulnerable populations, particularly women (Natamba et al. 2017; Tsai et al. 2012a). Nonetheless, there have been few studies that demonstrate the relationship or interaction between food insecurity and social support and how they influence mental health in Ghana (Na et al., 2019). Social Support tends to modify the association between food insecurity and mental health, typically amongst those vulnerable populations affected by food insecurity in SSA (Na et al. 2019). There are some models that propose how social support mediate this relationship although the phenomenon is not entirely understood. For instance, the main effect model predicts that social support improves health and healthy behaviors by altering how the mind perceive stress factors (i.e., food insecurity) regardless of its severity. The stress buffering model proposes that social support reduce the

negative consequence of stress factors by changing the changing the cognitive reaction of how people perceive their situation (Cohen and Wills, 1985)

The most vulnerable populations faced with the issue of food insecurity in Ghana are in rural areas with farming as their main source of livelihood. Poverty, especially in the Northern Region is another development related issue that is generally tied to these vulnerable groups. Rural women engage in most agricultural activities with limited access to resources and opportunities. Women are powerful drivers in the fight against food insecurity, especially when it comes to the fight against malnutrition and poverty. However, the situation of food insecurity has been less studied in the Eastern Region of Ghana compared to the Northern Regions. As such, information of food insecurity prevalence and its implication on mental health at the household level is important to contribute to the food security debate in the country.

Previous studies that have investigated the association between food insecurity and mental health in Africa used different data collection and assessment techniques. For instance, in rural Zambia, Cole and Tembo (2011) used panel data collected over two waves in 2009 to examine this relationship. They used a modified 7-item scale based on local coping strategies used during food shortages to assess food insecurity. In the systematic review of Jones (2017) a cross-sectional data analyzed in 2016 from the 2014 Gallup World Poll was used to investigate the association between food insecurity and mental health. In this study, mental health was analyzed using the Negative Experience Index and Positive Experience Index (0 -100 scale). In Ghana, Atuoye and Luginaah (2017) explored the association between food insecurity and mental health in the Upper West Region of Ghana (both rural and urban households). They used the household Food Insecurity Access Scale and the DUKE Health Profile to assess the relationship.

Against this backdrop, Weaver and Hadley (2009) emphasized on the importance to further investigate the relationship between food insecurity and mental health in varying contexts, specifically in Africa. To the best of the authors' knowledge, this study is the first to use the Food Insecurity Experience Scale (FIES) and the SRQ-20 to examine the association between food insecurity and mental health among rural women farmers (i.e., a different at-risk population) in the Eastern Region of Ghana where climatic and agro-ecological conditions support smallholder farming. The outcome of this study is important for both food and public health policy initiatives in specific contexts.

1.3 Rationale of the study

In rural Ghana, majority of households are accustomed to smallholder agriculture in different forms as their source of livelihood and a means of ensuring food security and livelihood. However, these farmers are plagued by many developmental challenges such as limited public sector development, dependence on rain, poor market linkages, little to no application of science and technology, and limited extension services among others (Ministry of Food and Agriculture (MoFA), 2018). The historical perspective of smallholder rural farmers has been linked to poverty (Suttie, 2019). Additionally, research has consistently found a strong association between poverty and mental health, with the former exacerbating the risk of populations suffering as a result of poor mental health (Lund et al., 2010).

However, arguments surrounding mental health issues are seldom discussed in African countries including Ghana (Sipsma et al., 2013). In fact, the topic is often almost overlooked by developmental organizations as much attention has been focused on other pressing issues such as poverty. Meanwhile, reports suggest that mental health and related issues is said to be

on the rise in Africa (Sankoh, Sevalie, and Weston, 2018). Yet, policies that target mental health as a public health service in Africa are given low priority (Gureje and Alem, 2000).

The Ministry of Food and Agriculture (MoFA, 2018) reports that over 42% of the country's labour force is working within the agricultural sector. This highlights the significance of the sector to the country. However, the two comprehensive agricultural policies; Medium Term Agriculture Sector Investment Plan (METASIP), and Food and Agriculture Sector Development Policy (FASDEP) do not include poor mental health of farmers as an important health outcome that farmers face because of their vulnerabilities to food insecurity among other challenges that exacerbate health problems.

In the last few years, research has focused attention on the issue of food insecurity and mental health in the country (Atuoye and Luginaah, 2017). This suggests that mental health is a public health concern as its implications for the well-being of individuals is as important as food insecurity. Concerns from the public and the state led to the establishment of the Ghana Mental Health Authority in 2013 through the Mental Health Bill Act 846, 2012 with objectives to provide mental health care and address related issues. As such, all prospective mental health cases are to be regarded as important and addressed appropriately through Ghana Health Service and collaborating bodies.

Other global interventions have been put in place to ensure that the mental health of populations is as important as any other public health actions which have been given priority in the past. For instance, the World Health Organization's (WHO's) "Mental Health Action Plan 2013 – 2020" was launched to raise awareness on the importance of mental health as a significant public health concern if people are to live an overall healthy life. The objectives of this initiative were to ensure (1) more effective leadership approach to mental health (2) provision of in-depth and inclusive mental health care as part of social care services in community-based

settings, (3) implementation of strategies that will promote and prevent mental health related issues and (4) strengthened information systems and evidence-based research.

It is against this backdrop that this study will contribute to existing literature and policy recommendations by using indicators of "access" to determine the relationship of food insecurity on mental health of farmers (with focus on women farmers) using a sample of Ghana's population. The findings and conclusions from this research will help all major stakeholders in the agricultural sector (i.e., government, farmers and developmental organizations including Non-Governmental Organizations, NGOs) tailor efforts needed to address mental health issues in the agricultural sector through policy implementation.

1.4 Research questions

To achieve the purpose of this study, the following research questions were examined

1) What is the situation of food insecurity prevalence of women farmers?
2) What is the prevalence of mental health distress on women farmers?
3) What is the relationship between food insecurity and mental health?
4) How does social support mediate food insecurity and mental health distress, while controlling for other variables?

1.5 Objectives of the study

Main research objective

To examine the association between food insecurity prevalence and mental health.

Specific research objectives

1) To determine the prevalence of food insecurity in the study area,

2) To examine the prevalence of mental health distress in the study area.
3) To determine the association between food insecurity and mental health distress and,
4) To examine how social support mediates food insecurity and mental health distress while controlling for other variables.

1.6 Organization of the study

The presentation of this study is organized in five general chapters. Chapter one introduces the background of the study and identifies the problem statement. It also states the research objective and corresponding research questions as well as the rationale behind the study. Chapter two encompass the various literature reviews on the concepts and definitions with of food security and insecurity, the challenges of women in agriculture, mental health and social support. It also includes the conceptual and theoretical frameworks of the study. Chapter three of this study presents a guide that was used to achieve the study objectives. It includes the general methodology, study area, research design as well as the sources of data for the study. In chapter four, the findings and results of the study are discussed. Chapter five highlights the conclusions and policy recommendations based on the findings of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter seeks to investigate different perspectives from various authors. It considers concepts and definitions of the main and sub themes of the topic under discussion. The empirical reviews under this section forms part of a larger collection of studies which will be used to gain a better understanding of the subject matter. In addition, a theoretical underpinning from which a conceptual framework was developed is also discussed under this review.

2.1 Definition and concept of food security

Over the last few decades, many perspectives and definitions of food security have been conceptualized by researchers, each with a central goal of addressing the issue globally. However, the most popular definition by the United Nations' Declaration on World Food Security defines food security to exist "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". This definition of food security encapsulates four main dimensions (i.e., food availability, food access, utilization, and stability of the first three dimensions over time) that make it complete. According to Ashby et al., (2016) these dimensions are hierarchical in nature and are essential in achieving food security.

2.1.1 Food availability

The availability dimension of food security deals with the supply side of food security. It encompasses all physical aspects related to production of food (yield and land use). It also includes the readiness for consumption or through storage, processing, distribution, sale and/or exchange (Mbow et al., 2019). In another spectrum, Sonnino et al., (2014) discusses food availability to mean the amount, type and quality of food that is within ease by a certain unit. They use 'unit' to refer to individuals or households who have food available at their disposal. However, Ashby et al., (2016) argue that availability of food at the national level as it is an integral focus, does not necessarily guarantee food availability at the household level. To them, availability does not anticipate access.

2.1.2 Food access

The access component is simply the ability to obtain food, irrespective of price. Drafor-Amenyah (2021) posits that adequate supply of food is all but enough and stress on the fact that, households must have physical and economic access to food as well. Again, Sonnino and colleagues (2014) assert that food access refers to the ability of a unit to obtain the type, quality and quantity of food that it needs. Consistent with these ideas of food access is Ashby et al., (2016) who explain that, access involves all the resources (i.e., economic or physical) that are needed to be put in place to ensure that food reaches the table. To them, food access encompasses households prioritizing food over other goods and services. Economic access entails households having a financial means (i.e. income) to purchase food even when prices flactuate. Away from economic access, physical access (i.e. transport) include, rail ways and good tarred roads to ensure that food is delivered away from where it originally was.

2.1.3 Food utilization

Gross et al., (2000) define utilization to be the ability of the human body to ingest and digest food. Basically, utilization has to do with the satisfaction an individual or a household enjoys from the consumption of food. It examines whether individuals or households make adequate use of the food accessible to them by paying attention to concerns such as dietary quality associated with micronutrient deficiency (Barrett, 2010). According to Sonnino et al., (2014), utilization refer to the benefit derived from food consumption, taking into consideration the nutritional and safety aspects as well as the socio-cultural aspects of food consumption. To make an argument that utilization involves the ability of body to use food, Pérez-Escamilla (2017) postulate the body's ability to convert nutrients of food consumed. These definitions are consistent with Mbow et al., (2019) who attribute food utilization to the achievement of total food potential through nutrition, cooking and health.

2.1.4 Food stability

Stability refers to all three dimensions being in synchronization so that there is always food available and accessible which can be adequately utilized at all times in to prevent households from being disturbed during certain seasons or unexpected events (Leroy et al., 2015). The stability of the other three dimensions over time entails sustained availability and access to food without any interruption (Mbow, 2019). These interruptions may be in the form poor weather conditions, political instability, unemployment and increasing food prices, weak functioning markets as pointed out by many authors. Drafor-Amenyah (2021) relates the utilization dimension to the "at all times" aspect of food security definition. The ideal situation will be to have all four dimensions occurring simultaneously. However, this is the challenge of food security and not fulfilling or missing out on one of the dimensions leads to food insecurity.

2.2 Food insecurity definition and concept

Like food security, many concepts and definitions of food insecurity have emerged with unique stand points although they tend to have a central focus. The concept and definition of food security as clearly defined by the FAO (1996) and other authors takes into consideration 4 distinct dimensions that work together to make a household (or an individual) fall in the food secure bracket. The conceptualization of food insecurity by various literature and research takes a similar path. The National Research Council (2006) in the United States defines food insecurity in a different way. To them, food insecurity is an economic and social issue which is an outcome of lack of resources and other setbacks that constrain the availability and accessibility to food. Further, they argue that the concept of food insecurity is estimated at the household level. Thus, the issue of limited availability, accessibility, insufficiency and utilization is what classify households as food secure or food insecure (NRC, 2006).

Irrespective of the definition of food insecurity, the concepts follow a cohesive manner. For instance, in a situation where any one of these 4 dimensions of food security are not met, it will be regarded as a clear case of food insecurity (Jones et al. 2013). However, this approach of defining food insecurity may be limited since it does not include some factors that contribute to food security. Other authors such as Sonnino et al., (2014) view the concept simply as lack of access to food from a demand-led point of view. To them, an individual or to a greater extent a household that do not have physical, economic, and cultural access to food can be considered food insecure. Conceptually, the definition of food insecurity by Sonnino et al., (2014) gives room to measure only the limited accessibility component due to its simplicity. Many studies including the FAO have made use of this 'simple' definition to measure food insecurity experience and severity at various levels. For instance, the FAO developed the Food Insecurity Experience Scale (FIES) during Voice of the Hungry project which measures food insecurity using only the accessibility dimension. All the items in this experience scale ask questions

which are related to food accessibility buttress the definition of food insecurity by Sonnino et al., (2014) making it valid and generally accepted.

Food insecurity referred to an experience based phenomenon by the FAO is supported by the NRC (2006) who posit that when there is uncertainty with regards to availability and accessibility to food, insufficient quantity of food needed for a healthy lifestyle, and the use of socially unacceptable means to obtain food, then it can be concluded that food insecurity is being experienced.

2.3 Food security situation in SSA

The world today has made significant progress towards the fight against poverty and hunger. Despite this feat, global food security continues to remain an imperative issue in the face of other developmental challenges that threaten humanity. For instance, reports from the Millennium Development Goals (MDG) in 2015 indicated that the number of undernourished people in developing countries decreased from 23.3 percent in 1992 – 1994 to 12.9 percent between 2014 -2016 (UN, 2015). However, a significant 800 million people were extremely poor and suffered from the consequences of hunger. Comparing these figures to that of FAO (2019) which reports that about 820 million people (i.e. about one in every nine people) still suffer from hunger in the world, it can be observed that prevalence of undernourishment PoU has been significantly slow. Again, FAO (2019) estimate about 700 million people (i.e. 9.2 percent of the world's population) were severely food insecure in 2018, indicating that they have been exposed to hunger. Both Prevalence of Undernourishment (PoU) and severity of food insecurity are used by the FAO as indicators that reflect the extent of severe food deprivation or hunger. Additionally, FAO (2019) reveal that 1.3 billion people (i.e. 17.2 percent of the world's population) were moderately food insecure.

Consequently, there are 2 billion people (i.e. 26.4 percent of the world's population) who suffer from moderate or severe levels of food insecurity, indicating a rise globally with estimates in Africa much higher than the rest of the world. Interestingly, in the light of SDGs (specifically SDG 2.1.2) half of the population in Africa are confronted by both severe and moderate food insecurity (ibid). Predominantly in many parts of SSA, many of the population still lack regular access to nutritious and sufficient food. This exacerbates the incidence of the double burden of malnutrition DBM in the region (i.e. highest rate undernourishment, and obesity), with rates affecting more women compared to men (Onyango et al. 2019; FAO, IFAD, UNICEF, WFP, 2020). According to Amugsi, Dimbuene, and Kyobutungi (2019) gender inequality and poverty account for the vulnerability of women to DBM.

2.4 Food security situation in Ghana

Food security is defined by The Ministry of Food and Agriculture (MoFA) as "good quality nutritious food, hygienically packaged and attractively presented, available in sufficient quantities all year round and located at the appropriate places at affordable prices". However, due to over dependence on rain-fed agriculture, Ghana's agricultural system is considered to be vulnerable to climate variability and change and desertification, with negative impacts on food security, typically within the rural regions in Northern Ghana (Wood et al., 2021). Again, the geographical position of these regions in the Sudanic savannah zone makes the situation even worse due to greater extreme impacts of climate change. For instance (Armah et al., 2011) reveal that desertification which is a prime impact of climate variability and change on West African countries will lead to decreased yield and low income with dire consequences on rural livelihoods, famine and malnutrition as in the case of Northern Ghana. Many studies and interventions in food security and vulnerability analysis have focused on the then three Northern Regions because it was observed that severe food insecurity, poverty and malnutrition were prevalent in these regions at the household level (WFP, 2012).

Consequently, the main causes of food insecurity is due to development disparity and poor agro ecology when compared to rest of the country (ibid). Reports from the first Comprehensive Food Security and Vulnerability Analysis by the WFP (2012) indicated that over 680,000 people in the three Northern Region were either severely or moderately food insecure. The WFP Ghana aims to improve food security and reduce stunting and micronutrient deficiency in these regions. Consistent with the contribution of the WFP, developmental organizations such as United States Agency for International Development (USAID), Canadian International Development Agency (CIDA), and Japan International Cooperation Agency (JICA) have carried varying projects both at the national and regional level. In addition, there is the Northern Rural Growth Programme (NRGP), Agricultural Development and Value Chain Enhancement (ADVANCE 1) project and the Partnership for Enhancing Food and Economic Security for the Rural Poor all with individual aims of improving food security improvement in Ghana. Not to mention, there are also projects by multilaterals such as World Bank and African Development Bank (ADB) with similar objectives. Despite these interventions, about 5% of Ghanaians are food insecure and a further 2 million people are vulnerable and are on the verge of becoming food insecure (Darfour and Rosentrater, 2016). However, Food Security and Nutrition Monitoring Report (FSNMS) by WFP (2020) found that 7.7% and 0.8% of 1600 households surveyed in Ghana were moderately or severely food insecure respectively. These food insecure households were from the Bono (Sunyani Municipal), Bono East (Kintampo Municipal), Northern Region (Tamale Metro), Oti Region (Nkwanta South) and Ashanti Region (Asante Akyem North Municipal). Meanwhile, the report predicted an improvement in food security (access dimension) in the 2020/2021 major season.

2.5 Household vulnerability to food insecurity

A households vulnerability to food security can be linked to its exposure, sensitivity and adaptive capacity (Antwi-Agyei et al., 2012). Food security is frequently the result of household livelihood strategies usually adopted by households (WFP, 2012). However, contrasts in income, food procurement, and assets amongst livelihood groups are crucial in understanding why certain groups are more food secure than others (ibid). According to Barrett, Reardon, and Webb (2001) asset, activity and income diversification are at the core of every rural household's livelihood strategies, especially in Africa. To achieve their livelihood strategies, households combine assets and activities to form a dossier of activities which include agriculture (Department For International Development (DFID), 1999). It is increasingly challenging to measure levels of food insecurity, due to the difference in scale, terms and data collection manuals (Wood et al., 2021). Nonetheless, data at the household level can reveal the food insecurity status of who is at high risk and how policy reforms can help address the situation. Poverty stricken households are more vulnerable to be food insecure because they have a low purchasing power, usually have smaller harvests and are more vulnerable to shocks (WFP, 2012). This is consistent with, inadequate income, poor health and lower education status argued by Wood et al., (2021) to characterize households that are food insecure despite efforts taken by each member of the household to improve the food security status.

2.6 Effects of food insecurity on women and children

Evidence from FAO (2011) established that, 43 percent of agricultural labour force in developing countries are rural women, representing a quarter of the world's population. Despite smallholder women farmers' role in food systems, productivity levels remain low compared to their male counterparts because of disparities in access to productive resources and entitlements. Many researches including FAO (2016) have argued that the underlying cause of

food loss in the agricultural value chain is as a result of social and cultural conditions such as gender roles. Thus, the issue of food insecurity is further exacerbated with dire consequences on the most vulnerable population (i.e., women and children). Several studies have reported the likely development of food insecurity and adverse impacts on nutritional outcomes. For instance, there is enough evidence to suggest that women who live in households that have a high prevalence of food insecurity are vulnerable to obesity with many reporting a higher body mass index (BMI) compared to women in households that are food secure (Gooding, Walls, and Richmond, 2012; Holben and Pheley 2006; Wilde and Peterman, 2006). Furthermore, (Laraia, Siega-Riz, and Gundersen, 2010) in their study highlight the potential risk of pregnancy complications among women living in households that are food insecure.

2.7 Women in agriculture and household food security

It has been widely accepted that women play an inarguable important role in agricultural production and ensuring household and national food security and essentially regarded as the backbone of development of rural economies (Ugwu, 2019). The contribution of women in agriculture and other rural enterprises in developing countries include their roles as farmers, farm workers and entrepreneurs. It has also been established that those other roles include women as food producers and processors, keepers of traditional knowledge and preservation of biodiversity. Universally, women are also known to be responsible for the preparation of food for their families and they do this through several processes. According Agarwal (2018), through active participation in forests and fisheries, women also contribute to food systems including food security. Forests are known to be useful for protecting biodiversity and its vital roles in reducing impacts of climate change. In addition, forests play an undervalued role in supplementing food production while supporting food security and nutrition (Gitz et al., 2021). For instance, firewood which is obtained from forests remains the main source of fuel energy for cooking in rural areas and women are responsible for the provision of firewood for cooking

in the household. Undoubtedly, the role of women's contribution in maintaining household food security cannot be over emphasized. However, Karl (2009) argues that misplaced priorities in agriculture and trade policies including failing to acknowledge women's contribution to agricultural production and food security at the household level form part of the on-going food crisis. This in turn limits women recognition as pillars of maintaining household food security. These issues have necessitated the call for gender mainstreaming and women empowerment in agriculture to maintain women's participation in agricultural production and food security (Lutomia et al., 2019).

2.8 Challenges facing women in agriculture in SSA

In SSA, women make up the majority of smallholder, subsistence farmers in the region thus carrying the load of improving agricultural productivity and food security (FAO, 2011). Despite considering women's indisputable role in production, processing and utilization by way of feeding the family within the agricultural sector Ugwu (2019), they are still faced with constraints of inequality and disempowerment. Men are more likely to take decisions that affect agricultural and rural development. Men also take control over productive agricultural resources although women are more heavily involved. Baba et al., (2015) argues that barriers to women's participation in agricultural activities that continue to plague the sector may occur in the form of (a) customs, beliefs and attitudes that confine women mostly to the domestic sphere, (b) women's economic and domestic workloads that impose severe time burdens on them and (c) laws and customs that impede women's access to credit, production inputs, employment, education, or medical care. Many researchers including FAO (2011) have emphatically attributed limited access and control to productive resources such as land, credit, technology (improved seed, agro-chemicals) and extension services to be the main challenges of gender gaps to agricultural productivity in SSA including Ghana.

2.8.1 Access to and control of land resources and land tenure systems

The significance of land access as a factor of production cannot be over emphasized in agricultural production and poverty alleviation. With a large share of responsibility on the path of rural women farmers to improve agricultural productivity and food insecurity, they are still faced with inability to secure access to land and in rare cases when they do, there is no control.

Chigbu, Paradza, and Dachaga (2019) define access as "the social and political relations mediating opportunities to use, own, hold (possess), manage, and enjoy rights (and privileges) that accrue from land". To Chigbu, (2019) land access involves having physical availability to land parcels while being able to make decisions on the land and enjoyment of all rights that comes with the land. Women's access to land is imperative to the achievement of food security both at the household and community level as it is an important factor for their empowerment.

Land tenure security, otherwise referred to as tenure security, means the "rights individuals and groups have to effective protection by the state against forced eviction" (UN-HABITAT, 2008). By this arrangement, the term land tenure is backed by law, and as a matter of fact must not discriminate irrespective of ones gender. Ugwu (2019) argues that women's access to land and land tenure security influences their access to other important resources such as credit, extension services and technology. In turn women's limited access to land means that obtaining credit and extension advisory services becomes limited and in most cases in SSA inaccessible. This negatively affects the agricultural productivity potential for women since the problem persists in SSA. A study by Chigbu, Paradza, and Dachaga (2019) that used evidence from Ghana, Nigeria and Zimbabwe demonstrated that women have differentiated challenges, needs and statuses when it comes to issues related to land tenure security in SSA.

2.8.2 Access to credit

Agricultural credit is significant especially for smallholder farmers to support agricultural production including its modernization and commercialization in rural agricultural development (Saqib, Ahmad, and Panezai, 2016). In order for farmers to acquire essential inputs and technology to boost agricultural production, make farm related strategic investments and exploit opportunities within the sector, Waje (2020) argues that it is imperative to have access to credit. However, the poor and most vulnerable people in society including women are more likely to be disadvantaged with regards to ease of access to credit. For example, in the Upper East of Ghana, farmers are unable to adopt new technologies such as the rice intensification due to the inability to secure credit. Many studies have given plausible reasons why women still cannot access credit to undertake agricultural activities. For example, claim in rural areas, the issue of limited access to credit by women is further exacerbated by illiteracy, lack of collateral assets, limited mobility as well as women's underprivileged position to own land (Kazi, Raza and Al-Jalaly, 1995; Ololade and Olagunju 2013). In conformity, being educated, literate in the local language, having collateral and land ownership increased rural farmer's chance of accessing credit (Assogba et al., 2017; Chandio et al. 2017; Motsoari, Cloete, and van Schalkwyk, 2015; Waje, 2020). Having collateral is considered to be very instrumental in the quest for accessing credit because it is the only way institutional sources that provide credit retrieve their monies in case borrowers default payment (Twumasi et al., 2019). However, this is not the case for many countries in SSA including Ghana, as women's productivity in agriculture is adversely affected due to their inability to own other productive assets to access timely credit.

2.8.3 Access to agricultural extension services and information

The FAO (2010) define extension as "systems that should facilitate the access of farmers, their organizations and other market actors to knowledge, information and technologies; facilitate

their interaction with partners in research, education, agri-business, and other relevant institutions; and assist them to develop their own technical, organizational and management skills and practices". This definition has in recent times shifted to creating an enabling environment where rural farmers themselves act as partners to facilitate the agricultural and rural development process. The issue of gender disparity with regards to access to agricultural extension services have been widely acknowledged by many studies. There is no accurate data in terms of differential access of extension services by gender (UN Women, 2017) . However, many studies at the micro and macro level reveal that women farmers are at disadvantaged position with regards to access to extension service (ibid). For example a study review with in Ghana revealed that women had low access to extension compared to men. Ugwu (2019) assets to this argument and in her study highlights low or no contact to extension service as one of the reasons why there is still a gap in agricultural information between male and female farmers in Nigeria. Inarguably, there is also an inadequate number of female extension staff in most parts of SSA to match the growing number of women farmers. Consequently, UN Women (2017) report that content design and methods in agricultural extension services including service delivery are not tailored to consider the role of women farmers. Thus, what women do as farming have been historically neglected and poorly defined. A study by Waje (2020) found that, there is a positive and significant relationship between access to extension service and access to credit. This means that farmer's access to extension services influence their ability to secure credit. In his study, he revealed that as extension services increased by one percent, there was a 46 percent chance that a farmer will have access to credit. According to Wakhungu (2010) in order to improve the adoption rate of agricultural technology, it is important to increase the number of women extension workers and ensure that dissemination of technology and service is channelled through languages that women themselves understand. It is imperative, a necessary approach to streamline extension service for rural women farmers by

tailoring extension services to meet the expectations and work done by women on farms (Ponnusamy, 2019).

2.8.4 Agricultural technology

The introduction and promotion of technologies to improve agricultural productivity of rural women farmers started in the 1980s (FAO, 2015b). Technology and innovation are important in all areas of sustainable agriculture development. In recent times, technology has been given much needed recognition due to changes in demand from consumers and producers of food within the agricultural sector (Odame et al., 2020). Improved and modern agricultural technologies provide women farmers with new opportunities to maximize yield and productivity thus, improving the livelihood of women farmers (Wakhungu, 2010; Okeke, Mbah, and Nwoye, 2019). However, a study by Murray et al., (2016) revealed that smallholder women farmers had limited access to the most fundamental form of rural energy and innovations that have the capacity to reduce the drudgery of farm work. Agricultural productivity of many women is still low in the face of restricted access to irrigation, no access to inorganic fertilizers, with many still dependent on handheld hoe and constrained access to mechanized rural transport (ibid). This is partly because inputs such as fertilizer, improved seeds and use of mechanization are less likely to be employed by women compared to men (FAO, 2015). The argument may shift to high illiteracy rate among women or inadequate to financial power to purchase these technologies, further worsening the situation of poor agricultural productivity. The introduction of appropriate technology including Information and Communication Technology (ICT) can help change the narrative as it helps with access to market and supply chain management and dissemination of information (ibid). Consequently, this can be constrained by ownership and control by men as with all other resources contributing to the gender digital divide.

2.9 Trends and threats to food insecurity

As previously established by many research and authors, agricultural production is necessary for achieving global food security. However, agricultural production is threatened by a myriad of factors that lead to global food insecurity of households and individuals. Generally, threats to food security and food systems vary considerably in scope and magnitude and may change in different contexts. For instance Sundström et al., (2014) argue that agricultural production depends on policy, economic and some biophysical parameters. Biophysical conditions such as natural resource depletion, land degradation, and climate change which remain the single most important threat to future food systems (Fan et al., 2021).

Additionally, FAO (2019) posit that economic slowdowns (i.e. economic shocks) conflicts and poverty also contribute to the growing threats of food insecurity. Irrespective of these known causes of food insecurity, it is evident that COVID-19 has some potential threats on food insecurity although its impact is unclear (Ayanlade and Radeny, 2020; FAO, 2020). It can be widely attributed to planting of staples crops coinciding with restrictions on movement due to lockdown and coupled by border closure consequently leading to food shortage (ibid). These threats pose disproportionate impact on agricultural food production and further increase households and individuals' vulnerability to food insecurity.

2.9.1 Climate change and food insecurity

Generally, the sustainable development of all nations are under threat from the long term impacts of climate change, which is itself inevitable (Gopalakrishnan et al., 2019). With agriculture likely to be 'hit hard', there is a dire need for urgent food policies, adaptation and mitigation strategies. Climate change is regarded as an environmental issue that pose threats to development and sustainability of all natural systems. Many literature suggest there are adaptation and mitigation practices employed by farmers globally to reduce vulnerabilities to climate change impacts. However, agriculture and food production systems and food security has unsympathetically been affected by climate change in a significant number of ways. This includes rise in sea level, increased average temperatures, extreme heat, change in rainfall pattern as well as loss of pollinators. Other changes, which are less understood, include pests infestation, soil composition and the response of crop growth because of increasing carbon dioxide CO_2 levels (Gowdy, 2020). For instance, areas close to the coast are subject to high rise is sea level and the likely consequence is usually saltwater intrusion and increased salinity in lands prepared for agriculture. Flooding and water logging of agricultural lands remain inevitable issues in these areas. According to the Fifth Assessment Report (AR5) by the IPCC, since the pre-industrial era, anthropogenic greenhouse gas emissions have increased, and they remain major drivers to economic and population growth. Consequently, there is a build-up of CO_2 concentrations, methane, and nitrous oxide at unprecedented rates within the last 800,000 years. This the IPCC (AR5) predicts climate change to be the most prominent cause of global warming since the mid-20th century (IPCC, 2014). Based on a meta-analysis of 1090 study on yield of wheat, maize, rice and sorghum using different climate scenarios, it was observed that yields will continue to reduce significantly (Porter et al. 2015). If this continues, there is a possibility that the net impact on humanity and the ecosystem will be severe, pervasive and irreversible creating new risks and natural and human systems (ibid).

Food security is constantly under threat by impacts of climate change particularly in developing countries that are pre-disposed to hunger and malnutrition and rely on agriculture for livelihood (FAO, 2019). In all this, it is no surprise as Springmann and his colleagues (2016) reveal that by 2050, there will be some 529,000 climate-associated deaths.

2.10 Mental health concept and definition

Many authors and scholars from diverse values, cultural and social backgrounds have defined mental health in different ways. The World Health Organization (2001) posit that concepts of mental health are not limited to subjective well-being, competence, self-efficacy, autonomy, intergenerational confidence, and self-actualization of one's emotional and intellectual potential and more of the same. For them and other scholar's, mental health is not merely absence of mental disorders. Since then, WHO has defined mental health as "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community." With reference to the WHO's (2001) definition of health, which according to them is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity", the slogan "no health without mental health" reiterates the importance of mental health as an integral component of individual's behaviour and to a greater extent well-being (WHO, 2004). Contrary to mental health are mental disorders which the WHO refers to as a combination of abnormal thoughts, perceptions and emotions linked to Common Mental Disorders CMDs. CMDs constitute depressive and anxiety disorders as highlighted by the WHO (2017) and generally regarded as the leading cause of disability globally.

2.11 Effects of food insecurity on mental health

Several studies have explored the relationship between food insecurity and a wide range of nutrition related measures. However, in the last decade, the effect of food insecurity on non-nutrition related health impacts have gained prominence. For instance, Chung et al. (2016) and Davison and Kaplan (2015) argue that food insecurity is linked to adverse health implications such as mental health distress manifested in the form of mood disorder and depression. Consistent with these arguments, Hadley and Patil (2008) reveal that food insecurity is a robust predictor of symptoms of poor mental health (i.e. anxiety and depression). Consequently, symptoms of anxiety and depression will change as food insecurity conditions change through the season (ibid).

Many studies have attempted quantitative methodologies to establish the relationship between food insecurity and mental health. However, Cole and Tembo (2011) hold the claim that in order to ultimately justify how food insecurity could or could not lead to mental health distress, it imperative to incorporate a qualitative aspect during study designs. This they argue will enable precise understanding of lived experience by individuals thus, a comprehensive understansting of the significance of being food insecure. Again, Cole and Tembo (2011) maintained that use of ethnographic data was used to show that, food insecurity is a source of mental distress. Regardless of the pre-established fact that food insecurity has a significant relationship with mental health, Jebena et al., (2015) argued that the mechanisms by which food insecurity affects mental health has not been well understood. However, many studies have demonstrated the phenomenon by stating that, food insecurity force people to obtain food through socially unacceptable ways which lead to a tendency of shame and guilt and has close association with poor mental health (Bernal, Frongillo, and Jaffe, 2016). In contrast, a recent study by Sweetland et al., (2019) revealed that there was no significant association between

food insecurity and mental distress and therefore, propose further understanding of the concept of food insecurity and mental distress.

2.12 Social support concept and definition

Different environmental settings exhibit different experiences. Meanwhile, the observation of different settings and contexts has drawn attention to the constructive roles of having a social attachment in shaping cognitive and physical well-being (Sarason et al., 1983). To them these observations accompanied the concept of social support as being a contributor to positive adjustment and personal growth as well as its role as a buffer against the repercussions of stress.

Social support is a multifaceted and complicated concept which has been studied from varying perspectives (Kocalevent et al. 2018). Research shows consistent theoretical and conceptual underpinnings with changing implicit assumptions of what social support is. The main argument Hupcey (1998) makes is that over the last few decades, there have been disagreements on the theoretical and operational definition of social support among authors. This is because definitions of social support are often vague and broad (Cohen and Wills 1985). According to Uehara (1990) earlier studies on social support focused on intangible and material support by family members among others were imperative for life. At the time, the concept had not evolved as much compared to recent times. For instance, Sarason et al., (1983) defined social support to exist when people show and make it known that they care, value and love other people in their lives. However, Kadushin, Nye and Specht (as cited in Uehara,1990) argue that, social support should be more understood as a "social exchange" instead of one-directional arrangement of providing care to people.

Contrary to the many conceptualizations and definitions made by different authors, Hupcey (1998) posit that the term has moved towards another trajectory. To her, the concept has grown increasingly abstract to include anticipation, perceptions, quality, and quantity of the support

provided. In addition, less understood characteristics of persons, behaviours as well as the social system have been imbedded in the concept of social support. Therefore, any type of social interaction will be considered social support owing to the complicated nature of the concept (Hupcey, 1998). Although research has advanced in the area of social support, consensus on conceptualizing the concept has not been reached. This means that many definitions, measures, and conceptualizations exist. This diverse nature of social support makes it increasingly difficult to compare with regards to its role (Lett et al., 2009).

2.12.1 Buffering effects of social support

In order to appropriately make an argument that support is a possible buffering mechanism, Cohen and Wills (1985) made the effort to define stress to occur when a demanding situation threatens an individual such that there is no coping response immediately available. According to them a single threatening event may not push a person beyond the limits of being able to cope. However, it is when these events accumulate and persists over time that strips a person's coping capacity, giving way for potential damaging effects to occur as they cite Wills and Langner. Based on this assertion, they posit that support comes up during stressful events or when a person appraises the expectation of a stressful event. To Cohen and Wills, there is a general perception that, when a person is faced with stress, other people will have the capacity to reverse the potential harm. Secondly, Cohen and Wills (1985) argue that support has the tendency to mediate the experience of stress and the beginning of a pathological outcome such that it reduces or eliminates the effects of the stress by directly influencing the process. These arguments have been conceptualized by theorists including Sarason et al., (1983) who distinguish social support into two distinct broad categories which are referred to as structural and functional support. These broad categories of social support are achieved through an individual's social network. Social networks are as mediums through which social support is provided.

Structural support encompasses the extent to which an individual integrates into a social network. This may include size, type, marital status, relationship with others as well as frequency of contact with family members. Structural support makes a distinction between frequency of contact to close social ties against the number of times an individual interacts with peripheral contacts or groups which describe the types of social network.

However, functional support relates to support that is obtained from belonging to a social network. Functional support is further categorized into attributes such as emotional support (i.e. feeling of being loved by others), instrumental support (i.e. making available tangible goods and services), financial (i.e. economic support), informational support needed in times of stress and appraisal support (i.e. help needed to evaluate a condition rather than offering support to solve the problem) (Barrera 1986; House, Umberson, and Landis, 1988). The impacts of these attributes are expected and hypothesized to result in positive health behaviours and well-being (Langford et al., 1997). Langford et al., (1997) argues that reciprocity or exchange is imperative when defining these attributes for social support to continue. This assertion is line with the arguments of authors who believe that social support should not be looked at as a one-directional process, but rather as a social exchange. Theorists including Barrera (1986) differentiate functional support that an individual perceives (i.e. perceived functional social support) from functional support that is received (i.e. received functional social support).

2.12.2 Perceived functional social support

This is recognized as a functional support that denotes a cognitive appraisal of support from people to which an individual is connected (Barrera, 1986). For instance as Cohen and Wills (1985) puts it, this functional support will intervene when stress is appraised or expected, resources will be available to ensure coping, thus reducing the negative impacts of this potential threat (Barrera, 1986). According to Sintos (2020) perceived functional social support has the tendency to control the relationship between environmental threats and cognitive distress. For instance, as functional social support increases, the relationship between environmental threats and cognitive distress is minimized (ibid). Zimet et al., (1988) posit that perceived functional social support is obtained from three specific sources: "family", "friends" and "significant other". Based on this, the Multidimensional Scale of Perceived Social Support was developed to examine the perception of social support from the "family", "friends" and "significant other". However, Barrera (1986) argued that, there is no intention to count the number of support network, but rather an endeavour to imagine that an individual would get adequate support as and when needed. Sharifi et al., (2017) in their study found a significant relationship between perceived social support and food security.

2.12.3 Received functional social support

Received social support include the tangible and intangible support resources (i.e. sense of belonging and emotions) (Barrera, 1986). Based on this assertion, Uchino (2009) defined received social support as the exchange of support resources through a social network. There is clear evidence that associates social support to health outcomes. However, growing literature suggests that, perceived social support when compared to received social support yields beneficial health implications (Uchino et al., 2018). According to Lett et al., (2009), measures of received functional support are often used because they are mostly correlated with need, physical impairments or health outcomes. Uchino et al., (2018) highlight inconsistencies with

regards to the outcomes of received social support. They argue that there may be other mediating factors working. Although the purpose of received support is directed towards achieving a positive outcome, there are cases where negative correlations are realized. For instance Bevan, Urbanovich, and Vahid, (2021) found a positive correlation between received social support and perceived quality of care as it was for similar research. Nonetheless, researchers have demonstrated and in some cases hypothesized that it is possible to have negative correlations when received social support is used to assess well-being (for e.g. in depressive symptoms) and in most there are variations (Uchino, 2009). Given this contradiction, Uchino et al., (2018) argue that it is imperative to include time to critically examine the nature of this behaviour because the best intentions are not always enough to ensure appropriate support. Although Uchino (2009) addressed the reasons why received social support ensures the most benefits related to health outcomes, it is important to take into consideration the context within which the social support is provided, the social skills of the support provider, the personality of the individual receiving the support as well as an assessment of the context within which the stressor operates (Uchino et al., 2018).

2.13 Social support, mental health, and food insecurity

The links between social support and more general indices of health have been explored extensively by research (Uchino et al. 2018). There is enough evidence that links social support and mental health outcomes, and that this association is usually beneficial (ibid). This assertion in line with Na et al., (2019) who argue that social support is an important social determinant of health which when brought into play, has the capacity to affect both physical and mental well-being of individuals. For example, Sarason et al., (1983) demonstrate that high levels of social support buffer against threats effects of stress that are faced by individuals.

There is a general agreement that suggests differences in demographic and economic comparison between urban and rural population. However, often, the latter is usually subjected to poverty and food insecurity. In order to cope and hence reduce the threats of food insecurity and poverty, rural populations usually rely on social networks to provide assistance (Hadley et al., 2007; Gajda & Jeżewska-Zychowicz, 2021). Social support systems in times of food insecurity are not limited to those provided through governments and NGOs. It also includes those resources obtained from a network of family and friends (Garasky et al., 2008). Many researchers agree to the fact that social support plays an imperative function and management of food security and has the capacity to reduce the impacts of food insecurity (Sharifi et al., 2017).

A study by Na et al., (2019) from thirty nine SSA countries found that social support modifies the relationship food security and mental well-being, particularly in countries that had prevalence of food insecurity. From their study, food security status which was not mediated by any form of social support independently anticipated mental well-being in a dose-responsive manner. Social support positively affected mental well-being such that the association was strongest amongst adults who were subject to severe food insecurity. This is consistent with a research by Tsai et al., (2012) who found social support to buffer against the negative impact of food insecurity. Their study further found out that women who had no form of social support were most vulnerable to the detrimental effects of food insecurity and poor mental health.

Attempts made to distinguish between the various forms of social support provides a view of appreciation of the multiple pathways within which social support intervenes food insecurity and mental health (Na et al., 2019). Consistent with this statement is a research by Tsai et al., (2012) who in their study argue that instrumental social support for example had a higher buffering effect compared to emotional social support . To Cohen and Wills (1985) when assessing moderating influences on food insecurity-mental health nexus, the most relevant

form of social support to consider is instrumental support. However, reviews from Hadley, Mulder, and Fitzherbert (2007) argue that instrumental support will not be appropriate if all members in one social network face similar levels of food insecurity.

2.14 Mental health policies and legislation in Ghana

Policies around health and typically mental health in Ghana are formulated by the Ministry of MoH and implemented by the Ghana Health Service (GHS). These policies are then deliberated on by the Parliament of Ghana through a Legislative Instrument. The first legislation of mental health in Ghana was the 1888 Lunatic Asylum Act of the Gold Coast followed by the Mental Health Act 1972 N.R.C.D in 1972. To add on, this Decree made provision for mental health professionals and facilities, including psychiatry hospitals and structures to implement mental health legislation in Ghana (Read and Adu-gyamfi, 2017).

In 1994, the first mental health policy of Ghana was ratified and subsequently approved. It was revised in 1996 by the then Director General of the GHS. The policy instrument was appraised using the WHO Policy Check by officials of the MoH, the chief psychiatrist by then who was recommended by the MoH, researchers as well as mental health professionals. The revised policy incorporated structures such as a Coordinating Inter-Ministerial Technical Committee was set up to ensure the implementation of the policy brief. However, the revised policy brief was met with challenges which impeded its functionality and implementation (Ministry of Health, 2018).

In 2001, the WHO (2001) in its reports emphasized on the need for countries to establish national policies and legislations that target mental health as part of its 10 key recommendation. These policies were to be based on current research and knowledge on human rights. The document highlighted the importance of including mental health reforms to larger health care reforms. Since 2001, several action plans and advocacies, such as the Mental Health Action

Plan 2013 – 2020 have been introduced by the WHO and more recently Goal 3 of the SDG which many countries including Ghana have adopted.

More recently, the Ministry of Health (2018) led by the Mental Health Authority and the Mental Health Board published the current Mental Health Policy 2019 – 2030 on the theme "Ensuring A Mentally Healthy Population" reiterating the statement mental health is total health. The new policy views mental health as an important indicator of the general well-being of the population within the country. Since the implementation of the previous mental health policies did not materialize, the new policy includes an entire layout on the establishment of governance institutions such as Mental Health Tribunals, Visiting Committees, District Mental Health Subcommittees, and the nomination of District Mental Health Coordinators that will help the Mental Health Authority with its implementation. The current policy is consistent with current national and global health sector viewpoints. It also considers perspectives under the 1992 Constitution of Ghana and the Mental Health Act, 2012 (Act 846) (Ministry of Health, 2018).

2.15 Theoretical framework

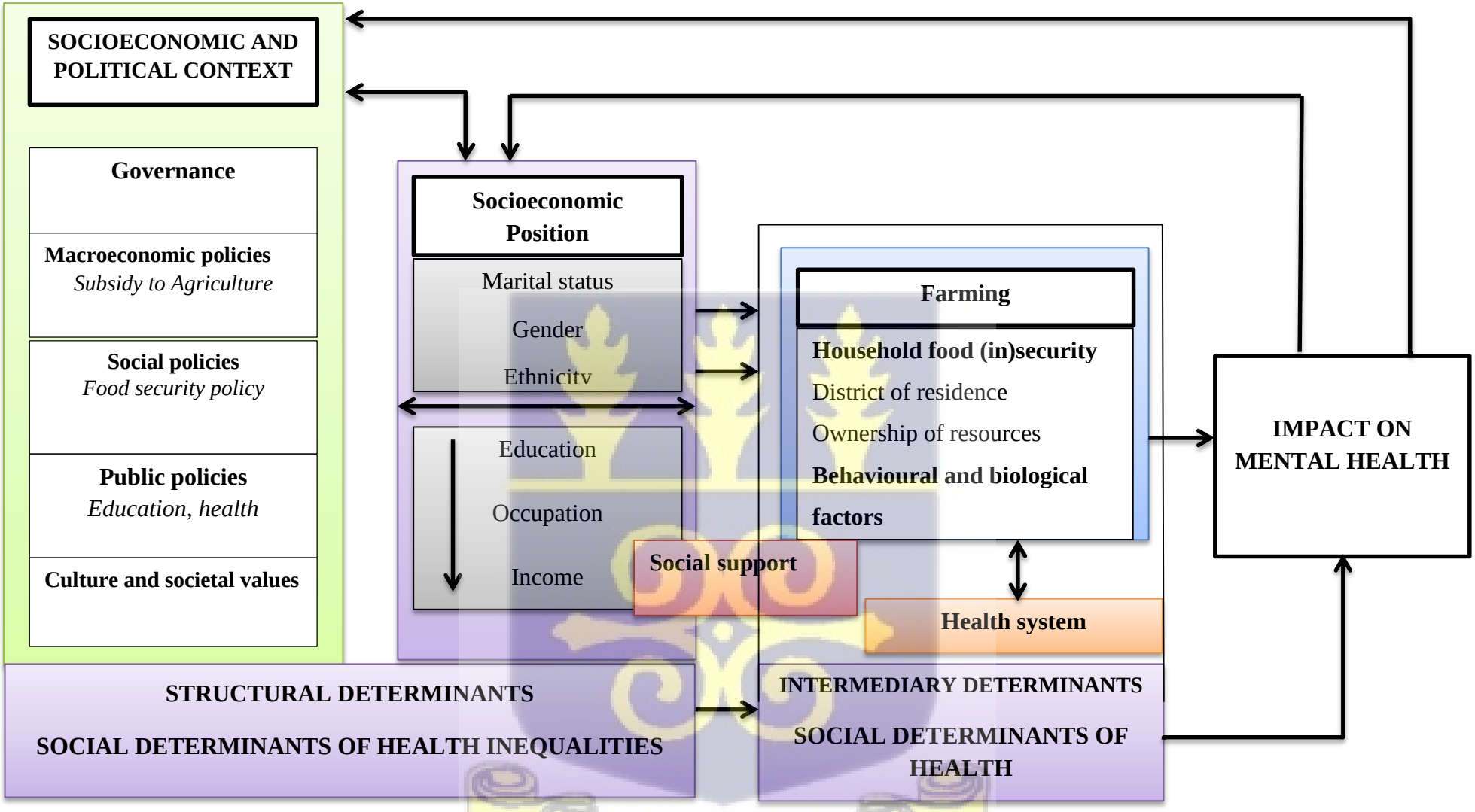
As established by various research and authors, discussions surrounding food insecurity highlight the concept to be multifaceted in nature with different health outcomes. Again, it is evident that food insecurity forms part of the social determinants of health. Thus, to fine-tune the arguments of putting forward a foundation that links food insecurity and mental health, this study employed the "Social Determinants of Health (SDH)" theory. The proponents of SDH theory postulate that, the health and well-being of individuals are influenced by social and economic factors (i.e., living conditions) other than medications and behavioural choices. The Ottawa Charter for Health Promotion, WHO (1986) highlight peace, shelter, education, food, income, a stable ecosystem, sustainable resources, social justice and equity as fundamentals to health which must be seen as essentials for well-being. All these constitute what the SDH

classify as social factors which influence the health of individuals. The SDH have been studied in different ways and conceptualized differently by many models. For instance, the Dahlgren-Whitehead rainbow model developed in 1992; depict the relationship between individuals, their environment and health. The model suggests that individuals are surrounded by various facets that influence health and can be modified. The first of these factors are lifestyle of individuals that have direct effects on health of individuals, followed by social and community support from social networks (i.e., family, friends etc.) and finally, the general socio-economic, cultural, and environmental factors such as education, agriculture and food production, unemployment, access to resources and services among others. According to Tarlov (1996), inequalities in these structural factors influence health related processes (as cited by Raphael, 2006).

This study explores the possibility of how food insecurity (caused because of lack of money and other resources) affects mental health. Lack of money and other resources (structural factors) are caused by inequalities in their distribution and are shown to interplay the health outcomes of individuals. To clearly establish the link between food insecurity and mental health, this study adopts the Commission on Social Determinants of Health (CSDH) framework. The CSDH framework tends to acknowledge the cause of socio-economic hierarchies in relation to health inequalities. The interplay between the broader socio-economic and political contexts leads to a social stratification by which individuals within the population are positioned based on their income, occupation, education, gender and ethnicity. These structural determinants shape an individual's health status (Solar and Irwin, 2010). The framework also presents an argument that, to capture the influence of structural determinants, it is imperative to include a contextual aspect such as education and social protection policies which act as buffers and the effects of structural determinants of socio-economic position on health. However there is a third element that completes the framework through which structural

determinants operate (Solar and Irwin, 2010). The latter is referred to as the social determinants of health. According to Atuoye and Luginaah (2017) social support mediates the relationship between the structural determinants and the social determinants.

Figure 2. 1: Commission on Social Determinants of Health Framework



Source: Adopted from Commission on Social Determinants of Health Framework WHO, (Solar and Irwin, 2010)

2.16 Conceptual framework

Figure 2.1 depicts the conceptual framework adopted for the study. The main objective of this study is to investigate the relationship between household food insecurity prevalence and mental health. This conceptual framework suggests that food insecurity at the household level among other variables (i.e., control and intermediary) influences mental health of rural women farmers. It is widely argued that the concept of health and for the purpose of this study mental health outcome is influenced by a myriad of multifaceted factors such as economic, social, and cultural dimensions among others.

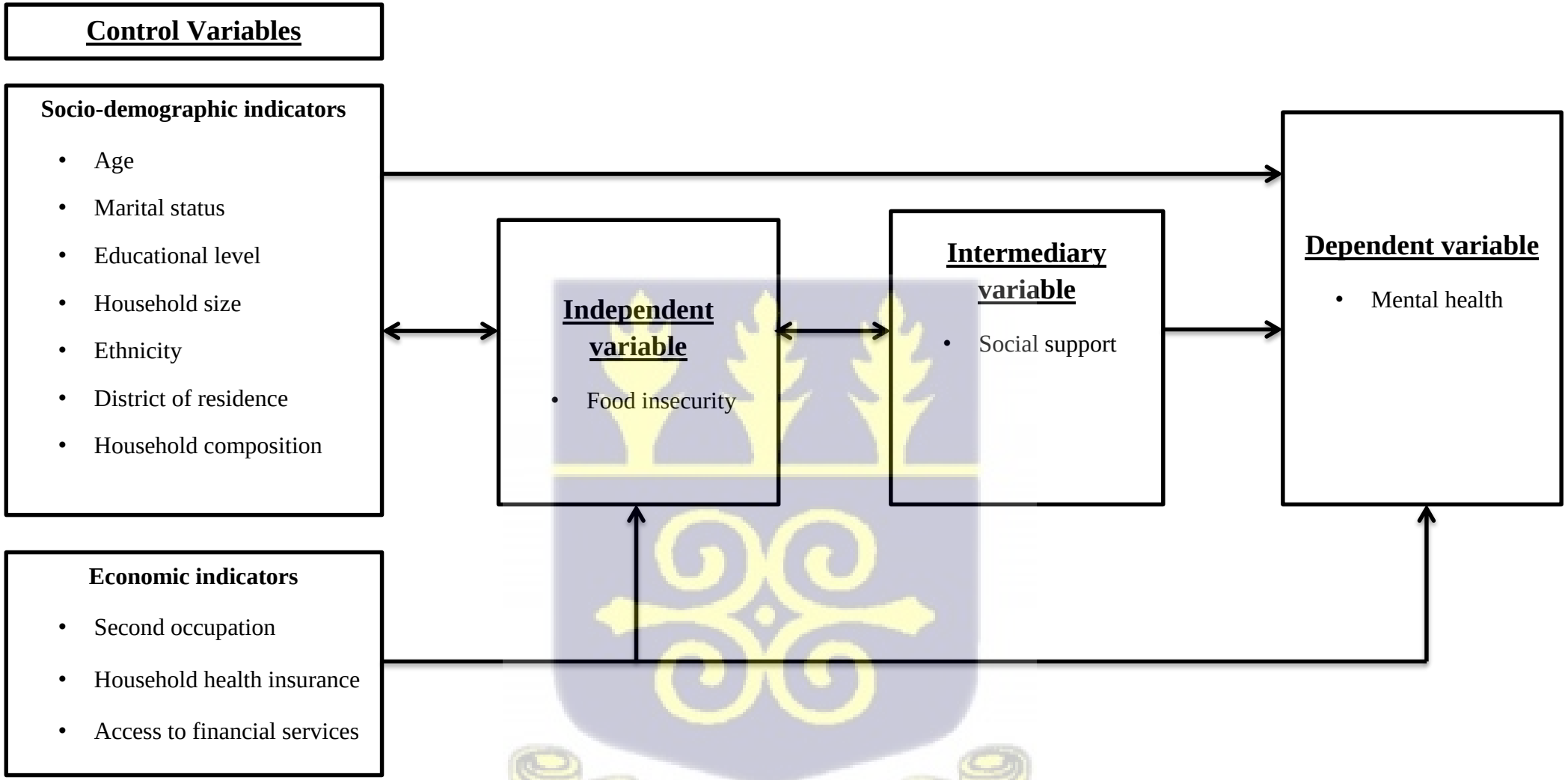
Food insecurity as defined by this study refers to the situation of lack of access to food at the household level because of lack of money and other resources. Food insecurity has been established as an economic issue which leads to stress, depression, and anxiety either because the food is not available or inaccessible.

Social support is used as an intermediate variable because many studies have linked it to a variety of health outcomes including mental health. For instance, Harandi, Taghinasab, and Nayeri (2017) asserts that mental health is impacted by such important factors such as social support. The rationale is that, received social support will help reduce the stress, anxiety and depression that comes with mental health distress. Many studies have demonstrated that high levels of social support help reduce the risk of depressive impairment (Turner and Lewis-Brown , 2010).

Socio-demographic indicators (i.e., age, ethnicity, marital status, level of education, district of residence, household composition and household size) and Socio-economic indicators (access to financial services, household health insurance and alternative occupation) are used as control variables. The study further postulates that these socio-demographic and economic indicators (i.e., control variables) also influence mental health outcomes.

Thus, this study set out to establish whether household food insecurity, social support as well as a set of demographic/socio-economic variables is independently associated with the dependent variable (mental health). Generally, the literature agrees that mental health outcomes are not caused only because of food insecurity (in this case) but many intervening factors which this study will explore.

Figure 2. 2: A conceptual framework showing the relationship between food insecurity, social support, and mental health



2.17 Hypotheses

Based on the conceptual framework and various literatures, this study hypothesizes that:

1. Women in households that are severely FI are more likely to experience mental health distress compared to women who live in food secure households.
2. Women in households who receive social support are less likely to experience mental health distress compared to women who do not receive social support.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This section focusses on the research design and how the main variables used in the study are measured. It also takes into consideration the source of data, the study area, sampling procedure and sample size, analysis of data as well as the limitations of the study.

3.1 Study area

The study was undertaken in Upper Manya Krobo District (UMKD), Lower Manya Krobo District (LMKD) and Yilo Krobo District (YKD). These Municipalities were previously districts but have been reorganized into Municipalities which constitute part of the 260 administrative Metropolitan, Municipal and District Assemblies (MMDAs) in Ghana. These districts belong to the 33 Municipalities and Districts in the Eastern Region.

Upper Manya Krobo District (UMKD) is located between latitudes 6º 24' N and longitudes 0º 9' W of the Greenwich Meridian. The district shares boundaries with Lower Manya Krobo District to the south-east and Fanteakwa North District to the west. It also shares common boundaries with Yilo Krobo District to the south-west, Asuogyaman Municipal to the east and to the north Kwahu Afram Plains South District Assembly. The district covers a total land area of about 859.1 square kilometres which is about 4.6% of the total land area of the entire Eastern Region. About 82.5% of the households in the district are employed in agriculture, fishery, and forestry. Interestingly, about 89.2% of all rural communities in the UMKD are agricultural households.

Lower Manya Krobo District lies between latitudes 6º 8' 56.5" N and longitudes 0º 0' 43.2" W at an altitude of 457.5 m above sea level. The district covers a total land area of about 1,476 square kilometres. Neighbouring boundaries to the Lower Manya Krobo District are Upper

Manya Krobo (UMK) in the Northeast, Yilo Krobo in the West, Dangbe-West in the South, and Asuogyaman in the East. About 32.5% of households within the district are engaged in agriculture, with majority (86.7%) involved in crop farming. In addition, more than 60% of households engaged in agriculture live in rural areas (Ghana Statistical Service (GSS), 2014)

The Yilo Krobo District on the other hand covers a total land area of about 805 square kilometres (4.2% of land area in the Eastern Region) and lies between latitudes 6° 6' 18" N and longitudes 0° 0' 57.6" W with altitude of between 300 and 500 m above sea level. Yilo Krobo District shares boundaries with Lower Manya Krobo District to the North, Upper Manya Krobo to the East, Dangbe West and Akwapim North Districts to the South. It also appears that the Municipality shares boundaries with New Juabeng and East Akim to the South west. (Ghana Statistical Service, 2014b) reports indicate that more than 50% of households in the district are engaged in agriculture, with about 70% of these households living in the rural areas.

3.2 Source of data

This study employs a secondary data obtained from the 2020 LinkINg Up dataset: Women's Agripreneurship Sustainability and Scale Up Initiative led by researchers in the Department of Nutrition and Food security, University of Ghana. LinkingUp is a partnership between local institutions in the three districts and McGill University, Canada, Heifer International, Ghana and University of Ghana. The study was conducted in the 3 districts in the Eastern Region of Ghana previously mentioned: Yilo Krobo District, Upper Manya Krobo and Lower Manya Krobo District.

3.3 Research design

This study is a part of a bigger study which employed repeated surveys to obtain data from the study areas. However, for the purpose of this study, the baseline survey was used. When social psychologists conduct survey research their overall aim is to provide in depth explanation and

understanding of how society influences people and vice versa (Visser, Krosnick, and Lavraws, 1986). Babbie (2008) defines a survey to include all methods by which information about a particular subject of interest is obtained from a sample of individuals who respond to questions which have been developed in advance. Salant and Dillman, (1994) identified the use of surveys for needs assessment and examination of impact of an intervention. Essentially, a survey solicits information from a pre-defined population. This information is then employed to conduct survey research (Glasow, 2005). According to Isaac and Michael (1997) survey research is conducted

> "to answer questions that have been raised, to solve problems that have been posed or observed, to assess needs and set goals, to determine whether or not specific objectives have been met, to establish baselines against which future comparisons can be made, to analyse across time, and generally, to describe what exists, in what amount, and in what context" (as cited in Glasow, 2005).

3.4 Sampling design and sample size

As indicated earlier, this household survey was carried out in three municipalities out of which a total of six communities were sampled. These communities were selected since households predominantly employed agriculture as their main economic activity. The Department of Agriculture in the respective municipalities provided a list of all women in the selected communities who were involved in agriculture as their primary source of income.

This study sets out to explore food insecurity and mental health related distress of women farmers in the three districts selected for the study. Communities which had farmer-based organisations involved in the Linking Up Initiative were selected within each district. Specifically, there were 3 from Yilo Krobo; New Somanya, Komatsi and Amanga, 2 from Upper Manya Krobo; Esuom Manya and Takorasi and 1 from Lower Manya Krobo; Ayermesu.

In these communities, there were 82 women in total who were beneficiaries of the initiative. Another 83 women were selected randomly to make up a total of 165 women from the 6 communities.

3.5 Construction of variables

The independent variables used in this study were food insecurity (main independent variable), control variables (socio-demographic) and social support (intermediary variable) with the dependent variable being mental health. Each of these variables was subject to available measurement procedures summarized in the sub-chapters below. A proxy measure was created for social support.

3.5.1 Dependent variable

The main dependent variable (i.e. mental health distress) was measured using the Self-Reporting Questionnaire SRQ-20, developed by the (WHO, 1994). The SRQ-20 is designed to contain 20 items which seek to obtain responses about symptoms and issues related to mental health distress 30 days prior to the survey. Initially the SRQ was designed to be a self-administered scale. However, it was reported to be an appropriate interviewer administered questionnaire (WHO, 1994). Each of the questions (i.e., 20 items) in the instrument is scored between 0 and 20 with 1 coded as "yes" indicating the mental health distress symptom was present in the previous month, and 0 coded as "no" indicating the mental health distress symptom was absent. A higher score therefore signals a speculation of higher mental distress. Since its conception, a number of studies including Jebena et al., (2015) and Piperata et al., (2016) have used the SRQ-20 to establish the symptoms of mental health distress and investigate the link between mental health and food insecurity.

For this study, a cut-off point of 7/8 as developed by Richardson et al., (2010) was used to categorise respondents as having probable mental distress or not. To develop this, the responses

to the 20 items were summed for each respondent. Respondents who had a total affirmative "yes" responses ranging from 0 to 7 were labelled as having "no case of mental distress (i.e., coded 0) and a sum of responses ranging between 8 and 20 were labelled as having "probable case of mental distress" (i.e., coded 1). This indicates that the respondent has scored positive for the mental health distress (i.e., positive common mental disorder, CMD). This resulted in a dichotomous independent variable.

Table 3. 1: Self-Reporting Questionnaire items (SRQ-20), Common Mental Disorders

Number	SRQ- questions	Yes	No
1	Do you often have headaches?	Yes	No
2	Has your appetite been poor?	Yes	No
3	Have you had trouble sleeping?	Yes	No
4	Are you easily frightened?	Yes	No
5	Do your hands shake often?	Yes	No
6	Do you feel nervous, tense, or worried?	Yes	No
7	Is your digestion poor?	Yes	No
8	Do you have trouble thinking clearly?	Yes	No
9	Do you feel unhappy?	Yes	No
10	Do you cry more than usual?	Yes	No
11	Do you find it difficult to enjoy your daily activities?	Yes	No
12	Do you find it difficult to make decisions?	Yes	No
13	Is your daily work suffering?	Yes	No
14	Are you unable to play a useful part in your life?	Yes	No
15	Have you lost interest in things?	Yes	No
16	Do you feel that you are a worthless person?	Yes	No
17	Has the thought of ending your life been on your mind?	Yes	No
18	Do you feel tired all the time?	Yes	No
19	Do you have uncomfortable feelings in your stomach?	Yes	No
20	Are you easily tired?	Yes	No

Source: WHO, 1994

3.5.2 Independent variable

Household food insecurity severity was measured using the Food Insecurity Experience Scale (FIES) which is modelled as a latent trait and used to measure food insecurity prevalence. The FIES is an experienced-based metric of food insecurity severity developed by using a set of eight questions (i.e., the FIES-Survey Module, FIES-SM) with each response categorized as dichotomous; "yes" or "no" coded as 1 and 0 respectively. The set of questions are related to whether respondents had experienced challenges with regards to food security either due to lack of money or other resources that compromised their consumption of food between one and twelve months preceding the survey. Although there may be other conditions which inhibit a household or an individual from accessing food, these are said to be the latent conditions that are widely observed in different contexts (Cafiero, Viviani, and Nord, 2018). The FIES makes use of a total raw score of between 0 and 8 (i.e., when child FI is not the focus of the enquiry). Thus, the FIES-SM questions refer to the food insecurity condition experienced by only adults in the household. Based on the responses to the FIES questions, households were classified as either food secure or in one of two food insecurity categories (moderately or severely food insecure). To establish the relationship between food insecurity and the dependent variable, the FIES-SM is was grouped into 4 categories; "food secure (0), "mild FI" (1-3), "moderately FI" (4-6) and "severe FI" (7-8) using a raw score of 0 as reference (FAO, 2015). From this, an estimated sum of the moderately or severely food insecure $\mathbf{FI_{mod+sev}}$ and the severely food insecure $\mathbf{FI_{sev}}$ groups in the population can be computed.

3.5.2.1 FIES-SM questions

Table 3. 2: English version of self-reported FIES-SM questions associated with constraints due to lack of money or other resources

N	Label	Question wording
1	WORRIED	Were you worried that your household would run out of food because of lack of money or other resource to get food?
2	HEALTHY	Did your household lack enough money or other resource to get healthy and nutritious food?
3	FEWFOODS	Did you or any adult in your household have to consume a diet based on only few kinds of foods because of lack of money or other resources to get food?
4	SKIPPED	Did you or any adult in your household not eat breakfast, lunch, or dinner [or skip a meal] because of lack of money or other resources to get food?
5	ATELESS	Did you or any adult in your household eat less than you thought you should because of lack of money or other resources to get food?
6	RANOUT	During the last month, did your household run out of food because of lack of money or other resource to get food?
7	HUNGRY	Did you or any adult in your household feel hungry but did not eat because of lack of money or other resources to get food?
8	WHOLEDAY	Did you or any adult in your household eat only one meal in a day or go without eating for a whole day because of lack of money or other resources to get food?

Source: FAO, 2014

3.5.3 Intermediate variable

So far, there is no permanently established measurement for social support or a firm theory that captures its measurement precisely; researchers have often relied on more practical measurements. For this study, social support was conceptualized as received (i.e., whether the respondents received any form of support from family and friends, co-workers and employers, banks, local authorities, and other institutions) using three domains of social support in the dataset. These include support in cases where respondents had (1) major personal problems (2) problems obtaining food and (3) money problems. Social support was categorized into a dichotomous variable with respect to respondents who chose affirmative yes to one or more of

the forms of support available which was classified as "yes". For those respondents whose support came from neither of the received forms of support (i.e. self), they were perceived as not receiving any form of social support and consequently, classified as "no".

3.5.4 Control variables

There is a consensus that mental health status is not only the outcome of a persons' food insecurity situation and that there are other factors at play. To have a better understanding of the phenomenon, it became apparent to include some control variables which are individual's personal characteristics. The control variables used in this study were age, sex, ethnicity, level of education, marital status, household size, household head, alternative occupation, access to health insurance, access to financial services and district of residence. All the control variables used in this study were organized into categories, and as such measured as categorical variables.

Due to small cell counts in some variables, individual characteristics such as age of respondents although collected as a continuous variable, was categorized into 2 groups coded as less than 50 years, and above 50 years. Ethnicity of respondents was categorized into Krobo and minor ethnic groups. Ethnic groups which fall in the minor ethnic group category were made up of Akan, Ewe, Ga, Ashanti and Dangbe. District of residence was categorized in Yilo Krobo, Upper Manya Krobo and Lower Manya Krobo. Marital status of respondents was labelled as formerly in union, monogamous marriage, and polygamous marriage. Educational status, although reported as highest level of education as a continuous variable, was categorized into no education (none), primary and secondary. Respondents' alternative occupation (i.e., other than farming), access to health insurance and financial services were also categorized and measured as dichotomous variables, yes or no.

Household characteristics such as household size was collected as continuous variables but were categorized as 1-4 members above 5 members. Lastly, household head was grouped into either male and female adult or female adult only and measured as categorical variables.

Table 3.3: Measurement of variables

Variables	Measurement of variables
Age	It was obtained originally as a continuous variable but subsequently grouped into two categories, i.e. Less than 50 years = 1 and above 50 years = 2
Marital status	Initially measured by four categories but recoded into two categories, i.e. Formerly in union = 0, Monogamous marriage = 1 and Polygamous marriage = 2
Level of education	It was obtained originally as a continuous variable but subsequently grouped into three categories, i.e. None = 0 Primary = 1 and Secondary+ = 2
Household size	It was obtained originally as a continuous variable but subsequently recoded into groups with two categories, i.e. 1 – 4 = 1 and 5 and above = 2
Ethnicity	It was originally measured by seven categories. However, recoded into two categories, i.e., Minor ethnic groups = 0 and Krobo = 1
District of residence	Made up three categories Yilo Krobo = 1, Lower Manya Krobo = 2 and Upper Manya Krobo = 3
Household composition	It was originally coded as two categories, i.e. Male and Female adult = 1 and Female adult only = 2

Alternative occupation	Respondents' alternative occupation was originally categorized as either No = 0 or Yes = 1.
Health insurance	Respondents' health insurance status was originally categorized as either No = 0 or Yes = 1.
Access to financial service	It was made up of 6 sources of financial services (NGOs, Formal lenders, Informal lenders, Friends and relatives, Microfinance and Informal credit and savings groups) which was composited together and recoded as either No = 0 or Yes = 1
Social support	This variable was coded as No = 0 and Yes = 1
Food insecurity	Constituted an 8-item set of self-reporting questions which were reduced by composite sum and categorized as Food secure = 0 Mild = 1, Moderate = 2, Severe = 3
Mental health	Originally made up of a 20 item self-reporting questions which was reduced to a scale and categorized as No case = 0 Probable mental symptom = 1

Source: Author's construct, 2021

3.6 Methods of analyses

The study employed both descriptive and inferential statistics during the analyses of data. The International Business Machines Corporation (IBM) Statistical Package for the Social Science (SPSS) for Windows was employed at the advanced stages to analyse the data for this study. Descriptive statistics such as frequencies and percentages were used to summarize the characteristics of the respondents at the univariate analyses stage.

At the bivariate analyses stage, cross tabulations were conducted to test and establish relationships between each of the variables (i.e., dependent variables against each of the independent variables).

At the multivariate level, although the dependent variable (mental health) was originally captured using the 20 item self-reporting questionnaire (SRQ-20) over the last 30 days, it was recategorized into a composite sum to obtain two indices (i.e., a probable case of mental health distress and no case of mental health distress). The total numbers of affirmative yes responses between 0 to 7 and 8 to 20 were the two categories. As such, with the dependent variable binary in nature, the binary logistic regression was specified to establish the relationship between the dependent and independent variables and to explain which of the independent variables best predicts mental health distress. Respondents whose affirmative yes responses fall with 0 to 7 were classified as having no case of mental health distress thus, coded as 0. Concurrently, respondents whose yes affirmative responses fall within 8 to 20 were perceived as having a case of mental health distress subsequently coded as 0.

The binary logistic regression model can simply be expressed mathematically as;

$$\ln \frac{[P1-P]}{P} = b0 + b1.x1 + b2.x2 + \ldots\ldots\ldots\ldots bn.xn$$

Where,

P = Probability of the outcome variable (mental health distress)

b = constant value

b*i* = regression coefficients and x*i* …… x*n* = all independent (predictor) variables

The binary logistic model postulates that for all positive values of the regression coefficients (b_i), a unit increase in the predictor variable x_i increases the odds of the outcome variable's

occurrence. Therefore, when b*i* is negative, then the odds of the occurrence of the outcome variable is decreased with every unit increase in the predictor variable. Note that the odds ratio, labelled as Exp(β) is the factor by which the odds change with unit increases in the predictor variable. When the odds ratio is greater than 1, it indicates a positive relationship between the outcome variable and the predictor variable and thus, the likelihood that the outcome will occur is increased. However, odds ratios less than 1 shows a negative relationship between the outcome and predictor variable which reduces the likelihood of the outcome variable from occurring. For this study, all the predictor variables were nominal with different categories. The various categories for each predictor variable have a different Exp(β) which was used to explain if the odds of the occurrence of the outcome variable are increased or decreased in relation to a reference category. The significance level of the regression model was set at 0.05 (i.e. 95% confidence interval). To assess the overall model fit, the maximum likelihood ratio χ^2 test statistic and the Nagelkerke pseudo R^2 was used.

The results of the multivariate analysis are summarized using two models. In Model 1, all the independent variables (including control variables) except for social support (i.e., intermediate variable) are regressed against mental health distress. The second model presents a binary logistic regression model of food insecurity regressed against mental health distress, while controlling for all other variables including social support (Model 2). This was done to establish the influence of social support on the model.

3.7 Limitation of the study

Like any other research work, this study encountered some limitations. For instance, due to time constraint and use of only secondary data, this study does not include a qualitative (i.e., ethnography) aspect which would have been ideal to capture the lived experience of food insecurity as other authors have recommended. Another limitation is that, instead of the 12-month reference period used by the FAO to measure food insecurity prevalence rates, this study used a 30-day reference period. Again, the variable social support was used without a reference period within which respondents may have reported.

CHAPTER FOUR

BACKGROUND CHARACTERISTICS OF RESPONDENTS

4.0 Introduction

In this chapter, three main sections are presented and discussed. The first section (univariate analysis) describes the background characteristics of the 165 respondents taking into consideration socio-demographic features as well as a summary of the main independent and dependent variable. This was done to explore the variations that exist in the study. The second section (bivariate analysis) examines the relationship between each of the independent variables and the dependent variable. In the third section, the multivariate component of the study is conferred.

4.1 Univariate Analysis

The background characteristics of the respondents were presented using descriptive statistics (i.e., frequency distribution) with the aid of a table. The variables of interest (both dependent and independent) were all categorical in nature and mutually exclusive. Table 4.1 shows the distribution of respondent's characteristics used in the study. Results obtained from this study were carried out on 165 respondents; all of which were predominantly women.

4.1.1 Food Insecurity Prevalence

Table 4.1 indicates that among the 165 respondents included in the study, about one-third (34.5%) were food secure. Meanwhile, a smaller proportion (20.0%) of the respondents reported that they were mildly food insecure.

4.1.2 Mental Health Prevalence

Results obtained from Table 4.1 suggest that a greater proportion (57%) of the 165 respondents had mental health symptoms whilst a lower proportion (43%) of the respondents had no case of mental health symptoms 30 days prior to the study.

4.1.3 Background Characteristics of Respondents

It can be observed from the Table 4.1 that, about 66% of the respondents were in the age group less than 50 years with about 34% in the age group 50 years and above. A high proportion (48.5%) of the respondents were in a monogamous marriage whilst a little over 20% were formerly in union. Respondents who were formerly in union were made up of those divorced and widowed. With regards to the level of education, a high proportion (67%) of the respondents had obtained primary, secondary, or tertiary education. Meanwhile, about 33% of the respondents had no education. Also, majority (83%) of the respondents belonged to the Krobo ethnic group. Additionally, it can also be observed from Table 4.1 that, a higher proportion (40.6%) of these respondents reside in Yilo Krobo with a lower proportion (26.7%) residing in Upper Manya Krobo. On household size, majority (58.8%) of the respondents were reported to live in households that were made of up 5 or more members. A higher proportion (73.3%) of the respondents lived in households made up of both a male and female adult. The results also reveal that, a higher proportion (69.1%) of the respondents did not have an alternative occupation. In addition to this, it can be observed that over 67% of the respondents had access to the National Health Insurance. Also, about 58% of the respondents did not have access to financial services. About 27% of the respondents did not have any form of social support.

Table 4. 1: Percentage distribution of background characteristics of respondents

Respondent's characteristics	Frequency	Percent %
Age		
Below 50 years	109	66.1
Above 50 years	56	33.9
Marital status		
Formerly in union	34	20.6
Monogamous marriage	80	48.5
Polygamous marriage	51	30.9
Level of education		
None	54	32.7
Primary	88	53.3
Secondary +	23	13.9
Ethnicity		
Krobo	137	83.0
Minor ethnic groups	28	17.0
District of residence		
Yilo Krobo	67	40.6
Lower Manya Krobo	54	32.7
Upper Manya Krobo	44	26.7
Household size		
1 – 4	68	41.2
5 +	97	58.8
Household Composition		
Male and Female adult	121	73.3
Female adult only	44	26.7
Alternative occupation		
No	114	69.1
Yes	51	30.9
Health insurance		
No	54	32.7
Yes	111	67.3
Access to financial services		
No	95	57.6
Yes	70	42.4
Social support		
No	45	27.3
Yes	120	72.7
Food Insecurity status		
Food secure	57	34.5
Mild	33	20.0
Moderate	42	25.5
Severe	33	20.0

Mental health distress		
No case	71	43.0
Probable case	94	57.0
Total	**165**	**100**

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2 Bivariate Analysis: Relationship between the dependent and independent variables

Included in this section is the relationship that exist between each of the independent variables (inclusive of the control and intermediate variables) and the dependent variable. These are respondents' age, marital status, level of education, household size, ethnicity, district of residence, household composition, alternative occupation, access to health insurance and financial services as well as social support and food insecurity and their relationship with mental health. To examine the outcome of the relationship, the Chi-square test statistics was employed. Using an alpha value of 0.05 or a 95% confidence interval, it was established that a test statistic with a p value greater or equal to 0.05 suggests no significant association between the dependent and that independent variable. Consequently, a test statistic with a p value less than 0.05 indicates a significant association among the dependent and independent variables. The results of the bivariate analysis are presented in separate tables for each independent variable.

4.2.1 Food Insecurity and Mental Health Distress

The results from Table 4.2 indicate that there is a significant relationship between a respondent's food insecurity status and mental health distress. This can be inferred from the table with a chi-square test statistic with a p-value of < 0.001. Mental health distress was highest amongst respondents who had severe food insecurity (84%) and reduced as food insecurity decreased. There was very little difference in mental health distress between respondents who were mildly food insecure (39.4%) and those who were food secure (38.6%).

Table 4. 2: Relationship between respondent's food insecurity status and mental health distress

Food insecurity status	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
Food secure	61.4	38.6	57
Mild FI	60.6	39.4	33
Moderate FI	26.2	73.8	42
Severe FI	15.2	84.8	33
Total	43.0	57.0	165
χ^2 = 27.329 df = 3 p-value = < 0.001			

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.2 Social Support and Mental Health Distress

The results from Table 4.3 indicate that there is no significant relationship between social support and mental health distress. This can be inferred from Table 4.3 which shows a chi-square test statistic with a p-value of 0.898. From the table, 56.7% of the respondents who had some form of social support are reported to have mental health distress compared to 57.8% who did not have any form of social support.

Table 4. 3: Relationship between social support and mental health distress

Social support	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
No	42.2	57.8	45
Yes	43.3	56.7	120
Total	43.0%	57.0%	165
χ^2 = 0.016 df = 1 p-value = 0.898			

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.3 Age and Mental Health Distress

The results from Table 4.4 indicate that there is no significant relationship between a respondent's age and mental health distress. This can be inferred from Table 4.4 which shows

a chi-square test statistic with a p-value of 0.304. About 63% of respondents who reported probable case of mental distress were above 50 years.

Table 4. 4:Relationship between respondent's age and mental health distress

Age	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
Below 50 years	45.9	54.1	109
Above 50 years	37.5	62.5	56
Total	43.0	57.0	165
χ^2 = 1.058 df = 1 p-value = 0.304			

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.4 Marital Status and Mental Health Distress

The results from Table 4.5 indicate that there is no significant relationship between a respondent's marital status and mental health distress. This can be inferred from Table 4.5 which shows a chi-square test statistic with a p-value of 0.968. From the table, it can be observed that, probable case of mental health distress is highest (58.8%) among respondents who were formerly in union compared to those who were in monogamous marriages (56.2%).

Table 4. 5: Relationship between respondent's age and mental health distress

Marital status	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
Formerly in union	41.2	58.8	34
Monogamous marriage	43.8	56.2	80
Polygamous marriage	43.1	56.9	51
Total	43.0	57.0	165
χ^2 = 0.065 df = 2 p-value = 0.968			

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.5 Level of Education and Mental Health Distress

The results from Table 4.6 indicate that there is no significant relationship between a respondent's level of education and mental health distress. This can be inferred from Table 4.6 which shows a chi-square test statistic with a p-value of 0.257. A high proportion (64.8%) of the respondents with no education reported probable case of mental health distress followed by respondents who had secondary or above education (60.9%).

Table 4. 6: Relationship between respondent's level of education and mental health distress

Level of education	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
None	35.2	64.8	54
Primary	48.9	51.1	88
Secondary+	39.1	60.9	23
Total	43.0	57.0	165
	χ^2 = 2.720 df = 2 p-value = 0.257		

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.6 Household Size and Mental Health Distress

The results from Table 4.7 indicate that there is no significant relationship between household size and mental health distress. This can be inferred from Table 4.7 which shows a chi-square test statistic with a p-value of 0.934. 57.4% of respondents who reported a probable case of mental health distress lived in households with 1 - 4 members. Similarly, about 57% of the respondents who lived in households made up of 5 or more members were reported to have a probable case of mental health distress.

Table 4. 7: Relationship between household size and mental health distress

Household size	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
1 – 4	42.6	57.4	68
5+	43.3	56.7	97
Total	43.0	57.0	165
χ^2 = 0.007 df = 2 p-value = 0.934			

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.7 Ethnicity and Mental Health Distress

The results from Table 4.8 indicate that there is no significant relationship between a respondent's ethnicity and mental health distress. This can be inferred from Table 4.8 which shows a chi-square test statistic with a p-value of 0.391. It can be seen from the table that, about 64% of the respondents who reported probable case of mental health distress were from the minor ethnic groups compared to 55.5% of the respondents who are from Krobo ethnic group.

Table 4. 8: Relationship between respondent's ethnicity and mental health distress

Ethnicity	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
Krobo	44.5	55.5	137
Minor ethnic groups	35.7	64.3	28
Total	43.0	57.0	165
χ^2 = 0.736 df = 1 p-value = 0.391			

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.8 District of Residence and Mental Health Distress

The results from Table 4.9 indicate that there is no significant relationship between a respondent's district of residence and mental health distress. This can be inferred from Table 4.9 which shows a chi-square test statistic with a p-value of 0.997. More than half (57%) of the

respondents in each of the districts were reported to have a probable case of mental health distress.

Table 4. 9: Relationship between respondent's district of residence and mental health distress

District of residence	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
Yilo Krobo	43.3	56.7	67
Lower Manya Krobo	42.6	57.4	54
Upper Manya Krobo	43.2	56.8	44
Total	43.0	57.0	165
	χ^2 = 0.006 df = 2 p-value = 0.997		

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.9 Household Composition and Mental Health Distress

The results from Table 4.10 indicate that there is no significant relationship between household head and mental health distress. This can be inferred from the table which shows a chi-square test statistic with a p-value of 0.492. About 61% of households which comprise of female adult only were reported to have the highest probable mental health distress compared to 55.4% of respondents who lived in households made up of male and female adult.

Table 4. 10: Relationship between household composition and mental health distress

Household head	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
Male and female adult	44.6	55.4	121
Female adult only	38.6	61.4	44
Total	43.0	57.0	165
	χ^2 = 0.473 df = 1 p-value = 0.492		

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.10 Alternative Occupation and Mental Health Distress

The results from Table 4.11 indicate that there is no significant relationship between a respondent having an alternative occupation and mental health distress. This can be inferred from Table 4.11 which shows a chi-square test statistic with a p-value of 0.085. A high proportion (61.4%) of the respondents who did not have an alternative occupation reported to have probable mental health distress compared to 47.1% of the respondents who had an alternative occupation.

Table 4. 11: Relationship between alternative occupation and mental health distress

Alternative occupation	**Mental health distress 7/8**		**Number**
	No case (%)	**Probable case (%)**	
Yes	52.9	47.1	51
No	38.6	61.4	114
Total	43.0	57.0	165
	χ^2 = 2.958 df = 1 p-value = 0.085		

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.11 Health Insurance and Mental Health Distress

The results from Table 4.12 indicate that there is no significant relationship between a respondent's access to health insurance and mental health distress. This can be inferred from Table 4.12 which shows a chi-square test statistic with a p-value of 0.156. About 65% of respondents who did not have a health insurance were reported to have a probable case of mental health distress compared to 53.2% of the respondents who had a health insurance.

Table 4. 12: Relationship between respondent's access to NHIS and mental health distress

Access to NHIS	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
Yes	46.8	53.2	111
No	35.2	64.8	54
Total	43.0	57.0	165
χ^2 = 2.015 df = 1 p-value = 0.156			

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.2.12 Financial Service and Mental Health Distress

The results from Table 4.13 indicate that there is no significant relationship between a respondent's access to financial services and mental health distress. This can be inferred from Table 4.13 which shows a chi-square test statistic with a p-value of 0.321. A majority (61.4%) of the respondents who had access to some form of financial service reported to have a probable case of mental health distress compared to about 54% of the respondents who did not have access to any form of financial service.

Table 4. 13: Relationship between respondent's access to financial service and mental health distress

Financial service	Mental health distress 7/8		Number
	No case (%)	Probable case (%)	
Yes	38.6	61.4	70
No	46.3	53.7	95
Total	43.0	57.0	165
χ^2 = 0.986 df = 1 p-value = 0.321			

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.3 Multivariate Analysis

This section presents models which were used to estimate which variables best predicts the dependent variable. It relies on a multivariate analysis that seeks to establish the influence of food insecurity, social support, and respondent's socio-demographic characteristics on mental health distress. Two models are presented in this analysis.

4.3.1: Model 1 Binary logistic regression model of food insecurity and socio-demographic characteristics and mental health distress

Table 4.14 presents the binary logistic regression of Model 1. The overall model was statistically significant at a p-value of 0.000 with a chi square value of 47.58 with 16 degrees of freedom. A Nagelkerke pseudo R^2 value of 0.336 in model 1 shows that food insecurity and socio-demographic characteristics of respondents explains about 33.6% of the variation in mental health distress. In the model, food insecurity status, district of residence, and alternative occupation were significantly associated with mental health distress. The variables which were not statistically significant were age, marital status, level of education, household size, ethnicity, household composition, access to health insurance and, access to financial services.

In Model 1, it can be observed that food insecurity has a strong significant relationship with mental health distress. Compared to women in food secure households, women in moderately food insecure households are 7.71 times as likely to have a probable case of mental health distress, controlling for all other variables. Again, compared to women in food secure households, women in severely food insecure households are 19.47 times as likely to have a probable case of mental health distress, controlling for all other variables. However, there was no significant relationship in the likelihood of mental health distress between women in mildly food insecure households and women in food secure households.

In addition, the relationship between a respondent's district of residence and mental health distress was significant. Compared to women living in Upper Manya Krobo, women who live in Yilo Krobo are 0.23 times as likely to have a probable case of mental health distress. Women having an alternative occupation had a significant relationship with mental health distress. Compared with women with no alternative occupation, women with an alternative occupation were 2.44 times as likely to have a probable case of mental health distress. The results of the regression model are presented in Table 4.14.

Table 4. 14: Binary logistic regression model of the relationship between food insecurity and social support and socio-demographic characteristics on mental health distress

Indicator variables	Mental health distress 7/8			
	Model 1		Model 2	
	OR [95% CI]	p-value	OR [95% CI]	p- value
Food insecurity				
Food secure (*Ref)*	1.00		100	
Mild	1.12 [0.4, 3.1]	0.82	1.08 [0.4, 3.0]	0.89
Moderate	7.71 [2.6, 22.6]	< 0.001	7.83 [2.7, 23.1]	< 0.001
Severe	19.43 [4.8, 78.3]	< 0.001	20.26 [5.0, 82.5]	< 0.001
Social support				
No			0.76 [0.3, 1.8]	0.53
Yes *(Ref)*			1.00	
Age				
Less than 50 years (*Ref)*	100			
Above 50 years	1.95 [0.8, 4.6]	0.13	1.95 [0.8, 4.6]	0.13
Marital status				
Formerly in union *(Ref)*	1.00		1.00	
Monogamous marriage	2.30 [0.6, 8.5]	0.21	2.32 [0.6, 8.6]	0.24
Polygamous marriage	1.33 [0.3, 4.9]	0.67	1.32 [0.4, 4.9]	0.72
Level of education				
None	0.78 [0.2, 2.7]	0.67	0.79 [0.2, 2.7]	0.70
Primary	0.47 [0.1, 1.5]	0.21	0.47 [0.1, 1.5]	0.21
Secondary *(Ref)*	1.00		1.00	
Household size				
1 – 4	1.00 [0.5, 2.3]	0.99	1.01 [0.4, 2.3]	0.97
5 +	1.00		1.00	

Ethnicity				
Other	2.20 [0.6, 7.4]	0.20	2.71 [0.74, 9.92]	0.13
Krobo *(Ref)*	1.00		1.00	
District of residence				
Yilo Krobo	0.23 [0.1, 0.7]	0.01	0.23 [0.1, 0.7]	0.01
Lower Manya Krobo	0.75 [0.3, 2.0]	0.56	0.74 [0.2, 2.0]	0.55
Upper Manya Krobo *(Ref)*	1.00		1.00	
Household head				
Male and female adult	0.66 [0.2, 2.1]	0.49	0.64 [0.2, 2.0]	0.45
Female adult only *(Ref)*	1.00		1.00	
Alternative occupation				
No	2.44 [1.0, 5.7]	0.04	2.53 [1.1, 6.0]	0.03
Yes *(Ref)*	1.00		1.00	
Health insurance				
No	1.48 [0.6, 3.3]	0.35	1.46 [0.6, 3.3]	0.36
Yes *(Ref)*	1.00		1.00	
Access to financial services				
No	0.76 [0.3, 1.7]	0.52	0.78 [0.3, 1.8]	0.55
Yes *(Ref)*	1.00		1.00	
Nagelkerke's R2	0.336		0.339	
Model Chi square (df)	47.58 (16)	< 0.001	47.98 (17)	0.001

Source: Computed from the (2020) LinkINg Up dataset, December 2021

4.3.2: Model 2 Binary logistic regression model of food insecurity, social support, and socio-demographic characteristics on mental health distress

The overall model was statistically significant at a p-value of 0.000 with a chi square value of 47.98 with 17 degrees of freedom. A Nagelkerke pseudo R^2 value of 0.339 in model 2 shows that food insecurity and socio-demographic characteristics of respondents explain about 33.9% of the variation in mental health distress. Again, in the model, food insecurity status, district of residence, and alternative occupation were significantly associated with mental health distress. The variables which were not statistically significant were social support, age, marital status, level of education, household size, ethnicity, household composition, access to health insurance and, access to financial services. Given this relationship, it can be established that social support is not a strong predictor of mental health distress. Although social support was not significant, it made the model fit better. The inclusion of social support predicted 76.7% of the response correctly.

In Model 2, there is a strong significant relationship between food insecurity and mental health distress. Women in moderately food insecure households when compared to women in food secure households are 7.83 times as likely to have mental health distress, controlling for all other variables. Further, women in severely food insecure households are 20.26 times as likely as women in food secure households to have mental health distress, controlling for all other variables. However, there was no significant relationship in the likelihood of mental health distress between women in mildly food insecure households and women in food secure households. It can therefore be said that food insecurity is a strong predictor of mental health distress. Again, the results indicate that there is significant (p-value 0.01) relationship between district of residence and mental health distress. Women living in Yilo Krobo are 77.1% less likely to have mental health distress compared to women living in Upper Manya Krobo, controlling for all other variables. However, there was no significant relationship in the likelihood of mental health distress between women living in Yilo Krobo and women living in Upper Manya Krobo.

There was a significant relationship between having an alternative occupation and mental health distress. Women who did not have an alternative occupation when compared to women who had an alternative occupation were 0.34 times as likely to have a probable case of mental health distress, controlling for other variables.

Like social support, the relationship between age, marital status, level of education, household size, ethnicity, household composition, access to health insurance and access to financial services and mental health distress were all not statistically significant at a 95% confidence interval. The results obtained in both models were similar. This means that these variables were not significant predictors of the outcome variable (i.e., mental health distress).

4.4 Discussion of results

The first objective of this study was to examine the association between food insecurity prevalence and mental health distress over a 30-day reference period. Thus, in this study, food insecurity (i.e., access dimension) was conceptualized as a social determinant of mental health. The results obtained by the analysis both at the bivariate and multivariate levels indicated that food insecurity is a strong predictor of mental health distress as women from severely and moderately food insecure households were more prone to report mental health distress, compared to mildly food insecure households. Generally, it has been established that individuals within a population who are food insecure are more likely to be subjected to poor mental health. For instance, a study by Atuoye and Luginaah, (2017) using the Household Food Insecurity Access Scale and the DUKE Health Profile revealed that there is a strong relationship between food insecurity and mental health distress. This finding is consistent with the results obtained from this study. In rural Zambia, Cole and Tembo (2011) also made available evidence that suggested a strong relationship between food insecurity and mental health distress. This study is also consistent with Jones (2017) who also found a strong association between food insecurity and mental health status across 149 countries. Although the populations which were investigated were different across board, they share a common feature of being classified as rural. This may explain why the relationship is positive as historically, rural populations have been linked to poverty, with the later sharing a close link with elevated mental health distress.

Secondly, this study used the FIES to determine the situation of food insecurity prevalence amongst respondents. As previously established, a high prevalence of food insecurity has the potential to cause elevated mental health distress. The outcome of this objective was found at the univariate level with results indicating that about 35% of the respondents were food secure whilst 20% of them were mildly food insecure. Consequently, 25% and 20% of the respondents

were moderately or severely food insecure respectively. Alternatively, this can be expressed as 45% of the respondents are moderately or severely food insecure (FI $_{(mod+sev)}$). According to the FAO, IFAD, UNICEF, WFP (2020) populations experiencing severe food insecurity have possibly run out of food or have a gone a day (or days) without having food or eating. Likewise, populations experiencing moderate food insecurity at the household level have been confronted with the inability to obtain food and may have been forced to choose between the quality and/or quantity of the food they have access to. However, this cannot entirely be the case as these prevalence rates are obtained from a self-reported questionnaire consisting of 8 items that gives a final score that is used to determine food insecurity prevalence. Comparing the food insecurity prevalence rates, it appears that the 20% severe food insecurity obtained in this study is higher than the national average of 10% (GSS, 2021) but close to the SSA average of 20.3% and 21.3% in 2018 and 2019 respectively (FAO, IFAD, UNICEF, WFP, 2020). Whilst the proportion of moderate or severe food insecurity in this study is similar to the national average of 48% (GSS, 2021), the proportion of moderate or severe food insecurity in SSA is higher reported to be 55.1% and 56.8% in 2018 and 2019 respectively (FAO, IFAD, UNICEF, WFP, 2020) compared to 45% obtained in this study.

This study also set forward an objective to examine the prevalence of mental health distress in the study population. The results obtained at the univariate level revealed that 57% of the respondents had a probable case of mental health distress within the 30-day reference period. This could be explained by the prevalence of food insecurity coupled with other factors which further exacerbate the issues associated with mental health distress. This figure is about 3 times higher than what was observed by Sipsma and colleagues (2013) in Ghana between 2009 and 2010. They revealed that about 19% of their sample reported to have poor mental health. The difference in prevalence rates of mental health distress can be argued from the fact that different measurements and cut-off points were used. For instance, Sipsma et al. (2013) used the Kessler

Psychological Distress Scale (K10) to measure mental health distress with a sample size of 3,007 between 2009 – 2010. Again, the difference in sample size between this study and that of Sipsma et al., (2013) could account for the difference in prevalence rates. Nonetheless, the findings on high prevalence of mental health in women are corroborated by other literature which suggests that women are vulnerable to issues of mental health distress (Iverse and Cullen, 2011; Maynard et al. 2018).

The last objective of this study was to examine how social support mediates the relationship between food insecurity and mental health distress. Several studies have posited the mediating role of social support on food insecurity and mental health distress. In this study, the relationship between social support and mental health distress is not significant at both the bivariate and univariate analysis stage. Again, after controlling for all the variables including social support in Model 2, food insecurity was strongly associated with mental health distress. The findings in this study are not consistent with the conceptualization of social support by Cohen and Wills (1985) who argue that social support and support groups acts as buffers. Consequently, social support is expected to influence the outcome of relationships between food insecurity and mental health distress which is not the case in this study. However, other studies have shown a strong significant relationship between social support and mental health. Yang and Jiang (2020) found that different dimensions of social support influence mental health. For instance, they revealed that emotional support was significantly associated with mental health distress. However, this study does not separate social support into the 4 dimensions being discussed Yang and Jiang (2020) which gives a clear indication of the different aspects of social support and how they are associated with mental health distress.

The findings of this study showed a strong significant relationship between district of residence and mental health distress. District of residence was a significant predictor of mental health distress at the multivariate analysis level in both models however, not significant at the

bivariate level of analysis. The districts (i.e., Yilo Krobo, Upper and Lower Manya Krobo) examined in this study are more rural than urban. In spite of the fact that the health of rural populations has improved when compared to urban populations, they are worse off in many aspects of health outcomes (Eberhardt and Pamuk, 2004). Generally, there is evidence that suggests that rural populations have much better indicators of life satisfaction and feelings of well-being due to high levels of social cohesion, social capital, volunteering, civic participation and social support from families, friends and the community (Ziersch et al., 2009).

However, in matters related to mental health, people living in rural areas often feel stigmatized and generally do not seek help because of fear of confidentiality being breached, especially in smaller communities (Pierce et al., 2017). Lower levels of education among rural populations also influence their health seeking behaviour and their willingness to engage mental health professionals and services. Coupled with these, the issue of low income of rural populations also place them at a disadvantaged position to seek mental health services (Pierce et al., 2017). It appears that the majority population in this study have no or low levels of education and may not be able to afford mental health services even when it is made available.

The relationship between participants' alternative occupation and mental health distress at the bivariate analysis was not significant. Nonetheless, controlling for other variables at the multivariate level of analysis, it was observed that having an alternative occupation was a significant predictor of mental health distress. Participants who did not have an alternative occupation were more likely to have elevated mental health distress. Farmers in general often engage in other livelihood activities to supplement the income they earn from farming as well as provide a means to income security (International Labour Office, 2012). Therefore, not having an alternative occupation leads to chronic stressors such as financial problems which usually have detrimental effects on mental health (Parry, Lindsey, and Taylor 2005; Daghagh-Yazd, Wheeler, and Zuo, 2019).

Social support has been identified in the literature to modify the relationship between food insecurity and mental health amongst populations most vulnerable to food insecurity in SSA (Na et al. 2019b). However, in this study, the modifying influence of social support on food insecurity and mental health did not change relationship. It is possible that some respondents may not have obtained any form of support in the 30-day reference period. It must also be noted that other dimensions support, were not used in this study. Thus, respondents who received other forms of social support would be categorized as having "no" social support. This could influence its association with mental health distress.

The findings of this study show that age was not significantly associated with mental health distress even though the literature suggests that higher ages predicted mental health distress in Norway, United Kingdom, Ghana and, Kenya (Ambugo, 2014). This is consistent with a longitudinal study conducted in South Africa by Tomita and Ramlall (2018) which revealed that age was significantly associated with mental health. The measurement of age into two distinct categories in this study may account for the reason why it was not significantly associated with mental health. Thus, there is a likelihood that some respondents in the age group 50 and above do not have symptoms of mental health distress.

Marital status has been shown to be significantly associated with mental health. However, the relationship is not significant in this study. Health literature has shown that those who are married have better health. Compared to single or divorced people, married people had improved wellbeing and registered less cases of chronic and mental illnesses. However, the association between marriage and mental health may vary due to the variations in cultural norms on marriage especially in the African context.

The social concept of mental health is also different in different ethnic communities as some ethnic communities may not view it as a health outcome. Gender inequality in many rural

African societies also plays a key role. Gender inequality may render different mental health outcomes to both men and women as advanced by the sex role hypothesis (SRH). This may explain why ethnicity is not significantly associated with mental health.

The role of education on mental health has been established as people with better education are well informed to make better decision with regards to their mental health. Chevalier & Feinstein (2006) posit that education slows down the transition to depression of individuals suffering because of poor mental health. In this study, there is no significant association between the education and mental health. It is likely that effects of education reduce risk of mental health distress. However, these estimates are not direct and may be difficult to measure (Chevalier & Feinstein, 2006). Conclusively, the assumptions of the hypotheses were consistent with the findings of the study.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter has three sub-sections. These sub-sections seek to summarize the entire study, draw conclusions, and make recommendations.

5.1 Summary

The primary objective of this study was to establish the relationship between food insecurity and mental health distress among rural women farmers in three districts in the Eastern Region of Ghana; Yilo Krobo, Upper and Lower Manya Krobo. In addition, the study also sought to assess the prevalence of food insecurity and mental health distress within the study area and how social support mediates their relationship. The LinkINg Up dataset, collected in 2020 with a sample size of 165 was used for the study. Findings were obtained using three different levels of statistical analysis: univariate, bivariate and multivariate analyses. The univariate analysis was performed to precisely describe the background characteristics taking into consideration socio-economic and socio-demographic attributes. These were presented using frequencies and percentages. Both the bivariate and multivariate statistical analyses were employed to establish the relationship between the independent variables (i.e., control and intermediate variables) and mental health distress with the use of the chi-squares tests and binary logistic regression models.

The main independent variable (i.e., food insecurity status) was categorized into four groups; food secure, mildly food insecure, moderately food insecure and severely food insecure using the 20 item FIES questionnaire based on the household experience of food insecurity over a period of 30 days. Mental health distress was measured using the WHO's SRQ-20 mental health symptoms experienced over a period of 30 days. This was further computed to obtain

two categories (i.e., no case of mental health distress and a probable case of mental health distress).

The first objective of this study was to establish the relationship between food insecurity status and mental health distress. The results indicate that there is a significant relationship between food insecurity and mental health distress at both the bivariate and multivariate levels. This corroborates a similar study by Jones (2017) who found a strong association between food insecurity and poor mental health indices.

The second and third objectives of the study sought out to determine the prevalence of food insecurity and mental health distress among rural women farmers in the study area 30 days prior to the beginning of the study. The results show that 45% of the women were moderately or severely food insecure (i.e., $FI_{mod+sev}$). Again, the results of the univariate analyses show that 57% of the respondents had a probable case of mental health distress.

To establish how social support mediates the relationship between food insecurity and mental health distress, two regression models were used at the multivariate level of analysis. The first model was fitted controlling for all other variables except for social support. The second model controlled for social support, in addition to all the controls in Model 1. However, social support was not a significantly associated with mental health distress in Model 2. As previously established, there was a significant relationship between food insecurity and mental health distress in both models. Contrary to results from other studies, the inclusion of social support variable does not affect the relationship between food insecurity and mental health distress in this study. The study also reveals that district of residence and alternative occupation of the women were strong predictors of mental health distress at the multivariate levels in both models. However, the relationship between these variables and mental health distress was not

significant at the bivariate level. The relationship between all other variables and mental health distress was not significant at both bivariate and multivariate analysis.

5.2 Conclusion

Women farmers are vulnerable to many agricultural challenges including the issue of food insecurity despite their enormous contribution to the agricultural sector. Many studies on food insecurity in Ghana have looked at other specific populations but not on its effects on mental health of rural women farmers. Based on this premise, the first objective of this study was to establish the relationship between food insecurity and mental health distress. The results from this study demonstrated that as expected, there is an association between food insecurity and mental health. Food insecurity is a strong predictor of mental health. Women farmers, who are vulnerable to food insecurity are more likely to have reported elevated symptoms of mental health distress. In addition, this study found that having a form of social support by virtue of living in a community, having close ties and support from family and friends as well as other means of support from other organizations was not significantly associated with mental health distress. The issue of food insecurity is a global concern. Thus, when coupled with poor mental health as has been demonstrated in this study, there is a strong tendency to further exacerbate the situation making the subjected population (i.e., rural women farmers) more vulnerable to its detrimental effects. It is therefore imperative to address the issue of food insecurity and mental health on a much bigger scale across the length and breadth of Ghana focusing on both men and women farmers. In this study, there was no attempt to find a causal relationship between food insecurity and mental health but rather a focus on association between the two. In conclusion, the study hypotheses support the findings of this study. Additionally, the structural determinants of health outcomes and the food insecurity as a social determinant of health was seen to have an impact on mental health as demonstrated by the Social Determinants of Health model. The findings in this study also promote the use of Commission on Social

Determinants of Health (CSDH) framework for further studies on food insecurity as an important social determinant of mental health as recommended (Atuoye and Luginaah, 2017). This study provides an opportunity to assess the fundamental relationship that exist between food insecurity and mental health among some women farmers in rural Ghana with the use of the FIES and the SRQ-20. It also adds to the growing body of literature, specifically addressing the issue of poor mental health as a challenge that rural women farmers are face. Given that mental health issues are under prioritized in Ghana, this study offers a new perspective on how for food and public health policy options can be tailored to support farmers, particularly rural women farmers.

5.3 Recommendations

In view of the findings related to this study, and further conclusions drawn, it has been established that the issue of food insecurity and mental health cannot be over emphasized. The study proposes the following recommendations for policy and subsequent research into the subject matter.

First and foremost, the study recommends a need to promote mental health and related issues as part of a public health service to rural poor farmers in general who are most vulnerable to the agricultural challenges outlined by the Ministry of Food and Agriculture. These challenges put rural poor farmers across the country at risk of food insecurity and subsequently increasing the likelihood of elevated mental health distress. Therefore, it is imperative for NGOs, MoFA and other developmental organizations to include mental health and related issues as part of their social obligations and services rendered to farmers. Again, future sub agricultural policies such as the National Agricultural Investment Plan should categorically include health programs, including mental health for farmers. Agricultural Extension Agents (AEAs) should be given training on mental health and related issues to help the farmers cope with mental

health distress which may be caused because of food insecurity. This should be enforced and implemented by both the district directorates of MoFA and MoH.

This study revealed that food insecurity has implications on the mental health of women farmers. However, there is a need for a comparative study on the prevalence of food insecurity and mental health between men and women farmers in Ghana. In doing so, a preferably larger sample size would be required. In addition to this, future studies can focus on comparative studies between rural and urban farmers to determine if there are any variations between the populations.

Also, there is enough evidence that suggests the intermediary role that social support plays between food insecurity and mental health. However, this intermediary role could not be established in this study. Therefore, it would be interesting to research further this intermediary role of social support and how it influences the relationship between food insecurity and mental health. Since there are many aspects of social support, it will be ideal to have different categories of support. For instance, the influence of emotional support on mental health may give a different result compared to the influence of financial support on mental health. This will add on to how the many dimensions of social support influence mental health and its intermediary role between the latter and food insecurity.

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