SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE

by

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SUPERVISOR: PROF A MAVHANDU-MUDZUSI

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Dedication

To the Almighty GOD, for giving me strength, and for his endless love in my life.

To my kindhearted and loving wife— whose affection, love, encouragement and prayers make me to move on.

To loving memory of our little princess, Sinaf— who gone too early. You are alive in my heart and soul. Secret tears and loving thoughts will be with me forever.

I am also grateful to my grandma whose care, love and blessings will stay with me forever.

Student number: 46773924

DECLARATION

I declare that the thesis on **SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before for any other degree at any other institution.

04 January 2019

..... **.....**

SIGNATURE **DATE**

Fikadu Tadesse Nigusso

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ABSTRACT

The purpose of this study was to develop a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care. The study was organised in three phases. Phase one was a quantitative cross-sectional survey that employed a structured interview with people living with HIV among selected two public hospitals and three health centres. The second phase employed focus group discussion with senior health experts to explore their perspective and experience in integrating nutrition and food security with HIV prevention, treatment, and care.

The findings indicated that malnutrition and food insecurity were highly prevalent and significantly affected the treatment outcome and quality of life of PLWHA in the region. Socio-economic, clinical features and structural factors, such as educational status, place of residence, household income, source of drinking water, kind of toilet facility, inadequate dietary diversity, poor asset possession, opportunistic infections, duration on ART, CD4 cell count, and health system-related factors such as lack of viral and CD4 analysis laboratories and inconsistent antiretroviral medication supply were found as predictors of malnutrition and food insecurity. To cope up with the dire impact of malnutrition and food insecurity, short term, erosive and unsustainable food consumption coping strategies were employed.

Based on the findings, the researcher developed a support programme for facilitating the integration of nutrition and food security with HIV prevention,

treatment and care as phase three of the study. The developed programme is holistic and focuses on multi- and intersectoral collaboration to improve the treatment outcome, quality of life and overall wellbeing people living with HIV.

Keywords: Acquired Immune Deficiency Syndrome, Food security, Human Immunodeficiency Virus, integration, nutrition, programme, support

LIST OF ABBREVIATIONS

AIDS	Acquired immune deficiency syndrome
ANOVA	Analysis of Variance
ART	Antiretroviral Treatment
BG-RHB	Benishangul Gumuz Regional State Health Bureau
BMI	Body Mass Index
CD4	Cluster of Differentiation 4 Cell count
CSA	Central Statistical Agency
CSI	Coping Strategy Index
FAO	Food and Agricultural Organization of the United Nation
FGD	Focus Group Discussion
FHAPCO	Federal HIV/AIDS Prevention and Control Office
FMOH	Federal Ministry of Health
GTP	Growth and Transformation Plan
HAART	Highly Active Antiretroviral Treatment
HDDS	Household Dietary Diversity Score
HFI	Household Food Insecurity
HFIAS	Household Food Insecurity Access Scale
HIV	Human Immunodeficiency Virus
HRQoL	Health-related quality of life
MHS	Mental Health Score
OI	Opportunistic Infection
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
PHS	Physical Health Score
PLWHA	Peoples Living with HIV and AIDS
UN	United Nations
UNAIDS	United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNICEF	United Nations Children Emergency Fund
UNHCR	United Nations Higher Commission for Refugees
UNISA	University of South Africa

USAID	United States Agency for International Development
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organizations

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CHAPTER 1

INTRODUCTION AND ORIENTATION TO THE STUDY

1.1 INTRODUCTION

The human immunodeficiency virus (HIV) epidemic remains global. According to the joint United Nations Programme on HIV/AIDS (UNAIDS), 36.9 million people living with HIV globally in 2017. In the same year, the adult population living with HIV globally constitute 35.1 million [29.6 million–41.7 million] (UNAIDS 2018: 2). The new HIV infections are still high, albeit declining very slowly. In 2017 only, there were 1.8 million [1.4 million–2.4 million] people newly infected with HIV (UNAIDS 2018:2), whereas in 2015, there were closely 2.1 million newly HIV infected individuals globally (UNAIDS 2016a: 6). The reduction in new HIV infection is an encouraging result in responding to the HIV epidemic. However, AIDS-related deaths are still unacceptably high. In 2017 alone, 940, 000 [670 000–1.3 million] people died from AIDS-related illnesses (UNAIDS 2018:2). This high death rate though it is relatively lower than the 1.1 million people who died of AIDS-related illnesses worldwide by 2015 (UNAIDS 2016a:2), it is still unacceptable. Most of these death are related to nutrition and food security.

There is a strong relationship and interaction between nutrition and food security, and HIV related death (UNAIDS 2014a:1). The United Nations High Level Task Force on Global Food Security (2011:4) defined nutrition and food security as a situation when all people, at all times, have social, economic and physical, access to nutritious food which is sufficient and safe to meet their food preferences and dietary needs and to ensure a healthy and active life. Food and nutrition security bridges a number of societal challenges especially when connected with HIV/AIDS because there exists a multifaceted association between them (Aberman, Rawat, Drimie, Claros & Kadiyala 2014:563). One of those challenges is food insecurity which is described as the uncertainty of being unable to obtain adequate food do to having insufficient money or other necessary resources (Zekeri & Diabate 2014:1). Food insecurity usually leads

to malnutrition which is a state resulting from a lack of uptake or intake of nutritious food. Malnutrition leads to an alteration in the composition of the body and body cell mass may diminish the mental and physical function and disease clinical outcome (Cederholm, Bosaeus, Barazzoni, Bauer, Gossum, Klek, Muscaritoli, Nyulasi, Ockenga, Schneider, Schueren & Singer 2015:336). All the above situations undermine HIV prevention efforts. Malnutrition and food insecurity are recognised as daunting factors for antiretroviral treatment (ART) adherence among peoples living with HIV and AIDS (PLWHA) (Benzekri, Sambou, Diaw, Sall, Sall, Niang, Ba, Guèye, Diallo, Hawes, Seydi & Gottlieb 2015:9; Weiser, Hatcher, Frongillo, Guzman, Bangsberg & kushel 2013:96). To avert negative impacts of malnutrition and food insecurity on antiretroviral treatment outcomes, scientific studies recommend that countries should incorporate nutrition and food security concerns into HIV programming (Aberman et al 2014:562; Palar, Wagner, Gosh-Dastidar & Mugyenyi 2012:2379-2380; Weiser, Tsai, Gupta, Frongillo, Kawuma, Senkungue, Hunt, Emenyonu, Mattson, Martin & Bangsberg 2012:6; Hu, Jiang, Chen, He, Deng, Wang, Wang, Lu, Klassen & Zeng 2011:546).

The Ethiopian government is one of the countries committed to reduce the impacts of malnutrition and food insecurity among people living with HIV. In order to achieve that, the government has designed a national nutrition strategy to improve the delivery of nutrition services for communicable and non-communicable diseases, including HIV/AIDS. One such initiative is strengthening the capacities of health facilities/health professionals to deliver quality standard nutrition services to PLWHA (Government of Ethiopia 2013: 22). To help ensure this commitment and reduce the detrimental impacts, this study is designed to investigate the determinants of malnutrition and food insecurity, and to assess the outcome of nutrition and food security on treatment outcome and quality of life; so as develop support programme for facilitation of integrating nutrition and food security with HIV prevention, treatment and care in Ethiopia.

This chapter provides an overview of the entire study. It covers the background and a problem statement to the study. The chapter also presents the research purpose, research objectives and research questions. Methodological issues, such as research design and methods are also introduced in this chapter. The

final section of this chapter provides the layout of the entire thesis is provided at the end of this chapter.

1.2 BACKGROUND TO THE RESEARCH PROBLEM

The Joint United Nations Programme on HIV/AIDS (2015a:100) revealed that 80% of PLWHA live in only 20 countries of which thirteen are in the African continent. Amongst African Continent, Sub-Saharan Africa, with 25.8 million [24 million– 28.7 million] people living with HIV in 2014, remains the region which is most heavily affected with HIV (UNAIDS 2015a:100; UNAIDS 2014a:17-18). Though millions of people are already living with HIV and AIDS globally, millions are continuing to acquire new HIV infection each year (UNAIDS 2016:1; UNAIDS 2015a:100; UNAIDS 2014a:17). Accordingly, HIV/AIDS mitigation and response still requires the highest levels of commitment (UNAIDS 2016a:1; Trocaire 2011:1). The wavering commitment will ensure that HIV and AIDS continue to substantially add to health burdens in many regions of the world (UNAIDS 2015a:100).

Nutrition and food security have many forms of association among individuals, households and communities affected by HIV and AIDS. Food insecurity impacts on the overall nutrition and health status of those infected and affected by HIV and AIDS (Palermo, Rawat, Weiser & Kadiyala 2013:8). Lack of food security and poor nutritional status may hasten progression to AIDS-related illnesses, undermine adherence and response to antiretroviral therapy (Musumari, Wouters, Kayembe, Nzita, Mbikayi, Suguimoto, Techasrivichien, Lukhele, El-saaidi, Piot, Ono-Kihara & Kiha 2014:3). The HIV infection clearly affects nutritional status by increasing energy requirements, reducing food intake, and adversely affecting nutrient absorption and metabolism which leads to further immune deficiency, and contributes to the rapid progression of HIV infection to AIDS (Duggal et al 2012:2). HIV infection itself further undermines food security and nutrition by reducing work capacity, and productivity thus endangers household livelihoods (UNAIDS 2014a: 2; Laar, Manu, Laar, El-Adas, Amenyah, Atuahene, Quarshie, Adjei & Quakyi 2015:8). By doing so, HIV forces PLWHA to choose between accessing care and treatment or food (Weiser, Tsai et al 2012:7). Malnutrition, in turn, can exacerbate the effects of

HIV and hasten AIDS-related illnesses. Once a person is infected with HIV, the patient's nutritional status declines further leading to immune depletion and HIV progression (Duggal et al 2012:1; Hu et al 2011:546).

Food insecurity is also found to be strongly associated with treatment outcomes (Weiser et al 2013:8). For example, in Uganda, food insecurity is associated with HIV-related morbidity, increased hospitalizations and decreased utilization of outpatient care services (Weiser et al 2012:8). Food insecurity is associated with poor Virologic response among PLWHA receiving antiretroviral treatment (Wang, McGinnis, Fiellin, Goulet, Bryant, Gibert, Leaf, Mattocks, Sullivan, Vogenthaler & Justice 2011:1017). A similar study conducted in South Africa indicated that food insecurity is also strongly associated with severe depression especially among women (Tsai, Tomlinson, Comulada & Rotheram-Borus 2016:72) which significantly compromise the treatment outcomes through mental health ailment.

The Joint United Nations Programme on HIV/AIDS (2016:1) has shown that the number of people receiving ART has increased dramatically. However, malnutrition and food insecurity are reported as deterring factors for treatment adherence (Weiser et al 2012:8). In this regard, all the above studies indicate that there is a need for integration of nutrition and food security with HIV prevention, treatment, and care to improve nutrition outcomes (Spratt 2013:12). Food security focused HIV programming can effectively improve treatment adherence and reduce the prevalence of HIV (Aberman et al 2014:562; Palar et al 2012:2379-2380; Wiser, Hatcher et al 2013:96; Hu et al 2011:546).

High incidence and prevalence rate of HIV infection are pronounced among countries where there is a challenge in nutrition and food security (Young, Wheeler, McCoy & Weiser 2012:6; UNAIDS and World Health Organization [WHO] 2011:1). In Ethiopia, although the incidence and prevalence rates of HIV have shown a declining trend, there is still variations of the prevalence across the regions and peri-urban areas of the country (Federal Ministry of Health [FMOH] 2015: 31). The HIV prevalence is 1.5% in 2011 (Central Statistical Agency [CSA] and ICF International 2012:234) and 1.1% in 2016 (Ethiopian Health and Nutrition Research Institute Federal Ministry of Health 2012: 6). According to Federal HIV/AIDS Prevention and Control Office (FHAPCO)

(FHAPCO 2014a:12), in 2013, there were an estimated 793,700 [716,300–893,200] PLWHA and approximately 45,200 [36,500–55,200] AIDS-related deaths in Ethiopia. The HIV prevalence is higher among females (1.9%) than males (1%) of sexually active age groups (CSA and ICF International 2012:234). The HIV epidemic is becoming more concentrated among young people in urban areas and along major transport corridors (FHAPCO 2014a:13). The Federal Ministry of Health and FHAPCO determined that the proportion of infection is much higher among key population groups such as female sex workers (23%), truck drivers (4.9%), migrant/season labourers [2-7%], and prisoners (4.2%) (FHAPCO & FMOH 2014:8).

Ethiopia is among the countries in Sub-Saharan Africa, where widespread highest rates of malnutrition (FMOH 2015:30). The country also has the highest food insecurity especially among PLWHA (Tiyou, Belachew, Alemseged, & Biadgilign 2012:6; Tesfaye, Kaestel, Olsen, Girma, Yilma, Abdissa, Ritz, Prince, Friis, & Hanlon 2016: 5). Cognisant of the nutrition issues, the government of Ethiopia developed a national nutrition strategy and program that can be implemented in a multi-sectoral approach (FMOH 2015:30). The national nutrition programme approach is more focused on HIV/AIDS case management. To foster a continuum of HIV-health promotion, prevention, and long-term care, putting people living with HIV at the cornerstone of the HIV/AIDS response; provision of opportunity, skills and resources to unlock PLWHA and the communities potentials to become co-producers of nutrition, food security, and their health is imperative.

It is recommended that nutrition and food security interventions should form the integral component of national and international HIV/AIDS prevention, treatment and care programmes (Aberman et al 2014:562; Weiser et al 2013:96; UNAIDS 2014a:1-2; Tiyou et al 2012:1). The study, thus, is to develop PLWHA-centred nutrition and food security programme integrated with HIV prevention, treatment, and care.

1.3 STATEMENT OF THE RESEARCH PROBLEM

The UNAIDS has set a 90, 90, 90 (90% of people living with HIV know their HIV status; and of those who know their status, 90% of them receive treatment; and of those on HIV treatment, 90% have a suppressed viral load to ensure strong immune system and reduced possibility of transmitting HIV to other people) target to help end the HIV pandemic by the year 2030 (UNAIDS 2015b:5). Ethiopian government is committed to achieving the set target as it has made significant achievements on responding to HIV/AIDS (FMOH 2015:31; US President's Emergency Plan for AIDS Relief [PEPFAR] 2018:3). Despite the government's commitment, there are recognitions that malnutrition and food insecurity are highly prevalent and significantly impeding treatment outcomes and quality of life of PLWHA in the country (Hadgu, Worku, Tetemke & Berhe 2013:9; Tiyou et al 2012:6). As a result, most PLWHA are predisposed to malnutrition and food insecurity (Gebremichael, Hadush, Kebede, & Zegeye 2018: 5; Tesfaye et al 2016: 5). This makes PLWHA not to adhere to antiretroviral treatments as most of those treatments are supposed to be taken within relation to meals (either before, after or with food) (Young, Wheeler, McCoy & Weiser 2014:507; Anema, Kerr, Milloy, Feng, Montaner, & Wood 2014: 5; Berhe, Tegabu & Alemayehu 2013:6). Not having food to take with medication is one of the most common reasons for lack of adherence to ART (Kalichman, Washington, Grebler, Hoyt, Welles, Kegler, Kalichman & Cherry 2015:85; Singer & Wesier 2014:1521). Poor adherence to antiretroviral treatments means that the viral load will never be suppressed (Anema et al 2014: 5), leading to the continuous spread of HIV and also increased morbidity and mortality rate of PLWHA. These situations of lack of food security will hinder the Ethiopian government from achieving the UNAIDS 90-90-90 targets by the year 2030.

1.4 AIM OF THE STUDY

The aim of the study was to develop a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care.

1.4.1 Research objectives

The following were the study objectives set to reach the aim of the study:

- To investigate the determinants of malnutrition and food insecurity among PLWHA in Benishangul Gumuz Region.
- To assess the outcome of nutrition and food security on treatment outcome and quality of life of PLWHA.
- To determine the status of PLWHA in Benishangul Gumuz Region in relation to access to nutritious food to meet their needs.
- To explore PLWHA's coping strategies for malnutrition and food insecurity.
- To explore senior health experts' perspective and experience in integrating nutrition and food security with HIV prevention, treatment, and care.

1.4.2 Research questions

The following questions were used to achieve the research objectives:

- What are the determinants of malnutrition and food insecurity among PLWHA in Benishangul Gumuz Region?
- What is the outcome of nutrition and food insecurity on treatment outcome and quality of life of PLWHA?
- What is the status of PLWHA in the Benishangul Gumuz region in relation to accessing nutritious food to meet their subsidiary need?
- How PLWHA cope up malnutrition and food insecurity?
- What are the senior health experts' perspective and experience in integrating nutrition and food security with HIV prevention, treatment and care?

1.5 DEFINITIONS OF KEY CONCEPTS

1.5.1 Conceptual definitions

- **Acquired Immune Deficiency Syndrome (AIDS)** is a condition where there is a severe loss of the body's cellular immunity, which greatly lowers the resistance to infection and malignancy (Avert 2013:1).
- **Food security**- when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for active and healthy life (Food and Agricultural Organization of the United Nation 1996 food summit, par.1).
- **Human Immunodeficiency Virus (HIV)** - is a retrovirus that infects cells of the immune system, destroying or impairing their function (WHO 2016).
- **HIV prevention**- are interventions aimed at halting the HIV transmission to ensure prevention of its spread through a complementary combination structural, behavioural and biomedical strategies (AVERT 2016:1).
- **HIV care-** is a continuum of care for people living with HIV from initial diagnosis to the achievement of viral suppression (a very low level of HIV in the body) through HIV testing and diagnosis, getting and staying in medical care, getting on antiretroviral therapy, and achieving viral suppression by taking ART regularly (CDC 2018:1).
- **HIV treatment-** the use of combination antiretroviral therapy to attack the virus itself, and medications to prevent and treat the many opportunistic infections that can occur when the immune system is compromised by HIV (Henry Kaiser Foundation 2018).
- **HIV treatment and care**- is a comprehensive HIV and AIDS services aimed at improving the quality of PLWHA and mitigate the impacts of HIV/AIDS; includes prophylaxis drugs, such as cotrimoxazole, to prevent opportunistic infections, tuberculosis screening, screening for sexually transmitted infections, prevention with positives to reduce HIV transmission, family and nutritional support (CDC 2011:3).
- **Nutrition-** is the intake of food, considered in relation to the body's dietary needs (WHO 2016).

- **Support Programme**–is described as a means to support the implementation of a general policy or expenditure programme developed by a partner country, often in concert with donors (Brobäck & Sjölander 2001:2).

1.5.2 Operational definitions

- **Adherence—**adherence (to treatment) signifies the extent a client follows a prescribed medication or treatment regimen (Stricker, Fox, Baggaley, Negussie, De Pee, Grede, & Bloem 2014:466). In this study, adherence refers to the prescription and taking of antiretroviral treatment at the correct time intervals, on a daily basis of one's entire life. Thus, optimal suboptimal ART adherence is premeditated. Optimal ART adherence is a condition when the average adherence of the PLWHA is greater than 90% (missed < 2 doses of 30 doses or < 3 doses of 60 doses) and, suboptimal if the average adherence is less than 90% (missed >2 doses of 30 doses or >3 doses of 60 doses).
- **Food insecurity—**uncertain of having, or unable to acquire, enough food because of insufficient money or other resources (Zekeri & Diabate 2014:1). The essential components of food insecurity include-insufficient food intake, inability to access foods of sufficient dietary quality, worry or anxiety over food supplies, and having to acquire food in socially unacceptable ways (Bickel, Nord, Price, Hamilton & Cook 2000 cited in Ivers 2015:24). In this study, food insecurity refers to a condition when PLWHA lack access or unable to acquire sufficient food for themselves and households because of lack of money or production. Based on Coates, Swindale and Bilinsky (2007:14) household food insecurity access scale, was computed to measure the food insecurity status of the PLWHA and households. According to the score, the higher the score, the more the household is vulnerable to food insecurity, and the lower the score the likely food sufficient they are.
- **Health-related quality of life—**is a measurement of the health status of individuals (Romero, Vivas-Consuelo & Alvis-Guzman 2013:1). In this study, Health-related quality of life was measured based on PROMIS®10 global physical and global mental health scores. T-Score distributions are standardized such that a 50 represents the average (mean), and the

standard deviation around that mean is 10 points. Poor health-related quality of life was defined as one standard deviation or more below the PROMIS population norm.

- **Household effective dependency**—the effective dependency rate measures the share of total household members that are below or above working age plus those of working age who are chronically ill. Working-age individuals or producers are often defined as being 15–64 years of age, while those less than 15 years or older than 64 years are considered consumers (Rowland 2003 cited in Hadley, Belachew, Lindstrom, & Tessema 2011: 4). In this study, household effective dependency ratio was analysed to compare the percentage of the total population, classified as working age, that will support the rest of the nonworking age of the households.
- **Malnutrition**—a state of altered body composition and body cell mass resulting from lack of uptake or intake of nutrition resulting to diminished mental and physical function and alteration in desease clinical outcome (Cederholmet al 2015:336). In this study, the term malnutrition refers to solely undernutrition which can be determined based on the body mass index and found to be below 18.5 kg/m^2.
- **Treatment outcome—**evaluation undertaken to assess the results or consequences of management and procedures used in combating disease in order to determine the efficacy, effectiveness, safety, and practicability of these interventions in individual cases or series (National Centre for Biology Information 2018:1). In this study treatment outcome was assessed based on PLWHA ART adherence status.

1.6 THEORETICAL FOUNDATIONS OF THE STUDY

This section presents the research paradigm and Conceptual framework which guided the study.

1.6.1 Research Paradigm

A paradigm is as a way of looking at natural phenomena ant it is consisting of of philosophical assumptions which guide research approach (Polit & Beck 2012:736). This research is situated in a pragmatic paradigm, which

emphasises that reality arises out of actions, situations, and consequences rather than antecedent conditions (Creswel 2014: 11). The core assumption of this form of inquiry is that the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone. This study used a mixed method approach, because mixed method enables the researcher to quantitatively investigate the determinants of malnutrition and food insecurity, assess the outcome of nutrition and food security on HIV treatment outcome and quality of life of PLWHA, and statistically analyse the relationship with the data to be collected and evaluate their associations. Whereas, the qualitative approach helped the researcher to study senior health experts' perspective on integrating nutrition and food security with HIV prevention, treatment, and care.

1.6.2 Conceptual framework

A conceptual framework represents a philosophical perspective or a particular way of viewing knowledge that the researcher uses to inform a study (Clark & Creswell 2015:121). Based on the objective of the study, a modified combination of the "Nutritional, Mental health, and Behavioural pathways" conceptual framework propounded by Ivers (2015:26) and the World Health Organization (WHO) "people-centred and integrated health services ecosystem mapping" conceptual framework (WHO 2015a:13) were used. Both conceptual frameworks were used to serve different purposes.

1.6.2.1 Nutritional, mental health, and behavioural pathways conceptual framework

"A nutritional, mental health, and behavioural pathways" conceptual framework elucidated nutrition, food security and health (in this case, HIV/AIDS) are viciously intertwined (Ivers 2015: 26). The framework explores the impacts of malnutrition and food insecurity on HIV/AIDS treatment outcomes and quality of life in many ways. For example, the nutrition pathway mediates the impacts of food insecurity and malnutrition on HIV treatment outcomes through undernutrition, micronutrient deficiencies, and HIV wasting (Hailemariam, Bune & Ayele 2013:10-11). Whereas, the mental health pathway facilitates the effect of food insecurity on overall mental health through depression (Vogenthaler, Hadley, Rodriguez, Valverde, Del Rio & Metsch 2011:5) and worsens mental

health condition (Garcia, Hromi-Fiedler, Mazur, Marquis, Sellen, Lartey & Pérez-Escamilla 2013:4). Behavioural pathways, on the other hand, link food insecurity with high risk sexual behaviours such as inconsistent condom use (Tsai, Hung & Weiser 2012:5; Shannon, Kerr, Milloy, Anema, Zhang, Montaner & Wood 2011:4; Vogenthaler, Kushel, Hadley, Frongillo, Riley, Bangsberg & Weiser 2013:5), and sexual violence among women (Tsai, Leiter, Heisler, Iacopino, Wolfe, Shannon & Weiser 2011:1071), subsequent low ART adherence (<90%) (Young, et al 2014:515; Hong, Fanelli, Jonas, Gweshe, Tjituka, Sheehan, Wanke, Terrin, Jordan & Tang 2014:119-120).

The nutritional, mental health, and behavioural pathways conceptual framework assisted the researcher to position scientific evidence related to this study within this framework. The framework was used as a foundation to base scientific literature throughout the description of the role of nutrition and food security on treatment outcome and quality of life and further assisted to underpin facts with the body of knowledge to build up and investigate the determinants of malnutrition and food insecurity among PLWHA.

1.6.2.2 People-centred and integrated health services conceptual framework

The World Health Organization has developed a conceptual framework that provides the context for people-centred and integrated health services which focuses on individuals, families and communities and the relationship between these elements (WHO 2015a:13). This framework situated within a service delivery context that supports people-centred, integrated, universal, and equitable health services that can be offered through linkages and integrated networks within the health sector while receiving direct inputs from communities (see figure 1.1). Thus, this framework was used to conceptualise the evidence in practice and shape the development of integrated and accessible by all PLWHA, equitable, PLWHA-centred and sustainable support programme that facilitate for the integration of nutrition and food security with HIV care and treatment in Ethiopia.

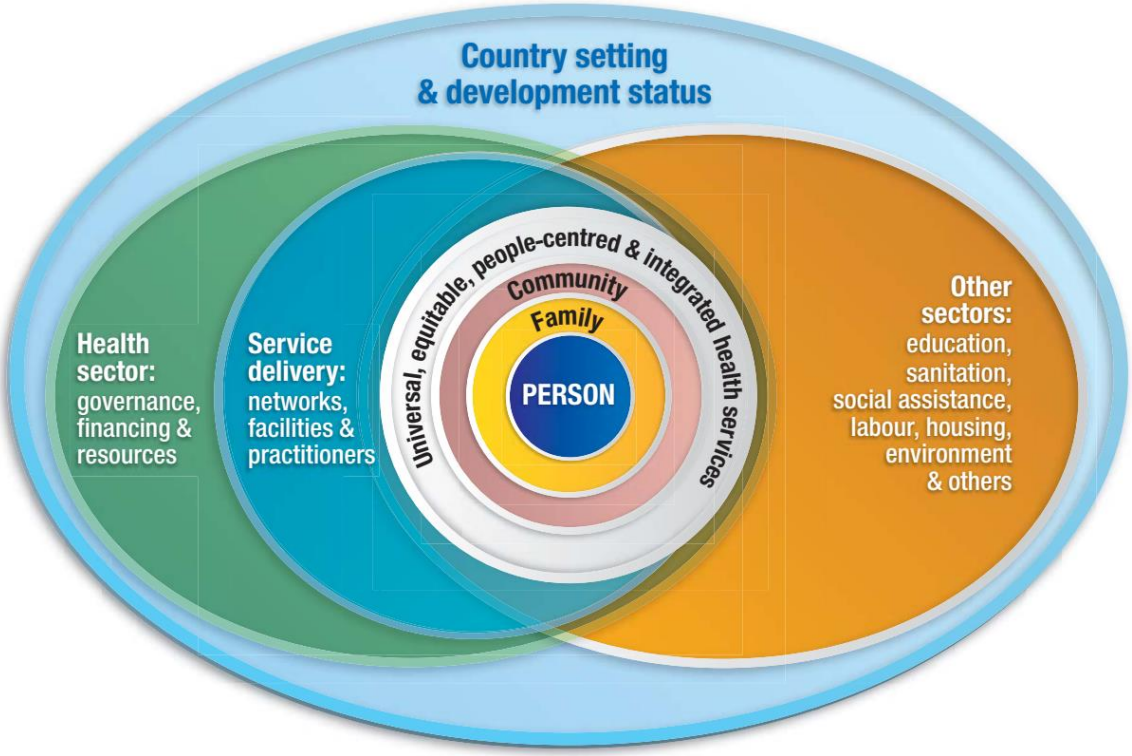

Figure 1.1 WHO's people-centred and integrated health services conceptual framework

(WHO 2015a:13)

1.7 RESEARCH METHODOLOGY

This section introduces the research setting, study design, scientific rigour and ethical aspects considered in this study.

1.7.1 Setting

The study was conducted in Benishangul Gumuz Region. Benishangul Gumuz Region is among the nine administrative regional states of Ethiopia, located in the North-Western part of the country. The total population of the region is estimated to be about 1,070,142 (Emergency Preparedness and Response–Benishangul Gumuz Region 2016:3).

1.7.2 The study design

A research design is a logical set of procedures that researchers use to collect, analyse, and report their data in a research study (Clark & Creswell 2015:192).

A mixed method research design comprising a set of procedures for collecting, analysing, and mixing both quantitative and qualitative method in a study to understand a research problem (Creswell & Clark 2011:54) was used in this study. The study researcher used was explanatory sequential design (Creswell & Clark 2015: 224) was adopted.

The study was done in three (3) phases. Phase 1, used a structured questionnaire to ascertain the determinants of malnutrition and food insecurity and the outcome of nutrition and food security on treatment outcome and quality of life of PLWHA. In phase 2, the qualitative study was used to explore and describe senior health experts' perspective on integrating nutrition and food security with HIV prevention, treatment and care. In phase 3, based on the findings from Phase 1 and 2 as well as by validating phase 1 and 2 by other senior health experts who are not part of those in phase 2, a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care is developed. More information regarding the phases of the study is presented in chapter 3.

1.8 SCIENTIFIC RIGOR

For the quantitative phase, the researcher used validity and reliability measure to ensure Scientific rigour. Four criteria of trustworthiness put forward by Lincoln and Guba (1985:301) namely: applicability, credibility, transferability and dependability were utilised to ensure that the qualitative findings are trustworthy. The processes followed are described thoroughly in chapter three.

1.9 ETHICAL CONSIDERATIONS

Research ethics is a set of principles that guides the researchers in what and how certain processes are supposed to be done or not done (Hammersley & Traianou 2012:17). Polit and Beck (2012:152) enlightened that any principles in which standards of ethical conduct in research conducted should maintain: beneficence, respect for human dignity and justice. Beneficence covers the dimensions of the right to protection from harm and discomfort. Respect for human dignity cover the dimensions of the right to self-determination and the right to full disclosure. Whereas, justice, the right to privacy and the right to fair

treatment is covered (Polit & Beck 2012:152-156). The processes followed to adhere to ethical principles are described thoroughly in chapter three.

1.10 STRUCTURE OF THE THESIS

This thesis layout is composed of seven chapters organized as follows:

Chapter 1: Introduction and orientation to the study: The first chapter introduces the study. The aim and objectives, theoretical framework, and the statement of the research problem pertinent to nutrition, food security and HIV/AIDS covers the orientation part. The significance of the study and the scope of the research are also given in this chapter.

Chapter 2: Literature review: In this chapter, global, regional and country perspective data sources relevant to the topic of the study are systematically explored and reviewed from published articles in journals or periodicals, internet publications, monographs, conference papers, theses and dissertations, clinical journals, textbooks, and other books. National and international strategic reports, policy documents, websites and reports developed by government agencies and professional organizations written on nutrition and food security in the case of peoples living with HIV are explored and reviewed. The chapter also presents the findings from the literature review.

Chapter 3: Research methodology: Research design and techniques employed during the study are explained in this chapter. Detailed information about the population and sample, instrumentation used, methods for data collection and analysis are presented, as well.

Chapter 4: Findings, presentation and analysis: In this chapter, the results of both the quantitative and qualitative part of the study, and their analysis are presented.

Chapter 5: Discussion and interpretation of the research findings: Chapter 5 discusses and interprets the findings of the study in line with the research questions the study purposed to answer.

Chapter 6: Support programme development: In this chapter, the development and description of PLWHA-centred support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care; based on the findings from empirical perspectives of the study as conceptualised following the WHO's people-centred and integrated health service conceptual framework (WHO 2015a:12) was developed.

Chapter 7: Conclusions and recommendations: Chapter 7 draws conclusions from the research findings, locates the limitations of the study, makes recommendations, and makes suggestions for further research.

1.11 CONCLUSION

This chapter has introduced the study. It provided the background of the study by presenting the relationship between food security and the outcome of HIV management. That gave rise to the problem statement which gave way to the aim, objectives and the research questions of this study. Theoretical framework and the research methodology are introduced in this chapter. The chapter also provides the layout of the entire thesis. The next chapter, which is chapter 2, provides a literature review.

CHAPTER 2

LITERATURE REVIEW

2.1. INTRODUCTION

In the previous chapter, detailed information has been presented regarding the overall orientation of the study including but not limited to the background, statement of the research problem, research objectives, research questions, theoretical framework and research methods. This chapter focuses on the literature review.

A literature review is a process where researchers locate books and journal articles on a topic, choose the literature to include in their review, and then summarise and critically evaluate the included literature (Clark & Creswell 2015:15). Grove, Gray and Burns (2015:163) described that literature reviews of published research reports provide the background for the problem studied. Such reviews include describing the current knowledge of a practice problem, identifying the gaps in this knowledge base, and explaining how the study being reported contributed to building knowledge in this area. Literature review conveys a researcher with what is and is not known about the research topic. It provides a sound base upon which new research can be founded (Paul 2012:1). In the current chapter, relevant studies that were conducted on factors of malnutrition and food insecurity, the result of nutrition and food security on treatment outcome and quality of life of PLWHA is broadly explored. The chapter provides the literature review process, thematic areas that emerged from of reviewed literature, theoretical framework used and the role of nutrition and food security on treatment outcome and quality of life, and also explored the determinants of malnutrition and food insecurity among PLWHA.

2.2 THE LITERATURE REVIEW PROCESS

The literature review process includes preparing evidence in a systematic approach (Aveyard 2014:74). For this study, the literature review was systematically carried out in reviewing existing evidence focused on factors

related to malnutrition and food insecurity, and the outcome of nutrition and food security on treatment and quality of life peoples living with HIV. The scope of the review is limited to English language publications, those studies published between the year 2011 and 2018, and literature which discuss nutrition and food security among PLWHA. Global, regional and country perspective data sources relevant to the topic of the study were systematically explored and reviewed from published articles in journals or periodicals, internet publications, monographs, conference papers, theses and dissertations, clinical journals, textbooks, and other books. National and international strategic reports, policy documents, websites and reports developed by government agencies and professional organizations were also included. The researcher reviewed websites and articles published on PLOS ONE, Cochrane systematic review database, PubMed, EBSCOhost, CINAHIL, BioMed Central Health Services Research, Google Scholar, SAGE and Elsevier/Embase. Guideline and periodicals published by UNAIDS, World Food Programme, WHO and FMOH of Ethiopia were also reviewed. Examples of terms used for literature search were: nutrition and HIV, food security and HIV, nutrition and food security and HIV, malnutrition and AIDS, food insecurity and HIV/AIDS, malnutrition and food insecurity and HIV/AIDS, malnutrition and ART outcome, impacts of malnutrition and food insecurity on quality of life among peoples living with HIV, food insecurity among peoples living with HIV, food insecurity and treatment outcome, and policies and programmes for HIV epidemic response.

2.3 THEMATIC DEVELOPMENT PROCESS

Polit and Beck (2012:97) recommend thinking of doing a literature review as similar to doing a qualitative study that is continuing the search strategies until redundant information and important themes were generated. Qualitative data analysis techniques are suitable for analysing literature as every selected literature whether regardless of the approach/methodology used contains several sources of qualitative data (for example, literature review of source article, conceptual or theoretical framework, author's interpretations, author's conclusion), thereby justifying within-case qualitative analyses (Onwuegbuzie, Leech & Collins 2012:3). With this in mind, the researcher used the framework method of data analysis technique to analyse and interpret the literature. The

framework analysis method sits within a broad family of analysis methods often termed thematic analysis or qualitative content analysis (Gale, Heath, Cameron, Rashid & Redwood 2013:2). According to Gale et al (2013:2), this approach is not aligned with a particular epistemological viewpoint or theoretical approach. Therefore it can be adapted for use in inductive or deductive analysis or a combination of the two (using pre-existing theoretical constructs deductively, then revising the theory with inductive aspects; or using an inductive approach to identify themes in the data, before returning to the literature and using theories deductively to help further explain certain themes).

In this study, the framework method of the data analysis (Gale et al 2013: 4-5) is used deductively using pre-existing theoretical constructs of nutritional, mental health and behavioral conceptual framework to map the connections of literature between the conceptual framework and generate typologies and interrogating prior concepts within the framework. As such, relationships identified, themes in the data or literature were arranged, written, and re-written across the conceptual framework. Nevertheless, the framework method of the analysis has seven steps, the last three: applying the analytical framework, charting data into the framework matrix and interpreting the data were utilised because the conceptual framework of this study was pre-specified. The process followed was as follows:

- Emerging transcripts from the literature review were categorised, coded and indexed in line to the nutritional, mental health and behavioural pathways conceptual framework through reading and re-reading of the literature.
- The reviewed data were charted into the nutritional, mental health and behavioural framework matrix. Transcripts of the review were captured in the framework to generate a data matrix from the reviewed literature and summarised into pre-identified nutritional, mental health and behavioural category from each transcript.
- Characteristics of and differences between ideas in literature, typologies with prior nutritional, mental and behavioural conceptual frameworks were mapped to generate connections across themes and to explore a relationship. Based on coded extracts and the data set in the review,

thematic analysis was generated and refined into the broad theme for discussion.

2.4 EMERGED THEMES

The following are the final themes that emerged from the appraisal of reviewed literature:

- The nutrition and food security context,
- Nutrition, food security and HIV,
- Determinants of malnutrition among people living with HIV,
- Determinants of food insecurity among people living with HIV,
- Nutritional, mental health, and behavioural pathways conceptual framework,
- Nutrition and food security, and HIV: nutritional, mental health, and behavioural pathways conceptual framework analysis on treatment outcome and quality of life nexus, and
- Nutrition and food security: policy support for integration into HIV and AIDS response programming.

2.4.1 The nutrition and food security context

Nutrition and food security is a multi-dimensional concept which includes dimensions such as the availability of food, physical and economic access to food, as well as adequate use and utilisation of available food by individuals, throughout the year (Trentmann, Latzke, Jülich & Oppeln 2015:5). Trentmann et al (2015:14) further explained the term ‘food security’ as the supply and access of food at national, community and household level, while ‘nutrition security’ refers to the consumption and proper utilisation of food in the body. Secure access to an appropriate and nutritious diet can only lead to good nutrition if coupled with sufficient care and good health.

Scarcity and lack of sustainability in nutrition and food security continue to be fundamental human welfare challenges in developing and developed countries. The rate and magnitude of malnutrition in the world are rising (FAO, IFAD,

UNICEF, WFP & WHO 2018:2). The absolute number of malnourished people has increased to nearly 821 million in 2017, from around 804 million in 2016 (see figure 2.1). According to the FAO et al (2018:2) report, the situation is worsening in South America and most regions of Africa. However, Africa remains the continent with the highest prevalence of malnutrition, affecting almost 21 percent of the population (more than 256 million people). The situation is also deteriorating in South America, where the prevalence of malnutrition has increased from 4.7 percent in 2014 to a projected five percent in 2017.

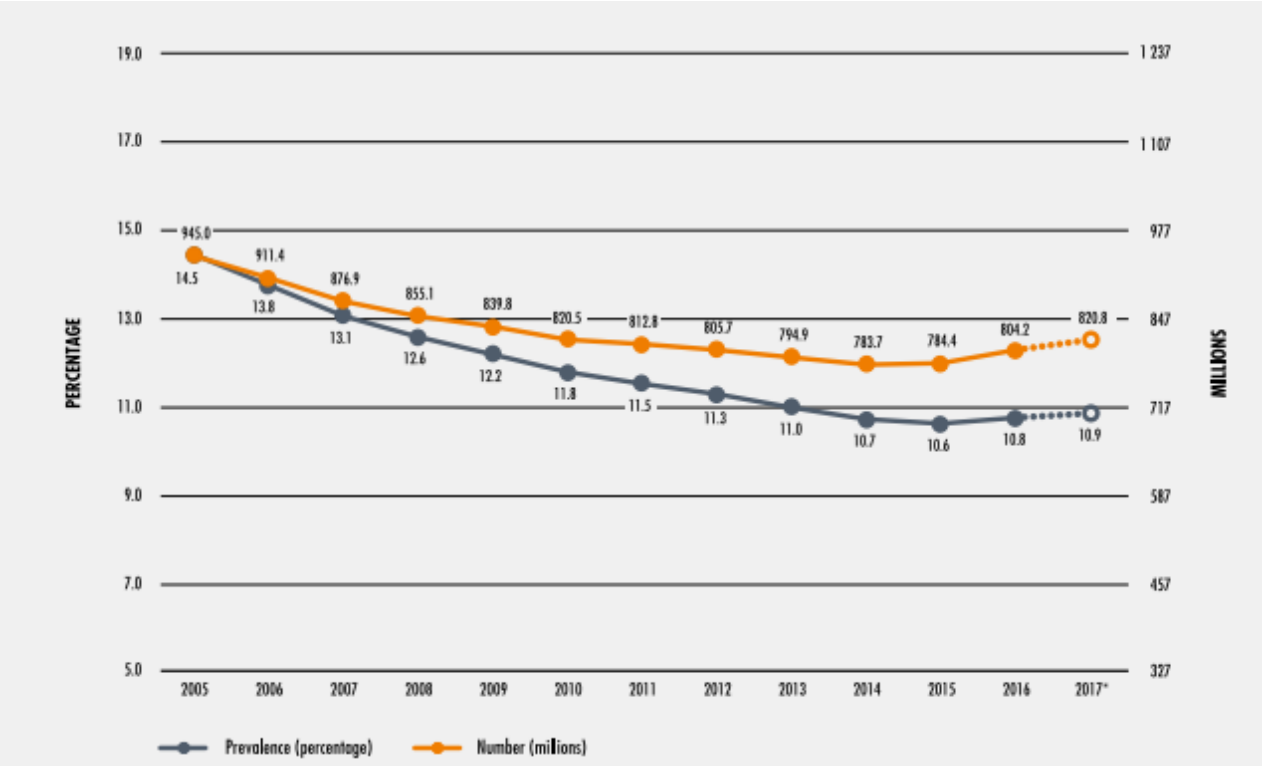

Figure 2.1 Global malnutrition trend from 2005 to 2017

(FAO, IFAD, UNICEF, WFP & WHO 2018:3)

From 2012–2014, about 805 million people were estimated to be chronically malnourished. The number of malnourished people has since then dramatically increase to 821 million in 2018 estimate report (FAO et al 2014:8). This means that, in every nine people in the world, one has insufficient food for an active and healthy life at a time. In 2014, just like the current FAO report, the trend of malnutrition was higher among Africa and South America regions of the world. For example, in 2014, the vast majority of the malnourished people were living in developing countries where an estimated 791 million, that is about one in

eight people in these regions or 13.5 percent of the overall population, remain chronically underfed and malnourished. Though the general prevalence of malnourishment in sub-Saharan Africa has declined, there are still countries with the highest prevalence where more than one in four people remain malnourished (FAO 2014:9). Thus, problems related to increasing food availability, feeding the population, improving nutritional status, and reducing poverty levels continue to confront decision makers (Babu, Gajanan & Sanyal 2014:7).

2.4.2 Nutrition, food security and HIV

This theme covers the nutrition and food security update in the global context. It also discusses the issue of malnutrition and food insecurity in the case of peoples living with HIV as a crucial path betterment in quality of life and treatment outcome.

Malnutrition and food insecurity are global challenges. They have a more detrimental effect on the life and livelihood of peoples living with HIV. The World Food Programme (WFP) (2016:1) corroborated that the HIV epidemic has a destructive impact on nutrition and food security, which may create a lethal cycle of illness and nutritional deprivation. The highest proportion of PLWHA is concentrated in Africa, especially Sub-Saharan Africa, where food insecurity and malnutrition are endemic (UNAIDS 2014a:3). In such countries where food insecurity and malnutrition are highly prevalent, there is growing evidence that HIV, malnutrition and food insecurity are intricately linked and exacerbate the harmful impacts of each other (Aberman et al 2014:562; Palermo, Rawat, Weiser & Kadiyala 2013:8).

Millions of HIV infected people live in countries where high levels of malnutrition and food insecurity are predominant. Among the 36.7 million people globally living with HIV in 2015, Sub-Saharan Africa remains most severely affected accounting for nearly 70% of the PLWHA worldwide where malnutrition and food insecurity are widespread (WHO 2017:1). Several studies have found that food insecurity has a negative impact on the overall nutritional and health status of those infected and affected by HIV and AIDS. People living with HIV

often express that food is the greatest need for themselves and their families (Aberman et al 2014:562; Palermo et al 2013:8). Malnutrition and food insecurity are associated with alteration of treatment outcomes among peoples living with HIV in many setups in the world (Weiser, Tsai et al 2012:8; Hailemariam, Bune & Ayele 2013:11). Not having food to take with medication is one of the most common reasons why patients discontinue antiretroviral treatment (Kalichman et al 2015:85; Singer & Wesier 2014:1521).

Malnutrition and food insecurity are significantly impeding health, wellbeing and health-related quality of life of PLWHA (Thapa, Amatya, Pahari, Bam & Newman 2015: 8; Tesfaye et al 2016:4). Studies have also shown that HIV contributes to food insecurity, reducing the work output of infected people living with HIV and the overall income and capacity of households to access an adequate diet and other essential needs (Martinez, Palar, Linnemayr, Smith, Derose, Ramirez, Farias & Wagner 2014:574). Food insecurity and malnutrition were recognised as major drivers of lack of sustained viral suppression among PLWHA and depression severity, particularly for women (Wang, McGinnis, Fiellin, Goulet, Bryant, Gibert, Leaf, Mattocks, Sullivan, Vogenthaler & Justice 2011:1017; Tsai, Tomlinson, Comulada & Rotheram-Borus 2016:72), therefore targeted intervention is recommended. To develop effective and targeted interventions to address malnutrition and food insecurity, better understanding of the relationships among various factors, including the predictors and the consequences of malnutrition and food insecurity is needed. The broad scope of nutrition and food security and their association with HIV, and roles on treatment outcome and quality of life of PLWHA is discussed below with the nutritional, mental health, and behavioral pathways conceptual framework.

2.4.3 Determinants of malnutrition among people living with HIV and AIDS

This theme is about the determinants of malnutrition among PLWHA. Factors mediating the manifestation of malnutrition in peoples living with HIV is explored.

There are several factors determining the occurrence of malnutrition. For instance, structural factors such as socio-economic; clinical characteristics, and

environmental factors are among well-studied features (Ivers 2015:25; Peletz, Mahin, Elliott, Harris, Chan, Cohen, Bartram & Clasen 2013:2597; Ruel, Alderman & the Maternal and Child Nutrition Study Group of International Food Policy Research Institute 2013:2).

Malnutrition is the outcome of imbalance of nutrient intake with physiological demand for growth, maintenance and reproduction. Both HIV and malnutrition can independently cause progressive damage to the immune system and viciously interrelate in many ways (Aberman et al 2014:563). The linkages between HIV/AIDS and malnutrition are many, strong, and long-lasting (see figure 2:2). Through a vicious cycle of immune dysfunction, infectious disease and malnutrition, the impact is altogether devastating in terms of human and economic development, food production and food security, and individual nutritional status. The HIV infection specifically affects nutritional status by increasing energy requirements, reducing food intake, and adversely affecting nutrient absorption and metabolism (UNAIDS 2014a:2; Laar et al 2015:8). Poor nutritional status is one of the major complications of HIV and a significant factor in full-blown AIDS. Malnutrition is one of the strong and independent risk factors for death among PLWHA (Argemi, Dara, You, Mattei, Courpotin, Simon, Hansmann, Christmann & Lefebvre 2012:1164). According to the UNAIDS and WHO (2011:2), the rate of PLWHA who are malnourished is two to six times more likely to die in the first six months of treatment than those who have a normal body mass index when they start antiretroviral therapy.

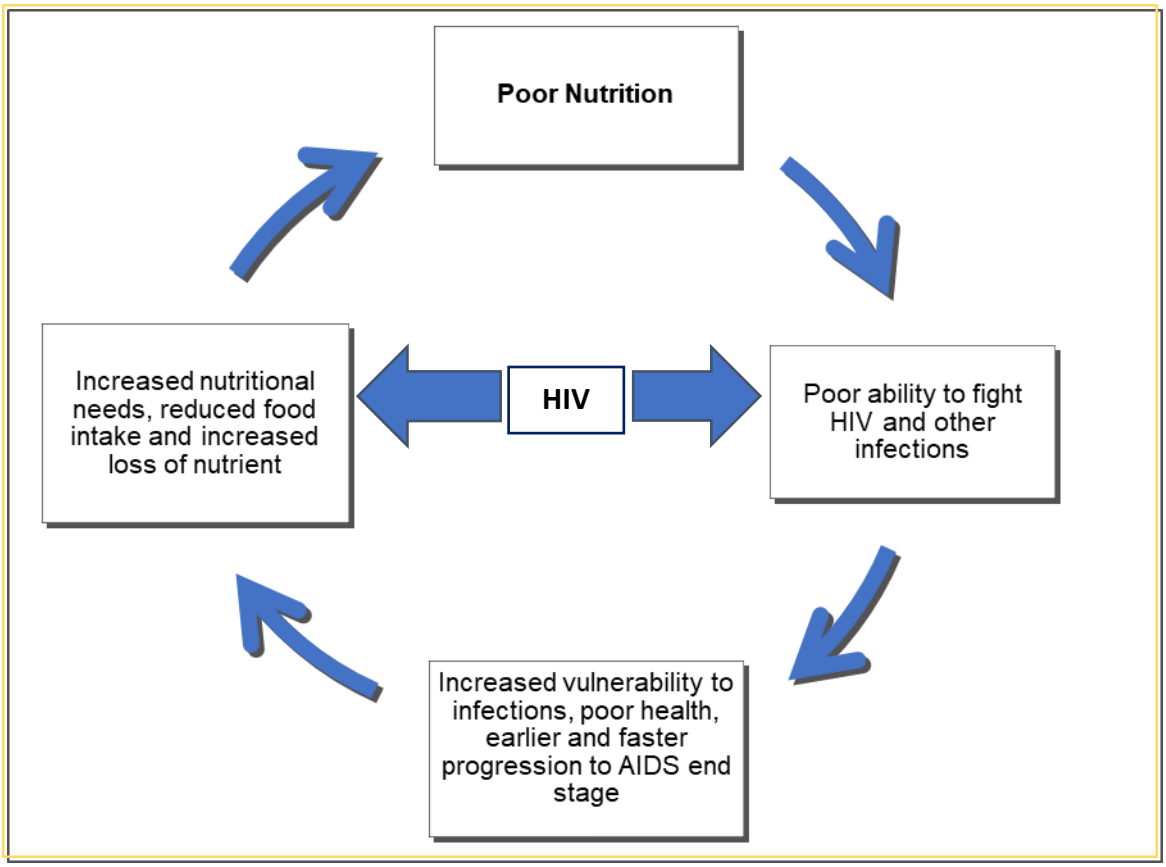

Figure 2.2 HIV/AIDS and Malnutrition vicious cycle

(adapted from Pal & Srivastav 2012:98)

The nature of the interactions between HIV and malnutrition emerge within particular local and wider socio-political and socioeconomic contexts. Studies conducted in different setups on malnutrition among PLWHA have shown that demographic, socio-economic and environmental factors such as gender, employment, income, opportunistic infection, drinking water, and sanitation were closely related determinants of nutritional status (Peletz et al 2013: 2597; Hailemariam et al 2013:10; Argemi et al 2012:1165). The causes of malnutrition are interconnected and are rooted in poverty, and are affected by cultural factors and social, economic and political structures that differ by context (Ivers 2015:25; Ruel et al 2013:2). The next paragraph discusses factors predicting malnutrition among PLWHA.

2.4.3.1 Demographic factors

Demographic factors such as gender, age, and educational status play an important role in determining food insecurity and malnutrition.

2.4.3.1.1 Gender

Gender is one of the determinant factors pronounced for predisposition to malnutrition. According to the UN Standing Committee on Nutrition, the nutritional status of girls and women is affected not only by biological factors but also by systematic inequalities within households and the sociocultural norms prevalent in a specific community. Given these unequal conditions, women and girls have poorer nutrition outcomes throughout the lifecycle, higher rates of mortality, less access to health care and greater household food insecurity (The UN Standing Committee on Nutrition 2004 cited in FMOH 2013:12). In countries where malnutrition is prevalent, evidence showed that women are more affected by malnutrition. A study conducted to determine predictor of malnutrition among PLWHA in Felege Hiwot referral hospital, Bahir Dar, Ethiopia (Daniel, Mazengia, Birhanu 2013:27), demonstrated that females are more affected by malnutrition. Similarly, women living with HIV receiving highly active antiretroviral therapy (HAART) in Addis Ababa, Ethiopia were twice more likely to be malnourished than men (Bayouh 2014:19). This is supported by FAO where higher levels of gender inequality is associated with higher levels of malnutrition, both acute and chronic (FAO 2011:12).

Siedner, Tsai, Dworkin, Mukiibi, Emenyonu, Hunt, Haberer, Martin, Bangsberg and Weiser (2012:4) conducted a study with the intention of investigating the association between low sexual relationship power and malnutrition in a sample of HIV-positive women in rural Uganda. Their findings thus far suggest that gender roles and power has affected the health outcomes and quality of life of women living with HIV and AIDS. There are also indications that gender-related dietary practice plays a role the proneness to malnutrition among PLWHA. For example, in Dar es Salaam, Tanzania, male HIV patients have poorer dietary practices than females (Abioye, Isanaka, Liu, Mwiru, Noor, Spiegelman, Mugusi, & Fawzi 2015:711) and thus found to be more susceptible to malnutrition and such practices were found contribute to faster progression of the disease in males. Thus, gender in terms of gender roles and gender-related dietary practice assigned for male and female PLWHA in a given community plays a critical role in implementing nutrition interventions effectively at household and community level. Such facts underscore the need for efforts that seek to mainstream gender into nutrition strategy and programming (FMOH

2013:13). Improvements in the nutritional status of women and girls will contribute to reducing gender inequality while at the same time breaking the cycle of intergenerational malnutrition.

2.4.3.1.2 Age

There are studies indicating that malnutrition is associated with age. For example, findings of the study conducted in Brazil indicate that as age increases, the prevalence of malnutrition increases among PLWHA (Andrade, Jesus, Andrade, Oliveira, Nabity & Ribeiro 2012:3). Similarly, older age was demonstrated as a risk factor for malnutrition in Addis Ababa, Ethiopia (Bayouh 2014:19). According to Bayou (2014:19), PLWHA who are above forty-eight years of age were more likely to be malnourished compared to those aged less than twenty-seven years. Another qualitative study conducted in Kenya showed that older age was found to be a predictor of malnutrition among people infected with HIV (Nagata, Magarenge, Young, Oguta, Weiser & Cohen 2012:731). Whereas, in Democratic Republic of Congo, those PLWHA who are less than fifty years old (age between 18 and 49 years old), had significantly lower means for weight, waist circumference, mid-upper arm circumference, and body mass index (BMI)—an indicator of malnutrition (Tshingani, Schirvel, Mukumbi, Ngambwe & Wilmet-Dramaix 2013:20). Likewise, young adults living with HIV and AIDS whose ages ranged between 18-29 years were associated with malnutrition in the study undertaken at Dembia district, Northwest Ethiopia (Mitiku, Ayele, Assefa & Tariku 2016:4).

2.4.3.1.3 Education

Illiteracy or lack of education is the underlying cause of many socio-economic and health problems. This was demonstrated in the study conducted in Nepal which indicates that illiteracy is a predictor of malnutrition among PLWHA (Thapa et al 2015:6). According to Thapa et al (2015:6), illiterate peoples living with HIV found to be twice as likely malnourished as people who could read and write. Similarly, lower schooling was found to be related to lower means for weight, waist circumference, mid-upper arm circumference and BMI in Kinshasa, Democratic Republic of Congo (Tshingani et al 2013:20). Illiterate PLWHA were twice more likely to be malnourished as compared to literate

among adult hospitalized patients at Amhara National Regional State Referral Hospitals, Ethiopia (Haile, Hailu & Tesfaye 2015:81). Haile et al (2015:81) reckoned that the possible reason for the high prevalence of malnutrition among illiterate PLWHA could be literacy level, awareness of dietary diversity, and lack of access to a balanced diet. On the other hand, illiterate educational status was not found to be a risk factor for malnutrition in a study conducted at Dilla University Referral Hospital, Ethiopia (Hailemariam et al 2013:5).

2.4.3.2 Socio-economic factors

Socio-economic factors such as employment and income play major roles in determining nutritional and food security status.

2.4.3.2.1 Employment

Employment opportunity and sustainability are one of the most pressing issues affecting PLWHA. Lack of employment was found as a predictor of malnutrition among PLWHA (Hailemariam et al 2013:5). According to Hailemariam et al (2013:5), the proportion of malnutrition was significantly higher in unemployed PLWHA compared to those employed and was associated with malnutrition. Another study also indicated that employed PLWHA demonstrated the better health-related quality of life (Imam, Karim, Ferdous & Akhter 2011:4). Thus, providing employment, and food assistance were associated with a better quality of life (Aberman et al 2014:19). Nevertheless, there are challenges for PLWHA to get and sustain employment as a result of their HIV status. For example, a qualitative study conducted in Singapore by Tan, Yong, Foong, Wong, Chew and Koh (2013:886), found the following five major challenges faced by PLWHA in possessing and sustaining employment after they discovered that they are HIV Positive: inability to ensure secrecy of diagnosis from employers, inability to secure financial resources for treatment and sustenance, inability to ensure stable health to meet job requirements, inability to cognitively sit with the concerns of uncertainty and limitations in career, and inability to work through discriminatory workplace practices.

Even if obtaining and sustaining employment as a result of HIV itself is a challenge, HIV infection is associated with frailty at work. This is because of the

disease progression which is associated with unemployment. For example, study conducted on factors associated with labour market participation among HIV-infected male PLWHA in Germany by Groß, Herr, Hower, Kuhlmann, Mahlich, & Stoll (2016:598), have shown that PLWHA who has faced frailty in their work at baseline compared to those who stayed employed during the two years' study period, was found to be losing their employment. The employment status of an individual is also related to income.

2.4.3.2.2 Income

Low income is a predictor of malnutrition among PLWHA (Tshingani et al 2013:20; Andrade et al 2012:4). Lower income is a common indicator of poverty (Fenton 2015:21; van Edig, Schwarz, & Zeller 2013:33). Among PLWHA, poverty has been identified to directly influence weight, waist circumference, and mid-upper arm circumference which are indicators of malnutrition. Poverty limits access to food, and this can increase the low weight which is the major determinant of malnutrition (Tshingani et al 2013:20). In a similar study conducted to determine the nutritional status and associated factors among adults living with HIV in Felege Hiwot Referral Hospital, Bahir Dar, Ethiopia, nearly half of them were with an average income of below poverty line and a quarter of them were malnourished (Daniel et al 2013:27).

2.4.3.3 Food insecurity

Food insecurity is both an outcome of and a contributor to the HIV/AIDS pandemic. Malnutrition among PLWHA remains a major challenge to achieve the full impact of interventions aimed at improving their quality of life, productivity and survival (Thapa et al 2015:6; Rawat, Faust, Maluccio & Kadiyala 2014:19; Daniel et al 2013:29). Severe food insecurity is associated with lower quality of life among PLWHA commencing antiretroviral treatment in Ethiopia (Tesfaye et al 2016:4). There is robust evidence supporting that food insecurity and malnutrition are strongly associated and sometimes overlap on structural factors (Aberman et al 2014:563; Weiser, Tsai, et al 2012:8). There are more suggestions that indicate food insecurity as a predictor of malnutrition among PLWHA (Thapa et al 2015:6; Hadgu et al 2013:4). This is shown in Tigray, Ethiopia where food insecure households of PLWHA were found to be

independently affected by malnutrition (Hadgu et al 2013:5). Same findings were noticed from the study conducted in Hossana, Southen Ethiopia by Asnakew, Hailu and Jarso (2015:9), which indicated that missing clinic appointments in search of food is associated with malnutrition (Benzekri et al 2015:8).

2.4.3.4 Dietary diversity

Inadequate dietary intake leads to poor nutrition and lowers immune system functioning. People living with HIV and AIDS are at a higher risk of malnutrition as HIV infection reduces food intake, thus lowering food absorption and increases nutritional needs (Laar et al 2015:8; Argemi et al 2012:1164). The demand increases significantly during the course of the infection posing additional challenges to PLWHA and their care providers. During such course of infection, diversified foods are recommended for peoples living with HIV and AIDS. However, lack of dietary diversity and poor dietary practice were found to predict malnutrition among PLWHA especially among the males (Abioye et al 2015:711). Malnutrition may contribute to the faster progression of the disease. Dietary diversity is associated with low income where food is insufficient (Sirotin, Hoover, Segal-Isaacson, Shi, Adedimeji, Mutimura, Cohen & Anastos 2012:3). Likewise, dietary diversity was found to be independent predictors of malnutrition among women living with HIV and AIDS in Ethiopia (Asnakew et al 2015:9; Hadgu et al 2013:5). Plenty of literature explored inadequately, and imbalance of essential nutrients diet intake was indicative of malnutrition. For instance, low dietary diversity score is found significantly associated with malnutrition among adult hospitalized PLWHA at Amhara National Regional State Referral Hospitals, Ethiopia (Haile et al 2015:83).

2.4.3.5 Environmental factors: water, sanitation and hygiene

Safe drinking water and sanitation are fundamental to nutrition. Lack of access to safe drinking water, sanitation facilities and hygiene practices undermines the nutritional status of people through water-borne diseases and chronic intestinal infections (Committee on World Food Security 2015:11). In a systematic review conducted by Peletz et al (2013:2598), lack of safe drinking water and sanitation were shown to be strongly associated with diarrhea-

related morbidity, and gastrointestinal illness which counts vomiting or abdominal cramps as well as diarrhea. On another hand, opportunistic infections like diarrhea were demonstrated to be a predictor of malnutrition among PLWHA through HIV and malnutrition vicious cycle interactions (Andrade et al 2012:4; Thapa et al 2015:8).

2.4.3.6 Clinical features

This section focuses on the clinical features that have an impact on nutrition and food security. The section focuses on the duration of ART, Cluster of Differentiation (CD)4 Cell count and Infection.

2.4.3.6.1 Duration on ART

Researchers recommend early initiation of ART to minimize and prevent the impacts of AIDS. Raiten et al 2005 cited in Kenea, Garoma, and Gemede (2015:93), explain the important observations about the interaction between ART and nutritional status. They have outlined that initiating ART often leads to a reversal of symptoms caused by HIV such as malnutrition and loss of body mass and muscle mass. Increased appetite, improved food intake, and reduced viral load improve nutritional status. This improvement is associated with a reduction in morbidity and mortality from HIV related causes. Findings thus far suggest that early initiation of ART prevents malnutrition. This is indicated in a study conducted by Daniel et al (2013:29). According to the study of Daniel et al, PLWHA who stayed on ART for a longer duration were found to have health nutritional status in comparison to those who stayed for a short duration and to those not started ART. The researchers explained the reason for the improvement in nutrition among those who took ART for a longer duration, as a result contentious and consistent adherence counseling to ARV treatment throughout life. Accordingly, adherence improves the nutritional status of individuals. However, those PLWHA who started ART for less than twelve months after knowing their serostatus were found to be twice more malnourished than those who took the drug more than a year as a result of immune-related infection and inflammation (Daniel et al 2013:29). Nonetheless, in a study conducted in rural South Africa, ART duration was not associated

with a lower weight, a predictor of malnutrition among PLWHA (Mashinya, Alberts, Colebunders, Van & Geertruyden 2016:4).

2.4.3.6.2 Cluster of Differentiation (CD)4 Cell count

Researchers established evidence of an association between CD4 count and malnutrition in different setups. Food insufficiency among PLWHA who are poverty stricken was found to have lower CD4 cell counts (Benzekri et al 2015:4; Thapa et al 2015:8; Weiser, Tsai et al 2012:6). A study conducted in Dembia district, Northwest Ethiopia (Mitiku et al 2016:5) and Jimma University specialized hospital (Mulu, Hamza & Alemseged 2016:223) revealed lower CD4 count (less than 200 cells/mm^3) was found to be associated with malnutrition among PLWHA. Likewise, lower CD4 count (less than or equal to 200 cells/mm^3) were shown as independent predictors of mortality among hospitalized HIV-infected patients in Bangladesh (Shahrin, Leung, Matin, Pervez, Azim, Bardhan, Heffelfinger & Chisti 2014:6). Therefore, it is evident that lower CD4 count is associated with malnutrition and affect the quality of life of people living with HIV. Another study in Zambia, by Fofana (2016:21) on the correlation between nutritional indicators and CD4 count among HIV positive adults, established lower CD4 count (less than 200 cell/mm^3) is associated with malnutrition. From this evidence, the higher the CD4 count, the lesser the risk of PLWHA to be affected by malnutrition. This is also demonstrated among studies undertaken by Mashinya et al (2014:4) where malnutrition is not demonstrated among PLWHA whose CD4 count is greater than 350 cells/mm^3, and also among study participants initiated ART in Addis Ababa, Ethiopia (Bayouh 2014:19). Nonetheless, in the cohort of African women initiating ART where no measure of malnutrition intervention prior to ART was taken, consistent change in CD4 count at 6, 12, and 24 months of follow up were detected, suggesting that poorer pre-treatment nutritional status does not prevent an excellent response to ART (Kiefer, Hoover, Shi, Dusingize, Cohen, Mutimura & Anastos 2011:4). Similar research in rural South Africa demonstrated that CD4 count was not associated with a lower weight, a predictor of malnutrition among PLWHA (Mashinya et al 2014:4).

2.4.3.6.3 Infection

There are well-documented evidence on the vicious association of malnutrition and infection especially among people living with HIV (Pal & Srivastav 2012:98). Several studies have shown the synergistic relationship of infection and malnutrition among people living with HIV fuelling into AIDS progression. For example, in a study conducted at Dilla University hospital, Ethiopia (Hailemariam et al 2013:9) two or more episodes of infections were found to be the predictors of malnutrition. Poor nutrition increases the body's vulnerability to infections, and infections aggravate poor nutrition through the HIV-malnutrition intricate vicious cycle. Research has signposted that opportunistic infections are the cause of hospital admissions among PLWHA and AIDS in Africa (Ford, Shubber, Meintjes, Grinsztejn, Eholie, Mills, Davies, Vitoria, Penazzato, Nsanzimana, Frigati, O'Brien, Ellman, Ajose, Calmy & Doherty 2016:3). A similar study conducted in Bahirdar, Ethiopia showed HIV/AIDS-related symptoms and eating difficulty was found to be associated with malnutrition (Daniel et al 2013:29). Poor nutrition reduces the body's ability to fight infections, and therefore helps increase the incidence, severity, and length of infections. Symptoms that accompany infections such as loss of appetite, diarrhea, and fever lead to reduced food intake, poor nutrient absorption, nutrient loss, and altered metabolism (WFP 2016: 1; Hadgu et al 2013:5; Thapa et al 2015:7).

Studies conducted in Brazil (Andrade et al 2012:4), China (Hu et al 2011:546), and Nepal (Thapa et al 2015:8), showed frequent acquisition of opportunistic infection such as febrile illness, throat sore, and gastroenteritis which results in diarrhea were associated with malnutrition. The presence of opportunistic infections such as inflammation of oral mucosa, loss of appetite and physical weakness as a result of infection was significantly associated with lower means for weight, waist circumference, MUAC, and BMI (Asnakew et al 2015:9; Tshingani et al 2013:20). On the other hand, a systematic review conducted in Indian set up, with aim of determining whether macronutrient interventions either given to provide protein and/or energy or test the effect of specific macronutrients given orally influence morbidity and mortality in adults and children living with HIV infection, found limited evidence that balanced macronutrient formulas increase protein and energy intake. However, the study conducted by Grobler, Siegfried, Visser, Mahlungulu & Volmink (2013:24) (Grobler, Siegfried, Visser, Mahlungulu & Volmink 2013:24) found no evidence

that such nutritional supplementation translates into reductions in disease progression or HIV-related complications, such as opportunistic infections or death.

2.4.4 Determinants of food insecurity among people living with HIV and AIDS

This theme covers the determinants of food insecurity. Factors determining food security in relation to people living with HIV and AIDS are discussed.

Food insecurity is a complex phenomenon that manifests itself in numerous physical conditions resulting from multiple causes. Therefore, to develop effective and targeted interventions to address food insecurity, a better understanding of the relationships among various factors, including the predictors and the consequences of food insecurity, is needed.

Ivers (2015:25) broadly explored factors which influence food security to include climatic features (for example drought and flooding), socioeconomic factors (for example, poverty and access to education), social factors (for example: gender inequality and health-related stigma), local food availability and environments factors. Food insecurity affects the life and livelihood of PLWHA in many ways. Food insecurity among PLWHA is closely linked to the quality of life, health status, and access and adherence to antiretroviral therapy (Martin, Palar, Derose & Adams 2011:202). The below topic address the factors predicting food insecurity among peoples living with HIV.

2.4.4.1 Demographic factors

The demographic factors such as gender, age, household size and education of people living with HIV and AIDS have an impact on nutrition and food security.

2.4.4.1.1 Gender

Food insecurity takes a severe toll on the health of PLWHA and their household members especially among women (Sirotin et al 2012:3). Several studies culminated that women and girls suffer the most. This is demonstrated in a study conducted by (Belachew, Hadley, Lindstrom, Gebremariam, Michael, Getachew, Lachat & Kolsteren 2011:401) in southwest Ethiopia, where girls suffer the most harmful health effects of food insecurity. Gender inequalities are a significant part of the problem in food security (Agarwal 2012:22). Reducing inequalities embedded in women's access to income-earning opportunities and productive assets would not only benefit women themselves but also their children and families. In Uganda, food insecurity among women living with HIV and AIDS led to their engagement in transactional sex or remain in violent or abusive relationships. This is due to their reliance on men in their communities to provide food to them and their children with food (Miller et al 2011:1516). A similar study in Kenya showed female-headed households were found less food secure than the male-headed households (Kassie, Ndiritu & Stage 2014:165). However, a cross-sectional study conducted by Salvo, Silver, and Stein (2016:93), showed that gender difference is not demonstrated in terms of food security among food secure and insecure households.

2.4.4.1.2 Age

The magnitude of food insecurity in those living with HIV varies with age and geographical setup. For instance, the high prevalence of food insecurity is shown among younger PLWHA receiving ART in a resource-rich setting (Anema, Weiser, Fernandes, Ding, Brandson, Palme, Montaner & Hogg 2011: 223). However, a high level of food insecurity was more prevalent among the older population of Australians (Russell, Flood, Yeatman & Mitchell 2014:7). The devastating role of food insecurity on human and economic development, food production and health among PLWHA are more pronounced when people get older and food insecure. Russell et al (2014: 7) documented that even if food insecurity is challenging the quality of life of older people, good health is a priority for older adults to live independently within the community. On the other hand, younger individuals who are in charge of food preparation for a household is associated with food insecurity in Canada (Guo, Berrang-Ford, Ford, Lardeau, Edge, Patterson, IHACC & Harper 2015: 6).

2.4.4.1.3 Household Size

Family size was pinpointed in various literature as one of the important demographic factors that affect household food security status. Household size affects the families' food security through dependency, and a higher dependency ratio is associated with food insecurity (Asghar & Ahmad 2015:13; Sultana & Kiani 2011:12977). In Addis Ababa, Ethiopia, larger household size was found more food insecure when compared with smaller family size (Gebre 2012:165). This is because higher household size adds further dependency ratio among food insecure and poor families. Likewise, in Nigeria household size and child dependency ratio were found to be negatively influencing food security. Thus, adequate attention to better family planning strategies was recommended (Fausat & Naphtali 2014:24; Adepoju & Adejare 2013:31). Studies in Swaziland found the household size and dependency affected the household food security (Mabuza, Ortman & Wale 2016:263). According to Mabuza et al (2016:263) in addition to food insufficiency, increase in household size, and dependency ratio for some households becomes an extra burden if one or more of their members require medical attention due to morbidity. In South Africa, larger household sizes are associated with a negative food security status because larger household sizes require increased food expenditure and competition for limited resources (Sekhampu 2013:546).

2.4.4.1.4 Education

Several studies have shown that educational status was highly associated with food insecurity among PLWHA. For instance, in Jima, Ethiopia, those PLWHA whose educational status is lower than elementary level is more likely to be food insecure than those who attended higher than elementary school (Tiyou et al 2012:3). Another study in Fiche, Ethiopia indicated that educational level lower than the second cycle (less than eighth grade) was associated with food insecurity (Tolasa et al 2015:12). The educated PLWHA have an opportunity to be involved in better income generation activity than the less educated. The ability to have good income enables them to fulfill their dietary needs. In Rwanda, those PLWHA who are illiterate and who cannot read, and those with minimal literacy reported food insufficiency (Sirotin et al 2012:3). Low level of food insecurity was associated with having completed primary education

among PLWHA in Dar es Salaam, Tanzania (Semali, Edwin, & Mboera 2011:6).

2.4.4.2 Socio-economic factors

Employment, income and dietary diversity are some of the socio-economic factors that affect food security and nutrition among people living with HIV and AIDS.

2.4.4.2.1 Employment

Lack of employment was also reported as a determinant factor. For example, in Alabama Black Belt, a higher level of food insecurity was reported among women living with HIV and AIDS on antiretroviral therapy (Zekeri & Diabate 2014:5). Likewise, food insecure PLWHA in Atlanta, Georgia taking ART regimens that should be taken with food were found more likely to be unemployed thus affected their antiretroviral treatment adherence (Kalichman et al 2015:86). Lack of employment contributes to psychological stress due to lack of financial constraint. Study in Delhi, India, showed unemployment had a larger effect on psychological distress (Kang, Delzell, McNamara, Cuffey, Cherian & Matthew 2016:419). This was also reported in a study conducted in Canada (Guo et al 2015: 5) and in Addis Ababa (Gebre 2012:165). Hence unemployed and low-income families living with HIV are not able to afford adequate food and therefore are food insecure. Nonetheless, in Pakistan, employment status was found not to have any effect on the household's food security significantly (Sultana & Kiani 2011:12977).

2.4.4.2.2 Income

The issue of food security among PLWHA is a critical element in achieving a better treatment and clinical outcome to ART. A large body of research documented that the primary cause of food insecurity is low income (Asghar & Ahmad 2015:13; Gundersen, Kreider & Pepper 2011:287; Anema et al 2011:223). In this regard, low income is associated with food insufficiency among peoples living with HIV in Rwanda (Sirotin et al 2012:3). Average family monthly income was found to be significantly and independently associated

with food insecurity among PLWHA in Ethiopia (Tolasa et al 2015:12; Tiyou et al 2012:4). In the same study, lower family income was found as a predictor of food insecurity. When income is constrained or limited, households may be forced to make difficult decisions that can result in a less than adequate supply of food. Oluoko-Odingo (2011:17) analysed the vulnerability and adaptation to food insecurity and poverty in Kenya. The findings of Oluoko-Odingo (2011:17) revealed, poverty is the main contributor to food insecurity. Households with incomes below the poverty threshold reported food insecurity.

Another study in South Africa (Sekhampu 2013:546) and in Nigeria (Fausat & Naphtali 2014:24) indicated household income was positively associated with household food security. Sekhampu (2013:546) described household food security is important as it determines how much can be spent on various needs of the household because the quantity and quality of a household's expenditure patterns are highly correlated with the purchasing power of the household. Semali et al (2011:6) indicated that a low level of food insecurity was associated with high income especially among PLWHA. Existing data on income and food security in lower income settings reveals, women suffered the most and found to have a lower body mass index (Hadley & Crooks 2012:83).

2.4.4.2.3 Dietary Diversity

Low food diversity and meal frequency were directly related to food insecurity among PLWHA. This is shown among the studies in South West Ethiopia (Tiyou et al 2012:5) where low dietary diversity was common among food insecure PLWHA, and a predictor of food insecurity. In the same way, low dietary diversity was evidenced among food insecure PLWHA in Rwanda (Sirotin et al 2012:3). From both pieces of evidence above, lower food diversity was significantly and independently associated with food insecurity. Likewise, a cross-sectional study was undertaken in Mettema, North West of Ethiopia, indicated low dietary diversity in more than half of adult HIV positive individuals (Woldemariam, Yusuf, Beyen & Yenit 2015:5). Less meal frequency is associated with lower dietary diversity. Meal frequency less than three times a day and lower dietary diversity was found to be a predictor of food insecurity among PLWHA attending ART clinic in Fitche Zonal Hospital, Ethiopia (Tolasa et al 2015:11). Equally, less quantity and frequency of meals were reported

among food insecure PLWHA in Tanzania (Semali et al 2011:6). Household food insecurity was associated with lower dietary quality and diversity among Ecuadorian women from low income (Weigel, Armijos, Racines & Cevallos 2016:6).

2.4.4.3 Clinical features

Clinical features such as infection, duration on ART, CD4 count and psychological distress has an impact on food security and nutrition.

2.4.4.3.1 Infection

Severe food insecurity was associated with opportunistic infections, and increased hospitalizations visit among adult PLWHA accessing ART in a resource-limited setting (Weiser, Tsai et al 2012:5). According to this study, when a family member falls ill to HIV disease under conditions of poverty, household earnings shrink. The situation affects the household tendency for accessing food thus predisposing them to malnutrition and infection. Food insecurity is associated with increased health services utilization as a result of infections among homeless and marginally housed HIV-infected individuals (Weiser, Hatcher et al 2012:94). In Uganda, severe food insecurity was associated with poor physical health, opportunistic infections, and increased hospitalizations (Weiser, Tsai, et al 2012:6). The lived experience of food insecurity among PLWHA in San Francisco Bay Area, United States indicated that insufficient quantity of food and resultant hunger, as well as long-term struggles with quality of food lead to concerns about the poor health effects (Whittle et al 2015:158). A recurrence of inflammation was also found to be manifested among food insecure adult population living with HIV and AIDS in the USA (Gowda, Hadley & Aiello 2012:1583).

2.4.4.3.2 Duration on ART

Food and nutritional intake can affect adherence to antiretroviral drugs as well as their effectiveness. Studies documented the reduction of HIV related symptoms after starting ART. A study in Uganda (Palar et al 2012: 2378) indicated ART as a significant predictor of improved food security above and

beyond HIV care without ART. According to Palar et al (2012:2378), food security progressively improves as PLWHA continue taking ART. Thus, ART benefits people with HIV beyond improving their health and extends to the range of socioeconomic benefits such as improved food security. Food insecurity was associated with lack of access to ART. Kalichman, Hernandez, Cherry, Kalichman and Grebler (2014:5) pointed out that PLWHA who were food insecure were significantly less likely to be taking ART, were less adherent to ART, had run out of their medications, and had to choose between medications and food relative to their secure food counterparts. Similarly, not taking antiretroviral therapy was found as a predictor of food insecurity among HIV-infected adults in Senegal, West Africa (Benzekri et al 2015:8).

2.4.4.3.3 CD4 count

Food insecurity was longitudinally associated with lower CD4 counts among HIV positive adults in different setups (McMahon, Wanke, Elliott, Skinner & Tang 2011:62; Weiser, Tsai, et al 2012:5). Food insecurity likely impacts clinical prognosis and indicators of HIV infection, including CD4 count. Food insecure PLWHA had fewer CD4 cells/mL than their secure food peers (Mendoza, Paul, Schwarzwald, Liu, Martinez, Nicklas & Baranowski 2013: 4). This difference is similar to the difference in CD4 counts (100 CD4 cells/ml) between food secure and insecure adults over five years as shown by McMahon et al (2011:63). According to McMahon et al, the higher prevalence of household food insecurity, the inverse association with CD4 counts. A systematic review and meta-analysis studied by Aibibula et al (2016:5), showed that food-insecure people had greater odds of having lower CD4 counts compared to food secure people. Food insecure people had on average 91 fewer CD4 cells/µl compared to their secure food counterparts. According to Aibibula et al, food insecurity could be a potential barrier to immune recovery as measured by CD4 counts among HIV-infected poor PLWHA. This is also demonstrated in Atlanta, Georgia, where PLWHA taking ART regimens that should be taken with food had significantly lower CD4 cell counts (Kalichman et al 2015:86).

2.4.4.3.4 Psychological distress

A multitude of studies has indicated that psychological depression is associated with food insecurity in those living with HIV and AIDS. This association will be clearly described in nutritional, mental health and behavioral pathway conceptual framework as below. A systematic review conducted by Degroote, Vogelaers, and Vandijck (2014:4) found that depression strongly interferes with daily life and negatively impact on health-related quality of life among PLWHA. Likewise, in South India, both male and female PLWHA affected moderately to severe forms food insecurity have shown the lower mean quality of life than those reporting mild-to-no food insecurity (Heylen, Panicker, Chandy, Steward & Ekstrand 2015:6). According to Heylen et al (2015:6), male food insecure PLWHA also had higher depression scores. Moreover, when depression is complemented with food insecurity, the treatment outcome and quality of life of PLWHA will be significantly affected (Palermo et al 2013:8; Tsai, Bangsberg et al 2012:7; Ivers & Cullen 2011:1743; Anema et al 2011: 223).

2.4.5 Nutritional, mental health, and behavioral pathways conceptual framework

This theme discusses the nutritional, mental health and behavioral pathways conceptual framework (Ivers 2015:26), to elucidate the interrelationship between nutrition, food security, and HIV/AIDS; and discuss the role of these factors on treatment outcome and quality of life in peoples living with HIV.

The adapted nutritional, mental health, and behavioral pathways conceptual framework (Ivers 2015:26) is assumed to map the interrelationship between nutrition, food security, and HIV/AIDS. Ivers (2015:26) reported that the conceptual framework grounds upon an existing framework of Weiser, Young, Cohen, Kushel, Tsai, Tien, Hatcher, Frongillo and Bangsberg (2011). According to Ivers (2015:26), there are nutritional, mental health, and behavioral pathways through which food insecurity leads to HIV acquisition and disease progression. Ivers indicated that food insecurity typically operates at the level of the household, and is also influenced by other household-level factors, such as family structure and social support. Through these occurrences, food insecurity, in turn, shapes individual behaviors and health outcomes through nutritional, mental health, and behavioral pathways. Figure 2.3 illustrates the modified

nutritional, mental health and behavioral conceptual framework for exploring the scientific evidence constructed for this study.

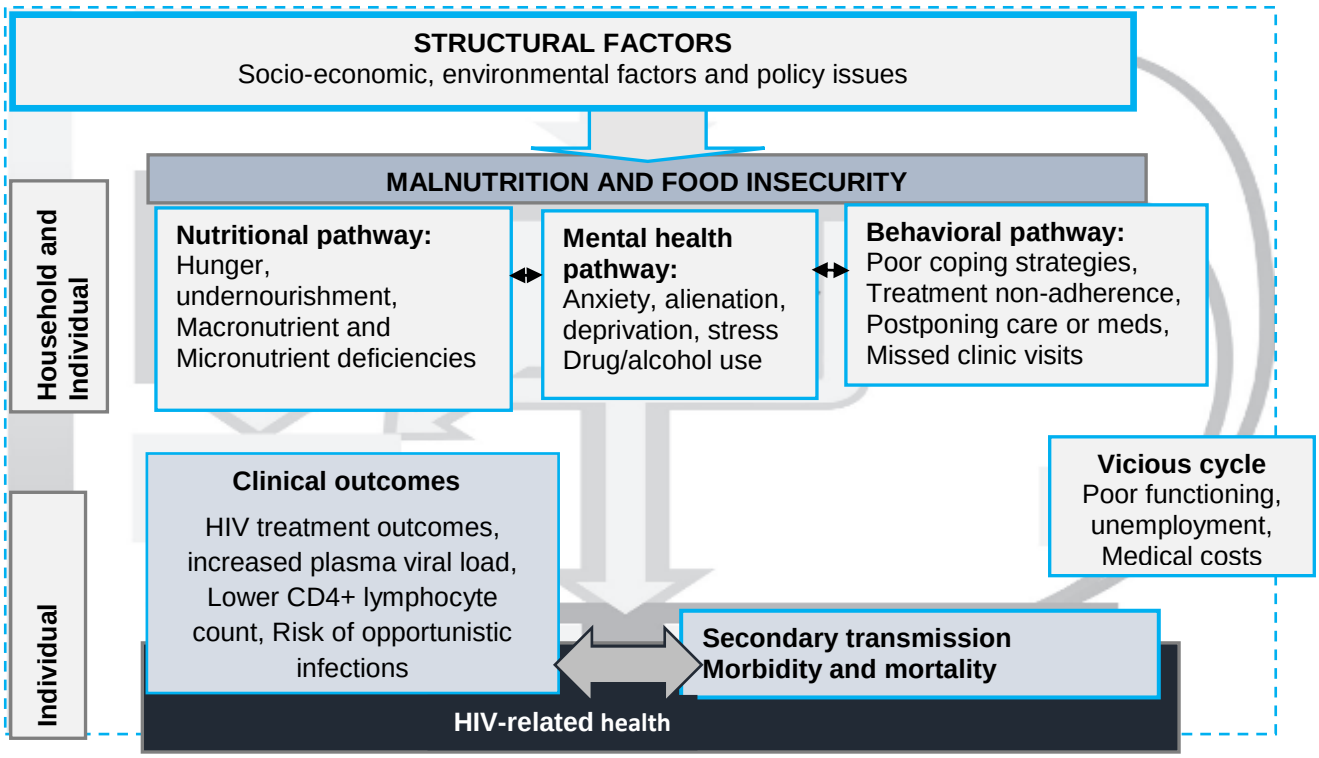

Figure 2.3 Modified nutritional, mental health and behavioral pathway conceptual framework

(adopted from Ivers 2015:26)

2.4.6 Nutrition, food security and HIV: nutritional, mental health, and behavioral pathways conceptual framework analysis on treatment outcome and quality of life nexus

The author underscores the importance of interdependence and interconnectedness of the nutrition, food security, and HIV underpin the nutritional, mental health and behavioral pathways conceptual framework (Ivers 2015:26). Thus, the outcome of nutrition and food security on treatment outcome and quality of life is mediated and separately discussed through nutritional, mental health and behavioral pathways.

2.4.6.1 The nutritional pathways

The nutritional pathway mediates the impacts of malnutrition and food insecurity on Anti-Retroviral (ARV) treatment outcomes and quality of life of

PLWHA in many ways. Achieving and maintaining optimal nutrition is considered an important adjunct in the clinical care of patients infected with HIV, as good nutrition can improve an individual's immune function, limit disease-specific complications, and improve quality of life and survival (Sicotte, Langlois, Aho, Ziegler & Zunzunegui 2014:6; Berhe et al 2013:8; WFP 2016:2). The nutritional pathway scrutinizes the effect of nutrition on HIV and vice versa in the following ways: HIV increases the metabolic requirements; reduce appetite and ability to take food and thus compromises the body's ability to fight infections and predisposing to opportunistic infections by weakening the immune system; and contribute to the acceleration of full-blown AIDS (WFP 2016:1), which further compounds the links between malnutrition and HIV and worsen the quality of life. This is demonstrated by a study conducted in Dilla University hospital, Ethiopia by Hailemariam et al (2013:5) where malnutrition is associated with frequent episodes of opportunistic infections among PLWHA. Thus, responding to the opportunistic infections requires targeted nutritional support. Nutritional support improved health-related quality of life among HIV-infected adults receiving combination antiretroviral therapy in Addis Ababa (Mekuria, Sprangers, Prins, Yalew & Nieuwkerk 2015:5)

Malnutrition is the main problem that is seen over people living with HIV and found negatively impacting the treatment outcomes among PLWHA in Nekemte town, Ethiopia (Kenea et al 2015:96). According to Kenea et al (2015:96), malnourished PLWHA interrupts their treatment because of body's less ability to absorb nutrients and reduced food intake which results from appetite loss and eating difficulty, possibly as a result of side effects of medication and infections. Research conducted in Northern Ethiopia by Berhe et al (2013:5), found a significant association between ART non-adherence and malnutrition, where the magnitude of ART non-adherence is twice as high as among malnourished group in contrast to their counterparts. This supports the view that nutritional status is a key determinant of anti-retroviral therapy outcomes. A systematic review conducted by Sicotte et al (2014:6) investigating the existence of an association between malnutrition and immune response at antiretroviral treatment initiation; and the following year in low- and middle-income countries where malnutrition is most prevalent shows strong evidence that malnutrition and weight loss are prevalent amongst highly active antiretroviral therapy-treated patients; and contribute to excess early mortality

The researchers justified that the reason could be poor immune reconstitution secondary to deficient nutritional status.

A study conducted both in resource-limited settings (Hadgu, Worku, Tetemke & Berhe 2013:5; Argemi et al 2012:1164) and resource-rich settings (Wright & Epps 2014:291), malnutrition is strongly associated with treatment outcomes among PLWHA. Malnutrition affects the quality of life of PLWHA through deteriorated physical and mental health and found a strong and independent risk factor for death among PLWHA (Argemi et al 2012:1164). A similar study conducted in Ethiopia showed HIV is associated with an increased burden of malnutrition among ART-treated women in Tigray, Ethiopia (Hadgu et al 2013:5), and compromised the quality of life of the PLWHA in the study group. This is also shown in a study conducted in Kathmandu, Nepal (Thapa et al 2015:7) where malnutrition found to compromise the quality of life of PLWHA attending public anti-retroviral therapy. Lack of good dietary practice among peoples living with HIV negatively impacts the treatment and quality of life as poor nutritional status is a good predictor of mortality risk (Hadgu et al 2013:5; Argemi et al 2012:1164).

A cross-sectional study in East Hararge Zone, Oromia, Ethiopia on malnutrition and associated factors among adults living with HIV and on antiretroviral therapy in hospitals has signposted that malnutrition has greatly affected the ART outcomes by imposing them to poor adherence (Dedha, Damena, Egata, Negesa 2017:39). A similar study conducted in Northern Ethiopia (Berhe et al 2013:5), has also shown that there is a strong association between malnutrition and antiretroviral treatment adherence. Lack of an adequately nutritious diet has reported to result in poor adherence to antiretroviral treatment and associated with antiretroviral treatment failure (Yassin & Gebretekle 2017:5).

Nutritional pathways also mediate the impacts of food insecurity on HIV outcomes through malnutrition and food insufficiency. The cyclical effects and relationship of food insecurity and HIV and AIDS are highly associated with poor HIV outcomes (UNAIDS 2014a:1). Food insecurity is associated with higher odds of ART non-adherence, incomplete viral suppression and lower CD4 count (Kalichman et al 2014:4; Musumari et al 2014:4). Kalichman et al (2015:85) further discussed ART regimens that require food were significantly

related to poorer ART adherence among food insecure PLWHA. Food insecurity play a devastating role on human and economic development, food production and food security, and individual nutritional status especially among PLWHA, by deteriorating the health and quality of life and reducing work capacity and productivity through adult chronic illness and labour shortage, and risking household livelihoods (WFP 2016:1; UNAIDS 2014b:2; Laar et al 2015:8).

A systematic review conducted by Young et al (2014:509), found evidence to support that food insecurity as a critical barrier to adherence to ART among PLWHA by exacerbating hunger or through ART side effects in the absence of adequate food and competing for resource demands. The narrative review by Young et al (2014:509) culminated evidence on associations between food insecurity and ART non-adherence in qualitative and quantitative studies conducted. As a result, the vicious association between HIV and food insecurity, food insecurity has reported to complicate and weaken the treatment outcome of PLWHA. Measures that directed towards improving the food insecurity of PLWHA has also shown to improve treatment outcomes. For example, a systematic scientific review conducted by Yacobson, Malkin, and Lebetkin (2016:5) has signposted food insecure PLWHA who has enrolled into food security intervention through strengthening their economic status were found to have optimal ART adherence.

2.4.6.2 The mental health pathway

The mental health pathway intermediates the effect of nutrition and food security on treatment outcomes and quality of life of peoples living with HIV and AIDS in different ways. For example, nutritionally- the mental health pathway explores the effect of nutrition on mental health issues such as anxiety, depression and alcohol and drug dependency. Considerable and growing evidence shows that mental health and many common mental disorders are associated to a great extent by social, economic and environmental factors, such as food or nutrition (WHO & Calouste Gulbenkian Foundation 2014:17). The nutritional effects were reflected in the health-related quality of life through chronic stress, anxiety and uncertainty, and nutritional status. There is well-

established evidence that poor nutritional status leaves HIV-positive substance abusers especially vulnerable to an increased risk of opportunistic infections and other illnesses (Mahadevan & Ruzsilla 2012:8). According to this study, while HIV and substance abuse can independently contribute to poor quality of health, their synergistic influence may impact the PLWHA food behaviors to a significantly greater extent, ultimately leading to widespread mental health abnormalities and compromising their treatment outcome. Mahadevan and Ruzsilla (2012:8) specified that malnutrition could precipitate the effects of mental health problems, on the other hand, people suffering from mental problems may be at heightened risk for HIV infection and progression to AIDS because of impaired judgment and resulting involvement in dangerous behaviours, including substance abuse, sexual risk, and non-adherence to treatment regimens (Singer 2011:12).

Mental health in relation to PLWHA is becoming an increasing concern worldwide. HIV infection is a traumatic and stressful experience that can negatively affect mental health status and potentially lead patients into a cycle of physical and mental decline. The mental health pathways also explore the effects of food security on quality of life and treatment outcomes especially among those living with HIV. To enlighten more, in Uganda (Palermo et al 2013:8), found severe food insecure households of peoples living with HIV have lower mean mental health and physical health status scores. A similar study in the same country (Weiser, Tsai, et al 2012:5) showed severe food insecurity was associated with worse physicals health score among food insecure PLWHA. Poor and food insecure women living with HIV in Alabama, United States (Andrew & Youssouf 2014:3), struggled with mental health problems. Thus significant association was established between food insecurity and psychological well-being. Food insecurity was found to be a pervasive source of uncertainty for those peoples living in resource-limited settings (Laraia 2013:207), utterly reduce the quality of life among peoples living with HIV/AIDS (Weiser, Tsai, et al 2012:6). Depression is common among PLWHA and AIDS and contributes to a wide range of worsened HIV-related outcomes, including AIDS-related mortality. This was demonstrated in the study conducted by (Tsai, Bangsberg, Frongillo, Hunt, Muzoora, Martin & Weiser 2012:7; Ivers & Cullen 2011:1743) where food insecurity was associated with anxiety, and depression symptom severity among women living with HIV.

A magnitude of the study indicated that anxiety and depression, when complemented with food insecurity, the treatment outcome and quality of life of PLWHA, will be significantly affected (Palermo et al 2013:8; Tsai, Bangsberg et al 2012:7; Ivers & Cullen 2011:1743). A systematic review conducted by Degroote et al (2014:4) found depression strongly interferes with daily life and negatively impact on health-related quality of life among PLWHA. Degroote et al, showed not only the presence of depression but also the history of depression are associated with affecting the mental health and can also cause physical problems (e.g., less appetite, sleep disorders, etc.). The same study reveals the prevalence of anxiety disorders among PLWHA found to be higher than the general population, and thus anxiety to be associated with depressive symptoms. Depression and anxiety are common among HIV-infected people and rank among the strongest predictors of non-adherence to antiretroviral therapy (Tsai et al 2012:7; Ivers & Cullen 2011:1743; Degroote et al 2014:4). A longitudinal study conducted in Belo Horizonte, Brazil (Campos, Guimarães & Remien 2010:5) and Fitche, Ethiopia (Tolasa, Demissie, Tesfaye & Belachew 2015:12), indicated severe anxiety and depression was found to be a predictor of non-adherence to ART and associated with food insecurity. Equally, in China, depression, and anxiety was the most widely studied problem and highly prevalent among women than men living with HIV (Niu, Luo, Liu, Silenzio & Xiao 2016:5). Correspondingly, food insecurity was found as an impeding factor health-related quality of life and found associated with mental health-related quality of life and found associated with depression symptom severity among poverty-stricken HIV positive women in South Africa (Tsai, Tomlinson, Comulada, Rotheram-Bor 2016:74).

2.4.6.3 The behavioral pathway

Scientific literature has pinpointed that the behavioral pathway mediates the nutrition and food security on treatment outcome and quality of life of PLWHA in several ways. Behavioral pathway explores the effect of nutrition on treatment outcome and quality of life through nutritional knowledge and nutrition-related decisions made within households. In Nigeria, a study aimed at rectifying records of nutrition among PLWHA found a weak negative association between energy intake, protein, and iron for both male and female

PLWHA respondents. Thus, the study documented that behavioral factors were responsible for inadequate energy intake and remain one of the primary determinants of wasting and weight loss- indicative of malnutrition among PLWHA (Bello, Olayiwola & Agbon 2011:356), where subsequently opportunistic infection occurs from malnutrition and affect the quality of their life. Based on their findings, Bello et al suggested a healthy diet that is adequate in terms of energy, protein, fat, and other essential nutrients to be promoted and parts of HIV treatment and care programme.

Nutrition or dietary related behavioral factors were described to be associated and affect the treatment adherence and quality of life of PLWHA in Nekemte, Western Ethiopia (Kenea et al 2015:96). Malnourished PLWHA interrupts their treatments and thus were affected by an opportunistic infection (Kenea et al 2015:96). Poor ART adherence is strongly associated with the vulnerability of acquiring opportunistic infections among PLWHA (Pal & Srivastav 2012:98). As a result of the strong association between malnutrition and infection among peoples living with HIV, an opportunistic infection found to affect the quality of life (Ford et al 2016:3). In Cambodia, the lack of adequate nutritional knowledge and dietary practice among households has depleted the national economy (Bagriansky, Champa, Pak, Whitney & Laillou 2014:4). On the contrary, in Kathmandu, Nepal, behavioral factors such as smoking and alcohol use were not found to be significantly associated with nutrition status among PLWHA (Thapa et al 2015:6).

The behavioral pathway mediates the effect of food security on treatment outcome and quality of life of PLWHA in terms of competing behaviors as a coping response to food insecurity. For example, households may engage in trade-offs between competing for food and non-food demands; individuals and households attempt food stretching and substitution techniques (such as using water in place of milk in breakfast cereals), consumption of expired and nearly expired foods, reduced meal size, meal diversity, and meal frequency, shifts to less expensive foods, and making one large pot of food to consume for several days; and consumption of road kill (Ford & Beaumier 2011:554; Marco et al 2009 cited in Hadley & Crooks 2012:77). Furthermore, food insecure households may engage in activities such as: hunting and fishing, the

consumption of discarded foods, participating in research studies or donating blood to earn money for food, intentionally being jailed to ensure three meals a day, drinking more tea or coffee to feel full, purchasing cheap and filling foods such as rice and pasta, avoiding expensive foods, skipping breakfast, sharing and borrowing and finally liquidating assets are among coping strategies of food insecurity (Beaumier & Ford 2014:553).

To withstand the effects of food insecurity, PLWHA engages in negative coping mechanisms that affect their quality of lives. For example, in Vancouver, Canada, severe food insecurity affected the quality of life of PLWHA by forcing them to engage into elevated unprotected sex among HIV-seropositive injection drug users independent of ART use (Shannon et al 2011:4). Similarly, in Uganda food, insecure women living with HIV were engaged in transactional sex or remain in violent or abusive relationships due to their reliance on men in their communities to provide food for themselves and their children (Miller, Bangsberg, Tuller, Senkungu, Kawuma, Frongillo & Weiser 2011:1516). Food insecurity among low-income PLWHA in a resource-rich setting was reported to be a strong contributor to risky sexual practices (Whittle, Palar, Napoles, Hufstedler, Ching, Hecht, Frongillo & Weiser 2015:4). According to Whittle et al, individuals described engaging in transactional sex for food or money to buy food, often during times of destitution. Whittle et al also expound that food insecurity could lead to condom-less sex despite knowledge of and desire to use safe sexual practices, largely because the need to obtain food in the short term was prioritized over the desire to use barrier protection.

Again, there are plenty of studies that indicate the behavioral pathway mediates the impacts of nutrition and food security impacts on treatment outcomes of PLWHA in several ways. For instance, food insecure PLWAs receiving ART that requires food endorsed more beliefs that taking medications was necessary for their health, nonetheless was significantly poorer ART adherence and unsuppressed HIV (Kalichman et al 2015:85). Severe food insecurity was associated with missing clinic appointments and not taking antiretroviral therapy due to hunger among adult PLWHA in Senegal, West Africa (Benzekri et al 2015:9). A systematic review and meta-analysis study indicated that food-insecure people had greater odds of having lower CD4 counts compared to food secure people and found to be a barrier to immune recovery (Aibibula,

Cox, Hamelin, Mamiya, Klein & Brassard 2016:5). Food Insecurity affects the quality of life of PLWHA through illness and reduced functioning. This was presented through greater acute care utilization among HIV-Infected homeless and marginally housed individuals in San Francisco, USA (Weiser, Hatcher et al 2012: 93). According to Weiser, Hatcher et al (2012:93), severe food-insecure PLWHA had increased odds of hospitalizations and emergency department visits due to illness.

2.4.7 Nutrition and food security: policy support for integration into HIV/AIDS response programming

Malnutrition and food insecurity are continuing to be a critical challenge for peoples living with HIV at the time where the number of PLWHA has dramatically increased and reached 17 million at the end of 2015, exceeding the 2015 target of the United Nations General Assembly of reaching 15 million people in 2011 (UNAIDS 2016b:1). Subsequently, the issues of food insecurity and malnutrition remain to challenge decision makers (Babu et al 2014:7; Ghattas 2014:3). In this context, food price crises, political instability, economic shocks have resulted in reductions in food consumption and dietary energy intake, compromised diet quality, and diversity which is known to erode both physical and mental health due to the deprivation of calories or essential nutrients. Consequently, lead to less economically productive populations (Jones, Ngure, Pelto & Young 2013: 490; The FAO, IFAD & WFP 2014:12). HIV and AIDS are synergistically fuelling these global challenges of nutrition and food security by weakening and affecting the young and productive age group of the populations. Program managers and policymakers have to make the best decisions considering the burden of malnutrition and food insecurity with priority program and policy options with special consideration to those living with HIV and AIDS.

Over the last decade, health, nutrition and policy experts have become increasingly recognized in the ways in which malnutrition and food insecurity and HIV infection negatively impact and reinforce one another (Tesfaye et al 2016:4; Tsai et al 2016:72; Thapa et al 2015: 8; Wang et al 2011:1017). In response, the policy has recognised the importance of integrating nutrition and food security into HIV programming (UNAIDS 2014a:4; UNAIDS 2011:3). For

instance, the Global Fund to Fight AIDS, Tuberculosis and Malaria, WHO, UNAIDS, WFP and the United States President's Emergency Plan for AIDS Relief (PEPFAR) are among the organizations and international initiatives advocate for the integration of food and nutritional support as an effective investment in HIV programming (UNAIDS 2011:1). Inline to these global initiatives, in 2012, WFP, United Nations Children Emergency Fund (UNICEF), WHO and UNAIDS met in Washington, DC, to discuss on food and nutrition (UNAIDS 2014a:3). Thus, the meeting established an Inter-Agency Task Team on food and nutrition, with WFP as the convener. WFP during 2013 continued to foster a coalition on food and nutrition with the task team, focusing on food security in the context of HIV.

Consequently, in 2013, a meeting was jointly organized with UNICEF and the Medical Research Council of South Africa in Cape Town and attended by UNAIDS and United Nations Higher Commission for Refugees (UNHCR), discussed lessons learned on food security and nutrition in the context of HIV in South Africa and explored how nutrition was linked in health services in the Western Cape. The task team's research sub-working group then developed a framework to review evidence on food and nutrition in the HIV context. Further, three peer-reviewed papers focusing on food security and the role of food and nutrition in HIV and AIDS were published, and a framework was developed to analyse the linkages between food security, nutrition, HIV and health systems (UNAIDS 2014a:3).

Likewise, in 2012, UNAIDS in partnership with United Nations Development Programme (UNDP) and the secretariat co-sponsors and prepared a document to guide the investment framework for national HIV and AIDS response. The guidance proposes two categories of programmes and policies that address HIV and AIDS. This was based on critical enablers critical enablers that support basic programme activities which are HIV-specific while aiming at achieving primary objectives. This activies which focuses on achiving a range of impacts across development and health sectors are important as they generate development synergies. These are seen as HIV-sensitive with HIV outcomes as one of many objectives. Both categories are described as necessary for efficiently and effectively addressing the epidemic. Food and nutrition support were among the critical enablers for treatment, care and support of PLWHA. Because food and nutritional intervention may reduce mortality and improve

treatment adherence and retention in care, thus, government entities and supporting agencies were recommended for policy considerations (UNDP 2012:19). The momentum of integrating food and nutrition within the HIV response at the policy level and global advocacy continued during 2014-2015. During this years, the UNAIDS Secretariat and cosponsors continued global advocacy and WFP as Inter-Agency Task Team leader on food and nutrition conducted three meetings on (1) El Niño; (2) linkages between non-communicable diseases and food and nutrition, and (3) maternal and child health and nutrition and HIV. The consultation shared emerging evidence on HIV, Food, and Nutrition and provided inputs in the goals and targets of the new UNAIDS Strategy of the 90-90-90 treatment targets of the UNAIDS. Further, the adoption of a decision point highlighting nutritional support as one of the critical factors contributing to HIV prevention and treatment adherence were emphasised (UNAIDS 2016b:3).

Nutrition and food policy at global, regional, national, and local levels operates in an increasingly complex world that is changing faster than ever. In the past several decades, much important nutrition and food policy issues about people living with HIV/AIDS have been understood. International and national policies and global initiatives, different programmatic approaches are being followed by different countries to minimise the effects of malnutrition and food insecurity on the treatment outcome and quality of life of PLWHA and to control the HIV and AIDS epidemic. For example, WFP participated in joint missions with UNAIDS and the Global Fund to provide technical assistance on integrating food and nutrition into national HIV responses in Côte d'Ivoire, Djibouti, Kenya, Zambia, Swaziland, the Democratic Republic of the Congo and Lesotho. This resulted in food and nutrition being successfully integrated into HIV and AIDS national strategy plans in these countries (UNAIDS 2014a:3).

From the time the first of development of the Ethiopian national HIV and AIDS control policy in 1998, the early response was a multi-sectoral approach to fight the epidemic. Inline to the current epidemiology and state of response for the post-2015, Ethiopia has developed a high impact intervention that reduces the annual new infection and expected to save many lives (FHAPCO and FMOH 2014:24). The targets set in this investment case are in line with the three '90s (90-90-90) treatment targets set by UNAIDS to help end the AIDS epidemic in

the country (UNAIDS 2016b:8; FHAPCO & FMOH 2014:24). The investment case approach includes four strategic objectives to achieve the goals and targets: implement high impact and targeted prevention program; intensify targeted HIV testing and counselling services; attain virtual elimination of mother to child transmission, and optimize and sustain quality care and treatment (FHAPCO & FMOH 2014:28; FHAPCO 2014b: 27-34).

The Government of Ethiopia has demonstrated its policy commitment to nutrition by developing a standalone National Nutrition Strategy and a National Nutrition Programme (NNP), along with a set of guidelines starting from 2004 and incorporated nutrition into its five-year Growth and Transformation Plan (GTP) (FMOH 2013:36). Using evidence on the intricate association of HIV and AIDS and malnutrition, a nutrition specific strategy, which is the unique of its kind in involving HIV with nutrition programme is developed in 2008. Based on this strategy, the national nutrition and HIV/AIDS implementation reference manual was prepared to indicate standardized nutrition and HIV care (FMOH 2008:5). Furthermore, the manual indicated the opportunities for integrating nutrition into HIV and AIDS programmes. The Ethiopian national nutrition policy in terms of HIV/AIDS mainly focuses on strengthening the capacities of facilities/health professionals to deliver quality standard nutrition services to PLWHA (FMOH 2013:22).

2.5 GAPS IN LITERATURE

The most common gap observed in the review is a lack of integrating nutrition and food security with HIV prevention, treatment and care programmes in resource-poor settings such as in Sub–Saharan Africa, including Ethiopia. Another identified gap is that the policymakers do not have decisions to prevent and minimise the suffering of households and lives of most vulnerable members of PLWHA. As a result, the current study develops a support programme which will assist the policy makers and health managers to integrate nutrition and food security into the national HIV/AIDS prevention, treatment, and care programmes.

2.6 CONCLUSION

This chapter presented the process of literature review and analysis of relevant literature on the issue of nutrition and food security in the global, regional and national context. The literature reviewed was relevant to the role of nutrition and food security on treatment outcome and quality of life, and determinants of malnutrition and food security among PLWHA. The nutritional, mental health and behavioral pathway conceptual framework is utilized as a foundation to base the existing scientific evidence within the literature, is also discussed in the review. From the extensive review of nutrition, food security, and HIV, integrating food and nutrition within the HIV response is well recommended. The following chapter (Chapter 3) describes the research design and methodology in more detail.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

In the previous chapter, detailed information on the literature review process, themes that emerged from the appraisal of literature pertinent to the study objectives were systematically presented in relation to the conceptual framework of the study. The link between nutrition, food security and people living with HIV was highlighted. This chapter outlines the study design, population, sampling technique, sample, data collection, and data analysis. Issues of validity and reliability of quantitative methods as well as measures employed to ensure the trustworthiness of qualitative approaches, as well as ethical issues, are also described.

The study is divided into three phases. In phase one, the researcher investigates the determinants of malnutrition and food insecurity and explores and describes the outcome of nutrition and food security on treatment outcome and quality of life of peoples living with HIV and AIDS. In phase two, senior health experts' perspective and experience on integrating nutrition and food security with HIV prevention, treatment and care were explored. In phase three, the researcher develops a support programme facilitating the integration of nutrition and food security with HIV prevention, treatment and care based on the findings from phase one and phase two following the mixed methods approach.

3.2 RESEARCH APPROACH

The study used a mixed methods approach. The mixed methods research study approach combined elements of qualitative and quantitative research approaches for breadth and depth of understanding and corroboration (Creswell, Klassen, Clark & Smith 2011:12). According to Creswell and Clark (2011:386), researchers conduct mixed methods studies when both quantitative and qualitative data, together, provide a better understanding of the

research problem than either type by itself. This is because the mixed method allows the researcher to build on the separate strengths of both quantitative and qualitative data. For instance, quantitative data, such as scores on instruments, yield specific numbers that can be statistically analysed, can produce results to assess the frequency and magnitude of variables and can provide useful information to describe trends about a large number of people.
In contrast, qualitative data, such as open-ended interviews that provide the actual words of a small number of people, offer in-depth perspectives on the study topic and provide a complex picture of the situation. Thus, by combining quantitative and qualitative data, the study can develop a complete picture of social phenomena that includes both trends and individuals' experiences. Not all the study can use a mixed methods approach.

According to Creswell and Clark (2011:61) and Cunningham, Weathington and Pittenger (2013:443), a mixed methods approach is conducted for the following reasons:

- Triangulation—using findings from one method to verify or corroborate findings collected using the other method.
- Complementarity—the use of data obtained through one method to enrich, elaborate and clarify data obtained from another method.
- Enhancement—building on findings from one method using evidence gathered from the other method.
- Development—this involves the use of results from one method to develop or inform the use of another method.
- Initiation—involves the use of different methods of the same phenomenon to identify contradictions or generate new insights.
- Expansion—different methods are used to address a different question.
- Completeness—using both methods to more comprehensively examine an area or issue of interest that would be possible with one method used alone.
- Illustration—using qualitative data to explain quantitative findings or vice versa, and,
- Sampling—using one method to help with the sampling of participants or cases in a targeted and focused fashion.

Hence, the mixed method provides strong evidence for the conclusion and adds better insight and understanding of the issue under study (Migiro & Magangi 2011:3759). However, using mixed methods research is not without challenges as it is more expensive and time-consuming. If not well coordinated and streamlined at the subject-level, these research projects carry the potential to overburden participating research sites and subjects. Given these challenges, mixed methods efforts must capitalise on all opportunities to streamline processes and recognize the benefits of the mixed-methods approach (Bowers, Cohen, Elliot, Grabowski, Fishman, Sharkey, Zimmerman, Horn, & Kemper 2013:2173). The following paragraphs discuss the research design and methods used in this research:

For this study, a mixed method approach was used for the following reasons:
Enhancement: this is because the researcher wanted to use the findings gathered from phase one, quantitative strand (the outcome of nutrition and food security on treatment outcome and quality of life, and investigate the determinants of malnutrition and food insecurity among PLWHA) to guide phase two, qualitative strand (senior health experts' perspective and experience on integrating nutrition and food security with HIV prevention, treatment, and care).
Expansion: phase one, quantitative strand answers the following study questions:

- What are the determinants of malnutrition and food insecurity among PLWHA in Benishangul Gumuz Region?
- What is the outcome of nutrition and food insecurity on treatment outcome and quality of life of PLWHA?
- What is the status of PLWHA in the Benishangul Gumuz region with regard to accessing nutritious food to meet their subsidiary need?
- How PLWHA cope up malnutrition and food insecurity?

While phase one, the quantitative strand of the study responded to the above questions, phase two, the qualitative strand answers the following question:

- What are the senior health experts' perspective and experience in integrating nutrition and food security with HIV prevention, treatment, and care?

This confirms the expansion purpose as different methods are used to address a different question. This is well clarified through the use of relevant research designs.

3.3 RESEARCH DESIGN

The research design is a logical model that guide investigators in various stages of research. Polit and Beck (2012:58) define research design as an overall plan for obtaining answers to the questions being studied and for identifying strategies to minimise bias during the research process. Creswell (2014:12) describes research design as types of inquiry within qualitative, quantitative and mixed methods approach that provide specific directions for procedures in research. According to Creswell and Clark (2011:15), choosing a research design involves the researcher designing an overall plan for the study's methods which include the overall plan for selecting participants, collecting data, analysing data, and reporting the results. Thus, study design guides the methods and decisions that researchers must make during their studies and sets the logic by which they make interpretations at the end of their studies. For this study, the explanatory sequential mixed method study design is adopted.

The explanatory sequential design is a sequential approach which is used when the researcher is interested in following up the quantitative results with qualitative data. Thus, the qualitative data is used in the subsequent interpretation and clarification of the results from the quantitative data analysis (Edmonds & Kennedy 2017:196). The method occurs in two distinct interactive phases: starts with the collection and analysis of quantitative data followed by the subsequent collection and analysis of qualitative data (Creswell & Clark 2011:71). Building from the quantitative results, the researcher in explanatory sequential design conducts a second qualitative phase to obtain the deeper meaning of some of the findings in the first phase. The researcher then interprets the two results together (Creswell & Clark 2011:71; Fetters, Curry, & Creswell 2013:2136). The rationale for this approach is that the quantitative data and results provide a general picture of the research problem. More analysis, specifically through qualitative data collection is needed to refine, extend or explain the general picture of the study (Subedi 2016:573). The

follow-up explanations design provides a framework for the researcher to collect qualitative data to expand on the quantitative data and results. Within this design, a researcher analyses the relevant quantitative results and then uses the qualitative findings to explain the initial quantitative results further. Thus, the primary emphasis is on the quantitative results (Edmonds & Kennedy 2017:197).

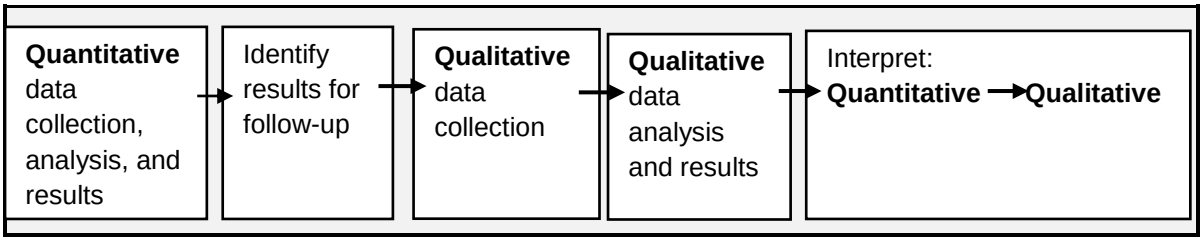

Figure 3.1 Follow-up in explanatory sequential design

(Edmonds & Kennedy 2017:197)

The researcher believed it imperative to use quantitative design to investigate the determinants of malnutrition and food insecurity, and assess the outcome of nutrition and food security on treatment outcome and quality of life, and among PLWHA. Quantitatively, researchers systematically examine the relationship between the independent and dependent variables and determines their relationships (Polit & Beck 2012:54). Cunningham et al (2013:440) pointed out that quantitative research is designed to empirically identify the presence and magnitude of differences between individuals and/or groups of individuals, whereas qualitative research is typically more focused on sense-making in a purer sense. According to Cunningham et al (2013:440), qualitative research often functions to develop theory from the data that are collected (an inductive process) through the rich description of a phenomenon than on its quantification. Consequently, qualitative methods bring a new or fresh perspective to existing research in areas that have been dominated by quantitative methods. Thus, in this study, senior health experts' perspective and experience, and their recommendations for the development of support programme for the integration of nutrition and food security with HIV prevention, treatment and care are qualitatively explored.

In a mixed method study approach, the data integration can be implemented at the design, methods, and interpretation and reporting levels of research

(Fetters, Curry & Creswell 2013:2135). In this study, data integration occurs at the interpretation and reporting level. The researcher reported the findings of the study within a single report, but the quantitative and qualitative findings are reported in different sections. Cunningham et al (2013:440), when combined with quantitative techniques, qualitative strategies can often help researchers to more strongly support their research design choices and final inferences. Based on the mixed findings of quantitative and qualitative of the study, a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care was developed.

3.4 RESEARCH METHOD

The study was conducted in three phases. Phase 1 is a quantitative strand that employed a structured questionnaire to collect data from PLWHA. Phase 2 is a qualitative strand that employed focus group discussion to collect data from senior health experts. Phase 3 is the development of a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment, and care based on the results of phase 1 and 2.

3.4.1 Phase 1: Quantitative strand

Phase one of the study was quantitative focusing on investigating the determinants, and outcome of nutrition and food security on treatment outcome and quality of life of PLWHA. The researcher considered it imperative to use quantitative design to describe and explore the role of nutrition and food security on treatment outcome and quality of life, and investigate the determinants of malnutrition and food insecurity among PLWHA. Quantitatively, researchers systematically examine the relationship between the independent and dependent variables and determines their relationships (Polit & Beck 2012:54). Cunningham et al (2013:440) pointed out that quantitative research is designed to empirically identify the presence and magnitude of differences between individuals and/or groups of individuals, whereas qualitative research is typically more focused on sense-making in a purer sense. In this section, the researcher presents the setting, population, sample, sampling, data collection, data management, data analysis, validity and reliability of the quantitative elements of the study.

3.4.1.1 Setting

The setting is the location in which a study is conducted (Grove, Gray & Burns 2015:38). The setting for this study was Benishangul Gumuz Regional State (Figure 3:2). The Benishangul Gumuz Regional State is one of the nine regional states of the Federal Democratic Republic of Ethiopia located in the North-Western part of the country. It is bounded in the North and North-East by Amhara region; in the East by Oromia Region; in the South by Oromia region and South Sudan; and in the West by Sudan. The total land area of the region is 50,380 square kilometers.

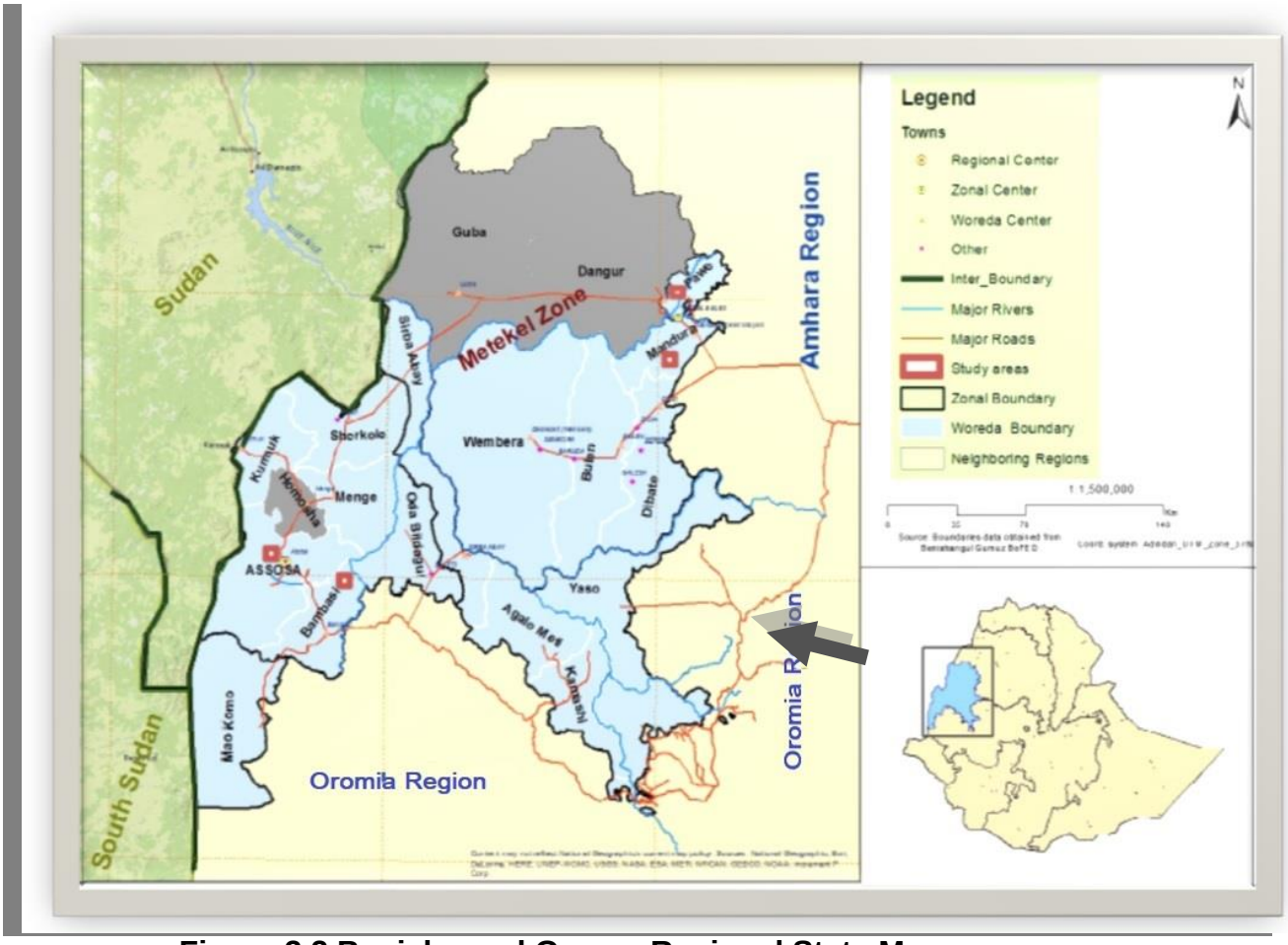

Figure 3.2 Benishangul Gumuz Regional State Map

(Adopted from Moreda 2017:702)

The total population of the region is estimated to be about 1,070,142. Administratively the region is divided into three zones, 20 woredas and one special woreda (third-level administrative divisions of Ethiopia followed by

Kebele), and 472 kebeles (the smallest unit of local government) (Emergency Preparedness and Response–Benishangul Gumuz 2016:3; Alemu & Chekol 2010:17). The study was conducted at health facilities that provide comprehensive HIV care, treatment, and support services in Benishangul Gumuz Region, Ethiopia. During the study period, a total of two referral hospitals and 16 health centres were providing comprehensive HIV prevention, treatment, and care in the region. The phase 1 of the study was conducted among the existing two referral hospitals: Hospital A and B; and three health centres: X, Y and Z health centres where utmost comprehensive HIV care service was provided in the region. These health facilities were purposely targeted to enhance capturing the maximum sample size of the study. The setting and the total population in the setting determined the study population of the study.

3.4.1.2 Population

The population is all elements (individuals, objects, or substances) that meet certain criteria for inclusion in a study (Kerlinger & Lee 2000 cited in Grove et al 2015:46). Polit and Beck (2012:59) described the population as the entire aggregation of cases in which a researcher is interested. In most research, two populations are described, the target population and the accessible population. According to Polit and Beck (2012:274), a target population is the aggregate of cases about which the researcher would like to generalize, whereas, an accessible population is the aggregate of cases that conform to designated criteria and that are accessible for a study. For this phase of the study, the target population was all PLWHA in Benishangul Gumuz region. Whereas, the accessible population includes documented adult living with HIV and AIDS who are on comprehensive HIV care among the selected health facilities in the region. According to Ethiopian Health and Nutrition Research Institute Federal Ministry of Health (2012: 33), by 2016, a total of 7,409 people were living with HIV and AIDS in the Benishangul Gumuz region. The prevalence of HIV was almost similar for both males (0.9%) and females (1%) of sexually active age (CSA & ICF International 2012:232). The population guided the sample of the study.

3.4.1.2.1 Sample

A sample is a subset of population elements, which are the most basic units about which data are collected (Polit & Beck 2012:275). To estimate the minimum number of the sample that needs to be sampled for phase 1 of the study, a population proportion formula (Rahman 2015:18), was used as follows:

$$\mathbf{n} = \left[\frac{z\left(\frac{\alpha}{2}\right)^2 p(1-p)}{d^2}\right].$$

Food insecurity among PLWHA was taken as an indicator variable to determine the number of PLWHA required to enroll in the study. Studies conducted in Jimma, South West of Ethiopia (Tiyou et al 2012:3) indicated that the prevalence of food insecurity among PLWHA was 63%. A marginal error (d) of 5%, population proportion (p) of 63% and 95% confidence limit (Zα/2) =1.96 were assumed. Thus, using Epi Info version 7.1.4.0 for windows,

$$\mathbf{n} = \left[\frac{(1.96)^2 0.63(1-0.63)}{(0.05)^2}\right] = 359$$

Accordingly, by adding 10% of the samples to cater for non-response rate, a total of 396 respondents were included for phase 1 of the study. However, only people who met the inclusion criteria were included in the study.

- **Inclusion criteria**

Only people who met the following eligibility criteria were included in the study:

- People living with HIV who are actively following their ART services at the selected health facilities in the region during the study period,
- Ambulant PLWHA visiting ART clinic at the designated health facilities in the region during the study period
- People age 18 years and above.
- Residing in the Benishangul Gumuz region for at least five years
- Able to understand and speak Amharic.

- **Exclusion criteria**

The following people, though they were living with HIV were excluded from participating in the study:

- People living with HIV who have cognitive impairment.

3.4.1.2.2 Sampling

Sampling is a process of selecting participants who are representative of the population being studied (Grove, Gray & Burns 2015:37). The rationale of sampling is selecting a representative subset of the population because it is impractical and very costly to survey the whole population (Curtis & Drennan 2013:180). Sampling designs are classified as either probability sampling or nonprobability sampling. In such probability sampling, researchers can specify the probability that an element of the population will be included in the sample. Greater confidence can be placed in the representativeness of probability samples. Probability sampling involves random selection of elements (Polit & Beck 2012:275).

Probability sampling was considered ideal for this study because it increases the likelihood of obtaining samples that are representative of the population. A simple random sampling is employed to select the samples. The number of registered PLWHA on comprehensive HIV care at each health facilities were used as a sampling frame to select all eligible respondents that meet the inclusion criteria for this study. A proportional to size allocation method was employed to determine the number of study subjects in each health facilities. In proportional to size (proportionate sampling), subjects are selected in proportion to their occurrence in the population (Grove et al 2013:360). This means that study participants per health facilities were determined by the percentage contribution of PLWHA in each health facility until the total required number of study participants was achieved. Following the simple random sampling technique, taking the first PLWHA visiting the ART clinic between January and May 2017 as case one, every 4th of daily attendances were interviewed using interviewer-administered questionnaire and anthropometric measurements.

During the study period, January to May 2017, a total of 2,721 PLWHA are receiving ART service among the study sites. Table 3.1 elaborate on the

number of accessible population and sample contribution among the study sites:

Table 3:1 The study sites and an accessible population of the study

Name of health facility	Accessible population (M)	Samples (frequency, %) $\sum\left[\left(\frac{M}{N}\right) * 396\right]$
Hospital A	1079	157 (40%)
Hospital B	921	134 (34%)
Health Centre X	275	40 (10%)
Health Centre Y	251	37 (9%)
Health centre Z	195	28 (7%)
Total (N)	**2721**	**396 (100%)**

3.4.1.3 Data collection

Research data are the pieces of information obtained in a study (Polit & Beck 2012:52). Polit and Beck pointed out that in quantitative studies, researchers identify variables, develop conceptual and operational definitions, and then collect relevant data. Data collection is the precise, systematic gathering of information relevant to the research purpose or the specific objectives, questions, or hypotheses of a study (Grove et al 2015:47). The Data collection section highlights data collection technique, development of the data collection instrument, pre-testing the instrument and the process of data collection

3.4.1.3.1 Data collection technique

According to Grove et al (2015:303), during data collection, investigators use a variety of techniques for measuring study variables, such as observation, interview, questionnaires, scales, and biological measures. In this study, the data collection approach employed was a structured data collection tool for an interview. Doody and Noonan (2013:28) elucidated that in structured interviews, each participant is asked the same questions using the same wording and in the same order as all the other participants. Information is gathered from participants in a comparable, pre-specified way. When data are

collected in a structured fashion, researchers must develop (or borrow) a data collection instrument, which is the formal written document used to collect and record information, such as a questionnaire (Polit & Beck 2012:191). In this phase of the study, the data collection approach employed was a structured data collection tool for an interview (see annexure F). A structured questionnaire was used for exit interviews for PLWHA leaving the ART clinic among the selected health facilities. Based on the sampling frame at each study sites, the data collectors conducted the interview through reading to respondents and ticking their response options. Before leaving the respondents, the data collectors checked and rechecked for missing data and consistency of the responses captured.

3.4.1.3.2 Development of the data collection instrument

In quantitative studies, researchers structure interviews to collect subject responses to questionnaires or surveys with possible responses to questions carefully designed by the researcher (Grove et al 2015:303). To enhance and maintain a quality questionnaire for an interview, the researcher reviewed secondary data, assessed related studies that have been conducted previously. The researcher also determined the target population and considered the advice of experts before designing the questionnaire. Based on the facts described, and researcher's existing knowledge about the kind of information to be collected, standardised and validated open domain data collection instruments available for scientific inquiries which were previously used in the other studies were used for this study. In order to make the questionnaire understandable by the respondents and get most accurate and complete information, the researcher translated the questionnaire from English to Amharic (Annexure G), and further translated from Amharic back to English by an independent translator to avoid its inconsistencies in the meaning and with intentions to maintain and check the validity of the questionnaire.

The questionnaire developed is composed of the following seven sections:

- *The first section* is about socio-demographic characteristics such as age, sex, education, marital status, religion, ethnicity, income, occupation, place of residence (urban/rural), household size and dependency ratio.

The socio-demographic characteristics were used to examine its association with the study objectives.

- *The second section* is about household food insecurity measurement. The measurement of food insecurity at any given time captures one if not more of the three dimensions of food security: availability, utilization, and access (Barrett 2010 cited in Gebreyesus, Lunde, Mariam, Woldehanna & Lindtjørn 2015:2). In this study, the access component of the household food insecurity is measured using the standard Household Food Insecurity Access Scale (HFIAS) (Coates, Swindale & Bilinsky 2007:14-16). This is a 9-item questionnaire assessing household food insecurity on the domains of anxiety about household food access, insufficient quality of food and insufficient food intake. Food access refers to physical and economic access to food (Jones, Ngure, Pelto & Young 2013:490). The primary explanatory variable for this analysis was household food insecurity over the last 30 days before the interview, as measured by the Household Food Insecurity Access Scale. This nine-item scale is based on validation studies in eight countries (Coates et al 2007:6; Frongillo & Nanama 2006:1412; Swindale & Bilinsky 2006: 1452). The scale was also used in Ethiopia by Gebreyesus et al (2015:10). Validation studies have demonstrated that this measure can distinguish food-secure from food-insecure households across different cultural contexts (Gebreyesus et al 2015:2; Jones et al 2013:490). Questions cover three domains of experience of food insecurity including anxiety and uncertainty about the household food supply, insufficient quality (variety, preferences, and types of food), and insufficient food intake and its physical consequences. Participants were identified as either being food secure, mildly, moderately, or severely food insecure. The internal consistency of this measure was high in this sample, with a Cronbach's alpha of 0.89.

- *The third secti*on of the instrument is about the measurement of Household Dietary Diversity. Dietary diversity is associated with various measures of household socioeconomic status that are commonly considered proxy indicators of household food security, including food and non-food expenditures, per capita daily caloric availability, household assets and education, and household income (Jones et al

2013:491). In this study, household dietary diversity was measured using the Household Dietary Diversity Score for measurement of household food access (Kennedy, Ballard & Dop 2011: 52; Anne & Bilinsky 2006: 4). All PLWHA in the study were asked if anyone in the household consumed any item from the food group in the last seven days.

- *The fourth section* is about wealth/asset possession of PLWHA and household. The researcher used the household wealth index score questionnaires for possession of assets which adopted from the Ethiopian Demographic Health Survey 2011 (DHS 2011:336-339). The wealth index serves as an indicator of the level of wealth that is consistent with expenditure and income measures (Chakraborty, Fry, Behl, & Longfield 2016:147; CSA & ICF International 2012:41). The adopted wealth index is a measure that has been used in many DHS and other country-level surveys to indicate inequalities in household characteristics, the use of health and other services, and health outcomes.

- *The fifth section* is about health-related quality of life (HRQoL). HRQoL is an individual's or a group's perceived physical and mental health over time (CDC 2017: 1). In this study, the 10-item Patient-Reported Outcomes Measurement Information System® (PROMIS®) Global Health Scale (PROMIS Global 10) were used to measure key HRQOL domains global mental health and physical health, and overall health. PROMIS® is a set of person-centred measures that evaluates and monitors physical, mental, and social health in adults and children (Health Measures 2017:1). It can be used with the general population and with individuals living with chronic conditions. The Global physical health (overall physical health, physical functioning, pain, and fatigue) and global mental health (quality of life, mental health, satisfaction with social activities, and emotional problems, key domains assessed in HRQoL (Bevans, Ross & Cella 2014:2; Health Measures 2017: 1).

- *The sixth section* is about measuring clinical characteristics believed to be involved in determinants of malnutrition and food security such as

CD4 count, history of ART adherence, duration of ART initiation, body mass index, history of any episodes of opportunistic infections and hospitalisation.

- *The seventh* section is about household food insecurity coping strategy. A validated household food insecurity is coping strategy index (Maxwell & Caldwell 2008: 8). This is a 13-item scale evaluating how households manage to cope with a shortfall in food for consumption were used. Using the CSI participants', obstacles to achieving optimum health were examined, including the history of times when households did not have enough food or money to buy food and quantification of participants' coping mechanisms were solicited using a series of questions regarding how households cope with food shortfalls.

To ensure that the data collection is relevant, the questionnaire was pre-tested.

3.4.1.3.3 Pre-testing the instrument

Polit and Beck (2012:643) indicated that pre-testing of the questionnaire is used to identify and detect any gaps inherent in the instruments and to determine the effectiveness of the tools before the data collection. The instrument was pretested in a selected health facility before the actual data collection to determine whether all respondents would understand the questions and instructions in the same way, and how contextually relevant the questions were. To verify if the language used in the questionnaire was clear and understandable and the layout of the questionnaire was user-friendly and easy to read, the researcher pre-tested the questionnaire with 32 participants receiving comprehensive HIV care services in Assosa hospital. In this study, the pre-test was also used to familiarise the data collectors and supervisors with the instrument, the questions, and the actual fieldwork process. Based on the pre-test findings, minor changes were made to the questions and thus improved the quality of the instruments.

3.4.1.3.4 Data collection process

Before proceeding to data collection, the researcher submitted an official request for permission to conduct a study among the study facilities to

Benishangul Gumuz regional state Health Bureau (Annexure C). Consequently, based on the researcher's request and a supporting letter written from UNISA Ethiopia Regional Learning Centre (Annexure B), the regional Health Bureau granted permission to the conduct the study (Annexure D). As a result, the researcher developed training material for data collectors and supervisors before commencing data collection. The training guide emphasises on how to assure the data quality, ethical issues, possible challenges and how to handle the challenges, effective communication strategies and some questions that need thorough attention by the data collectors. Accordingly, the researcher started training data collectors and supervisors. On the days of the data collection, the supervisors went around and guided the data collectors to comply with the data collection guidelines to ensure the quality of the data collected.

3.4.1.4 Data management

During the data collection periods, each day after data collection field work, the collected data were all checked to assess if all information intended to be collected has been collected. The collected and generated data were kept in locked cabinet and password protected computers during data processing and analysis. A total of three-day training which focuses on completeness of the data, record consistency with the follow-up visit, clear identification of unique numbers of the participants were executed for the supervisors and data collectors. Accordingly, the data collection supervisors executed strict supervision during data collection on top of cross-checking the collected data for completeness and consistencies. The overall activities were monitored by the principal investigator.

3.4.1.5 Data analysis

Data analysis is a rigorous process used to reduce, organize, and give meaning to data (Grove at al 2015:47). Data were coded and captured in Microsoft Excel and transferred to IBM SPSS version 24 (IBM Corp.). The entered data were checked for completeness, coded and checked for accuracy and analysed by a statistician. Both descriptive and inferential statistics were

utilised to analyse the data. Frequency, Independent t-test, ANOVA and correlations were used to present the data. Internal consistency of the study variables was analysed using Cronbach's Alpha (Alpha coefficient). Bivariate and Multivariate analysis was employed to investigate the determinants of malnutrition and food insecurity among PLWHA. According to Grove et al (2015: 501), the bivariate analysis is a statistical procedure in which the summary values from two groups of the same variable or two variables within a group are compared. The bivariate analysis focuses on the variables and their empirical relationship rather than only describing. Multivariate analysis is a statistical procedure designed to analyse the relationships among more than two variables simultaneously (Babbie 2014:456). Multivariate data arise when researchers record the values of several random variables on several subjects or objects or perhaps one of a variety of other things in which they are interested, leading to a multidimensional observation for each (Everitt & Hothorn 2011:1).

To analyse the relationship between various dependent and independent variables, parametric and nonparametric statistical methods were used. The bivariate analysis encompasses: independent t-test, simple linear regression method using ordinary least squares (OLS), Kruskal Wallis tests, Wilcoxon-Mann-Whitney test, and Student's t-test were used for continuous predictor variables, while Chi-square and ANOVA were used for categorical predictor variables as appropriate after checking of normality.

All independent variables which were significant at a *p*-value less than 0.25 and <0.05 in the bivariate analysis were included in the multivariate logistic regression analyses. The inclusion of p-values less than 0.25 was based on the finding from Bursac, Gauss, Williams and Hosmer (2008:4), who reported that p values less than 0.25 might indicate some reasonable association with the outcome. The results of the multivariate analysis were presented with an adjusted statistical test score, i.e., level of the coefficient with 95% confidence intervals (CI) and *p*-values. In all the analysis, the test was two-sided and *p*-value < 0.05 was considered as statistically significant.

3.4.1.6 Validity and reliability

This section will highlight measures employed to ensure the validity and reliability of the data for the quantitative strand of the study.

3.4.1.6.1 Validity

Study validity is a measure of the truth or accuracy of the findings obtained from a study (Grove et al 2015:224). According to Polit and Beck (2012:175), validity is a more complex concept that broadly concerns the soundness of the study's evidence, that is, whether the findings are unbiased and well-grounded (Polit & Beck 2012:175). The validity of a study's design is central to obtaining quality results and findings from a study. For this study, the following validity was taken into consideration: Statistical conclusion validity, content validity, internal validity, construct validity, and external validity of the study was discussed in this study.

- **Statistical conclusion validity**

Statistical conclusion validity is the statistical analysis used for inferring cause to determine whether the independent and dependent variables are related (Grove et al 2015:224). Statistical conclusion validity is concerned with whether the conclusions about relationships or differences drawn from statistical analysis are an accurate reflection of the real world. To safeguard the statistical conclusion validity of the study, the researcher set the *p*-value at < 0.05 during analysis and at the same time maximal sample size is maintained to minimise type-II error.

- **Content validity**

Content validity refers to how much a measure covers the range of meanings included within a concept (Babbie 2014:156). Grove et al (2013:394) define content validity as the extent to which the method of measurement includes all the major elements relevant to the construct being measured. In this study, the questionnaire was adapted from the tool(s) that have been used extensively and thus well-established content validity and freely available for scientific

inquiries, and had high reliability and validity ratings. An extensive review of the literature was conducted to contextualise and enrich the tool. Besides, to ensure the content validity of data, feedback offered by data collectors of the study on the translated interview schedule during the training of data collectors as well as the responses obtained from the pre-test of data collection tool on sampled PLWHA were used as input to refine the tool.

- **Internal validity**

Internal validity is the extent to which the effects detected in the study are a true reflection of reality rather than the result of extraneous variables (Grove et al 2015:226). In this study, the questionnaire was reviewed by the researcher and the researcher's supervisor and further by a panel of experts. Furthermore, a thorough literature review on the study area was well culminated and pilot interviews with PLWHA who have not included in the study to pre-test the questionnaire. This was done to further strengthen the internal validity of the instrument.

- **Construct validity**

Construct validity is the degree to which a measure relates to other variables as expected within a system of theoretical relationships (Babbie 2014:157). According to Grove et al (2015:227), construct validity examines the fit between the conceptual and operational definitions of variables. In this study, theoretical constructs or concepts are defined within the study framework (conceptual definitions). These conceptual definitions provide the basis for the operational definitions of the variables. Operational definitions (methods of measurement) must validly reflect the theoretical constructs. In this study, construct validity was ensured by conducting an extensive literature review and consulting a variety of publications to define all the key concepts of the study (see chapter 1, section 1.5.1). For example, in this study Food security-when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (FAO 1996 food summit, par.1).

- **External Validity**

External validity is concerned with the extent to which study findings can be generalized beyond the sample used in the study (Grove et al 2015: 228). In this study, external validity was addressed in the sampling strategies and sample selection procedures of the study participants. A probability sampling approach using systematic sampling was used so that the selected study participants were representative of the study population and the construction of the sampling framework ensured equal representation of the sample selection.

3.4.1.6.2 Reliability

Reliability refers to the accuracy and consistency of information obtained in a study. The term is most often associated with the methods used to measure variables (Polit & Beck 2012:175). Reliability is concerned with the consistency of a measurement method (Babbie 2014:287). To ensure the reliability of the data collection tool and to enhance the accuracy of measurements, standardised and structured data collection, using the same questions in the interview schedule was carried out for all PLWHA. Closed-ended questions were used in most items of the data collection tool which reduces the introduction of bias. The data collection tool was pre-tested, and data collectors were trained on the objective of the study with continuous guidance and supervision by the data collectors' supervisor and principal investigator to ensure completeness and consistency of the data collection process. All these were done to maximise the study's reliability.

After completion of phase 1, which is the quantitative strand of the study, the researcher proceeded to phase 2, the qualitative strand.

3.4.2 Phase 2: Qualitative strand

This section highlights the process followed in the qualitative strand of the study. According to Cunningham et al, qualitative research often functions to develop theory from the data that are collected (an inductive process) through the rich description of a phenomenon than on its quantification (Cunningham et al 2013:440). Consequently, qualitative methods bring a new or fresh

perspective to existing research in areas that have been dominated by quantitative methods (Mohajan 2018). Thus, in this study, senior health experts' perspective and experience, and their recommendations for the development of support programme for the integration of nutrition and food security with HIV prevention, treatment and care were qualitatively explored. The questions addressed in this phase of the study was "What is the senior health experts' perspective and experience in integrating nutrition and food security with HIV prevention, treatment, and care?" Thus, this qualitative phase was designed to explore and describe senior health experts' perspective and experience in integrating nutrition and food security with HIV prevention, treatment, and care. In this phase, the researcher presents, setting, population, sample, sampling, recruitment of the participants, data collection, data analysis and measured followed to ensure the trustworthiness of the findings.

3.4.2.1 Setting

A critical first step in the qualitative study is selecting settings with high potential for information richness (Polit & Beck 2012:515). The study was conducted in Benisahngul Gumuz region, Ethiopia. The details of the setting were thoroughly described in Phase 1 of the study.

3.4.2.2 Population and sampling

Senior health experts are those officials who have demonstrated work experience on policy/programme development, strategic planning in the health sector and services at the national level or regional state level. Senior health experts working in national level institutions or international organizations and working closely with the Benishangul Gumuz Region Health Bureau (BG-RHB) and Federal Ministry of Health, such as senior health experts in regional health bureau, development partners, non-governmental organizations, higher academics, and health care administrators were the study populations.

Sampling strategies in qualitative research are usually purposive and referred to as nonprobability sampling. In nonprobability sampling, researchers select individuals to study because they are available, convenient and meet some

criteria or characteristics that the investigator seeks to study (Clark & Creswell 2015:332). The participants were selected based on specific predetermined criteria and objective of the study. Those who did not meet the inclusion criteria were excluded from participating.

3.4.2.2.1 Inclusion criteria

The following were the criteria used to include the participants in the study:

- Senior health /policy experts working in the Institutions or organizations that collaborate with Benishangul Gumuz Region Health Bureau consisted of senior health/policy experts,
- Ability to speak and read English and Amharic fluently.
- Having worked in those institutions for at least two years.

3.4.2.2.2 Exclusion criteria

The following individuals were excluded in the studies through they were senior health/policy experts:

- Senior health experts who lack policy/programme development experience
- Senior health experts who are not aware of the current national health sector development programme.

3.4.2.2.3 Recruitment of the participants

Grove et al (2015:310) described that study participants or subjects might be recruited only at the initiation of data collection or throughout the data collection period. Selection and recruitment of participants are determined by the study designed the study purpose and objectives. For this study, organisations were approached with the support letter written from UNISA Ethiopia Regional Learning Centre requesting them to be part of the study. After that, within the organisations, willing senior health experts who met the selection criteria were requested to become part of the study. Accordingly, eight senior health experts from Benishangul Gumuz Regional Health Bureau, seven from an international organization and six healthcare administrators who are working in collaboration

with Benishangul Gumuz Regional State Health Bureau, making a total of twenty-one participants were included into the study.

3.4.2.3 Data collection

Data collection is the precise and systematic gathering of information relevant to a research problem using data collection instruments which could be in the form of questionnaires, interview schedules, and guides, field notes and records and artifacts (Grove et al 2013:691). In this section, the researcher describes the data collection instrument, piloting and the data collection process for the qualitative strand of the study.

3.4.2.3.1 Data collection instrument

Focus group discussions (FGD) were held with senior health experts on their views of integrating nutrition and food security with HIV prevention, treatment, and care. The data collection tool was designed based on the objective of the study (see annex I)

3.4.2.3.2 Piloting

A pilot study is often a smaller version of a proposed study, and researchers frequently conduct these to refine the study sampling process, treatment, or measurement of variables (Hertzog 2008 cited in Grove et al 2015:45). The researcher piloted a focus-group interview with six healthcare experts to establish the ability of the researcher to conduct such an interview, as well as the feasibility of using one central question. The pilot has created an opportunity for the researcher to maintain the flow of the discussion and the power dynamics of the group and become more familiar with the instrument.

3.4.2.3.3 Data collection process

Qualitative researchers typically go into the field knowing the most likely sources of data, while not ruling out other possible data sources that might come to light as data collection progresses (Polit & Beck 2012:532). In this

regard, researchers have special considerations in mind as they implement the data collection step of their qualitative studies aiming explanation of the subject matter.

In this study, senior health experts' perspective and experience on integrating nutrition and food security with HIV prevention, treatment and care were qualitatively explored using FGD method. Based on their willingness, a schedule for the interview was set in their respective organisation from December 2016 to April 2017. Overall, three FGD session with eight participants for the first session, seven participants for the second session, and six for the third session was executed across their respective organizations. Their level of experience ranged from 3 years to 29 years. The average length of the focus group interviews was an hour and a quarter. The interview sessions were conducted in participants' respective offices and calm private places for comfort and acoustically amenable to audiotape recording. On top of the audio recording, the researcher took detailed observational notes about each session. Chandler, Anstey and Ross (2015:2) pointed out that qualitative researchers capture the voices of participants during data collection through recording technology such as tape recorders and with digital voice recorders and mobile phones. Because this type of audio recording technology facilitates the analytic process by enabling verbatim transcription of the verbal content; and nonverbal elements into text and maintains the integrity of the data so that the researcher may repeatedly listen to the nuances of the vocal expression. In this study, the researcher recorded the voices of the participants with mobile phone accordingly to capture all the information in the discussion sessions. The recorded voices were transcribed after discussions. To ensure confidentiality and anonymity of transcriptions, the names of the participants were replaced with pseudonyms.

In addition to the focus group interviews, field notes were taken to support the data of the interviews. The field notes taken includes visual data such as the reaction of the participants to the interviews, the years of experience of the participants, information on the venue, seating arrangements, the way they spoke, and the researcher's reflective thoughts. The notes provided a better understanding of the situations of the data collection sessions and process. Field notes are broader, more analytic and represent the participant observer's

efforts to record information and also to synthesize and understand the data and serve as the data for analysis (Polit & beck 2012:548).

3.4.2.4 Data analysis

Qualitative data is an active and interactive process in which researchers typically scrutinize their data carefully and deliberatively, often reading the data over and over in search of meaning and understanding (Polit & Beck 2012:557). Qualitative data analysis involves the identification, examination, and interpretation of patterns and themes in textual data and describes how these patterns and themes answer the research questions (Taylor & Gibbs 2010 cited in de Chesnay 2015:1). In this study**,** audio recorded interviews were loaded into a password-restricted computer and then transcribed verbatim to provide a written account using actual words before being analysed. Verbatim transcriptions of records are a critical stage for preparation of data analysis and the researcher needed to ensure its accuracy (Polit & Beck 2012:557).

In this study, the first five steps of qualitative data analysis procedure employed by de Chesnay (2015:3) were followed using the following steps and components:

- **Data capture, organize and prepare for analysis:** the transcripts and field notes were prepared for analysis and captured in a Microsoft Excel. From Microsoft Excel, all narrative data were transferred into ATLAS. Ti (2011; version 7) for more precise, line-by-line scrutiny, processing, and organization through the analysis.
- **A detailed reading of all individual transcripts and field notes followed by open or first-level coding:** open coding was undertaken after reading and rereading the transcripts followed by grouping together and categorising the transcripts. During the coding process, the Tesch's 1990 cited in Creswell (2014:198) steps of the coding process were adopted:
    - *Get a sense of the whole*– the transcripts were read through, and ideas, questions, and observations were made in the margins as and when these presented themselves.

- *Pick one document*– one very interesting interview was picked as the one used for writing thoughts in the margin as they emerged. The shortest transcript was initially picked for this purpose; then the most interesting one was later chosen to get a sense of what the main points were.
- *Complete the task*– thoughts were recorded with several interviews/transcripts. A list of all the topics was made, and similar topics were clustered together and arranged on a Microsoft Excel.
- *Abbreviate the topics as codes*– the list of topics was abbreviated as codes which were written in a column next to the appropriate narrative.
- *Group like topics together*– topics related to each other were grouped together.
- *Abbreviate each category and alphabetise them as codes*– abbreviations were decided on for each category, and these were alphabetised as codes.
- *Assemble the data and perform the preliminary analysis*.

- **Second-level or sequential coding:** second-level coding consists of extracting commonly coded segments from all individual documents and placing them in new documents holding all instances of commonly coded items, creating composite collections of distinct conceptual categories. In this study, composite collections of distinct conceptual categories were synthesised, and integration of the previous coding across all the data was made.
- **The inclusion of visual data as complementary information.** Visual data can sometimes convey meaning, insight, impact, or significance much more quickly and effectively than words can alone (de Chesnay (2015:3). In this study, visual information obtained during the focus group discussion sessions were used to enhance, enrich, illustrate, or demonstrate ideas that cannot be adequately expressed with words. These include photos taken during the FGD sessions, the reaction of the participants to the interviews, information on the venue, seating arrangements, the way they spoke, and the researcher's reflective thoughts. The visual data were catalogued to themes to support the evidence.

- **Thematic analysis and interpretation.** The researcher undertook the synthesis and integration of the recurrent patterns and linkages between and among codes, evolving across all of the data into distinct themes or propositional statements. Accordingly, codes which were common across all data were then linked propositionally in some tentatively meaningful way. That process led to the development of themes. The themes developed include (i) comprehensive, (ii) integrated, and (iii) equitable health service programmes. The details of the themes will be discussed in the next chapter.

To ensure the rigour of the qualitative strand of the study, the criteria for trustworthiness were followed:

3.4.2.5 Trustworthiness

Trustworthiness is a determination that a qualitative study is rigorous and of high quality (Grove et al 2015:392). According to Grove et al (2015:392), the trustworthiness of the study refers to the extent to which a qualitative study is dependable, confirmable, credible, and transferable. To ensure the trustworthiness of the qualitative strand of the study, the researcher followed Lincoln and Guba (1985) criteria for ensuring trustworthiness as described in Polit & Beck (2012: 584). The criteria include credibility, dependability, authenticity, transferability, and confirmability.

3.4.2.5.1 Credibility

Credibility is the confidence of the reader about the extent to which the researchers have produced results that reflect the views of the participants. (Murphy & Yielder 2010 cited in Grove et al 2015:392). Credibility is similar to validity in the critical appraisal of quantitative studies. In this study, three focus group discussion sessions were conducted by the researcher until data saturation was reached. The researcher has fully engaged with the participants during data collection to have an in-depth account of the participants' view. The engagement with the participants assisted in clearing out misinformation or distortion of information and also assisted in ensuring data saturation. This is

one of the key strategies that were used to build trust which in turn helped to get appropriate information from the participants (Guba & Lincoln 1985 cited in Polit & Beck 2012:589). The researcher has established good relations with the regional senior health experts because he is working with and technically supporting the regional health bureau on HIV/AIDS, nutrition and food security. Therefore, his experience of the programme and research setting, the knowledge and his expertise on HIV/AIDS, nutrition and food security and research methodology were important for collecting the data and ensuring credibility. The researcher also used triangulation. Triangulation is the use of multiple data collection and analysis methods, multiple data sources, multiple analyses, and multiple theories or perspectives (Grove et al 2015: 244). In this study, method and data source triangulations were used. Field notes and focus group sessions were implemented simultaneously to answer the research question and ensure credibility. On the spot, checking was done during the focus group discussion through the use of probes repeatedly and at some stages requesting the participants to explain what they meant during data collection.

3.4.2.5.2 Dependability

Dependability refers to the consistency of the data throughout the period or conditions (Polit & Beck 2012:585). To maintain the dependability of the study, the documentation of steps taken and decisions made during analysis has to be established (Grove et al 2015:392). The researcher kept an 'audit trail' throughout the study. An audit trail is all the records (transcripts, audio tapes, and interview notes) which allow the researcher to follow the research process which to ensure that findings will be confirmed by others (Lincoln & Guba 1996 cited in Polit & Beck 2012:588). A research peer and the supervisor of this study were consulted to determine whether the procedures used were acceptable and dependable. A detailed description of the research process followed was provided to illustrate further insight into the study.

3.4.2.5.3 Confirmability

Confirmability is the extent to which other researchers can review the audit trail and agree that the authors' conclusions are logical (Murphy & Yielder 2010

cited in Grove et al 2015:392). Likewise, Polit and Beck (2012:585) pointed out confirmability as objectivity, that is, the potential for congruence between two or more independent people about the data's accuracy, relevance, or meaning. The findings of this study were supported by evidence from the literature throughout the study. The researcher acknowledged all the authors' viewpoints. The unprocessed data (voice recordings), field notes, the documents related to the themes, development of categories and subcategories were kept as evidence in case an audit needed to be conducted. Data was also independently coded by an independent coder. The codes and themes that emerged were compared and discussed until the consensus was reached between the researcher and an independent coder.

3.4.2.5.4 Transferability

Transferability is the extent to which the study findings can be transferred or applied to different settings or contexts (Polit & Beck 2012:585). Loiselle, Profetto-McGrath, Polit, and Beck (2011:275) explained transferability as the extent to which the findings from the data can be transferred to other settings and is thus similar to the concept of generalizability. A mechanism for promoting transferability is a thick description, the rich, thorough description of the research context so that others can make inferences about contextual similarities. In this study, the researcher used purposive sampling technique for selecting study participants which were appropriate for the study and representative to their groups. Moreover, the thick description was used. Thick description is a careful description of the study context, participants, experience, and process observed during the study (Polit & Beck 2012:585). The findings of the study are transferable to a similar group and sets represented in this study only.

3.4.3 Phase 3: Development of a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment, and care

Based on the results of phase 1 and phase 2, a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care were developed by the researcher. The development of

support programme was based on the findings from the integration of phase 1 and phase 2 (quantitative and qualitative strands) of the study based on the WHO (2015a:13)'s people-centred and integrated health services conceptual framework. The following were the concepts used: people-centred health services, integrated health services, and universal health service.

3.4.3.1 People-centred health services

According to WHO (2015a:10), people-centred health services are an approach to care that consciously adopts the perspectives of individuals, families, and communities. These services see individuals, families, and communities as the participants as well as beneficiaries of trusted health systems that respond to their needs and preferences inhumane and holistic ways. Similarly, McCormack, Dewing, Breslin, Tobin, Manning, Coyne-Nevin, Kennedy and Peelo-Kilroe (2010:13) described it as 'an approach to practice established through the formation and fostering of therapeutic relationships between all care providers, older people, and others significant to them in their lives. It is underpinned by values of respect for persons, individual right to self-determination, mutual respect, and understanding. It is enabled by the cultures of empowerment that foster continuous approaches to practice development'. In this study, people-centred health services cover the development of PLWHA-centred nutrition and food security programmes integrated with HIV prevention, treatment, and care.

3.4.3.2 Integrated health services

Integrated health services are health services that are managed and delivered in a way that ensures people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation, and palliative care services, at the different levels and sites of care within the health system, and according to their needs throughout their life course (WHO 2015a:11). In this study, integrated health service discusses nutrition and food security interventions incorporated with HIV/AIDS treatment, care and support programmes at all levels of the healthcare system.

3.4.3.3 Universal health service

Universal health service is when all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need. The service should be of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship (WHO 2017: [1]). In this study, universal health services focus on the development of inclusive nutrition and food security interventions integrated with HIV prevention, treatment, and care for all PLWHA.

Thus, this framework was used to conceptualise the evidence in practice and develop universal, equitable, and PLWHA-centred support programme that facilitates the integration of nutrition and food security with HIV prevention, treatment and care programmes in Ethiopia. At this stage, two datasets (one quantitative and one qualitative), two types of analyses (statistical and thematic), and some way of combining or mixing what is learned from the quantitative and qualitative components of the study were used to guide development of universal health service (Clark & Creswell 2014:383). The detail of this procedure and the development of support programme is discussed in chapter 6.

3.4.4 Ethical considerations

Research ethics is a set of principles that embody what researchers ought and ought not to do, and how this should be decided (Cohen, Manion & Morrison 2011: 87). Polit and Beck (2012:152) discussed the three broad principles on which standards of ethical conduct in research are based: beneficence, respect for human dignity, and justice. In this study, the following aspects were considered to ensure that the study is adhering to broad ethics principles: This section discusses the ethical principles followed in this study: rights of institutions where the research-based, informed consent, confidentiality and anonymity, beneficence and non-maleficence, and scientific integrity on the part of the researcher.

3.4.4.1 Rights of institutions where the research-based

Before the study begins, ethical clearance was obtained from the Health Studies Higher Degrees Committee of the College of Human Sciences at the University of South Africa (Annexure A). Further, permission to conduct the study (ethical clearance) was sought after authorised cooperation letter was written from UNISA Ethiopia regional learning centre to BG-RHB and thus obtained the ethical clearance (Annexure D). A support letter to conduct the study among the selected health facilities in the region was further written to those health facilities by BGR-RHB. Institutional consent and permission to conduct an interview with PLWHA among the selected health facilities in the region were sought. Authorities at the study sites were assured that any information that the researcher came across during the conduct of the research was not be disclosed to any interest groups that could jeopardize the participants' welfare in society and the concerned institution. The researcher abided the guideline of the institutions, which has the right to terminate the study if the safety and confidentiality of participants might be compromised.

3.4.4.2 Informed consent

Informed consent is concerned in addressing the study participants that they have adequate information about the research, comprehend that information, and can consent to or decline participation voluntarily (Polit & Beck 2012:157). In this study, an informed consent form that included permission to interview the PLWHA, audiotape the FGD interview, and publish the findings was obtained from all participants (see annex E and annex H). Included in the consent form is a statement that participants' participation to the study was completely voluntary and free from any form of coercion and may withdraw at any time, ask questions, and refuse to answer questions. The participants' rights, as depicted in the consent, were reiterated at the beginning of each interview. The purpose of the study and as well as their roles was well explained in a language that the individual participants speak or understand before the interview. Signed consent forms were obtained before the first interview.

3.4.4.3 Autonomy

Autonomy entails respect for human dignity involves the participant's right to self-determination, which means they have the freedom to control their actions, including voluntary participation (Polit & Beck 2012:172). The purpose and significance of the study, and potential benefits, if any, to the participants were explained to ensure the right to self-determination. The participants were informed that their participation is voluntary, required their consent, and they could choose to participate or not. They were informed that they have the right to withdraw from the study at any time without penalty. Furthermore, authorities at the health facilities were officially requested for permission.

3.4.4.4 Confidentiality and anonymity

Study participants have the right to expect that data they provide will be kept in strict confidence. Participants' right to privacy was protected through various confidentiality procedures. Anonymity, the most secure means of protecting confidentiality, occurs when the researcher cannot link participants to their data (Polit & Beck 2012: 162). In this study, participants' identifiers (such as name and address) were not used to ensure the anonymity of data. The collected data were stored in locked cabinets, and the transcribed data was stored in a password-protected site in the computer and memory sticks. The researcher also informed all the facility authorities that the data obtained from the PLWHA might be reported in the scientific journals without disclosing personal information of the participants that may enable any third party to identify them as participants in the research. All information was treated as strictly confidential. Furthermore, confidentiality and anonymity of participants in the FGD were ensured by participants choosing a pseudonym to be attached to the transcribed interviews and data analysis. Transcribed interviews and data were coded with the pseudonyms and maintained in a locked cabinet. Access to the transcribed interviews was limited to the researcher and an independent coder, and audio tape records were copied to a password-protected computer as audio. Information was erased from the tape records after the data has been transcribed.

3.4.4.5 Beneficence and non-maleficence

Beneficence involves the performance of good and the protection of participants from physical and psychological harm and exploitation (non-maleficence) (Polit & Beck 2012:171). Non-maleficence means non-harming or inflicting the least harm possible to reach a beneficial outcome (Sundean & McGrath 2013:118). The study participants were informed that no direct benefit would be individually gained from attending in this study. However, they were informed that the results of this study could contribute to the development of support programme to facilitate the integration of nutrition and food security with HIV prevention, treatment, and care in the country that plays a significant role in the control of HIV epidemics and improving the quality of life of PLWHA. The participants were accorded the utmost respect throughout the study process. The researcher was mindful and sensitive when dealing with personal issues. They were assured that their time and information would be put to good use and could go a long way to help improve the quality of services.

The participants were assured that they would not be exposed to any harm. The researcher provided the participants with his contact details and the contact details of the supervisor and Ethics research chairperson should they have any questions about the study or feel that they were disrespected.

3.4.4.6 Scientific integrity on the part of the researcher

To maintain scientific integrity and eliminate the possibility of scientific misconduct and plagiarism, the researcher strictly adhered to the ethical and appropriate use of scientific knowledge by refraining from falsifying or fabricating primary and secondary data. The information obtained from participants were recorded as such. Clear references were given to the respective source when citing ideas, words, processes, findings, and results obtained by other authors. The researcher also documented and acknowledged all important results which are contrary to the researcher's results and conclusions.

3.5 CONCLUSION

This chapter outlined the approach and design used for this study. It also presented the study methods according to phases: Phase 1, quantitative, strand in which Quantitative data were collected from PLWHA through structured questionnaire interviews. Phase 2, the qualitative strand were qualitative data was generated through focus groups interviews conducted with senior health experts. In phase 3, the key concepts used for the development of a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care were introduced. Measures which were taken to ensure the reliability and validity of quantitative strand are also presented. The researcher also presented measures used to ensure the trustworthiness of qualitative data. In the final section, the researcher highlighted ethical aspects adhered to in the study.

In the next chapter, the findings of the research obtained through all forms of data collection tools will be analysed, interoperated and presented.

CHAPTER 4

FINDINGS, PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

In Chapter 3, the research approach, design and methods for the study were discussed. In this chapter, the findings of the study based on data analyses discussed in chapter three are presented and discussed. The results are presented according to sections. Section one will focus on presenting the results of the quantitative strand of the study. The quantitative result of the study is presented and discussed first followed by the qualitative element. Section two, describes qualitative data analysis and presentation about perception and knowledge of senior health experts' perspective on ways of integrating nutrition and food security with HIV prevention, treatment, and care.

4.2 SECTION 1: QUANTITATIVE RESULT

In section 1, quantitative data are analysed and described. The descriptive and inferential findings are presented.

4.2.1 Descriptive statistics of the study participants

In this section, the demographic and socio-demographic profiles, household food Insecurity household dietary diversity, nutritional status, household wealth index, health-related quality of life, and clinical characteristics were presented.

4.2.1.1 Demographic and socio-economic profiles

This section provides the demographic and socio-economic profile of the study participants. A total of 396 PLWHA were proportionally sampled from each study site to participate in the study. However, the statistical information presented was obtained from a total of 390 participants because 6 declined participation, giving a response rate of 98.4%. The proportion of the PLWHA who participated in the study from hospital A was 40%, those from hospital B

constituted 34%, health centre X 10%, health centre Y 9%, and health centre Z contributed 7%. The demographic and socio-economic information collected includes age, gender, level of education, marital status, ethnic group, religious affiliation, residence area, number of families living under one house and their age category, occupation and income of the study participants. Table 4.1 presents a summary of the socio-demographic characteristics of the study participants.

Table 4.1 Demographic and socio-economic characteristics of the respondents (N=390)

Characteristics		Count (n=390)	Percent (%)	Cumulative Percent (%)
Gender	Female	259	66.4	66.4
	Male	131	33.6	100.0
Age	18-24	15	3.8	3.8
	25-34	158	40.5	44.4
	35-44	154	39.5	83.8
	45-54	46	11.8	95.6
	55-64	13	3.3	99.0
	≥65	4	1.0	100.0
Educational level	Never been to school	142	36.4	36.4
	Primary level	166	42.6	79.0
	Secondary and high school level	66	16.9	95.9
	College/University level	16	4.1	100.0
Marital status	Single	46	11.8	11.8
	Married	195	50.0	61.8
	Divorced	101	25.9	87.7
	Widowed	41	10.5	98.2
	Separated	7	1.8	100.0
Religion	Muslim	89	22.8	22.8
	Christian	301	77.2	100
Ethnic	Amhara	240	61.5	61.5
Group	Oromo	78	20.0	81.5
	Agew	36	9.2	90.8
	Berta	12	3.1	93.8
	Others	24	6.2	100.0
Residence area	Urban	355	91	9
	Rural	35	9	100.0
Household	1-3	231	59.2	59.2
Composition	4-6	138	35.4	94.6
	>6	21	5.4	100.0
Household	Self	260	67	66.7
breadwinner	Partner	106	27	93.8
	Others	24	6	100.0
Employment	Unemployed	120	31.3	31.3
status	Employed	270	68.7	100

4.2.1.1.1 Age distribution

The age of the respondents ranged from 18 to 67 years, and the mean age was 36.1 years with a standard deviation of 8.64 years. As indicated in table 4.1, the

majority (80%) of the participants were aged between 25 and 44 years. The lowest proportion was among respondents aged 65 years by 1%.

4.2.1.1.2 Gender of respondents

In this study, females were more dominant. Out of the 390 respondents, 66.4% (n= 259) were females, while 33.6% (n=131) were males.

4.2.1.1.3 Education levels of respondents

About 42.6% (n=166) had completed primary level education, 16.9% (n=66) had completed secondary level education while only 4% (n=16) had completed tertiary (college/university) level. However, a significant proportion, about 36.4% (n=142) were never enrolled in school and thus unable to read and write.

4.2.1.1.4 Marital status

About half, 50% (n=195) respondents were married. Nearly 25.9% (n=101) were divorced, 10.5% (n=41) were widowed, 1.8% (n=7) were separated; while 11.8% (n=46) were single.

4.2.1.1.5 Geographical location of residence

Residents staying in the Woreda towns (third-level administrative divisions of Ethiopia) in the region was defined as urban residents, and those who came from Kebele (the smallest administrative level) rather than the Woreda towns were considered as rural residents. About 91% (n=355). Of PLWHA in this study were urban residents. The remaining 9% (n=55) came from rural geographical locations.

4.2.1.1.6 Religion of respondents

Christians constituted the majority of respondents 77.2% (n=301). Among the Christian faith, Orthodox 66.4% (n=259), Protestant 10.5% (n=41) and Catholic 0.3% (n=1). On the other hand, the Muslim constitutes 22.8% (n=89).

4.2.1.1.7 Ethnic group

The vast majority of the respondents were Amhara ethnic group 61.5% (n=240) of the study population. Only 20% (n=78) were from Oromo ethnic group. The remaining 9.2% (n=36) Agew, 3.1% (n=12) were Berta, and 6.2% (n=24) constitutes the rest of the ethnic group living the Benishangul Gumuz Region.

4.2.1.1.8 Household composition

The majority 59.2% (n=231) of the respondents stay with one to three family members under one roof. About 35.4% (n=138) possess 4-6 family members living together, while only 5.4% (n=21) have larger family members of greater than six living under one roof.

4.2.1.1.9 Household effective dependency

Dependency ratios were reviewed to compare the percentage of the total population, classified as working age, that will support the rest of the non-working age of the households. The effective dependency rate measures the share of total household members that are below or above working age plus those of working age who are chronically ill. The study defined the chronically ill as a person who by reasons of his/her HIV status or any other health condition or disability experiences a diminished level of functioning relative to the primary level of daily living. To qualify, a person should be chronically ill for a minimum of six months. For every household, the numbers of these three categories of members were subtracted from the total household size and expressed as a percentage. The dependency ratio relates to the number of children (0-14 years old), working age who are chronically ill, and older persons (65 years or over) to the working-age population (15-64 years old).

$$\text{Dependency ratio} = 100 \times \left[\frac{\text{Population } (0-14) + \text{Population } (65+) + \text{working age who are chronically ill}}{\text{Population } (15-64)}\right]$$

The study highlighted that in total, the respondents were found to possess 1097 households. Among these, 46% (n=504) households were less than fifteen years, 51.5% (n=566) between the age of 15 and 64 years, while 2.5% (n=27)

were older than 65 years. There were no working-age household members found chronically ill for about six months. In this study, the average household effective dependency ratio is 0.8. That means for every ten working households; there are eight people of not working age.

4.2.1.1.10 Employment status

More than a quarter 31.3% (n=122); of participants were unemployed, whereas the remaining 68.7% (n=268) were employed on a different category of jobs.

4.2.1.1.11 Occupational status

The primary activity that occupies the majority of the respondents were being a housewife, 23.1% (n=90), followed by micro and small enterprise business, 22.1% (n=86). Figure 4.1 describes the occupational category of study participants.

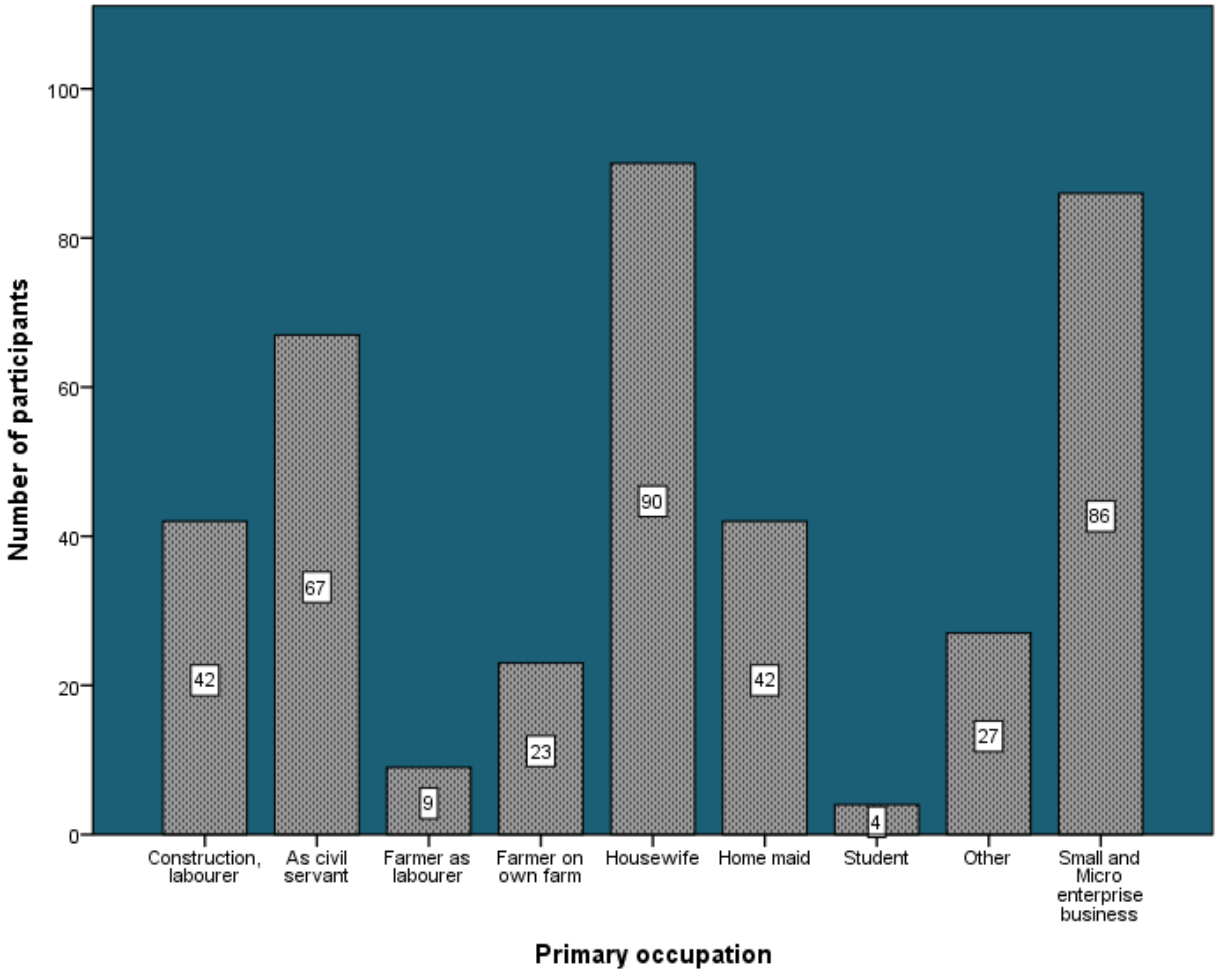

Figure 4.1 Occupational category of the study participants

4.2.1.1.12 Income

The finding of this study indicates that the mean average monthly income of the household of the study participants was 1,263 Ethiopian Birr per month which is equivalent to US$ 45.07 (based on the exchange rate as of November 2018) with a standard deviation of 1,253 Eth Birr. From this finding, 67.7% (n=264) live under absolute poverty (less than US$ 1.90 per day per person) (The World Bank Group 2018:1). Table 4.2 shows the detail of the monthly income of the respondents in Ethiopian Birr.

Table 4.2 Household Monthly income of the respondents

Monthly income in USD¥	Frequency	Percent (%)	Cumulative Percent
Less than 50	264	67.7	67.7
50 – 85.7	75	19.2	86.9
Above 85.7	51	13.1	100.0
Total	390	100.0	

¥1US Dollar = 28.02 Eth Birr according to November 2018 Dollar to Birr exchange rate

4.2.1.1.13 Head of the household

The majority of respondents, 68% (n=264) were the head of their households of which females headed household constitute 57.5% (n=149) from female shares, whereas males constitute 88% (n=115) among their male counterparts. The partners' contribution as head of the household is about 26% (n=103), while the remaining 6% (n=23) were headed by other members of their households.

4.2.1.1.14 Household breadwinner

The breadwinner is the member of a family who earns money to support the others. The result of the study demonstrated that the majority of respondents, 67% (n=260) were the breadwinner of the household. The breadwinner partner contributed about 27% (n=106) while the remaining 6% (n=24) depends on the rest of the family members.

4.2.1.2 Household food insecurity

Household Food Insecurity is a measure of household food insecurity/security of study subjects in the past four weeks. The food security status was calculated based on nine questions of food access (Coates, Swindale & Bilinsky 2007:16). Households were classified based on responses to the nine severity items in the HFIAS and coded "0" for "No" and "3" for "Yes." The procedure for scoring was used as follows: "0" was attributed if the event described by the question never occurred, "3" if it occurred during the previous 30 days. Responses on the nine HFIAS questions were summed to create a household food security score, with a minimum of "0" and a maximum score of "27." According to the score, the higher the score, the more the household is vulnerable to food insecurity. The lower the score, the lesser the food insecurity a household experienced. Using a validated scoring algorithm, the scores on the raw scale were used to assign respondents to discrete categories of food insecurity severity as follows: food secure (HFIAS score of 0–1), mildly food

insecure (HFIAS score of 2–6), moderately food insecure (HFIAS score of 7–12), and severely food insecure (HFIAS score of 13-27).

The mean household food insecurity status of the respondents was 12.3, which was slightly lower than the midpoint of the range of possible scores and the standard deviation of 8.85. Table 4.3 shows the frequency statistics of the household food security status of the participants.

Table 4.3 Frequency statistics of the household food security status of the participants

Items	Yes	No
A. In the past four weeks, did you worry that your household would not have enough food?	59.7% (233)	40.3% (157)
B. In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	67.7% (264)	32.3% (126)
C. In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	68.2% (266)	31.8% (124)
D. In the past four weeks, did you or any household member have to eat some foods that you did not want to eat because of a lack of resources to obtain other types of food?	62.1% (242)	37.9% (148)
E. In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	57.4% (224)	42.6% (166)
F. In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?	46.9% (183)	53.1% (207)
G. In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	27.2% (106)	72.8% (284)
H. In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	12.3% (48)	87.7% (342)
I. In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	9.5% (37)	90.5% (353)

From this finding, the household food security status of the participants was as follows: severe food insecure 52% (n=203), mild food insecure 8% (n=29), moderate food insecure 16% (n=64), and food secure 24% (n=94) (see figure 4.2). Cronbach's Alpha values for the scale used in this study showed 0.892 for food security, indicating excellent internal consistency.

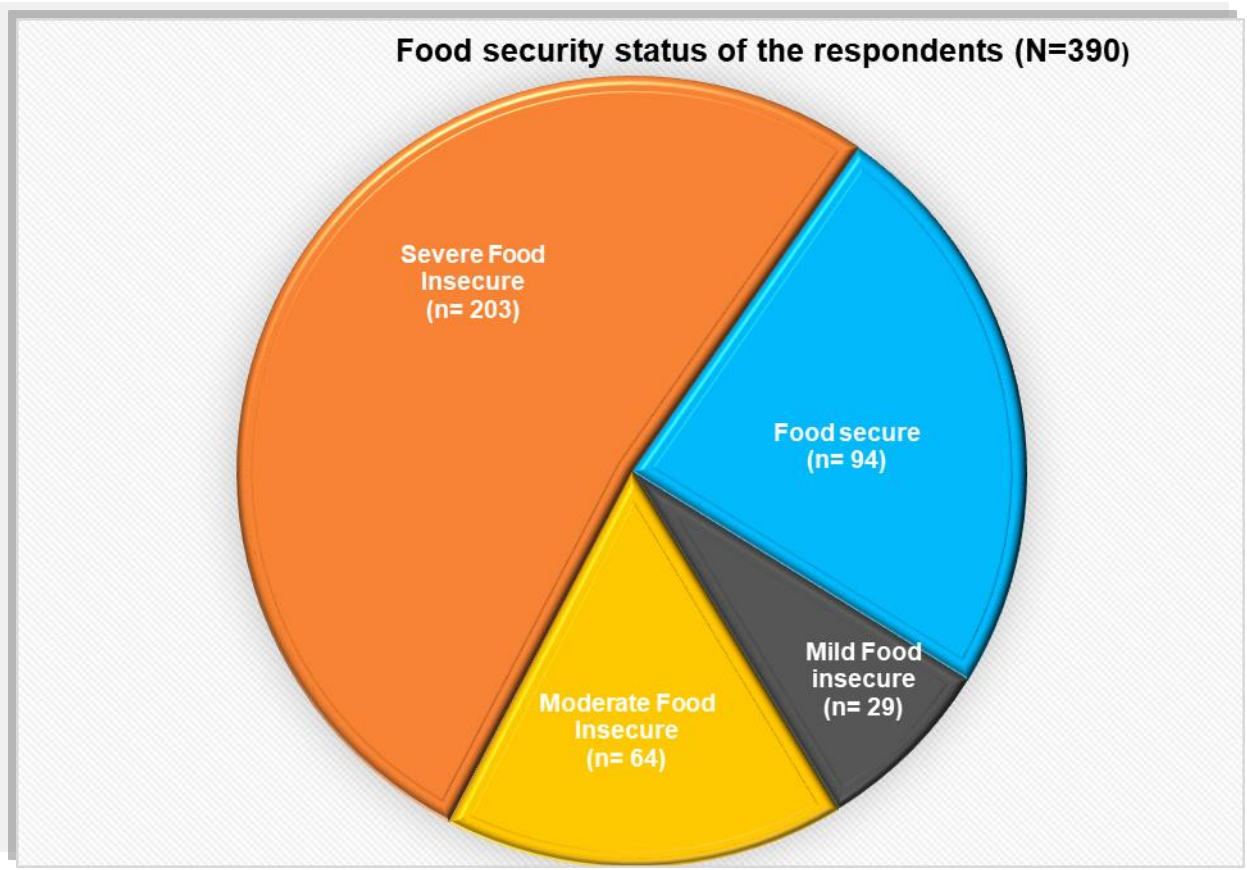

Figure 4.2 Food security status of the participants

4.2.1.3 Household dietary diversity

Household Dietary Diversity Score (HDDS) is the economic ability of a household to access a variety of foods during the past seven days. To determine the dietary diversity of the respondents, all foods consumed in the last seven days before the data collection was listed by respondents (both inside and outside the home). Listing of food was started from breakfast which is considered to be eaten between 6:00 AM and 10:00 AM, then lunch (12:00 AM-4:00 PM) and Dinner (8:00 PM-12:00 PM) while snacks considered to be eaten before or after the major meal in Ethiopian counting hours. Twelve questions were used to assess dietary diversity. Participants were asked to report the frequency of consumption of each of the following 12 food groups: (1) cereals; (2) roots and tubers; (3) pulses and legumes/nuts; (4) vegetables; (5) fruits; (6) meat and poultry; (7) eggs; (8) fish and seafood; (9) milk and milk products; (10) oils and fats; (11) sugar and sweets; and (12) miscellaneous (Kennedy et al 2011:24).

Irrespective of the frequency, participants received ‘1’ point if they consumed at least once during the last seven days of the foods within each subgroup, and ‘0’ points if they never consumed the food. The HDDS was constructed as the sum of several food groups consumed over the past week, ranging from 0 to 12. The mean household dietary diversity score in the study subjects was calculated. Then tertiles of the dietary diversity score were computed with the highest tertile defined as high diversified diet, the middle as medium diversified diet while the lowest tertiles were low diversified diet. For this study, dietary diversity was considered adequate, when the diversity score is nine or above, and inadequate, when the diversity score is below nine. Table 4.4 presents the respondents’ response to the various kinds of dietary consumed in the last seven days:

Table 4.4 Frequency of the household dietary diversity status of the participants

Items	Yes	No
▪ Any local foods: Injera, Bread, ‘Genfo,’ bread, rice, or any other foods made from millet, sorghum, maize, rice, wheat?	98.7%(385)	1.3%(5)
▪ Any potatoes, yams, manioc, or any other foods made from roots or tubers?	72.8%(284)	27.2%(106)
▪ Any vegetables: cabbage, tomato?	44.6%(174)	55.4%(216)
▪ Any fruits: banana, orange, papaya, mango?	60.5%(236)	39.5%(174)
▪ Any beef, pork, lamb, goat, wild rabbit game, chicken, duck, or other birds, liver, kidney, heart, or other organ meats?	44.6%(174)	55.4%(216)
▪ Any eggs?	29.5%(115)	70.5%(275)
▪ Any fresh or dried fish or shellfish?	11%(43)	89%(347)
▪ Any foods made from beans, peas, lentils, or nuts?	73.6%(287)	26.4%(103)
▪ Any cheese, yogurt, milk or other milk products?	35.6%(139)	64.4%(251)
▪ Any foods made with oil, fat, or butter?	87.9%(343)	12.1%(47)
▪ Any sugar or honey?	81%(316)	19%(74)
▪ Any other foods, such as condiments, coffee, tea?	84.9%(331)	15.1%(59)

The mean household dietary diversity of the participants was 7.5 with a standard deviation of 2.3. The majority of the respondents, 66.7% (n=260) study participants ate inadequate diversified diet while, 33.3% (n=130) ate adequately diversified diet. Most commonly eaten foods as stated by the respondents were cereals, 98.7% (n=385) followed by oils and fats, 87.9% (n=343), while fish and other seafood 9% (N=35) were the least consumed diets by PLWHA in the past 24 hours in the Benishangul Gumuz region,

Ethiopia. Figure 4.3 describes the detail of the participants' food consumption pattern in the last seven days.

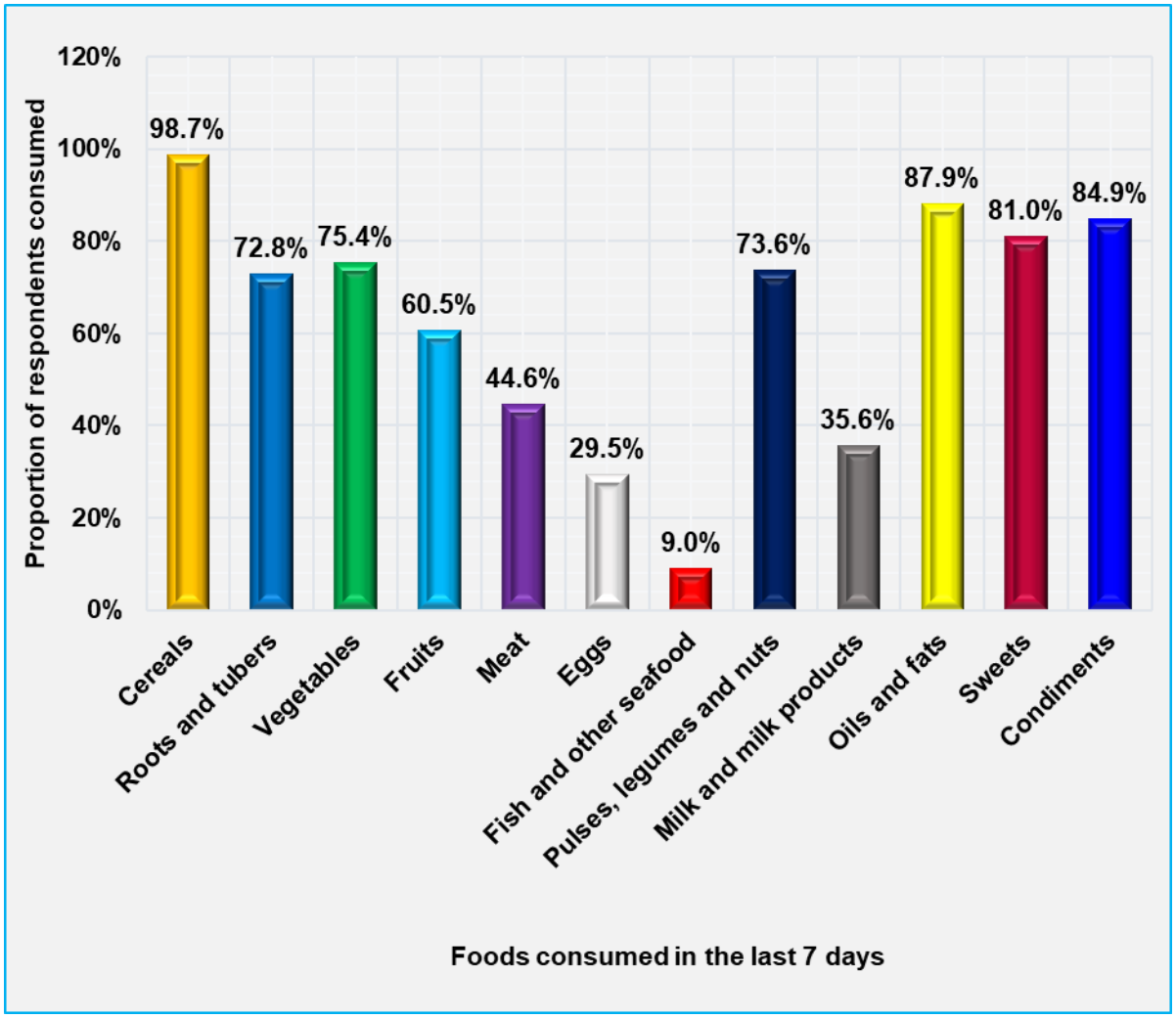

Figure 4.3 Proportion of food groups consumed by the households

4.2.1.4 Nutritional status

Nutritional status was determined by anthropometric measurement. The anthropometric measurement consists of a client's weight and height. Participants' weight was measured by Seka weight scale calibrated to 0.5 kg after removing heavy clothes. Participants' height was measured using Seka measuring rod calibrated to 0.5 cm. Participants took off their shoes, stand erect, and look straight in the horizontal plane to measure their Height (WHO 1995:4). The nutritional status of the study participants was measured by body mass index (BMI). The body mass index was calculated as weight in kilograms divided by the square of height in meters (kg/m^2). The mean BMI of the

participants was 18.02 kg/m^2 and a standard deviation of 2.90. The mean BMI of 68%(n=228) of the PLWHA is below 18.5 kg/m^2. The lowest BMI was 9.68 kg/m^2 whereas the highest score is 28.89 kg/m^2. Malnutrition could occur in different forms and degrees. In this study, 26%, 34%, 38%, and 2% were in severe, moderate, normal and overweight respectively. Figure 4.4 shows the proportion of BMI of the participants relative to their nutritional category.

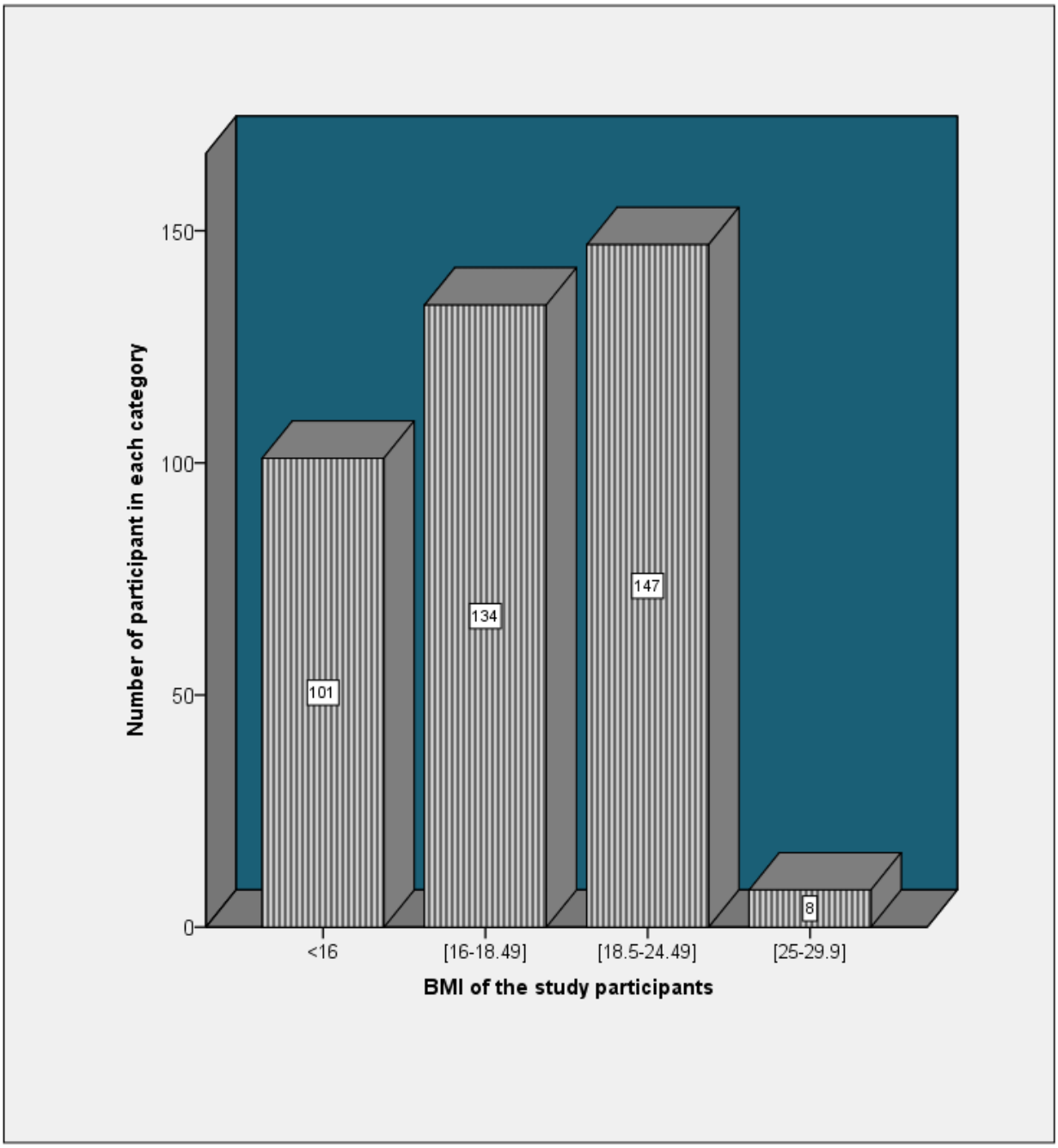

Figure 4.4 Nutritional status per BMI (kg/m^2) category of participants

4.2.1.5 Household wealth index

A household wealth index based on household assets and housing quality was used as a proxy indicator for the socioeconomic status of households. A household wealth index was generated by performing a principal component analysis of questions regarding household possession of assets. This was elicited by asking participants a series of 13 questions about household assets and housing characteristics (e.g., on housing quality (floor, walls, and roof material), source of drinking water, type of toilet facility, the presence of electricity, type of cooking fuel, and ownership of modern household durable goods and livestock (e.g., bicycle, television, radio, motorcycle, sewing machine, telephone, cars, refrigerator, mattress, bed, computer, and mobile phone). Then, following the method of Filmer and Pritchett (2001:116), the principal components analysis was applied to these variables. The first principal component was retained and used to define the asset wealth index among the PLWHA, and participants were sorted into quintiles of relative asset wealth. Tertiles of the wealth index was used to categorize individual household wealth relative to the cohort. The asset means scores were re-categorized into five different wealth quintiles of equal proportion (lowest, second, middle, fourth and highest) by using principal component analysis.

Accordingly, of the 390 study participants, the asset possession as per the wealth distribution, 80 of them is in the highest wealth tertiles while 77 of them is in the poorest wealth index category. (See figure 4.5 for the wealth status of the study participants).

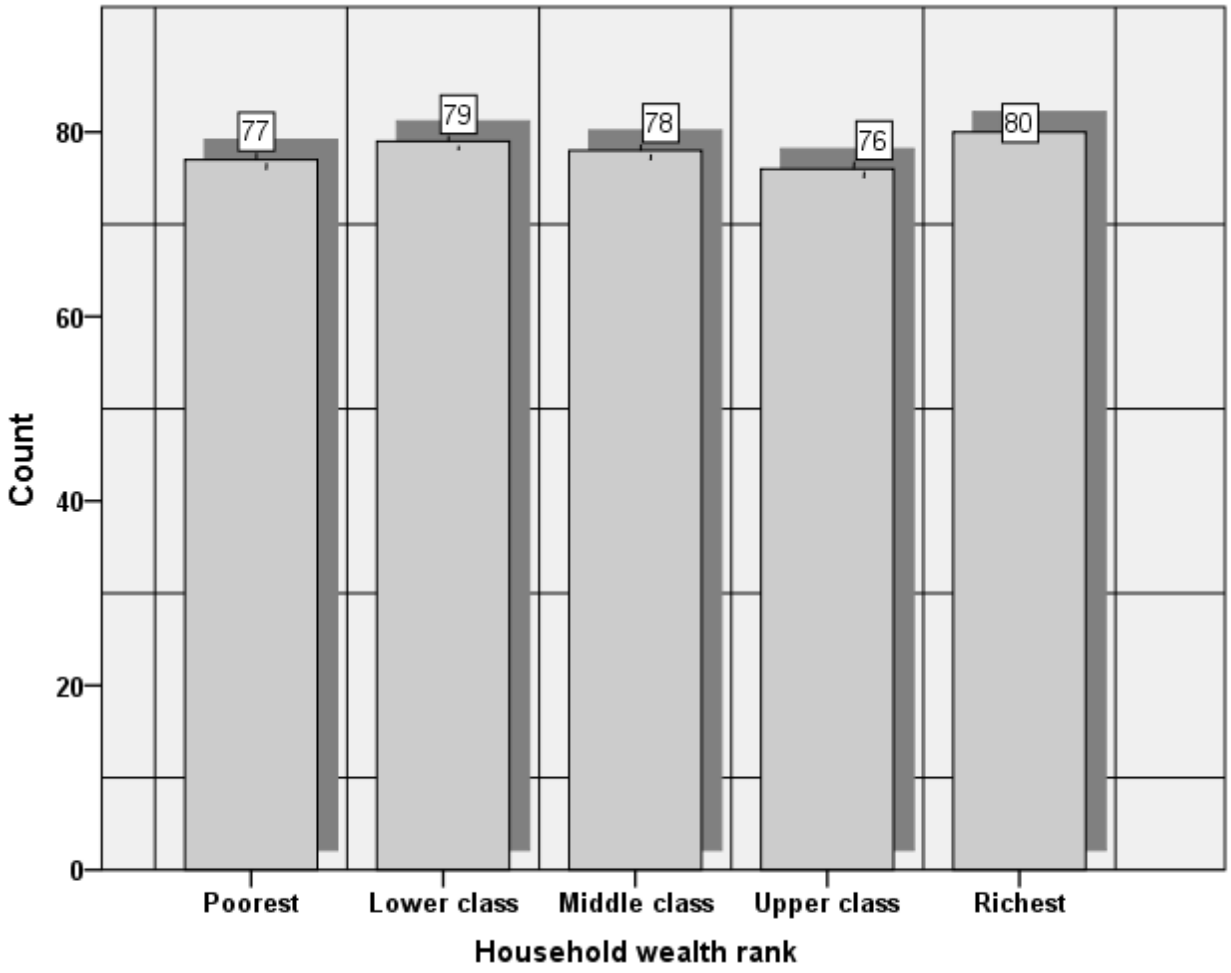

Figure 4.5 Wealth status of study participants

4.2.1.6 Health-related quality of life

Health-related quality of life is a multi-dimensional concept commonly used to examine the impact of health status on quality of life (Healthy People 2020 2018:1) Health-Related Quality of Life (HRQoL) is a type of patient-reported outcome and is the patient's report of how his/her well-being and level of functioning are affected by individual health or medical treatment received. The 10-item PROMIS Global Health scale was administered to assess the physical and mental components of health-related quality of life of the PLWHA. The 10-item PROMIS Global Health scale was scored into Global Physical Health (overall physical health, physical functioning, pain, and fatigue) and Global Mental Health (quality of life, mental health, satisfaction with social activities, and emotional problems) subscales. To understand the underlying structure of the HRQoL, factor analysis was used. An exploratory factor analysis was done to summarise, and group together correlated variables and confirm the

presence of a single component. The sampling adequacy of the study was assessed by examining the Kaiser-Meyer-Olkin test (KMO-test) sampling adequacy study (Beavers, Lounsbury, Richards, Huck, Skolits, & Esquivel 2013: 4). The KMO index ranges from 0 to 1, with 0.6 suggested as the minimum value for a good factor analysis (Field 2009 cited in Yong & Pearce 2013: 90). The value of KMO was calculated as 0.641.

The scoring for Global Physical Health Summary (PHS) score or Global Mental Health Summary (MHS) score based on PROMIS global T-score values was generated based on the PCA conversion. T-Score distributions are standardized such that a 50 represents the average (mean), and the standard deviation around that mean is 10 points. A high score always represents more of the concept being measured, and poor health-related quality of life was defined as one standard deviation or more below the PROMIS population norm (PROMIS® 2010:1).

The mean PHS score was 48.8 with a standard deviation of 8.89, and the mean MHS was 51.7 with a standard deviation of 8.10. The proportion of respondents who scored the lowest dimension in global physical health was 0.3% (n=1) while the highest score was 18.7% (n=73). Similarly, the proportion of respondents who scored the lowest dimension in global mental health was 0.3% (n=1), and the highest proportion was 11.8% (n=46). All the covariate groups had lower PHS score than MHS. The study participants reported the lowest median PHS score of 48.8 (16.2–67.7) and MHS score 51.7 (28.4–67.6). Cronbach's alpha for the ten subscales used to compute the global physical and mental health score was 0.82, indicating a high degree of correlation between the dimensions. Table 4.5 presents the descriptive findings of physical and mental health scores.

Table 4.5 Descriptive statistics: global physical and mental T-scores of PLWHA with the PROMIS 10-item quality-of-life

Item	N	Range	Floor[a] (%)	Ceiling[b] (%)	Mean	Std. Deviation
PHS score	390	51.50	0.3	18.7	48.8	8.89
MHS score	390	39.20	0.3	11.8	51.7	8.10

[a]Percent of subjects who have scored the lowest possible dimension score.
[b]Percent of subjects who have scored the highest possible dimension score.

4.2.2.1 Clinical characteristics

Clinical characteristics cover aspects such as antiretroviral treatment duration, CD4 count, smoking history, opportunistic infections and hospitalisation, treatment adherence, missing scheduled clinic appointments and distance from the clinic.

4.2.2.1.1 Antiretroviral treatment duration

The antiretroviral treatment (ART) duration of treatment ranges from 1 year to 13 years, and the median was six years. The average mean for the duration of ART was six years with a standard deviation of 3 years.

4.2.2.1.2 CD4 count

All PLWHA started their ARV at a CD4 count below 350 cells/mm^3 with the lowest CD4 count of 26 cells/mm^3 and highest of 337 cells/mm^3 with the mean of 176.7 and standard deviation of 82.4 at baseline. On the other hand, after staying on treatment for about one year to 13 years, the lowest CD4 count was 33 cells/mm^3, while the highest was 1,914 cells/mm^3. The mean for the most recent CD4 count is 614.7 with a standard deviation of 312. Table 4.6 presents the proportion of CD4 count of the study participants.

Table 4:6 The most recent CD4 count of the study participants (n=390)

Cell count	Frequency	Percent
<200	62	15.9
200-499	125	32.1
>_500	203	52.1
Total	390	100.0

4.2.2.1.3 Smoking history

Only 12.8% (n=50) study participants smoke cigarettes. The remaining 87.2% (n=340) participants were non-smokers. The smoking history ranges from 1 year to 40 years.

4.2.2.1.4 Opportunistic infections and hospitalisation

In line with the clinical features, history of any episodes of opportunistic infections such as diarrhea, tuberculosis and oral thrush in the last three months, and history of hospitalization by any co-morbidities were elicited. Accordingly, 33% (n=129) participants have a history of one or more episodes of opportunistic infections in the last three months. Among those, 14% (n=55), has been hospitalized for medical investigation and treatment.

4.2.2.1.5 Treatment adherence

A self-reported antiretroviral therapy adherence measurement that places a minimal burden on patients and clinic staff using a visual analogue scale was used to assess the participants' treatment adherence status. ART adherence status was estimated by the percent of missed dose enclosed in the last 1-month follow-up time from a patient with self-reported adherence measurement approach, by asking each participant about the number of times he/she has missed taking his/her pills each day in a month and recorded. Thereafter, a participant was considered as optimal adherent if the average adherence is greater than 90% (he/she missed < 2 doses of 30 doses or < 3 doses of 60 doses), and suboptimal if the average adherence is less than 90% (he/she missed >2 doses of 30 doses or >3 doses of 60 doses). The finding of this study indicates 41% (n=160) of the participants have suboptimal adherence (less than 90%).

4.2.2.1.6 Missing scheduled clinic appointments

In this study, the participants were asked about their appointment history as: "People may have different reasons for missing their scheduled clinic appointment. In the last three months, did this happen to you?" Accordingly, 44.6% (n=174) reported missing their clinic visits in the last three months. Among those, 9% (n=33) missed once, while, 36% (n=141) missed twice or more times. The main reasons for missing their scheduled appointment includes: forgetfulness 3.3% (n=13); to pursuit food for household 10.5% (n=41); lack of transportation fee 14.4% (n=56); and work or household responsibilities 16.4% (n=64).

The participants were asked what factors might facilitate their return to their next scheduled clinic visit and responded as the following table 4.7.

Table 4.7 The factors assist for easy to return to the clinic for your next visit (n=174)

Characteristics	Frequency	Percent (%)
Think about your next scheduled visit, what makes it most easy to return to the clinic for your next visit?		
Someone to take care of things at home	69	17.7
Money for transportation	45	11.5
Food support for your household	60	15.4
Total	174	44.6

4.2.2.1.7 Distance from the clinic

60% (n=234) study participants reach the ART clinic within 15 minutes, 25.6% (n=100) took them 16 minutes to one hour, 8.7% (n=34) between 1 hour to 2 hours whereas 5.6% (n=22) took them 2 hours to 6 hours to arrive at the clinic.

4.2.3 Inferential findings

This section was presented and discussed in line with the following objectives of the study:

- To investigate the determinants of malnutrition and food insecurity among PLWHA in Benishangul Gumuz Region.
- To assess the outcome of nutrition and food security on treatment outcome and quality of life of PLWHA.
- To determine the status of PLWHA in the region with regard to access to sufficient, safe, nutritious food to meet their needs.
- To explore PLWHA's coping strategies for malnutrition and food insecurity.
- To explore senior health experts' perspective and experience in integrating nutrition and food security with HIV prevention, treatment, and care.

4.2.3.1 To investigate the determinants of malnutrition and food insecurity among peoples living with HIV and AIDS in the Benishangul Gumuz region

The section highlights the determinants of malnutrition: bivariate and multivariate analysis.

4.2.3.1.1 Determinants of malnutrition: bivariate analysis

To explore the determinants of malnutrition among PLWHA, the researcher used an analysis plan comprised of several components. Bivariable analyses were conducted to identify differences in BMI scores based on key independent variables. For binary predictors, comparison of mean BMI scores was conducted using the independent t-test. For predictors with more than two response categories, one-way ANOVA and Kruskal Wallis tests were used to compare mean scores. Simple linear regression method using ordinary least squares was used to examine bivariable associations between nutritional status, that is, BMI scores and continuous predictor variables. Linear regression method using OLS was extended to multivariable models to simultaneously examine multiple predictors of malnutrition.

The results of the binary analysis indicated socio-demographic factors such as gender, education level, ethnic group, and household income, the source of drinking water, kind of toilet facility, household food insecurity; household dietary diversity; household asset possession and duration of ART initiation to determine the predictors of malnutrition among PLWHA in the region. The result has shown that there is significant difference between male and females in the mean BMI scores for males (Mean-M = 34.02, Standard Deviation-SD = 4.91) and females (M= 33.17, SD = 5.71); t(398)=-2.7, p = 0.007). The severity of malnutrition is higher among women. Overall, 60.3% of the study participants were malnourished. Among study participants, 63.3% of the women and 54.2% of the males in the study were malnourished (see table 4.8).

Table 4.8 Gender of the participant and nutritional status cross tabulation

Characteristics	Nutritional Category		Chi-square test	
	Malnourished	Non-malnourished	Test score	p-value

Gender of the participant	Female	Count	164	95	4.02	0.2
		% within the gender of the participant	63.3%	36.7%		
	Male	Count	71	60		
		% within the gender of the participant	54.2%	45.8%		
Total		Count	235	155		
		% within the gender of the participant	60.3%	39.7%		

People living with HIV and AIDS who never enrolled in school were found more malnourished, whereas college/university level study found well-nourished. Thus, lower schooling (M=17.5, SD=2.8) is more associated with malnutrition (lower BMI scores) whereas College/University level graduates (M=19.45, SD=2.75) were more well-nourished; t(398)=3.54, p=0.015. Among ethnic groups, lower BMI is recorded for Agew (M=16.59, SD=2.8) and higher BMI among Berta (M=20.18, SD=4.8), t(1)=2.49, p=0.016. Average monthly income of the household PLWHA was associated with lower BMI, an indicator of malnutrition. Those households who earn less income were associated with malnutrition than their peers who had higher income and more assets.

Household food insecurity also found to predict malnutrition among PLWHA. In this study, the mean household food insecurity score is reported to be 3.27 with an SD of 2.27. Thus, there is an inverse relationship between BMI score and HFIAS, i.e., as the HFIAS increases the rate of malnutrition decreases. Likewise, PLWHA who experienced some episodes of opportunistic infections and those who has been stayed on ART for less than one year were found to be more malnourished than those who have stayed on ART for a longer duration, preferably beyond five years, F(3,390)=3.4, p= 0.01. Table 4.9 presents associations between BMI scores and characteristics of the study sample.

Table 4.9 BMI scores and characteristics of the study (N=390)

Characteristics		[a]n(%); [b]Mean+ SD	BMI score	
			Test score	p(t-test, ANOVA, OLS, Kruskal-Wallis tests)
Gender	Female	259(66.4)	-2.7	0.007
	Male	131 (33.6)		
Age (in years)		36.1± 8.64	2.45	0.11
Education	Never been to school	142 (36.4)	3.54	0.015
	Primary level	166 (42.6)		
	Secondary level	66(16.9)		
	College/University level	16(4.1)		
Marital status	Single	46(11.8)	1.3	0.39
	Married	195(50)		
	Divorced	101(25.9)		
	Widowed	41(10.5)		
	Separated	7(1.8)		
Ethnic groups	Amhara	240(61.6)	3.04	0.11
	Oromo	78(20)		
	Agew	36(9.2)		
	Others	36(9.2)		
Religious category	Christian	301(77.2)	-0.91	0.37
	Muslim	89(22.8)		
Place of residence	Urban	355(91.1)	2.9	0.004
	Rural	35(8.9)		
Household effective dependency score		1.15 ± 0.82	-2.7	0.007
Employment status	Unemployed	122(31.3)	-2.1	0.039
	Employed	268(68.7)		
Monthly income-mean (in birr)		1126±1698	4.8	<0.0001
Source of drinking water:				
Piped to yard/plot		315 (80.7)	4.8	<0.0001
Spring/Open sources		75 (19.3)		
Kind of toilet facility:				
No facility/Bush/Open source		81 (20.7)	-6.03	<0.001
Pit latrine		309 (79.3)		
HFIAS scores		3.16 ± 2.27	-5.3	<0.0001
HDDS scores		7.5 ± 2.3	4.6	<0.0001
The Household Wealth Index score		0.85 ± 0.15	-5.6	<0.0001
Duration of ART initiation:				
1 year or less		37(9.5)	3.4	0.017
1-5 years		155(39.7)		
5-10 years		168(43.1)		
≥ 10 years		30(7.7)		
CD4 count (cell/mm^3)				
<350		107 (27)	-0.6	0.5
351-500		81 (21)		
≥ 501		202 (52)		
Opportunistic infections in the last three months:	Yes	131(33.6)	-3.4	0.001
	No	259(76.4)		

[a]n (%)-categorical variable
[b]Mean± SD-continuous

4.2.3.1.2 Determinants of malnutrition: multivariate analysis

The purpose of conducting the binary logistic regression was to estimate the association between the dependent variable and independent variables. All independent variables which were significant at a p-value less than 0.05 in the bivariate analysis using Chi-square tests or Fisher's exact, independent sample t-test, ANOVA, Kruskal-Wallis, and ordinary logistic regression analysis tests were extended to multivariate linear regression analysis. In all the analysis, the test was two-sided and p-value <0.05 was considered as statistically significant. Diagnostic tests and residual analysis were and conducted and thus, no heteroscedastic and highly collinear data observed. Robust regression analysis was used to address the non-normality of predictor variables by employing three multivariate linear regression models.

Model 1 estimated BMI scores by controlling for gender, education, place of residence, household dependency ratio, and employment status. Model 2 considers the household income, the source of drinking water, kind of toilet facility and household food insecurity in addition to variables introduced in model 1. Model 3 added HDDS, household wealth index or asset possession score, duration of ARV treatment, and OIs on top of the variables in model 1 and 2. Model 4 used a backward elimination technique to determine the final predictors of malnutrition among PLWHA. Entry and addition of subsequent variables into the models are simply based on the proportion of the study variables included in each model.

Table 4.10 presents the results of the multivariate linear regression analysis. In this result, the analysis was conducted in four multivariate linear regression models. In model 1, educational status and place of residence were significant determinants of malnutrition. In model 2, all except household dependency and employment status were significant predictors of malnutrition. In model 3, gender, place of residence, household income, the source of drinking water, kind of toilet facility, household wealth status, and duration of ARV treatment were found to predict malnutrition.

In model 4, the final multivariate analysis using backward elimination method revealed five determinants of malnutrition: gender [β= 0.14, 95% CI: 0.33, 1.5,

p=0.002], place of residence [β= -0.1, 95% CI: -2.1, -0.12, p=0.003], household income [β= 0.18, 95% CI: 0.001, 0.01, p<0.0001], source of drinking water [β= -0.14, 95% CI: -1.88, -0.37, p=0.003], kind of toilet facility [β= 0.16, 95% CI: 0.46, 1.93, p=0.001], household food insecurity [β= -0.12, 95% CI: -0.30, -0.03, p=0.019], household wealth index [β= -0.13, 95% CI: -0.71, -0.06, p=0.02], and duration of ART [β= -0.13, 95% CI: -0.86, -0.015, p=0.006].

Table 4.10 Multivariate linear regression results of BMI score and study sample characteristics

BMI Scores

Variable	Model 1				Model 2				Model 3				Model 4			
	β	P	95% CI		B	p	95% CI		β	p	95% CI		β	p	95% CI	
Gender	0.099	0.050	-0.001	1.29	0.14	0.003	0.31	1.52	0.14	0.004	0.29	1.49	0.14	0.002	0.33	1.5
Highest level of education	0.129	0.01	0.11	0.85	0.12	0.013	0.091	0.77	0.08	0.118	-0.07	0.63	0.08	0.082	-0.039	0.65
Place of residence	-0.133	0.007	-2.49	-0.39	-0.10	0.03	-2.1	-0.11	-0.1	0.033	-2.09	-0.09	-0.10	0.028	-2.12	-0.12
Household dependency ratio score	-0.092	0.068	-0.68	0.02	-0.01	0.836	-.37	0.3	-0.01	0.836	-0.37	0.3				
Employment status	0.071	0.157	-0.18	1.12	0.004	0.935	-0.61	0.66	0.02	0.730	-0.53	0.8				
Household income					0.18	<0.0001	0.0001	0.001	0.18	<0.0001	0.0001	0.001	0.18	<0.0001	.0001	0.001
Source of drinking water					-0.14	0.004	-1.9	-0.36	-0.14	0.006	-1.84	-0.31	-0.14	0.003	-1.88	-0.37
Kind of toilet facility					0.18	<0.0001	0.63	2.1	0.16	0.001	0.47	1.95	0.16	0.001	0.46	1.93
HFIAS score					-0.15	0.002	-0.35	-0.07	-.082	0.168	-0.27	0.05	-0.12	0.019	-0.30	-0.03
HDDS Score									0.029	0.616	-0.11	0.2				
Household wealth index/asset possession									-0.12	0.043	-0.7	-.011	-.13	0.019	-0.71	-0.06
Duration of ARV treatment									-0.14	0.004	-0.92	-.180	-.13	0.006	-0.86	-0.15
Opportunistic Infections (OIs)									0.07	0.163	-0.18	1.074				
R Square (R^2)	0.19				0.22				0.25				0.245			

Note: β= Standard coefficient, p= statistical significance, 95% CI = 95% Confidence Interval, BMI= Body Mass Index, ARV= antiretroviral therapy, HFIAS= Household Food insecurity Access Scale

4.2.3.2 To investigate determinants of food insecurity among peoples living with HIV and AIDS

This section covers the determinants of food insecurity: bivariate analysis and multivariate analysis.

4.2.3.2.1 Determinants of food insecurity: bivariate analysis

To explore the determinants of food insecurity, the researcher used an analysis plan comprised of several components. Food insecurity scores based on key independent variables are examined. For binary predictors, comparison of mean food insecurity scores was conducted using an independent t-test and Wilcoxon rank-sum test. For predictors with more than two response categories, one-way ANOVA and Kruskal Wallis tests were used to compare mean scores. Simple linear regression method using OLS was used to examine bivariable associations between food insecurity and continuous predictor variables. Linear regression method using OLS was extended to multivariable models to simultaneously examine multiple predictors of food insecurity.

Increasing severity of food insecurity was associated with the following aspects: lower education and marital status (those widowed experienced higher food insecurity), ethnic group, higher household dependency, use of spring or open source of drinking water, lack of toilet facility or open use, lack of employment, household's lower income, poor asset possession, and frequent episodes of opportunistic infections were associated with higher food insecurity. Table 4.13 describes the bivariate analysis of the HFIAS score with sample characteristics.

In terms gender disaggregation, among the female respondents, 62.8% (n=59), 69% (n=20), 73.4% (n=47), 65.5% (n=133) were food secure, mild food insecure, moderately food insecure, and severely food insecure respectively. While among male participants, 37.2% (n=35), 31% (n=9), 26.6% (n=17), and 34.5% (n=70) were food secure, mildly food insecure, moderately food insecure, and severely food insecure, respectively. Bivariate analysis showed that there is no significant difference in terms of food insecurity between both males and female participants, $t(3) = 0.09$, $p=0.78$).

The mean age of the study participants is 36 years with a standard deviation of 8.6. The age of study participants is not statistically associated with the food insecurity, t (3) =-0.21, p=0.98).

There was a statistically significant difference at the $p < .05$ level in the mean food insecurity scores for the educational status (i.e., never attended school, primary, secondary/high school, college/university level education), F(3,390) = 43.34, p =.019. Despite reaching statistical significance, the actual difference in mean scores between the groups was quite small.

The bivariate analysis was conducted for marital status. There was a statistically significant difference at the $p < .05$ level in the mean food insecurity scores for the marital status (i.e., single, married, divorced, and widowed), F(3,390)= 2.9, p = .035. The mean level of food insecurity is normal to-mild for those singles and married, severe—for those divorced and widowed peoples living with HIV. Figure 4.6 shows the increase in average mean food insecurity status from single to married, divorced and widowed marital status.

The bivariate analysis of HFIAS about the study variables were computed as table 4.11 as below:

Table 4.11 Bivariate linear regression results of HFIAS score and study sample characteristics

Characteristics		[a]n(%); [b]Mean± SD	HFIAS score	
			Test score	P (t-test, ANOVA, OLS, Kruskal-Wallis tests)
Gender	Female	259(66.4)	0.09	0.9
	Male	131 (33.6)		
Age (in years)		36.1± 8.64	1.6	0.12
Education	Never been to school	142 (36.4)	3.5	0.019
	Primary level	166 (42.6)		
	Secondary level	66(16.9)		
	College/University level	16(4.1)		
Marital status	Single	46(11.8)	2.8	0.035
	Married	195(50)		
	Divorced	101(25.9)		
	Widowed	41(10.5)		
Ethnic groups	Amhara	240(61.5)	3.6	0.013
	Oromo	78(20)		
	Agew	36(9.25)		
	Others	36(9.25)		
Religious category	Christian	301(77.2)	-0.9	0.37
	Muslim	89(22.8)		
Place of residence	Urban	357(91.5)	-4.4	<0.001
	Rural	33(8.5)		
Employment status	Unemployed	78(20)	6.3	<0.0001
	Employed	312(80)		
Household dependency ratio score		0.82 ± 0.87	4.6	<0.0001
Household Monthly income-mean (in birr)		1126 ±1698	22.8	<0.0001
Source of drinking water: Piped to yard/plot		315 (80.8)	-2.9	0.004
Spring/Open sources		75(19.2)		
Kind of toilet facility:				
No facility/Bush/Open source		81 (20.8)	2.3	0.025
Pit latrine		309 (79.2)		
Nutritional status:				
BMI score		18.02±3.1	-5.3	<0.0001
Household asset possession:				
Household wealth Index score		0.85 ± 0.15	8.8	<0.0001
Clinical features				
Duration of ART initiation:				
1 year or less		37(9.5)	1.84	0.14
1-5 years		155(39.7)		
5-10 years		168(43.1)		
≥ 10 years		30(7.7)		
Most recent CD4 count (cell/mm^3)				
<350		62 (16)	11	<0.0001
351-500		125 (32)		
≥ 501		203 (52)		
History of opportunistic infections in the last three months:	Yes	129(33)	7.1	<0.0001
	No	261(77)		

4.2.3.2.2 Determinants of food insecurity: a multivariate analysis

All independent variables which were significant at a *p*-value less than 0.05 in the bivariate analysis using Chi-square tests or Fisher's exact, independent sample t-test, ANOVA, Kruskal-Wallis and ordinary logistic regression analysis tests for food insecurity were extended to multivariate linear regression analysis. All variables determined to be significantly associated in the bivariate models at a p<0.05 were considered in the multivariate models. In all the analysis, the test was two-sided and *p*-value <0.05 was considered as statistically significant. Diagnostic tests and residual analysis were and conducted and thus, no heteroscedastic and highly collinear data observed. Robust regression analysis was used to address the non-normality of predictor variables by employing three multivariate linear regression models. Model 1 estimated HFIAS scores by controlling for socio-demographic characteristics such as educational status, marital status, ethnic group, place of residence and employment status of the PLWHA. Model 2, considers household effective dependency ratio, household income, the source of drinking water and kind of toilet facility used by the household in addition to variables introduced in model 1. Model 3, added the nutrition status in terms of BMI score of the participants, household wealth index score for household asset possession, recent CD4 Count, and episodes of opportunistic infections together with variables included in model 1 and 2. Model 4 used a backward elimination technique to determine the final determinants of food insecurity among PLWHA (see table 4.12).

In the final model, model 4; multivariate analysis using backward elimination method, six study variables were found to predict the factors involved as determinants of food insecurity among PLWHA. These includes: place of residence [β= 0.18, 95% CI: 0.76, 2.0, p<0.0001], employment status [β= -0.19, 95% CI: -1.34, -0.53, p<0.0001], household effective dependency ratio [β= 0.14, 95% CI: 0.15, 0.59, p=0.001], asset possession [β= 0.33, 95% CI: 0.55, 0.95, p<0.0001], recent CD4 count below 350 cell/mm^3 [β= -0.1, 95% CI: -0.48, -0.04, p= 0.04] and episodes of opportunistic infection [β= -0.18, 95% CI: -1.3, -0.46, p<0.0001].

Table 4.12 Multivariate linear regression results of HFIAS score and study sample characteristics

Body Mass Index Scores																
Variable	**Model 1**				**Model 2**				**Model 3**				**Model 4**			
	β	**P**	**95% CI**		**β**	**P**	**95% CI**		**β**	**P**	**95% CI**		**β**	**p**	**95% CI**	
Educational status	-0.05	0.31	-0.39	0.13	-0.025	0.59	-0.33	0.19	0.08	0.07	-0.02	0.46	0.08	0.08	-0.03	0.44
Marital status	0.11	0.02	0.04	0.55	0.08	0.11	-0.05	0.45	0.05	0.24	-0.09	0.36				
Ethnic group	0.002	0.97	-0.09	0.09	0.013	0.79	-0.08	0.10	0.06	0.14	-0.02	0.14				
Place of residence	0.19	<0.0001	0.77	2.25	0.19	<0.0001	0.78	2.24	0.18	<0.0001	0.72	2.06	0.18	<0.0001	.764	2.077
Employment status	-0.3	<0.0001	-1.92	-1.00	-.281	<0.0001	-1.83	-0.92	-0.2	<0.0001	-1.4	-0.54	-0.19	<0.0001	-1.34	-0.53
Household Effective Dependency Ratio					0.15	0.002	0.15	0.64	0.14	0.002	0.14	0.58	0.14	0.001	0.15	0.59
Household income					-0.07	0.16	0.000	0.000	-0.022	0.61	0.0001	0.001				
Source of drinking water					0.11	0.024	0.09	1.21	0.03	0.47	-0.32	0.71				
Kind of toilet facility					-0.05	0.35	-0.80	0.28	0.05	0.33	-0.26	0.76				
Nutrition status: BMI scale score									-0.08	0.07	-0.13	0.006	-0.08	0.06	-0.12	0.003
Household Wealth Index/Asset possession									0.34	<0.0001	0.55	0.97	0.33	0.000	0.55	0.95
Recent CD4 Count									-0.10	0.02	-0.49	-0.05	-0.1	0.021	-0.48	-0.04
Episodes of Opportunistic Infections (OIs)									-0.18	<0.0001	-1.26	-0.43	-0.18	<0.0001	-1.3	-0.46
R Square (R^2)	0.15				0.21				0.37				0.36			

4.2.3.3 To assess the outcome of malnutrition and food insecurity on treatment outcome and quality of life of peoples living with HIV and AIDS

This section highlights the outcome of malnutrition and food insecurity on treatment outcome and predictors of ART adherence among peoples living with HIV.

4.2.3.3.1 The outcome of malnutrition and food insecurity on treatment outcome

To test whether lack of adequate nutritious diet indicated by malnutrition and lack of access to food such as factors in food security is associated with treatment outcome, ART adherence status of the PLWHA was assessed. Table 4.14 explores the result of lower BMI (i.e., malnutrition) and HFIAS (food insecurity) on ART adherence, logistic regression. For treatment outcome, ART adherence status was estimated by percent of missed dose enclosed in the last one-month follow-up time from a patient with self-reported adherence measurement approach by asking each participant about the number of times he/she has missed taking his/her pills each month and recorded. Finally, a participant was considered as optimal adherent if the average adherence is greater than 90% (he/she missed <2 doses of 30 doses or <3 doses of 60 doses) and suboptimal if the average adherence is less than 90% (he/she missed >2 doses of 30 doses or >3 doses of 60 doses). To evaluate the outcome of malnutrition and food insecurity on treatment outcome, BMI and HFIAS scores were explicitly analysed using OLS (table 4.13).

Table 4.13 Independent sample t-test analysis of HFIAS and BMI in relation to ART adherence (N=390)

Characteristics	Independent t-test		
	t-Test score	**95% CI**	**(p-value)**
Average HFIAS scores	7.8	[1.2, 2.1]	<0.0001
BMI Score	-3.4	[-1.7, -0.45]	0.001

From the result of HFIAS and BMI binary logistic regression analysis (table 4.14), it is strongly evident that ART non-adherence is associated with higher food insecurity score and lower BMI score.

4.2.3.3.2 Predictors of ART adherence among peoples living with HIV

To assess the factors affecting ART treatment outcome (that is adherence) beyond malnutrition and food insecurity, the researcher used bivariate and multivariate linear regression analyses with the study's independent variables. Each potential confounder, i.e., sociodemographic characteristics, asset possession, and clinical features were added to the linear model sequentially. All variables showed a significant association in binary logistic regression analysis at $p< 0.05$ in the bivariate analysis were included in the multivariable regression analysis.

The result of the bivariate analysis indicated that suboptimal ART adherence is associated with lower educational status, divorced marital status, lack of employment, monthly income, inadequate diversified diet, food insecurity, lower BMI, poor asset possession, and recurrent opportunistic infection. However, during multivariate linear regression analysis, only educational status, i.e., those who have never been to school [β= -1.9, 95% CI: 0.03, 0.6, p= 0.008], primary level (β= -1.5, 95% CI: 0.05, 0.9, p= 0.039] and secondary education level [β= -1.5, 95% CI: 0.05, 0.9, p= 0.04]; household food insecurity (β= -0.3, 95% CI: 0.6, 0.8, p< 0.0001]; and recurrent episodes of opportunistic infections in the last three months [β= -0.7, 95% CI: 0.30, 0.87, p= 0.14]. However, marital status, employment status, dietary diversity, nutritional status, household asset possession, and CD4 count did not reach statistical significance: table 4.14 bivariate and multivariable analysis of factors associated with non-adherence to ART (N=390).

Table 4.14 Bivariate and multivariable analysis of factors associated with ART adherence (N=390)

Characteristics	ART adherence		Unadjusted model			Adjusted model		
	Suboptimal	Optimal	β	95% CI	p- value	β	95% CI	p- value
Gender:								
Female	63%(163)	37%(96)	-0.11	[0.6, 1.4]	0.60			
Male	60%(79)	40%(52)	Ref					
Age (in years)	36.1+ 8.64		0.02	[1, 1.04]	0.12			
Education level:								
Never been to school	69.7%(99)	30.3%(43)	-2.3	[0.027, 0.37]	0.001	-1.9	[0.03, 0.6]	0.008
Primary level	60.8%(101)	39.2%(65)	-1.9	[0.04, 0.54]	0.004	-1.5	[0.05, 0.9]	0.039
Secondary level	59%(39)	41%(27)	-1.8	[0.04, 0.62]	0.008	-1.5	[0.05, 0.9]	0.043
College/university level	18.8%(3)	81.2%(13)	Ref			Ref		
Marital status:								
Single	52.2% (24)	47.8%(22)	Ref			Ref		
Married	58.5%(114)	41.5% (81)	-0.25	[0.6, 2.9]	-0.15	0.83	[0.4, 1.7]	0.68
Divorced	75.2%(76)	24.8%(25)	-0.005	[0.52, 1.9]	-0.70	0.47	[0.21, 1.1]	0.097
Widowed	63.4%(26)	36.6%(15)	-0.8	[0.22, 0.96]	0.08	0.92	[0.35, 2.4]	0.86
Ethnic group:								
Amhara	59%(141)	41%(99)	0.47	[0.75, 3.4]	0.22			
Oromo	64%(50)	36%(28)	0.24	[0.56, 2.9]	0.58			
Agew	72%(26)	28%(10)	-1.4	[0.32, 2.4]	0.8			
Others	76.5%(13)	23.5%(4)	Ref					
Religious:								
Christian	71% (63)	29%(26)	0.5	[0.9, 2.8]	0.055			
Muslim	59.5%(179)	40.5%(122)	Ref					
Residence area:								
Urban	57%(20)	43%(15)	-0.2	[0.62, 2.5]	0.5			
Rural	62.5%(222)	37.5%(133)	Ref					
Household dependency	1.15 + 0.82		0.06	[0.74, 1.2]	0.6			
Employment status:								
Unemployed	71%(87)	29%(35)	-0.6	[0.4, 0.9]	0.012	-0.09	[0.54, 1.6]	0.74
Employed	58%(155)	42%(113)	Ref			Ref		
Monthly income-mean (in birr)	1263+ 1253		1.00	[1.0,1.001]	0.10			
HDDS	7.6 + 2.4		0.2	[1.1, 1.3]	<0.0001	-0.06	[0.83, 1.1]	0.4
HFIAS score	3.2+ 2.3		-0.4	[0.63, 0.77]	<0.0001	-0.3	[0.6, 0.8]	<0.0001
BMI score	18.02+3.09		0.1	[1.05, 1.2]	<0.001	0.05	(0.97-1.13)	0.2
Household wealth index score	-0.0001 + 1		-0.4	[0.55, 0.84]	<0.0001	0.07	[0.8-1.4]	0.60
Duration of ART initiation:								
1 year or less	57%(21)	43%(16)	-0.14	[0.3, 2.3]	0.78			
1-5 years	70%(109)	30%(46)	-0.73	[0.22, 1.1]	0.073			
5-10 years	57%(96)	43%(72)	-0.15	[0.4, 1.9]	0.70			
> 10 years	53%(13)	47%(14)	Ref			Ref		
CD4 count:								
<350 Cell/mm3	75 (70)	32 (30)	-0.6	[0.35, 0.95]	0.03	-0.14	[0.49, 1.54]	0.63
350-500 Cell/mm3	51 (63)	30 (37)	-0.2	[0.47, 1.3]	0.4	-0.33	[0.4, 1.3]	0.27
>501 Cell/mm3	116 (57)	86 (43)	Ref					
OIs:								
Yes	79%(103)	21%(28)	-1.2	[0.19, 0.51]	<0.0001	-0.7	(0.30-0.87)	0.014
No	54%(139)	46%(120)	Ref			Ref		

[a]n (%)-categorical variable, [b]Mean± SD-continuous, Ref-reference

4.2.3.4 To assess the outcome of malnutrition and food insecurity on the quality of life of peoples living with HIV and AIDS

In this section, the outcome of malnutrition and food insecurity on quality of life were discussed, and factors determining the quality of life were analysed in bivariate and multivariate linear regression analysis. The physical and mental health aspects of HRQoL were covered.

4.2.3.4.1 The outcome of malnutrition and food insecurity on quality of life

To assess the outcomes of malnutrition and food insecurity on quality of life of PLWHA, the researcher used bivariate and multivariate linear regression analyses with the study's independent variables including nutrition and food security aspects. For the global physical health-related quality of life and global mental health-related quality of life. The PHS score and MHS score were respectively computed based on standard algorithms to measure the HRQoL among PLWHA. The scoring for PHS or MHS is based on PROMIS global T-score values. T-Score distributions are standardized such that a 50 represents the average (mean), and the standard deviation around that mean is 10 points. Accordingly, a score of less than 50 as low, and 50 and above as a high PHS and MHS score were used in the analysis of bivariate and multivariate regression. Table 4.15 presents the PHS and MHS score about BMI and HFIAS.

Table 4.15 PHS and MHS scores in relation to BMI and HFIAS (N=390), OLS

Characteristics	PHS score			MHS score		
	β Coefficient	**95% CI**	**p-value)**	**β Coefficient**	**95% CI**	**p-value**
BMI Score	0.097	[-0.007, 0.6]	0.056	0.13	[0.085. 0.6]	0.009
Average HFIAS scores	-0.36	[-1.7, -1.03]	0.000	-0.54	[-2.2, -1.62]	<0.0001

4.2.3.4.2 Factors for the quality of life among peoples living with HIV and AIDS: The Physical Health aspect

This section presents the physical health aspect of HRQoL: bivariate and multivariate linear regression analysis.

All independent variables were significant at a *p*-value less than 0.25 in the bivariate analysis using OLS tests for physical related quality of life were extended to multivariate linear regression analysis. All variables determined to be significantly associated in the multivariate models at a $p<0.05$, were reported for the association. After that, p-value $p<0.05$ was used as a cut off for the determinants of HRQoL at multivariate analysis.

Those independent variables which showed some significance with PHS score during bivariate analysis were extended to multivariate logistic regression analysis. The mean PHS score of the participants was 48.8 with a standard deviation of 8.89. The range score varies from 16.2 to 67. the results of the bivariate linear regression analysis. Accordingly, religious affiliation, marital status, household dependency, food insecurity, and duration of ART treatment were found to be associated with PHS. Table 4.16 shows the bivariate and multivariable analysis of factors associated with PHS (N=390).

Table 4.16 PHS score, bivariate and multivariable linear regression analysis with selected study sample characteristics (N=390)

Characteristics	Global Physical Health Scores					
	Bivariate model			Multivariate Model		
	β Coefficient	95% CI	p- value	β Coefficient	95% CI	p- value
Gender:						
Female	-0.26	[0.51, 1.2]	0.23	-0.28	[0.47, 1.22]	0.25
Male	Ref					
Age (in years)	-0.05	(0.97, 1.01)	0.7			
Education level:						
Never been to school	-0.14	[0.31, 2.44]	0.79			
Primary level	-0.29	[0.27, 2.10]	0.58			
Secondary level	-0.24	[0.26, 2.34]	0.66			
College/University level	Ref					
Marital status:						
Single	Ref					
Married	0.35	[0.3, 1.6]	0.39	0.81	[0.43, 2.2]	0.035
Divorced	-0.16	[0.6, 2.1]	0.63	-0.02	[1.05, 6.8]	0.97
Widowed	-0.69	[0.25, 1.0]	0.057	-0.9	[0.43, 2.23]	0.040
Religious:						
Christian	0.85	[1.4, 3.9]	0.001	0.9	[1.4, 4.5]	0.001
Muslim	Ref					
Place of residence:						
Urban	-0.82	[0.2, 0.9]	0.026	-0.4	[0.3, 1.49]	0.32
Rural	Ref			Ref		
Household dependency ratio	-0.35	[0.55, 0.90]	0.007	-0.35	[0.52, 0.97]	0.03
Employment status:						
Unemployed	-0.5	(0.33, 0.80)	0.003	-0.34	[0.42, 1.1]	0.2
Employed	Ref			Ref		
Household mean monthly income	0.01	[1, 1.3]	0.06			
Dietary diversity status:						
Inadequate diversified diet	-0.47	[0.41, 0.96]	0.031	-0.13	[0.52, 1.48]	0.63
Adequate diversified diet	Ref					
HFIAS score	-0.25	[0.71, 0.86]	<0.0001	-0.25	[0.68, 0.88]	<0.0001
BMI score	0.302	[0.96, 1.10]	0.34			
Household wealth Index score	-0.13	[0.71, 1.07]	0.2			
Duration of ART initiation:						
1 year or less	0.31	[0.50, 3.7]	0.55	0.57	[0.58, 5.43]	0.32
1-5 years	0.45	[0.69, 3.56]	0.29	0.85	[0.93, 5.93]	0.07
5-10 years	0.62	[0.82, 4.2]	0.14	0.93	[0.58, 5.43]	0.045
≥ 10 years	Ref					
ART adherence status:						
Suboptimal	0.44	[0.43, 0.97]	0.037	-0.007	[0.61, 1.66]	0.98
Optimal	Ref					
CD4 <350	-0.48	[0.4, 1.01]	0.053	-0.19	[0.48, 1.43]	0.49
count (in 350-500	0.33	(0.8, 2.3]	0.208	0.31	[0.77, 2.42]	0.28
Cell/mm^3) ≥501	Ref					
History of OIs:						
Yes	-0.3	(0.48, 1.13)	0.17	0.24	[0.76, 2.13]	0.36
No	Ref					

4.2.3.4.3 Factors for the quality of life among peoples living with HIV and AIDS: The Mental Health aspect

This section presents the mental health aspect of HRQoL: bivariate and multivariate linear regression analysis.

All independent variables were significant at a *p*-value less than 0.25 in the bivariate analysis using OLS tests for mental health-related quality of life were extended to multivariate linear regression analysis. During bivariate linear regression analysis, global mental health-related quality of life as evaluated by MHS score, was to some extent associated with gender, marital status, religious affiliation, educational status, household dependency, employment status, dietary diversity, food insecurity, BMI, asset possession, duration of ART, ART adherence, CD4 count, and history of opportunistic infections in the last three months. However, during multivariable linear regression analysis, only food insecurity and CD4 count below 350 cell/mm^3 were showed a strong association with mental health-related quality of life. Table 4.17 shows the bivariate and multivariable analysis of factors associated with mental health-related quality of life (N=390).

Table 4.17 MHS score, bivariate and multivariable linear regression analysis with selected study sample characteristics (N=390)

Characteristics	Mental Health Summary Scores					
	Bivariate model			Multivariable Model		
	β	95% CI	p- value	β	95% CI	p- value
Gender:						
Female	-0.3	[0.47, 1.1]	0.14	-0.46	[0.37, 1.1]	0.098
Male	Ref					
Age (in years)	1	[0.98, 1.03]	0.56			
Education level:						
Never been to school	-0.8	[0.14, 1.5]	0.19	0.007	[0.2, 3.2]	0.98
Primary level	-0.91	[0.13, 1.3]	0.13	-0.22	[0.25, 4.85]	0.75
Secondary level	-0.54	[0.17, 2.0]	0.39	0.10	[0.2, 3.23]	0.89
College/University level	Ref			Ref		
Marital status:						
Single	Ref			Ref		
Married	0.16	[0.6, 2.7]	0.634	0.34	[0.25, 1.4]	0.99
Divorced	-0.82	[0.22, 0.9]	0.024	-0.51	[0.87, 6.77]	0.75
Widowed	0.25	[0.55, 2.9]	0.559	0.88	[0.25, 1.44]	0.89
Religious:						
Christian	0.4	[0.93, 2.4]	0.10	0.22	[0.7, 2.2]	0.45
Muslim	Ref					
Place of residence:						

Urban		0.2	[0.6, 2.5]	0.60			
Rural		Ref					
Household dependency ratio		-0.3	[0.57, 0.92]	0.009	-0.14	[0.65, 1.16]	0.34
Employment status:							
Unemployed		-0.8	(0.3, 0.7)	<0.0001	-0.16	[0.50, 1.46]	0.57
Employed		Ref			Ref		
Mean monthly income		0.006	[0.19, 1.0]	0.29			
Dietary diversity status:							
Dietary		-0.7	[0.32, 0.77]	0.002	0.007	[0.56, 1.80]	0.98
Adequate diversified diet		Ref			Ref		
HFIAS score		-0.5	[0.56, 0.70]	<0.0001	-0.44	[0.56, 0.75]	<0.0001
BMI score		0.09	[1.02, 1.2]	0.009	0.013	[0.93, 1.10]	0.76
Household wealth index score		-0.4	[0.55, 0.84]	<0.0001	0.05	[0.79, 1.4]	0.73
Duration of ART initiation:							
1 year or less		-0.7	[0.17, 1.35]	0.16	0.06	[0.44, 2.60]	0.89
1-5 years		-0.9	[0.18, 0.99]	0.050	0.02	[0.42, 2.48]	0.97
5-10 years		-0.6	[0.23, 1.30]	0.17	0.57	[0.50, 6.18]	0.38
$\geq$ 10 years		Ref			Ref		
ART adherence status:							
Suboptimal		-0.9	[0.27, 0.64]	<0.0001	-0.12	[0.52, 1.53]	0.68
Optimal		Ref			Ref		
CD4 count (Cell/mm^3):	<350	-0.9	[0.25, 0.65]	<0.0001	-0.62	[0.32, 0.95]	0.032
	350-500	-0.007	[0.58, 1.7])	0.98	-0.09	[0.49, 1.70]	0.77
	$\geq$501	Ref			Ref		
History of opportunistic infections:							
Yes		-0.6	[0.35, 0.82]	0.004	0.16	[0.68, 2.02]	0.56
No		Ref			Ref		

4.2.3.5 To determine the status of peoples living with HIV about access to nutritious food to meet their dietary needs: the dietary diversity

This section presents dietary diversity: bivariate and multivariate linear regression analysis.

4.2.3.5.1 Dietary diversity: bivariate analysis

Under this sub-topic, the study investigates the PLWHA access to nutritious diet by studying their pattern of dietary diversity. Dietary diversity score was computed using the study variables to understand factors associated with the PLWHA's dietary diversity (see as in table 4.18).

Table 4.18 Household diversity score category of the participants by consumption of food groups

Items	Feed in the last seven days		Test statistics (t-test)	
	Yes	No	t-score	p-value
Cereals	98.7% (385)	1.3%(5)	-2.8	0.005
Tubers	72.8%(284)	27.2%(106)	-9.1	<0.0001
Vegetables	44.6%(174)	55.4%(216)	-14.6	<0.0001
Fruits	60.5%(236)	39.5%(174)	-12.8	<0.0001
Meat	44.6%(174)	55.4%(216)	-16.8	<0.0001
Eggs	29.5%(115)	70.5%(275)	-15.6	<0.0001
Fish	11%(43)	89%(347)	-6.9	<0.0001
Legumes	73.6%(287)	26.4%(103)	-11	<0.0001
Milk	35.6%(139)	64.4%(251)	-11.5	<0.0001
Oil	87.9%(343)	12.1%(47)	-8.9	<0.0001
Sweets	81%(316)	19%(74)	-10.3	<0.0001
Condiments	84.9%(331)	15.1%(59)	-9.6	<0.0001

The household dietary diversity aims to capture nutritional access and adequacy because different studies amongst people of different age groups have shown that its increase is related to increased nutrient adequacy of the diet. First bivariate analysis was conducted with the study variables, and further multivariate analysis was extended to conclude on the factors which determine dietary diversity.

Bivariate analysis showed that access to diversified diet varies with educational level, marital status, place of residence, employment status, dependency ratio, household food insecurity, malnutrition, ART adherence, and recurrence of acquisition by opportunistic infection. Table 4.19 describes the bivariate analysis of household dietary diversity score with sample characteristics, and figure 4.6 illustrates the inverse correlation of household dietary diversity with food insecurity.

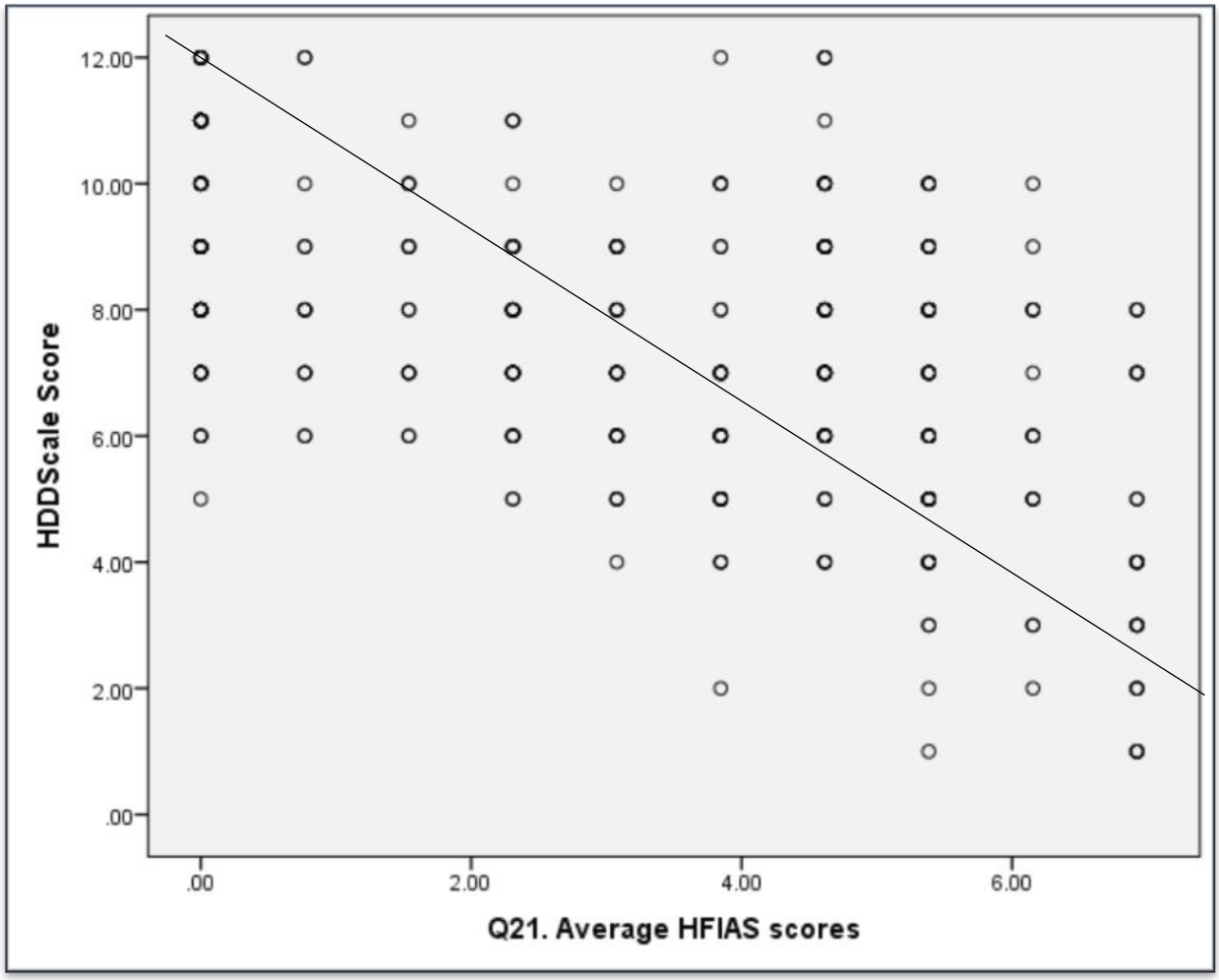

Figure 4: 6 Household dietary diversity in relation to HFIAS scale

Table 4.19 Bivariate analysis of household dietary diversity score with sample characteristics (N= 390)

Characteristics		[a]n(%); [b]Mean± SD	Dietary Diversity Score	
			Test score	p (t-test, ANOVA, OLS, Kruskal-Wallis tests)
Gender	Female	259(66.4)	-0.37	0.7
	Male	131 (33.6)		
Age (in years)		36.1± 8.64	-0.42	0.7
Education	Never been to school	142 (36.4)	3.3	0.019
	Primary level	166 (42.6)		
	Secondary level	66(16.9)		
	College/University level	16(4.1)		
Marital status	Single	46(12)	2.9	0.035
	Married	195(50)		
	Divorced	101(26)		
	Widowed	41(10)		
	Separated	7(2)		
Religious affiliation	Christian	301(77.2)	0.8	0.37
	Muslim	89(22.8)		

Place of residence	Urban	324(83.1)	2.2	0.027
	Rural	66(16.9)		
Household effective dependency		1.15 ± 0.82	-2.9	0.003
Source of drinking water:	Piped to yard/plot	315 (80)	3	0.003
	Spring/open sources	75 (19)		
Kind of toilet facility:	No facility/bush/open source	81(218)	-2.9	0.004
	Pit latrine	309(79))		
Employment status	Unemployed	122(23.3)	-4.4	<0.0001
	Employed	268(76.7)		
Household income		1263±1253	1.4	0.17
Household food insecurity (HFIAS score)		3.16 ± 2.27	-13	<0.0001
Household asset possession or wealth index score		0.85 ± 0.15	-10.95	<0.0001
Duration of ART initiation in years	1 or less	37(9.5)		
	1-5	155(39.7)	1.8	0.14
	5-10	168(43.1)		
	≥ 10	30(7.7)		
CD4 count ($Cell/mm^3$)	<350	62 (16)		<0.0001
	351-500	125 (32)	11	
	≥ 501	203 (52)		
History of opportunistic infections	Yes	129(33)	-5.3	<0.0001
	No	261(77)		

[a]n (%)-categorical variable, [bMean]± SD-continuous

4.2.3.5.2 Dietary diversity: Multivariate linear regression analysis

All variables that showed a significant association in binary logistic regression analysis at p=below 0.05 were included in the multivariable regression analysis of three multivariate linear regression models. Model 1, estimated HDDS by controlling for the effect of education level, marital status, place of residence, and the household effective dependency ratio characteristics. Model 2, considers the source of drinking water, kind of toilet facility, employment status, and household food security features on top of those introduced in model 1. Model 3, introduced household asset possession, recent CD4 cell count, and episodes of opportunistic infections in addition to those variables included in model 1 and 2 (see table 4.21). Statistical significance is set at $p<0.05$.

The results of the multivariate analysis indicate that there are variations in dietary diversity on some of the factors at the four models. In model 1, dietary diversity varies with educational status and the level of household dependency of the PLWHA. In model 2, dietary diversity varies only with household food security status. In model 3, again only food insecurity and the difference in asset possession were found to varies with dietary diversity. In the final model,

model 4; multivariate analysis using backward elimination method, only two variables were found to vary the access of PLWHAs to a nutritious diet. These includes: food insecurity [β= -0.4, 95% CI: -0.53, -0.36, p<0.0001] and poor asset possession [β= -0.3, 95% CI: -0.94, -0.53, p<0.0001]. Table 4.21 presents multivariate linear regression associations between household dietary diversity score and characteristics of the study sample. From this table 4.20 the R^2 result, 39% of factors for lack of adequate diversified diet is associated with the factors studied.

Table 4.20 Multivariate linear regression results of household diversity score and study sample characteristics

Dietary Diversity Scores																
Variable	**Model 1**				**Model 2**				**Model 3**				**Model 4**			
	β	**p**	**95% CI**		**β**	**p**	**95% CI**		**β**	**p**	**95% CI**		**β**	**p**	**95% CI**	
Education level	0.11	0.03	0.03	0.6	0.08	0.07	-0.02	0.47	0.005	0.91	-0.23	0.25				
Marital status	-0.09	0.07	-0.54	0.02	-0.06	0.17	-0.40	0.07	-0.05	0.22	-0.37	0.09				
Place of residence	-0.10	0.06	-1.6	0.02	0.007	0.87	-0.65	0.77	-0.03	0.49	-0.92	0.45				
Household Effective Dependency Rate	-0.11	0.03	-0.57	-0.03	0.006	0.90	-0.22	0.25	-0.009	0.83	-0.25	0.20				
Source of drinking water					-0.044	0.34	-0.80	0.28	-0.01	0.82	-0.58	0.46				
Kind of toilet facility					0.07	0.14	-0.12	0.91	0.01	0.82	-0.44	0.56				
Employment status					0.06	0.16	-0.13	0.76	0.04	0.32	-0.21	0.64				
Household food insecurity					-0.51	<0.0001	-0.63	-0.44	-0.38	<0.0001	-0.5	-0.29	-0.43	<0.0001	-0.54	-0.36
Household asset possession									-0.30	<0.0001	-0.93	-0.49	-0.31	<0.0001	-0.94	-0.53
Recent CD4 cell count									0.024	0.56	-0.16	0.29				
Episodes of opportunistic infections									0.05	0.22	-0.16	0.7				
R Square (R^2)	0.056				0.33				0.40				0.39			

4.2.3.6 To explore peoples living with HIV's coping strategies for nutrition and food security

The reduced coping strategy index is considered a proxy indicator of the food access component of food security and it is calculated based on a specific set of behaviors each with its universal severity weighting (Maxwell & Caldwell 2008:8). Answers to the simple question "In the past seven days, if there have been times when you did not have enough food or enough money to buy food, how many days has your household had to adopt a particular food-based coping strategy" were used to create the CSI. The severity of the weight (magnitude of the scale) for each item is based on the Maxwell & Caldwell severity score. For each household, a score was given to each coping strategy. The score = (frequency with which coping strategy is used) × (severity weight). The scores for each coping strategy are added together to give a composite score for each household. Higher values of the index indicate more severe food insecurity.

In this study, the prevalence of food insecurity is found to be higher, 76% (n= 296). Thus, it is reasonable that PLWHA households may establish a mechanism to cope-up with such complex food insecurity challenges. The coping strategy index was only generated for households that reported not having enough food or money to buy food in the past month; thus are included in table 4:22. The household has developed four strategies for coping with food insecurity. Namely, (1) dietary change strategy, (2) short-term measures to decrease numbers of people to feed, (3) short-term measures to decrease numbers of people to feed, and (4) rationing, or managing the shortfall. Overall, households reported a low level of daily use of most coping strategies — generally, households employed coping strategies either once or twice a week, or every week. Changing dietary habit by consuming less preferred/less expensive food was the most commonly reported coping strategy daily, 67% (n= 340), followed by relying on casual labour for food, limiting portion size at mealtimes and reduce the number of meals eaten in a day. Table 4:21 shows the weekly frequency in which households reported using different coping strategies, and figure 4:7 illustrates the proportion and strategies employed household members of PLWHA to cope-up with food insecurity.

Table 4.21 List of household food insecurity coping strategy and the household food insecurity CSI

List of coping strategies	Relative frequency score [A]			Severity [B]	CSI Score [A*B]
	Never	Sometimes (1-4) days/week	Often (5-7) days/week		
	0	1	2		
1. Dietary change					
• Rely on less preferred foods	50 (12.8%)	98 (25.1%)	242 (62.1%)	1	1.5
2. **Short-term measures to increase household food availability**					
• Borrow food, or rely on help from a friend or relative	184 (47.2%)	149 (38.2%)	57 (14.6%)	2	1.35
• Purchase food on credit	160 (41.0%)	176 (45.1%)	54 (13.8%)	2	1.46
• Gather unusual types or amounts of wild food/hunt	350 (89.7%)	35 (9.0%)	5(1.3%)	4	0.46
• Harvest immature crops (e.g. green maize)	372 (95.4%)	14 (3.6%)	4 (1.0%)	3	0.17
• Rely on casual labour for food	185 (47.4%)	79 (20.3%)	126 (32.3%)	2	1.7
3. **Short-term measures to decrease numbers of people to feed**					
• Send household members to eat elsewhere	304 (77.9%)	72 (18.5%)	14 (3.6%)	2	0.51
• Send household members to beg	382 (97.9%)	5 (1.3%)	3 (0.8%)	4	0.06
4. Rationing, or managing the shortfall					
• Limit portion size at mealtimes	120 (30.8%)	187 (47.9%)	83 (21.3%)	1	0.91
• Restrict consumption by adults for small children to eat	183 (46.9%)	175 (44.9%)	32 (8.2%)	2	1.45
• Reduce number of meals eaten in a day	100 (25.6%)	221 (56.7%)	69 (17.7%)	2	1.84
• Skip entire days without eating	242 (62.1%)	133 (34.1%)	15 (3.8%)	4	1.67
TOTAL HOUSEHOLD SCORE	**(∑A×B) =**				**13.08**

The table shows the relative frequency score, the severity weight, the individual score, and the total household score. The total household score (∑A×B); or the summation of the products of each raw score/relative frequency score and the severity weight for each strategy) is defined as the CSI for that particular household and is 13.08.

Figure 4.7 Food insecurity coping strategies employed by study participants

This section addresses the coping strategy by food consumption. Correlation analysis showed that CSI was positively associated with overall household food insecurity (HFI) (r = 0.67, p = 0.000). However, CSI associated negatively with BMI (r = −0.2, p = 0.000) and dietary diversity score (HDDS) (r = −0.29, p = 0.000). Of the study participants in Pearson correlation analyses, the CSI was negatively associated with consumption of vegetables, meat, eggs; pulses, legumes, nuts; milk and milk products; sweets and condiments. Table 4.22 shows the correlation between CSI and the types of food consumed by the household of PLWHA.

Table 4.22 Correlation between coping strategy index and the consumption of selected foods

		Consumption score of foods														
CSI for Households		**BMI**	**HFI**	**HDDS**	**Cereals**	**Roots and tuber**	**Vegetables**	**Fruits**	**Meat**	**Eggs**	**Fish or other seafood**	**Pulses, legumes, and nuts**	**Milk and milk products**	**Oils and fats**	**Sweets**	**Condiment**
Spearman's rho:	Correlation Coefficient	-0.2**	0.67**	-0.29**	-0.009	-0.006	-0.203**	-0.040	-0.257**	-0.138**	-0.003	-0.218**	-0.146**	-0.187**	-0.278**	-0.265**
	Sig. (2-tailed)	<0.0001	<0.001	<0.001	0.864	0.910	<0.0001	0.434	<0.0001	0.007	0.95	<0.0001	0.004	<0.0001	<0.0001	<0.0001
	N	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390

**Correlation is significant at the 0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed)

4.3 SECTION 2: QUALITATIVE RESULTS

4.3.1 Introduction

The qualitative component of the study was conducted to explore senior health experts' perspective and experience on integrating nutrition and food security with HIV prevention, treatment, and care and substantiate the quantitative data through triangulation**.** To understand the qualitative component, focus group discussions were conducted with senior health experts. Overall, twenty-one purposively selected senior health experts participated in the focus group discussions. Among those, 7 (23%) were females whereas 14 (67%) were males (see table 4:25). Concerning experience, participants' experiences vary from 3-29 years in healthcare settings. Three focus group discussion sessions were conducted as FGD 1, FGD 2, and FGD 3. The number and mix of participants in the first participants were eight, the second six, and the last sessions were seven. Two of the focus group discussion sessions were conducted at the participants' workplace in their training hall, whereas the last session was at calm and environmentally acoustic places to make the recording convenient. Table 4.23 shows the profiles of the informants.

Table 4.23 The FGD participants profiles (N=21)

Variable	Category	FGD1 (n=7)	FGD2 (n=8)	FGD3 (n=6)	Total
Sex	Female	2 (28.6%)	4 (50%)	1 (16.7%)	7 (33.3%)
	Male	5 (71.4%)	4 (50%)	5 (83.3%)	14 (66.7%)
Age	20-30	2(29%)	1 (12.5)	0 (0%)	3(14%)
	31-40	4 (57%)	3 (37.5)	0 (0%)	7 (34%)
	41-50	1 (14%)	3 (37.5)	4 (66.7%)	8 (38%)
	50+	0 (0%)	1 (12.5)	2 (33.3%)	3 (14%)
Educational background	Bachelor's degree	5(72%)	5 (62.5)	3 (50%)	15 (71%)
	Medical Doctor	1(14%)	0	1(17%)	2(9.5)
	Master's degree	1 (14%)	3 (37.5%)	2 (33%)	5 (24%)
Health policy/programme related experience in years	2-6	1 (12.5%)	1 (14%)	2 (33.3)	4 (19%)
	7-12	3 (37.5%)	2 (28.5%)	1 (16.7%)	6 (29%)
	13-19	2 (25%)	3 (43%))	2 (33.3%)	7 (33%)
	$\geq$ 20	1 (12.5%)	2 (28.5%)	1 (16.7%)	4 (19%)

4.3.2 Result of the Focus Group Discussions

During the analysis of the transcripts, the following themes were crystallized: factors affecting treatment outcome, factors surrounding the quality of life of PLWHA, senior health experts' experience and perception on integration of nutrition and food security with HIV prevention, treatment and care; and senior

health experts' recommendation to help explain and improve integration of nutrition and food security issues (see table 4.24).

Table 4.24 Emerging themes and sub-themes

Theme	Sub-themes	Categories
Factors affecting treatment outcome, i.e., ART adherence	Healthcare workers related	○ The poor capacity of ART service providers on the provision of targeted counselling
	Health system issues	○ High staff turnover ○ Lack of infrastructure such as Viral and CD4 analysis laboratories ○ Inconsistent ART medication supply
	Socio-economic status	○ Malnutrition ○ Food insecurity
	PLWHA related issues	○ Lack of adequate knowledge on the importance and outcome of poor adherence ○ Missed treatment and appointment
Factors surrounding the quality of life of PLWHA	Healthcare workers related	○ Inadequate ART adherence counselling ○ Delay in HIV testing
	Socio-economic status	○ Poverty ○ Food insecurity
	PLWHA factors	○ Poor ART adherence ○ Deteriorated health ○ Lack of knowledge on the benefit of early HIV test
Senior health experts' experience and perception on the integration of nutrition and food security with HIV prevention, treatment, and care	What has worked	○ Establishing a cordial working relationship ○ Strengthening Partnership ○ Training and capacity building ○ Financing the programme
	What has not worked	○ lack of programme ownership ○ Poor collaboration with stakeholders and donors
Senior health experts' recommendation to help explain and improve the integration of nutrition and food security issues	An integrated approach	○ Integrate with the existing multispectral HIV/AIDS response ○ Strengthen the health system
	Leadership and Accountability	○ Participation of PLWHA and their families', individuals and families on HIV response measures ○ Accountability to local stakeholders and PLWHA
	Nutrition sensitive intervention approach	○ Intersectoral collaboration ○ Inclusion of nutrition objectives for nutrition sensitive intervention across sectors

4.3.2.1 Theme 1: Factors affecting treatment outcome

During the FGD, four categories were identified affecting treatment outcome of peoples living with HIV. These include—healthcare workers related, health system issues, socio-economic status, and PLWHA related issues.

4.3.2.1.1 Poor ART counselling

The FGD participants pointed out that poor ART counselling as one of the main challenges to adherence. Furthermore, the high turnover of trained staff is the other challenge sorted out by senior health experts. The participants explained these issues as follow:

> *"One of the challenges that we are facing concerning ART adherence is the poor capacity of ART service providers that has resulted in poor treatment outcome. This happens because our ART service providers are not taking time properly to counsel and prepare their clients for ART initiation and adherence. Likewise, once ART is initiated, poor counselling and follow-up are also evident". [FGD 1, Participant 2 (P2)]*

The other regional senior health expert added,

> *"With a lot of efforts, we work to build their capacity on ART treatment as well as counselling through training and refreshments, but again, they leave out the facility. In our region, high staff turnover is a trend that we were dared to attain maximum ART adherence as well as improve health service delivery". [FGD 3, P1]*

4.3.2.1.2 Health system issues

Lack of infrastructures such as Viral and CD4 analysis of regional laboratories and inconsistent ART medication supply was declared by participants affecting the ART adherence. One group of the FGD discussed these health system subjects as:

> "*Not only we are facing the provider related issues about ART adherence, but lack of regional laboratory is also significantly affecting monitoring of treatment adherence and the overall treatment progress of the PLWHA. There is no CD4 count analysing laboratory at least to track their improvement, which is a proxy adherence monitoring". [FGD 2, P1]*

"Nevertheless, we try to allocate ART medication supply for adults, lack of consistent ART supply particularly paediatric ART medication is also a challenge in our region. To maintain good adherence and uninterrupted service delivery, health facilities swap medication from health facilities where extra drugs are available to health facilities where there is no/below the number of eligible PLWHA." [FGD 2, P2]

One senior health experts added

"*you know, we are one of developing Regional State of the country where we face a lot of challenges" [FGD 2, P4]*

Regardless of maximum efforts to enhance the capacity of our healthcare providers in the region, as explained by this senior expert:

"Including logistics, and geographical barrier, there are enormous programmatic and service challenges impacting the regional HIV/AIDS response. And sometimes it is difficult to monitor the programmes because of their remoteness, lack of logistics." [FGD 1, P5]

4.3.2.1.3 Socio-economic status

When asked about factors involved in treatment outcome in Benishangul Gumuz Region, the senior health experts explained that most of the PLWHA are poor and food insecure. They continued explaining that malnutrition and food insecurity were highly prevalent in the region and affecting ART adherence.

"Most of the PLWHA in the region are in lower living standards. Malnutrition and food insecurity are commonly affecting ART adherence of the PLWHA in our region. As a result, the Regional Health Bureau and HIV/AIDS Prevention and Control Office are collaborating with stakeholders in the livelihood support of PLWHA in the region". The participants added, "we do have data of those PLWHA disclosed their status at all Woredas/districts. From those, the upper hand of them were very poor and food insecure and, found malnourished among the health facilities where they follow-on ART thus provided with nutritional care and support". [FGD 3, P5]

"As we all know; how can one take his/her medication on an empty stomach? It is very difficult for such vulnerable and food insecure PLWHA

to expect the desired treatment outcome. To minimize the impact and improve ART adherence we were partnered with the United Nations World Food Programme (WFP) to support the poor and vulnerable PLWHA. The WFP has been providing cash and in-kind food assistance, and livelihood support for long term livelihood interventions. In this regard we were grateful". [FGD 2, P6]

4.3.2.1.4 Peoples living with HIV related issues

There are PLWHA related factors for poor treatment outcome. Senior health experts discussed that lack of adequate knowledge among PLWHA and missing treatment and appointment are the factors for poor treatment outcome. The group discussed this issue as:

"*Although food insecurity is paramount, poor knowledge is more evident to direct PLWHA interrupt from their medication and miss clinic appointment. In this regard, we admit that we are not working to the extent required and thus we should continue strengthening the community-based social mobilization to raise the awareness of the community on ART adherence and positive living." [FGD 3, P3]*

4.3.2.2 Theme 2: Factors surrounding the quality of life of peoples living with HIV

The focus group discussion participants mentioned inadequate ART adherence counselling, delay in HIV testing, poverty, food insecurity; poor ART adherence, deteriorated health and lack of knowledge was among the factors challenging the quality of life of PLWHA. These factors were explained as follows:

"*When we talk about the quality of life we should address the issue of ART adherence first because it has a direct impact on their quality of life. If they (the PLWHA) are not taking their medication, their health will be deteriorate. Recently, we have conducted a Virologic analysis test for all registered PLWHA and on chronic care to determine their level of response to ART. The result indicated that, though some of the PLWHA*

have suppressed Virologic load, our observation is that most of them are underprivileged, food insecure and their quality of life is at its lowest."

"Lack of HIV test kit and/or HIV test service interruption has resulted in poor ART enrolment because of missed opportunities. Consequently, PLWHA seeks healthcare after their health condition has deteriorated." [FGD 3, P1]

4.3.2.3 Theme 3: Senior health experts' experience and perspective on the integration of nutrition and food security with HIV prevention, treatment, and care: What has worked and not worked

All experts discussed their rich experience of programme integration which varies from two to twenty-nine years. Generally, they mentioned in their experience what has worked out and what did not work out in the case of programme integration and development. The senior health experts shared their views on integrating nutrition and food security with HIV, care, and treatment to be as an important milestone towards improving the treatment outcome and quality of life of peoples living with HIV and AIDS. According to their discussion, programme integration and development requires establishing a cordial working relationship with all stakeholders and good partnership, training the workforce and financing the programme. However, lack of programme ownership and poor collaboration with stakeholders and donors' results in uncoordinated and ineffective programme integration. During the focus group discussion, participants express their opinion as follows:

"Integrating nutrition and food security interventions with comprehensive HIV, care and treatment mean strengthening the health system, improving the life and livelihood of PLWHA. It is about networking because of the issue of food/nutrition is not only the issue of health, but it is a collective agenda for sectors such as agriculture, education, and finance." [FGD 1, P4]

One expert discussed

“Overall I worked for about 27 years of which thirteen years were as a regional senior health expert. I have been involved in Tuberculosis/HIV programme integration, health system strengthening and performance measurement”. [FGD 1, P7]

The other added “...

I have worked as a seconded expert by the Federal Ministry of Health for this Regional Health Bureau for about seven years. During this period, I was engaged in programme design, programme integration, and measurement. Lack of programme ownership and poor collaboration with donors negatively impact on programme design and integration.” [FGD 3, P6]

The others added—

“programme integration requires establishing a cordial working relationship with all stakeholders and good partnership, training the workforce and financing the programme. If there is no partnership and there is no finance for the programme, the programme integration will fail.” [FGD 2, P4]

4.3.2.4 Theme 4: Approaches to help explain and improve the integration of nutrition and food security issues

The experts were requested to give their thoughts to help explain and improve integration of nutrition and food security issues with HIV prevention, treatment, and care policy agenda to improve the services and ART adherence and quality of life of PLWHA. Consequently, they elaborated the best possible programme integration approach as an integrated approach; intersectoral collaboration for nutrition sensitive and food security interventions; and tailored leadership and accountability were mentioned:

“*Programme integration requires an integral component of the programme that equally serves all PLWHA irrespective of their socio-economic status. In this regard, HIV prevention and control strategies could have to focus on nutrition and food security interventions integrated with comprehensive*

HIV prevention, treatment, and care. The policy designed should be centered on PLWHA. This means a holistic people-centred strategy which can be implemented through intersectoral collaboration". [FGD 3, P2]

Participants believed that collaboration should be focused on the integration of nutrition-sensitive and food security interventions across sectors:

"The issue of food is a global agenda. We are not able to solve the issue of food for PLWHA on our own. Nutrition objectives could have to be aligned with all relevant sectors. Thus, intersectoral collaboration is a need for nutrition sensitive and food security interventions. In this regard, leadership and accountability must be tailored across sectors. Even the PLWHA and their families need to be active participants to access quality nutrition care and an integrated food security intervention". [FGD 2, P5]

4.4 CONCLUSION

This chapter presented the findings of the study in the form of tables, figures, and texts to achieve the stated objectives of the study in two sections. Section 1, the quantitative part, analysed and presented the determinants of malnutrition and food insecurity; assessed the outcome of nutrition and food insecurity on treatment outcome and quality of life. Section 2 explored and presented the perception and knowledge of senior health experts' perspective on integrating nutrition and food security with HIV prevention, treatment, and care.

The next chapter, Chapter 5, will discuss the pertinent discussion and interprets the findings of the study in line with the research questions which the study purposed to answer.

CHAPTER 5

DISCUSSION AND INTERPRETATION OF THE RESEARCH FINDINGS

5.1 INTRODUCTION

The previous chapter presented the quantitative and qualitative findings of the study and explained how the findings were analysed. This chapter explores and discusses the core findings of the study.

The discussions and interpretation of the findings of the study were aligned with the research questions the study purposed to answer. These questions were:

- What are the determinants of malnutrition and food insecurity among PLWHA in Benishangul Gumuz Region?
- What is the outcome of nutrition and food security on treatment outcome and quality of life of PLWHA?
- What is the status of PLWHA in the region about accessing adequate nutritious food to meet their need?
- How PLWHAs cope-up with malnutrition and food insecurity?
- What are the senior health experts' perspective and experience in integrating nutrition and food security with HIV prevention, treatment, and care?

5.2 RESEARCH APPROACH, DESIGN AND METHOD

The study investigated the determinants of malnutrition and food insecurity and assessed the outcome of malnutrition and food security on treatment outcome and quality of life of peoples living with HIV and AIDS. The study used a mixed method sequential explanatory design in two phases.

Phase 1 followed the quantitative approach to collect primary data from PLWHA and on ART follow-up. Data were collected using a pre-tested

interviewer-administered questionnaire. The data were analysed using IBM SPSS version 24 software.

Phase 2 followed a qualitative approach using FGDs with senior health experts to explore their perspective and experience in integrating nutrition and food security with HIV prevention, treatment, and care.

In both quantitative and qualitative data collection procedures, important validity and reliability measures were taken to ensure data quality and consistency. The study strictly followed ethical considerations to safeguard participants' rights in relation to standard ethical principles of human subjects' research that are stated in Chapter 3 of the study.

5.3 OVERVIEW OF THE RESEARCH FINDINGS AND DISCUSSION

5.3.1 Determinants of malnutrition among people living with HIV in Benishangul Gumuz Region

The results of the binary analysis with independent variables indicated socio-demographic factors such as gender, education level, and household income; household food insecurity, household dietary diversity, household asset possession and duration of ART initiation as predictors of malnutrition among PLWHA in the region. However, the multivariable analysis showed that, among socio-demographic aspects, only gender and place of residence had reached statistical significance. Household income, the source of drinking water, kind of toilet facility, asset possession, food insecurity, and of clinical features such as the duration on ART, opportunistic infection, and ART adherence were also found to be the predictors of malnutrition among PLWHA.

The strong association of social, structural and clinical factors that lead to disease vulnerability among PLWHA can be best explained by syndemic theory which explains that there is a strong association of high magnitude of malnutrition in the context of peoples living with HIV (Douglas-Vail 2016:85). First, the disease itself, that is, HIV, can exacerbate nutritional debilitation through high-energy expenditure, loss through fever, recurrence of

opportunistic infections, including diarrhoea that leads to emaciation of lean tissues. Secondly, HIV as a disease can subject the affected people to socio-economic disadvantages including food insecurity, poverty, and other challenges associated with malnutrition (Himmelgreen et al 2009 cited in Sunguya, Ulenga, Siril, Puryear, Aris, Mtisi, Tarimo, Urassa, Fawzi & Mugusi 2017:7). The factors involved in the association of malnutrition were discussed as follows:

5.3.1.1 Gender

The descriptive result indicates 63% (n=164) females and 54% (n=71) males were found malnourished. This shows the overall prevalence of malnutrition to be 60.3% and more concentrated among female PLWHA. The bivariate analysis using t-test indicates that the prevalence of malnutrition between males (M = 18.6, SD = 2.8) significantly varies with females, $t(388) = -2.7$, p =0.007. Thus, being male gender is inversely related with malnutrition. The findings of a robust multivariate logistic analysis of this study indicate the severity of malnutrition is higher among female [β= 0.14, 95% CI: 0.33, 1.5, p=0.002]. This finding is supported by another study conducted in Ethiopia (Daniel et al 2013:27), which has demonstrated female PLWHA were more affected by malnutrition. Another study conducted in Zimbabwe (Takarinda, Mutasa-Apollo, Madzima, Nkomo, Chigumira, Banda, Muti, Harries, & Mugurungi 2017:4) and in Tanzania (Sunguya et al 2017:5), showed that female PLWHA were more affected by malnutrition.

The possible reason for females to become more malnourished than males may be that females take care of their household in terms of diet preparation as well they prioritise food for their children and/or to their family members than taking care of themselves to consume better food sources to maintain their nutrition. Particularly this is true in the case of certain groups of the society in the case this study's setups in which gender-based feeding arrangements exist (Birhan & Zewdie 2018:52). In the Gumuz ethnic groups, boys eat together with their fathers while girls and mothers have to wait till the male members finish eating their meal. Priority is also given to males while having any meal where all male family members, regardless of age, eat before

the females do. In addition, there is a food taboo among females where females avoid certain food items, especially during their reproductive ages such as avoiding eating meat of wild animals, egg, milk and some vegetables with the belief that if a pregnant female consumes meat and milk products, the foetus will get fat and delivery will be complicated (Birhan & Zewdie 2018:51). Contrary to this finding, in Dar es Salaam, Tanzania, male HIV patients were found to be malnourished and more susceptible to malnutrition (Abioye et al 2015:711). A similar, study in the same country supports this evidence (Takarinda et al 2017:8) indicating that there is a gender difference in malnutrition. Again, in Iran, the prevalence of malnutrition was found to be higher among males than female PLWHA (Hamzeh, Pasdar, Darbandi, Majd, & Mohajeri 2017:4). These findings highlight the importance of gender roles in terms of nutritional status particularly in those living with HIV.

5.3.1.2 Educational status

In this study, educational status is associated with malnutrition, steering the difference in schooling analysis using ANOVA. Although, the higher proportion of the participants attended primary school 42.6% (n=166), about 36.4% (n=142) of them never been to school. The result of ANOVA showed that there is a statistically significant difference between those enrolled and attended school at least primary school (1-6 grades) to those of never enrolled, $F(3,390) = 3.54$, $p = 0.015$. However, during the multivariate regression analysis, educational status did not reach the level of significance. Nonetheless, other studies demonstrated the association of educational status with malnutrition in those living with HIV. For instance, a study conducted in Ethiopia (Haile et al 2015:81) showed that illiterate PLWHA were twice more likely to be malnourished. Similar in the country study on malnutrition and associated factors among adult PLWHA taking ART in Jimma town Oromia Region, South West Ethiopia, found that lack education and illiteracy were strongly linked with malnutrition (Gizaw, Eshetu, & Birhanu 2018:6). Studies at different setups also signposted that illiteracy or lack of education is strongly associated with malnutrition among PLWHA (Thapa et al 2015:6; Tshingani et al 2013:20).

5.3.1.3 Place of residence

In this study, the place of residence is strongly associated with predicting malnutrition among peoples living with HIV. Both the bivariate and multivariate analysis showed a robust association of malnutrition among urban residents [β= -0.1, 95% CI: -2.1, -0.12, p=0.003]. Since the highest proportion of the study participants were from urban areas, their number can over predict the association of urban residence and malnutrition among those groups of the study. Contrary to this finding, a study conducted in Butajira Hospital, southern Ethiopia on the prevalence of malnutrition and its associated factors among adults living with HIV/ and AIDS, designated that living in the rural area is a predicting factor for malnutrition among PLWHA (Gedle, Gelaw, Muluye, & Mesele 2015:9). Nevertheless, no significant differences were noted in risk factors for malnutrition by rural/urban residence in Zimbabwe (Takarinda et al 2017:5). Mohiddin, Phelps and and Walters (2012:2) described the reason for malnutrition among urban residence as related to weaker social support systems for the most food insecure urban area residents, as they often do not have the same access to kin, political or religious groups to offer and provide support as in rural areas. All of which affect their social capital. Migration between rural and urban areas which is two-way and often very context-specific can induce residence associated malnutrition (Mohiddin et al 2012).

5.3.1.4 Income

The study reveals that household income is associated with malnutrition [β= 0.18, 95% CI: 0.01, 0.1, p=0.000]. From this study, 67.7% of the participants earn less than 1,400 Birr (45.07 USD) per month according to November 2018 Birr to Dollar exchange rate. According to the World Bank Group, those earning below USD ($) 1.90 a day is termed as living below the poverty line (World Bank Group 2018:1). In line to this, 67.7% of PLWHA earn $ 1.69 per day which is far below the Ethiopian poverty datum line. In 2015, at the national level, the poverty rate at $1.9 a day for Ethiopia was 26.7% and declining. The poverty rate between 1995 and 2015 moderately decline from 67.1 % in 1995 to 26.7 % in 2015 (World Bank Group 2018:1). Another study conducted in

Ethiopia (Daniel et al 2013:27) also indicated PLWHA earning an income of below poverty line, that is below poverty headcount ratio of $ 1.90 a day was found as predictors of malnutrition. Beyond the association, this study indicates that special attention is required in the case of those population living with HIV. Similar studies conducted in Jimma zone, Southwest Ethiopia (Tiyou et al 2012:6); Kinshasa, Democratic Republic of Congo (Tshingani et al 2013:20); Brazil (Andrade et al 2012:4); Temeke District, Tanzania (Kabalimu, Sungwa & Lwabukuna 2018:4) indicated that very low daily per capita household income increased the prevalence of malnutrition in those living with HIV.

5.3.1.5 Source water for drinking

In this study, use of spring or open source water for drinking is inversely related to the nutritional status of PLWHA [β= -0.14, 95% CI: -1.88, -0.37, p=0.003]. Those study participants who use spring/open source for drinking water were found to be predictors of malnutrition, while the use of piped water to the yard/plot is a protector for malnutrition. This is because lack of access to safe drinking water and hygiene practices undermines the nutritional status of people through water-borne diseases and chronic intestinal infections (Committee on World Food Security 2015:11), that can expose the consumers to diarrhoea-related morbidity, and gastrointestinal illness which counts vomiting or abdominal cramps as well as diarrhoea (Peletz et al 2013:2598).

This finding is supported by the evidence of the study conducted in Mumbai where participants practice of using boiled or clean water for drinking purpose significantly improves the mean body mass index of people living with HIV and AIDS (Gaikwad, Giri, Suryawanshi, Garg, Singh & Guptal 2013:101). Also, many of the anti-retroviral treatments and drugs that PLWHA require need clean and safe water to be effective. Even, HIV positive mothers who feed their infants with formula instead of breast milk requires clean and safe water to mix the formula to minimise and prevent the babies from the risk of contracting life-threatening diarrhoea or other water-borne diseases and infections (Life Water 2014:1). In a place where clean water, sanitation and hygiene are poor, the tendency of getting sick with ascariasis, diarrhoea, dracunculiasis, hookworm, schistosomiasis, and trachoma is so common (Rodríguez & Velázquez 2017:5).

Because contaminated water is one of the most important determinants associated with the acquisition of opportunistic infections (Peletz et al 2013:2598; Gaikwad et al 2013:101). This is mediated through the vicious cycle cycle association of opportunistic infection and malnutrition and HIV (Pal & Srivastav 2012:98).

5.3.1.6 Toilet facility

According to this study, kind of toilet facility, which is open defecation is strongly associated with malnutrition [β= 0.16, 95% CI: 0.46, 1.93, p=0.001]. Mohiddin et al (2012:2) pinpointed that environmental issues such as open defecation, poor sanitation, open sewerage, and contamination have a significant impact on household health which are intertwined with high rates of malnutrition exists. The absence of using toilet facility, use of bush or open source, poor sanitation facilities and hygiene practices undermines the nutritional status of people through water-borne diseases and chronic intestinal infections (Committee on World Food Security 2015:11). Opportunistic infections like diarrhoea were demonstrated to be a predictor of malnutrition among PLWHA through HIV and malnutrition vicious cycle interactions (Andrade et al 2012:4; Thapa et al 2015:8).

5.3.1.7 Household food insecurity

It is also found that household food insecurity is the strong predictor of malnutrition among poor PLWHA while food secure PLWHA's demonstrated absence of malnutrition [β= -0.12, 95%CI: -0.30, -0.028, p=0.019]. This finding is similar to other study conducted in West Shewa Zone, Central Ethiopia (Gebremichael et al 2018:5). Another study conducted in Humera, Tigray, Ethiopia by Hadgu et al (2013: 5), indicated that household food insecurity is a strong predictor of malnutrition among people living with HIV that necessitated the strong attention for nutrition and livelihood interventions, especially for PLWHA. In Zimbabwe, it is reported that the difficulty of accessing food is associated with malnutrition (Takarinda et al 2017:5). Martin et al (2011:202) stated that the lack of access to food and nutrition prevents PLWHA from maintaining or improving their health, even when receiving treatment. This is

because malnutrition exacerbates the progression of HIV infection as a result of the interconnection of malnutrition and food insecurity that affects the quality of life, health status, and access and adherence to antiretroviral therapy. There are significant studies that signposted the relationship between HIV, malnutrition and food insecurity, that calls for inclusive programming to interrupt their intricate cycle (Gebremichael et al 2018:5; Bahwere, Deconinck, Banda, Mtimuni & Collins 2011: 625).

5.3.1.8 Household wealth status

From this study, asset possession is associated with nutritional status among those people living with HIV. Poor asset possession or lower wealth index score are strong predictors of malnutrition during bivariate OLS analysis [β= -0.28, 95% CI: -1.15, -0.56, p=0.00], and subsequent multivariate analysis [β= -0.21, 95%CI: -0.15, -0.06, p=0.00]. Thus, lower wealth quintal was found to be a predictor of malnutrition in PLWHA. Analogous to this finding, the study conducted in Ethiopia by Weldehaweria, Abreha, Weldu and Misgina (2017:9) indicated that lowest asset possession, that is lowest wealth quintal is associated with malnutrition. A study conducted by Birhane, Loha, and Alemayehu (2017:5) in Dilla, Southern Ethiopia also similarly established that lowest wealth quintals are associated with malnutrition.

Another study in Tanzania (Sunguya et al 2017:5), has shown that high magnitude of malnutrition among HIV infected adults is associated with lower wealth quintiles among those who have not started ART which calls for the inclusion of nutrition care and treatment in the test and treat model. The same situations happened to individual households with lower wealth index and found malnourished in Bangladesh (Hasan, Sutradhar, Shahabuddin, et al 2017:4). Parallel to these findings, in Zimbabwe, highest wealth quintal is associated with being overweight or obese among HIV-positive patients enrolled in ART clinics (Takarinda et al 2017:7), which is also one form of malnutrition. The higher wealth index was also associated with better nutritional status and less likely to exhibit malnutrition compared with their counterparts at the lowest wealth index in Dar es Salaam, Tanzania (Sunguya et al 2017: 6), where more than one in four HIV-positive adults present with malnutrition.

5.3.1.9 Duration of ART Treatment

This study showed that the duration of ART treatment [β= -0.13, 95% CI: -0.86, -0.015, p=0.006] is significantly associated with nutritional status of PLWHA. Substantial and higher prevalence of malnutrition was found among patients who were on ART for less than one year. This is similar to the study conducted in West Shewa Zone, Ethiopia (Gebremichaelet al 2018:5). The study signposted that as the number of years on ART advances, the probability of being predisposed to malnutrition slightly diminishes. This is because as PLWHA stay longer on ART, the immunity improves and reduces the risk of opportunistic infections, diarrhoea, and vomiting. As a result, PLWHA could have a better appetite, increased dietary intake, nutritional counselling due to frequent consultation with the healthcare workers. Improved immunity lead to improved nutritional status (Gedle et al 2015:8). On the contrary, a cross-sectional study conducted in East Hararge Zone, Oromia, Ethiopia, showed that those PLWHA who have been on ART for more than a year were more likely malnourished as compared to those who have been on ART for less than six months (Dedha et al 2017: 39).

5.3.1.10 ART adherence

The result of bivariate analysis using a t-test, indicates that there is a strong association between suboptimal ART adherence and malnutrition, t(388)=-3.4, p=0.001. For this study, optimal adherence is considered when the average adherence is greater than 90% (he/she missed 2 doses of 30 doses or 3 doses of 60 doses) and suboptimal if the average adherence is less than 90% (he/she missed >2 doses of 30 doses or >3 doses of 60 doses) using self-reported antiretroviral therapy visual analogue scale adherence measurement. However, this statistical significance was not demonstrated during the multivariate regression analysis. A similar study conducted in Northern Ethiopia showed a strong association between malnutrition and antiretroviral treatment adherence (Berhe et al 2013;5). According to Berhe et al, the body mass index of non-adherent PLWHA showed no significant improvement and decrease in comparison with their adherent counterparts where the mean increment in

weight of the adherent group in the latest four visits was 1.2 Kg whereas the weight in the non-adherent group was decreased by a mean of 0.1 Kg. Another study in Nekemte, East Wollega, Ethiopia documented that ART interruption is significantly associated with malnutrition (Kenea et al 2015:96). Furthermore, suboptimal adherence to Antiretroviral treatment is associated with antiretroviral treatment failure (Yassin & Gebretekle 2017:5).

5.3.1.11 Opportunistic infections

The finding of this study indicated that PLWHA who were exposed to two or more episodes of opportunistic infections in the last three months (M=17.3, SD= 2.9) were strongly associated with malnutrition, t(388)=-3.4, p=0.001 than that acquired infection rarely. However, the study presented that absence of recurrent opportunistic infection is the protector of malnutrition among PLWHA. Even if the presence of opportunistic infection is not associated with malnutrition during multivariate regression analysis, an enormous scientific studies apprise the synergistic relationship of malnutrition and recurrence of OIs among PLWHA, because malnutrition reduces the body's ability to fight infections and therefore helps increase the incidence, severity, and length of infections (WFP 2016:1; Hadgu et al 2013:5; Thapa et al 2015:7).

There are studies in other settings that established strong interconnectedness of malnutrition with infection. In Brazil, a higher prevalence of malnutrition among PLWHA is associated with opportunistic infection such as chronic diarrhoea (Andrad 2012:4), which requires a strong attention to chronic diarrhoea as a clinical condition that contributes to malnutrition. Other findings of the study conducted in China (Hu et al 2011:548) is consistent with the result of this study. According to Hu et al (2011:548), high risk of malnutrition is associated with the presence of recurrent opportunistic infections among hospitalized PLWHA. Frequent acquisition of tuberculosis infection was strongly associated with malnutrition among PLWHA in Kathmandu, Nepal (Thapa et al 2015:6). The result of this study is also in line with a meta-analysis study conducted by De Pee and Semba (2010:319) who described the relationship between adequate nutritional status and its subsequent importance on preventing opportunistic infection. Adequate nutrition supports immunity and

physical performance, thus assisting in the prevention of opportunistic infections through mitigation of antiretroviral side effects and stimulating the appetite.

5.3.2 Determinants of food insecurity among peoples living with HIV

Food insecurity is a complex phenomenon that manifests itself in numerous physical conditions resulting from multiple causes. It affects life and livelihood, reduces the quality of life, health status, and access and adherence to antiretroviral therapy (Martin et al 2011:202). This study investigates the predictors of food insecurity from perspectives such as socioeconomic factors: gender, education, marital status, ethnic groups, religious category, place of residence, and household effective dependency; employment status and income; nutritional status; household dietary diversity; household asset possession; and clinical features such as duration on ART, ART adherence status, CD4 count, and history of opportunistic infections.

The bivariate analysis of this study revealed that increasing severity of food insecurity is associated with lower education, marital status—those widowed partners experienced higher food insecurity, higher household dependency, lack of employment, household's lower income, poor asset possession, frequent episodes of opportunistic infections and sub-optimal ART adherence. However, in the final model, multivariable logistic regression analysis using backward elimination method, revealed six study variables that predict determinants of food insecurity among PLWHA. These include the place of residence, employment status, household effective dependency rate, dietary diversity, asset possession, ART adherence, and episodes of opportunistic infection. The next passage describes those predictor factors for food insecurity:

5.3.2.1 Gender

In this study, the prevalence of food insecurity is 76% (n=296). About 77% (n=200) females and 73% (n=96) males were found food insecure. This shows the prevalence of food insecurity is significantly concentrated among female

PLWHA. There is no difference in mean food insecurity between females (M=3.2, SD= 2.3) and males, t(388)= 0.09, p=0.9. Unlike other studies, the current study did not establish an association between food insecurity and gender. In opposite to the current study, there are rich scientific evidences which have culminated profound association between food insecurity and gender disparity. For instance, a study conducted by Belachew et al (2011:401) in South West Ethiopia, indicated that women and girls severely suffered the negative impacts of food insecurity. Similarly, female PLWHA in India, engaged in negative coping mechanism to deal with the impact of food insecurity (Patel, Battala & Adhikary 2016:108).

Food insecurity has many forms of disparity interms of gender roles. It is positively associated with poor school attendance especially among female-headed households (Tamiru, Argaw, Gerbaba, Ayana, Nigussie & Belachew 2016:6). A meta scientific review study (Agarwa 2012:6), solicited that gender inequalities are a significant part of the problem in food security. Such inequalities faced by women as producers reduce the potential productivity of agriculture and hence of overall food availability of food in countries, regions, and worldwide. Gender-related food insecurity was also found among PLWHA in the Dominican Republic (Derose, Paya´n, Fulcar, Terrero, Acevedo, Farı´as & Palar 2017:13. According to Derose et al, food insecurity was found to be precipitated by enacted stigma in the labour and social domains in peoples living with HIV. As a result, women experience HIV-related labour discrimination in formal and informal sectors and dismissal from their job if found to be HIV positive. In Uganda (Miller et al 2011:1516), reported that gender inequality played a significant role among people living with HIV to engage into transactional sex and/or remain in violent or abusive relationships to cope with food insecurity.

5.3.2.2 Education

The study recognized lack of education as one of the contributing factors for food insecurity among peoples living with HIV. From this result there is a significant level of the difference in food insecurity within the level of schooling, for example, the highest food insecurity is in those never enrolled to school,

primary schooling, and secondary with the mean score difference of 3.29, 3.21, 3.12 respectively, F(3, 390) = 3.3, p= 0.019. While college/university level education is associated with the lowest food insecurity mean score. However, this result did not show an association with food insecurity during multivariate logistic regression. Contrary to this finding, there are nationally conducted studies (Tiyou et al 2012:3; Asnakew 2015:6; Tolasa et al 2015:12), and regional level studies (Sholeye, Animasahun, Salako & Oyewole 2017:99; Semali et al 2011:6; Sirotin et al 2012:3; Weigel et al 2016:7) which have established that lack of or lower level schooling is the predictor of malnutrition. Similarly, a study in India showed that those PLWHA who has schooled for five or more grades were associated with food security, not food insecurity (Dasgupta, Bhattacherjee & Das 2016: 243). From this finding, food insecurity is evident to be strongly associated with poor schooling and also found to be affecting education enrolment and attendance (Tamiru et al 2016:6).

5.3.2.3 Household effective dependency

It was found that the mean household dependency of the study participants is 0.8, meaning that, for every ten working people in the household, there are eight non-working household members. The bivariate analysis of this study outlined that household effective dependency is strongly associated with food insecurity, F(1, 390) = 21, p=0.000. Subsequent multivariate analysis has also established household dependency as a predictor of food insecurity among PLWHA [β= 0.11, 95% CI: 0.09, 0.46, p=0.003]. The study further identified that higher household size was associated with higher dependency rate. Similar to this finding, a study conducted in Wolaita Sodo town, South Ethiopia, has indicated that higher household effective dependency ratio was associated with food insecurity (Tantu, Gamebo, Sheno & Kabalo 2017:6). Another similar study conducted in Zambia found that lower household dependency ratio was inversely associated with food insecurity (Masa, Chowa & Nyirenda 2017:8). However, contrary to this study, household size was negatively associated with food insecurity in the study undertaken by Masa et al (2017:8). According to Masa et al (2017:8), larger-sized households were less food insecure than smaller-sized households and outlined the possible reasons to be larger

households may comprise other working-age members who can earn additional income and provide adequate food for all household members.

5.3.2.4 Place of residence

Urban place of residence in comparison to rural residence (M=1.58, SD=1.7) is associated with food insecurity during bivariate analysis, t(388)=-4.4, p<0.001. Multivariate logistic regression analysis using backward elimination technique showed that urban residence is strongly associated with food insecurity among peoples living with HIV [β= 0.18, 95% CI: 0.76, 2.0, p<0.001]. As high percentage of the participants are from urban areas, 91% (n=355), such proportion can inflate the association of urban residence with food insecurity. A high percentage of food insecurity were found among urban PLWHA in the Free State province of South Africa (Pienaar, van Rooyen, Walsh 2017:121). On another hand, a study in Butajira Hospital, Southern Ethiopia, showed that rural resident PLWHA is significantly associated with food insecurity, and found two times more likely to be food insecure as compared to those living in urban areas (Gedele et al 2015: 3). Still similar study in Jimma zone, Southwest Ethiopia, has shown that living outside the Jimma urban area was associated with food insecurity (Tiyou et al 2012:7). From this finding of the study, the HIV response could have to target food insecurity and must be tailored to specific settings such as urban-rural set-ups. Because Ethiopia is rapidly urbanizing, as such urbanization makes food insecurity complex issue with several overlapping dimensions as social structures are so weak in urban areas (Crush, Drimie, Frayne, & Caesar 2011:350).

5.3.2.5 Lack of employment

Lack of employment is associated with food insecurity among people living with HIV in Benishangul Gumuz Region, Ethiopia. The study revealed that those PLWHA who are not employed has the highest HFIAS scores, t(388)= 6.3, p<0.001. While the multivariate analysis showed [β= -0.11, 95% CI: -0.86, -0.18, p=0.003], that lack of employment is strongly associated with food insecurity. Several studies have indicated that HIV/AIDS negatively impacts on the employment status of PLWHA which exposes them for food insecurity. A finding of a study by Asnakew (2015:6) in Hosanna Town, Hadiya Zone,

Southern Ethiopia has shown that lack of employment is a predictive factor for food insecurity among people living with HIV. For example, a study conducted by Zekeri and Diabate (2014:5) and Kalichman et al (2015:86) showed the negative impacts of HIV/AIDS on none employed households. Both of these studies showed a lack of employment as a predictor of food insecurity in people living with HIV. Study in Delhi, India, highlighted that unemployment causes psychological distress among PLWHA. As a result, intriguing access to food (Kang et al 2016:419) remains an employment enquiries which requires robost food security responses for PLWHA. Equally, unemployment is significantly associated with food insecurity in Addis Ababa (Gebre 2012:165), Zimbabwe (Moyo, Maharaj & Mambondiani 2017:229), and in Canada (Guo et al 2015: [5]). However, in Pakistan, employment status was found not to affect households' food security (Sultana & Kiani 2011:12977).

5.3.2.6 Poor dietary diversity

In this study, the bivariate and multivariate analysis showed that inadequate diversified diet is strongly associated with food insecurity among PLWHA [β= -0.26, 95% CI: -0.33, -0.17, p=0.000]. A similar study in South West Ethiopia signposted that low dietary diversity is a predictor of food insecurity among PLWHA (Tiyou et al 2012:5). Another study in Mettema, North West of Ethiopia, indicated low dietary diversity in more than half of adult HIV positive individuals (Woldemariam et al 2015:5). A study conducted in Fiche, Ethiopia (Tolasa et al 2015:11) indicated poor dietary diversity is associated with food insecurity among people living with HIV. Low dietary diversity was evidenced among food insecure PLWHA in Ethiopia (Gedle et al 2015:4); Rwanda (Sirotin et al 2012:3) and Ecuadorian Women (Weigel et al 2016:7). Inadequately diversified diet is an indicator of food insecurity. Socioeconomic, cultural, medical and behaviour characteristics of each individual could determine the dietary diversity of individuals and households. Eating adequately diversified diet ensures the presence of beneficial phytochemicals, promotes balance among nutrients that influence micronutrient absorption and utilization and reduces the risk for multiple micronutrient deficiencies (Weigel et al 2016:12). Thus, special consideration is required on maintaining the adequate diversified diet for health and well-being of PLWHA.

5.3.2.7 Asset possession

According to this study, poor asset possession, that is lower wealth index score is a strong predictor of food insecurity among PLWHA in the region, [β= 0.17, 95% CI: 0.2, 0.56, p=0.000]. A study conducted in Zambia indicated poor asset possession as a predictor of food insecurity among people living with HIV, while the highest wealth possession is a predictor of food security (Masa et al 2017:6). Asset ownership, in particular, plays an important role in decreasing the risk of food insecurity. Studies conducted in Kenya and Zambia have indicated that HIV-afflicted households often sell their assets to cope with food insecurity (Samuels & Rutenberg 2011:751). Alternatively, low-asset or decreased ownership scale based on owning material assets households tend to experience severe and more frequent food insecurity compared with high-asset households (Nagata, Fiorella, Salmen, Hickey, Mattah, Magerenge, Milner, Weiser, Bukusi & Cohen 2015:5; Tsai, Bangsberg, Emenyonu, Senkungu, Martin & Weiser 2011:8). Some types of assets also have a direct effect on food security.

5.3.2.8 CD4 cell count

The study found that CD4 count of <350 cell/mm^3 is associated with food insecurity, F(2, 390) =12.7, p<0.0001. This result has not shown an association with food insecurity during multivariate linear regression analysis. There is strong evidence that lower CD4 count is associated with food insecurity. A systematic review and meta-analysis study by Aibibula et al (2016:5), has publicised that food insecurity and low CD4 count among HIV infected individuals are strongly interconnected. Aibibula et al discussed that food-insecure people had 1.32 times greater odds of having lower CD4 counts compared to food secure people. Food insecure people had on average 91 fewer CD4 cells/μl compared to their secure food counterparts. In such a way, food insecurity could be a potential barrier to immune recovery as measured by CD4 counts among PLWHA. Another longitudinal study steered on assessment of associations between food insecurity, antiretroviral adherence and HIV treatment outcomes in rural Uganda, found that food insecurity was associated with lower CD4 cell count of <350 cells/mm^3 (Weiser, Palar, Frongillo, Tsai,

Kumbakumba, de Pee, Hunt, Ragland, Martin & Bangsberg 2014:4). Unlike the finding of this study, though food insecurity negatively impacts on HIV infection outcomes in international settings, lower CD4 count was not independently associated with food insecurity in a large cohort of HIV-infected patients receiving antiretroviral medications in USA (Wang 2012:1014).

5.3.2.9 Opportunistic infection

Studies have shown that food insecurity is independently associated with the recurrent occurrence of opportunistic infections among peoples living with HIV. Similarly, this study has shown the variation in levels of food insecurity with the episodes of opportunistic infections during bivariate analysis, $t(388)= 7$, $p= 0.000$. This relationship evidenced that the acquisition of opportunistic is a predictor of food insecurity among PLWHA at the study area [β= -0.12, 95% CI: -0.86, -0.17, p=0.004]. The result of the finding of this study is consistent with the longitudinal cohort study conducted in Uganda, where food insecurity was found associated with worse opportunistic infections (Weiser, Tsai et al 2012:5). Sexually active women in Brazil reported symptoms of itchy vaginal discharge, opportunistic infections which succeed the suppressed immune system, were associated with food insecurity (Tsai et al 2012:6). As a result of decline in the consistent use of condom overtime from 15.0% to 10.5% to cope-up with negative impacts of food insecurity.

5.3.3 To assess the outcome of malnutrition and food insecurity on treatment outcome

To assess the outcomes of malnutrition and food insecurity on treatment outcome, ART adherence status of PLWA were measured using self-report measures. Medication adherence is the extent to which patients take medications as prescribed by their health care providers. Assessment of medication adherence in clinical settings through brief, validated self-report measures can provide actionable information to medical providers about patient non-adherence (Stirratt, Dunbar-Jacob, Crane, Simoni, Czajkowski, Hilliard, Aikens, Hunter, Velligan, Huntley, Ogedegbe, Rand, Schron & Nilsen 2015: 471). Bivariate and multivariable linear regression analyses with the study's independent variables including nutrition and food security aspects were used

to assess the ART adherence status of the PLWHA. The result of multivariate logistic regression analysis showed that only educational status, that is, those who have never been to school [β= -1.9, 95% CI: 0.03, 0.6, p= 0.008], primary level [β= -1.5, 95% CI: 0.05, 0.9, p= 0.039] and secondary education level [β= -1.5, 95% CI: 0.05, 0.9, p= 0.04]; household food insecurity (β= -0.3, 95% CI: 0.6, 0.8, p<0.0001]; malnutrition [β= 0.1, 95% CI: 1.05, 1.2; p=0.001] and opportunistic infections in the last three months [β= -0.7, 95% CI: 0.30, 0.87, p= 0.14] were strongly found to affect the treatment outcome of the PLWHA in the study. However, marital status, employment status, dietary diversity, nutritional status, household asset possession, and CD4 count did not reach the level of statistical significance.

5.3.3.1 Predictors of antiretroviral therapy adherence among peoples living with HIV

In this sub-section, malnutrition, food insecurity, educational status and opportunistic infections are discussed as predictors of ART adherence among peoples living with HIV.

5.3.3.1.1 Malnutrition

Malnutrition (BMI <18.5 kg/m^2) was found as a predictor of sub-optimal ART adherence in this study. The result of the bivariate analysis indicated that there is a significant association between malnutrition and poor ART adherence [β= 0.1, 95% CI: 1.05, 1.2; p= 0.001]. This association is not maintained during the multivariate logistic regression analysis. Regardless, this moderate association of malnutrition and ART adherence culminates the necessity of focused clinical and programmatic nutrition management. There are studies which have established the association of malnutrition and ART adherence. For instance, scientific study in Northern Ethiopia (Berhe et al 2013: 5) showed that malnutrition, inability to get enough and/or quality food and consumption pattern, is significantly associated with non-adherence to ART. Another matched case-control study done in the Central zone of Tigray, Northern Ethiopia, discovered malnutrition was among the independent factors associated with lack of adherence to ART (Weldehaweria et al 2017: 9). With the fact that existing converse association between malnutrition and treatment

adherence, a meta-scientific review study conducted by Audain, Zotor, Amuna, and Ellahi (2015: 523) recommend food-based intervention to play a supportive role in overall weight gain and improving ART adherence. As a result of the synergism co-existence between HIV and malnutrition that a debilitating effect on the other (Kenea et al 2015: 96; Mekuria et al 2015: 5; Sicotte et al 2014: 6; Berhe et al 2013:8; Argemi et al 2012:1164). Nutritious food support is highly regarded as a viable option for improving treatment outcome.

5.3.3.1.2 Food insecurity

This study shows that food insecurity is severely impeding the treatment outcomes of the study participants. Of total participants, 62% (n= 242) were found to have sub-optimal ART adherence. Among those found to have sub-optimal ART adherence, 70% (n=208) were found to be food insecure. Logistic regression using OLS analysis [β= -0.4, 95% CI: 0.63, 0.77, p= 0.000] and subsequent multivariate logistic regression analysis [β= -0.3, 95% CI: 0.6, 0.8, p= 0.000] showed strong association of food insecurity with suboptimal ART adherence. Thus, food insecurity is a major challenge for attaining maximum treatment outcome in the prevention and control of HIV programmes. For example, a study undertaken in Lake Victoria, Kenya, on determinants, lived experiences, and consequences of household food insecurity among persons living with HIV and AIDS has revealed that food insecure PLWHA miss doses of their medication on a daily level (Nagata et al 2012:732).

A similar study conducted by Pellowski, Kalichman, Cherry, Conway-Washington, Cherry, Grebler and Krug (2016: 849), has discovered that food insecure PLWHA miss doses of medication which indicates that there is a relationship between food insecurity and non-adherence to antiretroviral therapy. Likewise, a study conducted by Kalichman et al (2014:7) has shown that food insecure PLWHA had poorer ART adherence and failed to achieve 85% adherence for each month during the study period. Food insecurity was established as a critical barrier to adherence to ART and other health care recommendations among HIV-infected individuals (Young et al 2014: 515). Young et al (2014:507), elaborated that the associations between food insecurity and ART non-adherence were causally linked, including the

exacerbation of hunger or ART side effects in the absence of adequate food and competing for resource demands.

There are other similar studies which designated a strong association between poor ART adherence and food insecurity (Hong et al 2010:5). Hong et al identified five mechanisms on how food insecurity can contribute to ART non-adherence and treatment interruptions:(i) ARVs increase appetite and led to intolerable hunger in the absence of food; (ii) side effects of ARVs were exacerbated in the absence of food; (iii) participants believed they should skip doses or not start on ARVs at all if they could not afford the added nutritional burden; (iv) competing demands between costs of food and medical expenses led people either to default from treatment, or to give up food and wages to get medications; (v) while working for food for long days in the fields, participants sometimes forgot medication doses. On the other hand, there are evidence which show that ART significantly reduces the food insecurity among people living with HIV over time (Palar et al 2012:2379). Palar et al (2012:2379), explained the way ART improves food security as a potential pathway through improving work and mental health status. Thus, it is conclusive that timely ART initiation will minimise the likely manifestation of food insecurity among PLWHA.

5.3.3.1.3 Educational status

In this study, ART adherence was linked with educational status. The bivariate analysis showed that a strong association exists with the level of education and ART treatment adherence. In this case, there is inverse association between level of schooling and ART treatment adherence, that is, those who has never been to school [β= -2.3, 95% CI: 0.027, 0.37, p= 0.001], primary level schooling [β= -1.9, 95% CI: 0.04, 0.54, p= 0.004], and secondary level [β= -1.8, 95% CI: 0.04, 0.62, p= 0.008] were found to be negatively associated with optimal ART adherence. Lower education is found to have associations with barriers to ART adherence. On the other hand, those PLWHA who studied up to college/university level were found to have optimal ART adherence. Similarly, another study in Jimma University Teaching Hospital, Southwest Ethiopia, designated that educational status had a significant association with the level of adherence (Abera, Fenti, Tesfaye & Balcha 2015:4). A study in Kwa-Thema

clinic in Gauteng Province, South Africa, has shown that the level of education is among factors for ART treatment adherence (Eyassu, Mothiba & Mbambo-Kekana 2016:6). Likewise, a study conducted in Yaounde, Cameroon, reveals that educational predict the status of ART adherence in people living with HIV (Fonsah, Njamnshi, Kouanfack, Qiu, Njamnshi, Tagny, Nchindap, Kenmogne, Mbanya, Heaton, & Kanmogne 2017:11). Another study conducted with the aiming of determining the predictors of adherence to antiretroviral therapy among people living with HIV and AIDS at the regional hospital of Sokodé, Togo, has similarly shown that the level of schooling is associated with ART adherence of PLWHA (Yaya, Landoh, Saka, Patchali, Wasswa, Aboubakari, N'Dri, Patassi, Kombaté & Pitche 2014:5).

On the contrary, there are the findings of the studies which has shown that adherence status was not to be associated with educational level. For example, a systematic scientific review conducted to determine on the associations of the socioeconomic status of PLWHA including education; educational level was not found to be significantly associated with adherence to ART among adult patients infected with HIV in low- and middle-income countries (Peltzer & Pengpid 2013:153). The findings of Peltzer and Pengpid (2013:153), is supported with the study done in Zimbabwe where demographic variables such as the level of education had no association with ART adherence (Gonah & Mukwirimba 2016:178).

5.3.3.1.4. Opportunistic infections

The occurrence of opportunistic infections was found to predict ART treatment outcome among PLWHA in Benishangul Gumuz Region, Ethiopia. Recurrent incidence of opportunistic infections was significantly associated with ART treatment outcome, both during bivariate analysis [β= -1.2, 95% CI: 0.19, 0.51, p= 0.000], and during subsequent multivariate analysis [β= -0.7, 95% CI: 0.3, 0.9, p= 0.014]. Thus, it is possible to signpost that suboptimal treatment adherence is allied with episodes of falling ill with opportunistic infections. This finding is consistent with the findings of other studies that have reported the presence of a significant association between treatment for HIV and other infections, and adherence to ART (Eyasu et al 2016: 6). According to Eyasu et al, the reason for poor ART adherence among PLWHA was explored to be pill

burden. Suboptimal ART adherence as a result of opportunistic infection was also reported among PLWHA in Yaounde, Cameroon (Fonsah et al 2017: 9). Fonsah et al found that PLWHA who fall-sick with opportunistic infections had 3.1-times higher odds being non-adherent to ART. Similar to the discussions above, a nation-wide study conducted in Republic of Korea, on adherence to antiretroviral therapy and factors affecting low medication adherence among HIV-infected individuals, and history of acquisition of opportunistic infection, namely having a history of malignancy, was significantly associated with sub-optimal ART adherence (Kim, Lee, Park, Bang & Lee 2018: 5).

5.3.4 The outcome of nutrition and food security on health-related quality of life

When the quality of life is considered in the context of health and disease, it is commonly referred to as health-related quality of life to differentiate it from other aspects of quality of life. Since health is a multidimensional concept, HRQoL is also multidimensional and incorporates domains related to physical, mental and emotional, and social functioning (Healthy People 2020 2010: 2). For this study, to assess the outcomes of malnutrition and food insecurity on quality of life of PLWHA, the physical and mental dimensions were studied based on standard algorithms with the study variables including the nutrition and food security indicators. The high quality of life in both the domain of physical and mental health score might indicate better HRQoL.

5.3.4.1 The physical health-related quality of life

Physical health-related quality of Life is the physical health measurement of well-being and reflect individuals' assessments of the impact of their physical health on their social participation within their current environment. The average study participants were found to have below average mean PHS score, with a mean of 48.81 and a standard deviation of 8.9. The result of bivariate and subsequent analysis of this study reveals, PHS score is associated with religious affiliation, marital status, household dependency, food insecurity, and duration of ART treatment.

5.3.4.1.1 Marital status

The findings of this study indicated that socio-demographic factors such as marital status were independently found to be associated with PHS score. Specifically, those PLWHA who were divorced [β= -0.02, 95% CI: 1.05, 6.8, p= 0.04], and those widowed [β= -0.9, 95% CI: 0.43, 2.2, p= 0.03] were found to have the lowest physical health-related quality of life scores. Married PLWHA were among those who have higher physical health score and thus support improvement in physical health-related quality of life. A similar study in Addis Ababa, Ethiopia, has shown that demographic characteristics such as marital status were found with physical health-related quality of life (Mekuria et al 2015: 6). In the findings of Mekuriaet al, divorced and separated PLWHA were found to be associated with lower physical health-related quality of life. A similar study undertaken on health-related quality of life among military HIV patients on antiretroviral therapy in USA, found that marital status was among factors associated with physical health-related quality of life (Emuren, Welles, Evans, Polansky, Okulicz, Macalino, Agan, the Infectious Disease Clinical Research Program HIV Working Group. 2017: 8).

5.3.4.1.2 Religious affiliation

Another socio-demographic factor found to be associated with physical health-related quality of life is religious affiliation. Christian faith followers PLWHA were found to have the higher global physical health-related quality of life score in contrast to the remaining faith groups, Muslim [β= 0.9, 95% CI: 1.4, 4.5, p= 0.001]. Religion was found to be associated with health-related quality of life among PLWHA on combination antiretroviral therapy in Addis Ababa (Mekuria et al 2015:6), as well. A similar study undertaken on health-related quality of life among HIV positive individuals in Brazil found that religion was among factors associated with health-related quality of life (Oliveira, Moura, Araújo & Andrade 2016: 513).

5.3.4.1.3 Household effective dependency

The current study reveals that higher household effective dependency ratio is associated with the lowest physical health-related summary score [β= -0.35, 95% CI: 0.52, 0.97, p= 0.03]. Comparable to this study, a cross-sectional study conducted at Udupi District, Southern India, on psychosocial determinants of health-related quality of life of people living with HIV and AIDS on antiretroviral therapy, Southern India, showed that household dependency was associated with HRQoL (Peter, Kamath, Andrews, & Hegde 2014: 207). Also, cross-sectional study conducted in the UK, which measured health and health-related behaviours in individuals living with HIV, has shown that people living with HIV have significantly lower HRQoL than the general population regardless of being virologically and immunologically stable (Miners, Phillips, Kreif, Rodger, Speakman, Fisher, Anderson, Collins, Hart, Sherr, Lampe & for the ASTRA [Antiretrovirals, Sexual Transmission Risk and Attitudes] 2014:37). Such lower HRQoL was found to be higher among those household who has children. From this study by Miners et al (2014:37), it is evident that household dependency is one of the contributing factors for poor HRQoL as lower HRQoL was pronounced among those who have children and living with HIV.

5.3.4.1.4 Malnutrition

Unlike other studies, body mass index, an indicator of nutrition is slightly related to physical health-related quality of life, even during the bivariate logistic regression analysis [β= 0.097, 95% CI: -0.007, 0.56, p= 0.056]. To exemplify, a study in Addis Ababa, Ethiopia, by Mekuria et al (2015:6) has shown that lower BMI (malnutrition) is associated affecting the quality of life among PLWHA. Thus, the researcher recommended interventions that improve HRQoL to focus on enhancing food security and job opportunity. Nutrition and HRQoL are hypothesized to be associated with nutrition, mental health and behavioral pathways conceptual framework (Ivers 2015:26). Malnutrition weakens the immune system and may lead to an increased rate of progression through compromised physical health. Optimal nutrition is found to maximise the period of asymptomatic infection, to mount an effective immune response to fight opportunistic infections, and to optimize the benefits of ART (Thapa et al

2015:8; Tesfaye et al 2016:4). HIV infection has long been associated with wasting syndrome, and being underweight with HIV can compromise the physical health-related quality of life through malnutrition and HIV vicious cycle mechanism (Mekuria et al 2015:5; Kenea et al 2015:96; Sicotte et al 2014:6; Berhe et al 2013:8; Hailemariam et al 2013:5).

5.3.4.1.5 Food insecurity

In this study, food insecurity is found to envisage physical health-related quality of life. The food insecure PLWHA were found to have the lower physical health-related quality of life in bivariate and consequent multivariate analysis [β= -0.35, 95% CI: 0.52, 0.97, p= 0.03]. There are similar studies that found food insecurity mediating poor PHS score in the case of PLWHA. For illustration, a longitudinal community-based research study in Canada, one of the first to establish a longitudinal negative relationship between food insecurity and HRQoL among adults living with HIV in North America (Choi, Fielden, Globerman, Koornstra, Hambly, Walker, Sobota, O'Brien-Teengs, Watson, Bekele, Greene, Tucker, Hwang, Rourke, & The Positive Spaces Healthy Places Team 2015:1186), found that food insecurity is consistently associated with poor physical health scores. From this finding, one can conclude that the relationship between food insecurity and HIV is complex, and how food insecurity impacts physical functional health-related quality of life may be both indirect and direct. For example, both food insecurity and HIV infection lead to a gradual decline in immunity that may result in lower global physical health summary scores. Weiser, Gupta, Tsai, Frongillo, Grede, Kumbakumba, Kawuma, Hunt, Martin, and Bangsberg (2012:6) pronounced that food insecurity was found to be associated with worse physical health-related quality of life. Thus, food assistance for food insecure PLWHA can significantly increase the physical health scores and reported to positively increase the physical health-related quality of life of PLWHA in Ugandan setup (Maluccio et al 2015:12).

5.3.4.1.6 Duration of ART initiation

This study revealed that treatment duration predicts the quality of life in PLWHA. For example, this study found as time goes-up with ART, the physical health-related quality of life of the PLWHA augmented. Staying on ART for more than 5 years were found to demonstrate the highest PHS score [β= 0.93, 95% CI: 0.58, 5.5, p= 0.045]. Analogues to this study, a study on health-related quality of life of people with HIV in Zambia and South Africa, showed that the longer PLWHA stay on ART, the more they found to be asymptomatic for HIV and the more they become health and wellbeing (Donald 2017:1058). According to Donald, those PLWHA who stayed on ART for a longer duration has the higher physical health-related quality of life. Another study in the same country, Zambia and South Africa, by Thomas, Burger, Harper, Kanema, Mwenge, Vanqa, Bell-Mandla, Smith, Floyd, Bock, Ayles, Beyers, Donnell, Fidler, Hayes, and Hauck, on behalf of the HPTN 071 (PopART) Study Team (2017:1138) documented that the physical health-related quality of life scores of PLWHA did not differ significantly between individuals who had initiated ART for more than 5 years previously and HIV-negative individuals. Thus, it is strongly recommended to initiate ART as soon as the PHS score of PLWHA improves with the duration of ART gets elongated.

5.3.4.2 The mental health-related quality of life

Mental health-related quality of life is the mental health measurement of well-being and reflect individuals' assessments of the impact of their mental health on their social participation within their current environment. The result of bivariate and subsequent analysis of this study reveals, MHS score is associated with malnutrition (lower BMI), food insecurity, and CD4 cell count below 350 cell/mm^3.

5.3.4.2.1 Malnutrition

The bivariate OLS analysis has revealed a strong association between MHS score and malnutrition. Lower BMI score, that is, malnutrition is strongly associated with lower MHS score [β= 0.09, 95% CI: 1.02, 1.2, p= 0.009]. But

subsequent multivariate analysis has not maintained the association between mental health summary score and BMI. A similar study in South West of Ethiopia designated lower body mass index is strongly associated with quality of life among PLWHA (Tesfaye et al 2016:5). Malnutrition was found to strongly associated with mental health problems, affecting mental health-related quality of life among PLWHA (Weldehaweria et al 2017: 8). According to Weldehaweria et al (2016:5), of the people living with HIV enrolled in ART and who were depressed, the risk of malnutrition was almost three-fold higher compared to their undepressed counterparts. As a result of depression, PLWHA has most likely opted to interrupt their treatments that consequently result in a vicious cycle of HIV and malnutrition. There are well established scientific evidence on the impact of malnutrition on PLWHA interrupting their treatments and follow-up which subsequently has resulted in becoming sick with an opportunistic infection and found to have a poorer quality of life (Ford et al 2016:3; Kenea et al 2015: 96; Pal & Srivastav 2012:98).

5.3.4.2.2 Food insecurity

This study revealed that food insecurity is strongly evidenced to be associated with HRQoL among peoples living with HIV in the study area. Both bivariate logistic regression analysis [β= -0.5, 95% CI: 0.56, 0.7, p=0.000], and subsequent multivariate logistic regression analysis [β= -0.44, 95% CI: 0.56, 0.75, p=0.000], showed that lowest global mental health score is found to be strongly associated with food insecurity. Equally, another study on the quality of life among food insecure PLWHA found that mental health problems such as major depression are strongly associated with food insecurity, negatively impacts the mental health and quality of life (Tolassa et al 2015:14). A longitudinal community-based research study in Canada also found that food insecurity was associated with poor mental health scores (Choi et al 2015:1186).

There are also scientific studies which indicated that food insecurity is associated with mental health problems (Salvo et al 2016:94). In Southern India, a study aimed at determining the relationship between food insecurity and psychological well-being of people living with HIV indicated that poorer

quality of life is associated with food insecurity (Heylen et al 2015:7). According to Heylen et al (2015:7), food insecure PLWHA has had the lowest mental health score. Consequently, the researcher recommended nutritional support to reduce food insecurity. However, a study conducted in Uganda found that food assistance to food insecure PLWHA was not found to increase the mental health score (Maluccio et al 2015:12). Mental health problems such as major depression were strongly associated with food insecurity. Food insecurity negatively impacts on the mental health quality of life of PLWHA (Tolassa et al 2015:14). A scientific review undertaken by Rivera-Rivera, Vázquez-Santiago, Albino, Sánchez, and Rivera-Amil (2016:5), has discovered that the mental health and quality of life due to symptoms associated with mental health problems such as depression, were found to affect mental health-related quality of life in those people living with HIV. According to Rivera-Rivera et al (2016:5), depression accelerates disease progression of HIV to AIDS, which can affect their appetite, food security status and eventually results in lower quality of life in general.

5.3.4.2.3 CD4 cell count

This study found that CD4 count is associated with mental health-related quality of life. It is found that CD4 count of < 350 cell/mm3 is found to be predictors of poor mental health during bivariate [β= -0.9, 95% CI: 0.25, 0.65, p=0.000],] and subsequent multivariate analysis [β= -0.6, 95% CI: 0.32, 0.95, p=0.032]. A study in rural South Africa (Igumbor, Stewart & Holzemer 2013:28), has also shown that the quality of life tended to increase with an increase in the CD4 cell count. Similar to this study, a study conducted by Emuren et al (2017: 8) has shown that lower MHS score is associated with CD4 count. Also, study at Chiang Mai University Hospital, Thailand, exposed that CD4 count was found to be independently associated with health-related quality of life scores among PLWHA (Aurpibul, Oberdorfer, Choeyprasert & Louthrenoo 2016:235). A study in the UK, revealed people living with HIV have significantly lower HRQoL than do the general population (Miners et al 2014:38), irrespective of that most HIV positive individuals are virologically and immunologically stable.

Analogous to this finding, studies in Bangladesh (Imam et 2011: 4) has shown that CD4 count is associated with HRQoL among people living HIV. A study

conducted in Southern Brazil (Passos & Souza 2015: 807). On evaluating the quality of life and its determinants among people living with HIV/AIDS, and in Nigeria (Akinboro, Akinyemi, Olaitan, Raji, Popoola, Awoyemi, Ayodele 2014: 4) has shown that a CD4+ cell count less than 350 was associated with poorer HRQoL. On the contrary, a study on health-related quality of life and associated factors in people with HIV in an Irish cohort, have shown that CD4 count was not independently associated with mental health-related quality of life (George, Bergin, Clarke, Courtney & Codd 2016:8). Another study in the USA on health-related quality of life and psychosocial correlates among HIV-infected adolescent, and young adult women demonstrated that CD4 counts were not significantly associated with mental health-related quality of life (Andrinopoulos, Clum, Murphy, Harper, Perez, Xu, Cunningham, Ellen 2011: 6). Similarly, no association was found between CD4+ counts and QoL in Taiwanese PLWHA (Feng, Feng, Yu, Chen, Yang, Shih, & Lu 2015: 490).

5.3.5 The status of people living with HIV and AIDS with regard to access to nutritious food: the household dietary diversity status

Dietary diversifications are interventions that change food consumption at the household level, such as increasing the consumption of animal-source foods and increasing the variety and quantity of micronutrient-rich foods to decrease micronutrient deficiencies (the Strengthening Partnerships, Results, Innovation in Nutrition Globally-[SPRING] 2018:1). Whereas, the household dietary diversity score is meant to reflect, in a snapshot form, the economic ability of a household to access a variety of foods (Kennedy et al 2011:5). For this study, dietary diversity was considered adequate when the diversity score is 9 or above, and inadequate when the diversity score is below 9. Bivariate analysis and subsequent multivariate analysis using robust backward elimination with four models were used to determine the status of PLWHA with access to a nutritious diet based on basic socio-economic and clinical factors.

The findings of this study outlined that the mean household dietary diversity score of the participants was 7.5 with a standard deviation of 2.3. The majority of the respondents, 66.7% (n=260) study participants were feeding on inadequately diversified diet while, 33.3% (n=130) were feeding on an adequately diversified diet. The bivariate analysis also found that access to a

diversified diet varies with various parameters of the study. For example, poor dietary diversity is strongly prevalent among those PLWHA who has never been to school (p=0.006), widowed marital status (p=0.001), urban residence (p=0.027), higher household effective dependency (p=0.003), lack of employment (p=0.000), lower body mass index (p=0.000), food insecurity (p=0.000), poor household asset possession (p=0.000), sub-optimal ART adherence (p=0.000), CD4 count below 350 Cell/mm^3 (p=0.00), and frequent episodes of opportunistic infections (p=0.000). However, the result of multivariate analysis using backward elimination method showed that only two variables were found to vary the access to nutritious diet among PLWHA. These includes: food insecurity [β= -0.4, 95% CI: -0.5, -0.3, p<0.001], and poor asset possession [β= -0.3, 95% CI: -0.96, -0.56, p<0.001].

5.3.5.1 Factors for dietary diversity among peoples living with HIV and AIDS

This sub-section highlights malnutrition, food insecurity and asset possession as some of the factors for dietary diversity among peoples living with HIV and AIDS.

5.3.5.1.1 Malnutrition

In this study, the result of bivariate OLS has shown that malnutrition strongly predicts the inadequate diversified diet in those living with HIV [β= 0.2, 95% CI: 0.10, 0.25, p=0.000]. This association was not maintained during multivariate analysis. Comparable to this study, a study in Jimma University Specialized Hospital, South West, Ethiopia, unveiled that lower dietary diversity is associated with malnutrition while respondents with high dietary diversity were less likely to have malnutrition (Teshome, Gissa, Tefera, & Lema 2017:70). Another study directed on malnutrition and associated factors among adult receiving ART in Health Facilities of Hosanna town, Southern Ethiopia, reported that inadequate diversified diet independently associated with malnutrition (Asnakew et al 2015:9). Thus, it is evident that nutritional interventions supplemented behaviours directed at improving the dietary diversity and pattern of PLWHA is strongly recommended.

5.3.5.1.2 Food insecurity

According to the finding of this study, inadequately diversified diet is predominantly common among food insecure PLWHA [β= -0.4, 95% CI: -0.5, -0.3, p=0.000]. Similar studies have shown that dietary diversity and food insecurity are strongly intertwined among PLWHA. These findings are similar to other findings, both nationally conducted studies and abroad. For instances in Ethiopia, the study conducted by Gedle et al (2015:5) at Butajira Hospital, Southern Ethiopia, Tiyou et al (2012:5) in Jimma, southwest of the country; Woldemariam et al (2015:5) in Mettema, North West of Ethiopia; Tolasa et al (2015:11) in Fitche Zonal Hospital, Ethiopia; and abroad by researchers such as: Semali et al (2011:6) in Tanzania; Sirotin et al (2012:3) in Rwanda were among front studies demonstrating the strong association of dietary diversity and food insecurity among PLWHA that needs strong policy and programme interventions. According to FAO (2018:1), nutritional care and support promote well-being, self-esteem and a positive attitude to life for people and their families living with HIV. FAO (2018:1) outlined that nutritional care and support with adequately diversified food improves the quality of life of people living with HIV. This happens because of the maintenance of body weight and strength; replacement of lost vitamins and minerals; improved function of the immune system and the body's ability to fight infection. There is also an extension of the period from infection to the development of the AIDS disease; improved response to treatment; reduction of time and money spent on health care; keeping HIV-infected people active, allowing them to take care of themselves, their family and children; and keeping HIV-infected people productive, able to work, grow food and contribute to the income of their families.

5.3.5.1.3 Asset Possession

The study investigated predictors of dietary diversity from different perspective among which asset possession as measured by wealth index score is one. There is a difference in their mean wealth index between household who feed on adequately diversified diets (M=-0.5, SD=0.88) and those not diversified in binary analysis, t(388)=-7.8, p=0.000, and consequent multivariate regression

analysis [β= -0.3, 95% CI: -0.96, -0.56, p=0.000]. This study found that poor asset possession is positively interrelated with inadequate diversified diet, while asset passion was a predictor of good dietary diversity. This finding is similar to the other study conducted by Woldemariam et al (2015:4) which has shown that inadequate dietary diversity is associated with wealth quintals. Those PLWHA who possess the least asset were positively associated with inadequate dietary diversity. This could be as a result of poor dietary habit and poor household food security status of HIV positive adults. Thus, livelihood and food security interventions could form the core part of the HIV response.

5.3.6 To explore people living with HIV and AIDS's coping strategies for malnutrition and food insecurity

Coping strategy index is considered a proxy indicator of the food access component of food security and it is designed based on a specific set of food consumption patterns as set by Maxwell and Caldwell (2008: 8), each with its universal severity weighting score. Household food insecurity coping strategies are typically context-specific and can be food and non-food based (Hadley & Crooks 2012: 77). Consequently, this study considered coping strategies for food aspects.

The study found that 60% (n=235) and 76% (n=296) of the PLWHA were malnourished and food insecure respectively. As a result, determining how people living with HIV in the region cope with the negative impact of malnutrition and food insecurity is so vital. The study explored the PLWHA's coping strategies for malnutrition and food insecurity, and found that CSI is positively associated with overall household food insecurity (r= 0.67, p = 0.000). Which means PLWHA develop coping strategy towards food insecurity; inversely correlated with malnutrition (r= -0.2, p<0.0001) and dietary diversity of the study participants (r = −0.29, p<0.0001), that is, the coping strategies were developed to minimise the impacts of food insecurity by prone to malnutrition in feeding on inadequate diversified diet.

The CSI was negatively associated with consumption of vegetables, meat, eggs; pulses, legumes, nuts; milk, milk products, sweets and condiments. It is

to be meant that PLWHA prohibits themselves from feeding on such enlisted foods to cope-up with food insecurity. As a result of profound co-existence of malnutrition and food insecurity with PLWHA in the region, PLWHA adopt different coping strategies to minimize the impact of malnutrition and food insecurity. The coping strategies include (i) dietary change practices such as relying on less preferred foods; (ii) short-term measures to increase household food availability behaviours such as borrowing food, or relying on help from a friend or relative, purchasing food on credit, gathering unusual types or amounts of wild food/hunt, harvesting immature crops (e.g. green maize), and relying on casual labour for food; (iii) short-term measures to decrease numbers of people to feed by sending household members to eat elsewhere and sending household members to beg; (iv) by rationing, or managing the shortfall through limiting food portion size at mealtimes, restricting consumption by adults for small children to eat, reducing number of meals eaten in a day and skipping entire days without eating food.

These findings were similar to a study conducted in Ghana (Laar et al 2015:7), where PLWHA engage in various coping strategies such as skipping an entire day's meal, reducing portion sizes, harvesting immature crops, and begging. Food insecure pregnant women in rural areas of Northern Ghana also employed coping strategies such as limiting portion sizes at meal times at least one day in a week, a commonly practiced strategy; borrowing money to buy food and receiving foods from family members, relatives and friends (Saaka, Oladele, Larbi & Hoeschle-Zeledon 2017:1158). Equally, a cross-sectional study in a Subdivision of Darjeeling District, West Bengal, India, has shown that food insecure PLWHA adopt several coping strategies to deal with food insecurity including borrowing money, loans from microfinance institutions, banks, or money lenders, borrowing food, or selling agricultural products (Dasgupta et al 2016: 245). There is also a study in Dar es Salaam, Tanzania, on food insecurity and coping strategies among people living with HIV, which found PLWHA adopt borrowing money and taking less preferred foods as commonest coping strategies (Semali et al 2011:6). A study by Zekeri (2016:3) on food insecurity and coping strategies among African American women living with HIV/AIDS and on antiretroviral therapy in rural Alabama found that most of the women were food insecure and used numerous strategies to cope including

receiving food from food banks, supplemental nutrition assistance program, receiving food from family members and friends, making cheaper meals, food from churches, and reducing the amount of food cooked for meals. To conclude, malnutrition and food insecurity is a barrier to medication adherence, HRQoL and even for survival. As a result, addressing food insecurity should be a significant aspect in HIV/AIDS treatment and prevention programs to attain the 90-90-90 global treatment target to help end the HIV epidemic.

5.3.7 Perspective and experience of senior health experts' on integrating nutrition and food security with HIV prevention, treatment, and care

The following factors were pointed out while studying the perspectives and experience of senior health experts: factors affecting treatment outcome, factors surrounding the quality of life of PLWHA, and programmatic consideration for integration.

5.3.7.1 Factors affecting treatment outcome of peoples living with HIV: senior health experts' perspective

This study found that health care providers related factors such as poor capacity on the provision of targeted nutrition counselling was found affecting the treatment outcome of peoples living with HIV and AIDS in the region. Similar study conducted from health care providers' perspectives in Southern Malawi, reveals that health care providers related factors such as feeling busy caused them to overwork and turn patients away and ask them to come back another time (McKinney, Modeste, Lee, Gleason & Maynard-Tucker 2014:4), thus affected the treatment outcome.

In this study, health system related factors such as high staff turnover, lack of viral and CD4 analysis laboratories and inconsistent ART medication supply were also disclosed affecting the treatment outcome of PLWHA. A similar study in Kabwe District, Zambia (Mukumbang, Mwale & van Wyk 2017:7) has shown that health system related factors such as shortage of third-line drugs, inadequate space in the clinic, long waiting times, and long travel distances

were among the barriers to retention in care and thus affected treatment outcome.

This study also found that malnutrition and food insecurity as a result of poor socio-economic status were abating the treatment outcome of PLWHA in the region. This was also found in the result of the quantitative part of this study. Food shortages were reported as barriers to achieving the required maximum treatment outcome in Zambia (Mukumbang et al 2017:7). There are also several studies that have established nutrition and food insecurity as critical barriers to achieved optimal treatment outcome among peoples living with HIV and AIDS. To outline a few, Weldehaweria et al (2017:9), Audain et al (2015: 523), Berhe et al (2013:5) disclosed the effect of malnutrition on achieving optimal treatment outcome; while, Pellowski et al (2016: 849), Kalichman et al (2014:7), Young et al (2014:5), Palar et al (2012:2379) has unveiled food insecurity as barriers to achieving optimal treatment outcome. Thus, nutritional/food supplementation was found to help in improving adherence and improve treatment outcome (McKinney et al 2014:5).

Poor treatment outcome is also revealed to be related to factors related to peoples living with HIV themselves. PLWHA misses their treatment and appointment dates and times due to lack of adequate knowledge on the importance of good adherence and outcome of poor adherence. Similar study in Debre Markos Referral Hospital designated that factors for poor treatment outcomes, such as forgot to take the pills, felt sleep, too many pills to take at the same time, and the feeling that the drugs were too toxic (harmful), need to avoid side effects were the main problems associated to poor treatment outcome (Asmare, Aychiluhem, Ayana & Jara 2014:123). A similar study conducted in Lagos, Nigeria found that PLWHA related factors were contributed to poor treatment adherence (Nduaguba, Soremekun, Olugbake & Barner 2017:741). According to Nduaguba et al (2017:741), PLWHA related barriers were forgetfulness, running out of medication, alcohol use, and medication side effects, thus employing strategies to overcome such barriers were recommended. Another study in Kabwe District, Zambia, was also found that PLWHA related factors such as discontinuing medication due to side effects, as a result of gaining weight, belief in faith healing, and use of herbal

remedies and alcohol use were found as barriers to treatment outcome (Mukumbanget al 2017:7). A mixed method study in Nepal revealed that PLWHA related factors such as lack of knowledge and negative perception towards ART medications were significantly affected non-adherence to their treatment (Wasti, Simkhada, Randall, Freeman & van Teijlingen 2012:5).

5.3.7.2 Factors determining the quality of life of peoples living with HIV and AIDS: perspectives from senior health experts

According to senior health experts' perspectives, QOL is the general well-being of PLWHA including everything from physical health, family to mental health. They ascertained poor QOL is associated with poor ART adherence, delay in HIV testing, poverty, and food insecurity. This result is very similar to the findings of the quantitative part of this study. Lower HRQoL is strongly associated with lower HRQoL (Mekuria et al 2015:6) and poor adherence to treatment (Arjun, Unnikrishnan, Ramapuram, Thapar, Mithra, Kumar, Madi, Kulkarni, Holla & Darshan 2017:250). But, higher HRQoL was found with higher socio-economic status (Nobre, Pereira, Roine, Sintonen & Sutinen 2017:4; Arjun et al 2017:250).

5.3.7.3 Programmatic consideration for the integration of nutrition and food security with HIV prevention, treatment, and care: senior health experts' perspectives

It was found that establishing a cordial working relationship with stakeholders, provision of training and capacity building for health professionals and programme managers and financing the nutrition and food security programme was supporting programme integration. Similarly, UNICEF expounded that integrated programmes require building effective partnerships to leverage resources and action in programmatic design, and support the generation, dissemination, and utilization of knowledge by staff and partners (UNICEF 2013:16). From this study, it was recommended that integrating nutrition and food security with HIV prevention, treatment and care also entails strengthening accountability and leadership, and adopting nutrition sensitive intervention approach across multisector. Similarly, it is elucidated that integrated high

impact HIV programme requires working across multisector to integrate HIV responses and achieve synergies with broader development programming that impacts on HIV vulnerability. Accordingly, achieving maximal HIV/AIDS response envisions the multisectoral approach, and establishing a good partnership (UNICEF 2013:9). The programme development follows a triangulation approach: mixing quantitative and qualitative findings. It will be discussed in detail in the next chapter, Chapter 6.

5.4 CONCLUSION

This chapter discussed and interpreted the findings of the study in line with the research questions the study purposed to answer. The discussions were conducted in relation to the available current scientific evidence aligned with the objectives of the study. The next chapter, Chapter 6, will discuss the development of a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment, and care.

CHAPTER 6

DEVELOPMENT OF A SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE

6.1 INTRODUCTION

This chapter presents phase 3 of the study which is aimed at developing a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care. The development of support programme is based on the triangulated findings of quantitative (phase 1), and qualitative (phase 2) of the study, relevant aspects of literature, the insight of the researcher, and the theoretical framework used for this purpose.

Program development aims to deliver a clear, well thought out and deliverable pipeline of initiatives over a given horizon taking into consideration a broad range of constraints (Australian transport assessment and planning 2016:1). The development of support programme was based on the WHO's people-centred and integrated health services conceptual framework (WHO 2015a:13) to help map the programme development between the different parts of the health ecosystem that provides the context for people-centred and integrated health services. Based on this conceptual framework, the deductive and inductive reasoning were positioned to combine facts found in relation to nutrition and food security and experience of the senior health experts. Deductive reasoning was used to conclude the initial set of the premises of a phenomenon based on the framework, while inductive reasoning, draws a conclusion based on observed evidence (Bhattacherjee 2012:4). Inductive reasoning is the process of reasoning from detailed facts, progressing to the more general picture (Sloan & Bowe 2014:10). The syntheses were repeated back and forth of deductive and inductive reasoning of the findings.

The role of nutrition and food security on treatment outcome and quality of life and determinants of malnutrition and food insecurity among PLWHA were

quantitatively investigated. Whereas, senior health experts' perspective and experience on integrating nutrition and food security with HIV prevention, treatment and care were qualitatively explored. Following the result of the study, quantitative findings from the PWHA and qualitative findings from senior health experts were combined. Consequently, the mixed evidence were synthesized. This approach, synthesizing the qualitative and quantitative data findings from a different set of populations assist the programme in taking advantage of both qualitative and quantitative approaches and getting a full picture from the problem-solution perspectives. Figure 6.1 below depicts the steps followed when developing the support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment, and care.

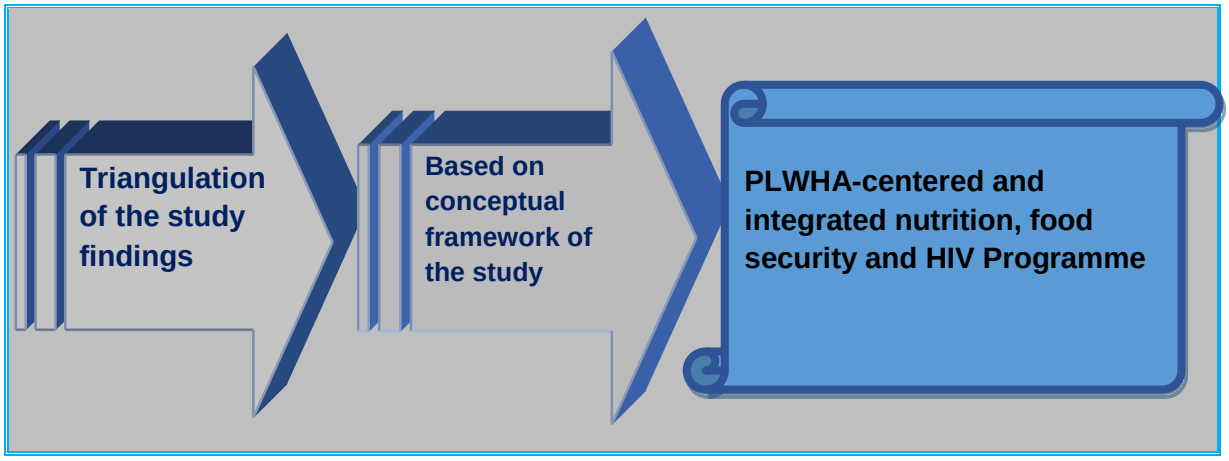

Figure 6.1 Schematic diagram of programme development for the integration of nutrition and food security with HIV prevention, treatment, and care

6.2 TRIANGULATED FINDINGS

The study approach was a mixed method, starting with quantitative strand followed by qualitative strand. The quantitative findings were from the PLWHA in Benishangul Gumuz Region, Ethiopia, while the qualitative part employed senior health experts in the same region using focus group discussion.

The study showed a higher prevalence of malnutrition 60% (n=234) among PLWHA in the region. The determinants of malnutrition among PLWHA living in

the region were female, living in an urban area, earning lower income, use of spring or open source water for drinking, lack of toilet facility and consequent use of open defecation, household food insecurity, poor asset possession, and shorter ART duration, i.e., being on ART for less than a year. Also, educational status, household dependency ratio, lack of employment, suboptimal ART adherence and recurrent episodes of opportunistic infections were also found to be predictors of malnutrition with PLWHA, to some extent.

In this study, higher proportion of food insecurity 67% (n= 296) is evident. The study predictors of food insecurity were found to be an urban residence, lack of employment, higher household effective dependency, inadequate diversified diet, poor asset possession, sub-optimal ART adherence, and recurrent episodes of opportunistic infection. The following determinants were also found to be associated with food insecurity: lower education level and marital status-those widowed partners experienced higher food insecurity.

The study found that the majority of the study participants, 66.7% (n=260) were feed on an inadequately diversified diet, while only 33.3% (n=130) were feed on an adequately diversified diet. Thus, it was found that the lack of adequate access to sufficient, safe and nutritious food is mainly associated with food insecurity and poor asset possession. The following factors were also found affecting the dietary diversity of the PLWHA: never been to school, being widowed, living in urban area, higher household effective dependency, lack of employment, malnutrition, sub-optimal ART adherence, CD4 count below 350 cell/mm^3 and frequent episodes of opportunistic infections were among least contributing factors for PLWHA to unable to access sufficient, safe and nutritious foods.

This study found malnutrition and food insecurity as strong predictors of suboptimal ART adherence. This was also explored during FGD with senior health experts. The senior health experts reiterated malnutrition and food insecurity is among the factors affecting ART adherence of the people living with HIV in the Benishangul Gumuz Region. Sub-optimal ART Adherence was also found to be strongly associated with lower educational status, i.e., those who never been to school, primary level, and secondary education level while

those who attended college/university level education were found to have optimal ART adherence. Senior health experts described the factors affecting ART adherence as i) healthcare workers related: poor capacity of ART service providers and high staff turnover; ii) health system issues: lack of infrastructures such as viral and CD4 analysis laboratories and inconsistent ART medication supply; 3) socio-economic status: malnutrition and food insecurity; 4) PLWHA related factors: lack of adequate knowledge, and missed treatment and appointment.

The study found the lowest PHS score is associated with marital status, i.e., those PLWHA who were divorced and widowed were found to have the lowest physical health-related quality of life scores. Married PLWHA were among those who have higher physical health score and thus marriage support improvement in physical health quality of life. The lower MHS score is also associated with higher household dependency, food insecurity, and shorter duration on ART. Likewise, religious affiliation, Christian faith follower PLWHA were found to have higher PHS score in contrast to the remaining faith groups, the Muslims. On the other hand, lower MHS score is strongly associated with food insecurity and CD4 cell count below 350 cell/mm^3, and to some extent with malnutrition. The qualitative findings indicated that factors surrounding the quality of life of PLWHA include (1) Healthcare workers related: poor ART adherence counselling and delay in HIV testing; (2) socio-economic status: poverty and food insecurity; (3) PLWHA related factors: poor ART adherence, deteriorated health, and lack of knowledge on the benefit of early HIV test.

As a result of higher prevalence of malnutrition and food insecurity in the study area, PLWHA developed the following coping strategies: (i) dietary change practices such as relying on less preferred foods; (ii) short-term measures to increase household food availability behaviours such as borrow food, or rely on help from a friend or relative, purchase food on credit, gather unusual types or amounts of wild food/hunt, harvest immature crops (e.g. green maize), and rely on casual labour for food; (iii) short-term measures to decrease numbers of people to feed by sending household members to eat elsewhere and sending household members to beg; (iv) by rationing, or managing the shortfall through limiting food portion size at mealtimes, restricting consumption by adults for

small children to eat, reducing number of meals eaten in a day and skipping entire days without eating food.

6.3 PEOPLE-CENTRED AND INTEGRATED HEALTH SERVICES CONCEPTUAL FRAMEWORK

This section of the chapter explains the background, the rationale, purpose, and strategic approach of the conceptual framework.

6.3.1 Background

People-centred and integrated health services (PIHS) conceptual framework were developed by WHO to help in creating the relationship between the different parts of the health network that provides the context for people-centred and integrated health services (WHO 2015a:13). Future Health Systems (2018:1) describes people-centred and integrated health services framework as a fundamental shift in the way health services are funded, managed and delivered as it supports countries' progress towards universal health coverage by shifting away from health systems designed around diseases and health institutions towards health systems designed for people.

According to WHO (2018:1), people-centred health services is an approach to care that consciously adopts the perspectives of individuals, families, and communities, and sees them as participants as well as beneficiaries of trusted health systems that respond to their needs and preferences in humane and holistic ways. It includes integrated health services that are managed and delivered in a way which ensures that people receive a continuum of health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation, and palliative care services. The care is provided at different levels and sites of care within the health system, and according to their needs, throughout their whole life. People-centred and integrated health services are aimed at improving health equity if social determinants of health and health benefits of all policies are considered. Integration for the basis for approach across sectors might be organizational, structural, budgetary or administrative nature. EuroHealthNet (2017:[1]) further elucidate the people-centred and

Integrated Health Services as a range of public services and users work in context to reach efficient coordination and improve outcomes. People-centred integrated care is globally considered a vital strategy to reform healthcare systems (WHO 2018:1). The main goal of people-centred care is to achieve optimal experience and quality of care, quality of life, and positive health outcomes (United States Agency for International Development [USAID] 2014:2).

6.3.2 Rational

The National Nutrition Programme (FMOH 2015:34) reiterates the government's commitment to strive towards equitable and sustainable multisectoral actions to realize optimal nutritional status for all Ethiopians and to end hunger by 2030 through emphasising that the high malnutrition rate in Ethiopia is completely unacceptable. As a result, the FMOH adopted implementation of nutrition-specific and nutrition-sensitive interventions across sectors including the mitigation of the malnutrition impacts in the prevention and management of chronic communicable diseases including HIV and AIDS. However, there are gaps in the programme specifics on nutrition interventions in the country (Kennedy, Fekadu, Ghosh, Baral, Davis, Sapkota & Webb 2016:122). According to Kennedy et al (2016:122), despite the high level of enthusiasm to be a champion and keep nutrition plans alive through designing and implementing a multi-sector plan for nutrition, there are challenges in this regard. These include: lack of more specificity in the roles of agencies/individuals in program implementation, committed leadership, effective mechanisms for linking national to subnational officials, methods for creating awareness of the plans, and dedicated line item in the budgets. Moreover, the NNP is designed around diseases, that is around chronic communicable diseases including HIV and AIDS, not around people. NNP does not address the food security components, and also institution based.

This study found compelling evidence on the higher prevalence of malnutrition and food insecurity which is much higher than the studied national data set. For instances, the national prevalence of malnutrition was reported to be 30% and food insecurity 27% (Kennedy et al 2016:117). On the other hand, the current

study found the prevalence of malnutrition and food insecurity among PLWHA to be much higher than the rest of the population in the country, that is, 60% of the PLWHA were malnourished while 67% of them were found to be food insecure. This high rate of food insecurity and malnutrition significantly affect the treatment outcome and quality of life of the PLWHA in the region. Consequently, PLWHA were engaged and developed negative coping strategies to withstand the dire outcomes of malnutrition and food insecurity. To avert the situation, an integrated and PLWHA-centred nutrition and food security programme development and intervention was an option. Thus, the people-centred and integrated health services conceptual framework supports programme design towards universal health coverage by shifting away from health systems designed around diseases, in this case, HIV/AIDS, and health institutions towards health systems designed for people, that is, an integrated nutrition and food security programme tailored for PLWHA. The findings of this study show the importance and calls for people-centred and integrated nutrition and food security programmes and services aligned with NNP.

6.3.4 Purpose

The primary purpose of the proposed conceptual framework is to help develop nutrition and food security programme integrated with HIV prevention, treatment, and care. As such it will help in the improvement of the treatment outcome and quality of life.

6.3.5 Core principles

The WHO (2015a:10) sets and describes the goals and aspirations of these people-centred and integrated health service delivery to be grounded on a common set of principles. Accordingly, PLWHA-centred and integrated nutrition and food security programme comprise care that is:

- Comprehensive—offering care that is comprehensive and tailored to the evolving health care needs and aspirations of peoples living with HIV and AIDS and contributes to universal health coverage.
- Equitable—providing accessible nutrition and food support intervention that improves the quality of life and treatment outcome and equally serves every PLWHA across multisector.

- Sustainable—delivering integrated nutrition care and food support programme that is efficient, effective and contributes to sustainable development and improves the health and wellbeing of PLWHA.
- Coordinated—effectively coordinated across intersectoral and multisector.
- Continuous—the nutrition and food security programme development should be an evolving, targets all groups according to their health and HIV care needs and the service delivery should be implemented across life cycle, that is it encompasses pregnant women living HIV, new-born and adults according to their needs for service delivery.
- Holistic—ensuring the nutrition and food security programme focus on improving the physical, socioeconomic, mental and emotional well-being of PLWHA.
- Preventive—exploring the PLWHA-cented programme that contributes to tackling the social determinants of ill-health through action within and between sectors that promotes nutrition and food security for optimum health and wellbeing.
- Empowering—supporting PLWHA to manage and take responsibility for their own health through nutrition and food.
- Goal oriented—maximising the programme objectives to improve the treatment outcomes and quality of life of PLWHA.
- Respectful—implement the nutrition and food security programme implementation that maximises the PLWHA's dignity, social circumstances, and cultural values.
- Collaborative—supporting relationship-building across sectors and intra-sectors for integration of nutrition and food security intervention; collaborate for the promotion of optimal and nutritious food practice across primary, secondary and tertiary care, and with other sectors.
- Co-produced—engage and promote through active partnerships with PLWHA, family, and communities to co-produce their health through nutrition, food security and comprehensive HIV prevention, treatment and care.
- Endowed with rights and responsibilities—there should be an environment where all PLWHA should expect, exercise and respect during service delivery and acquisition.
- Governed through shared accountability– the multisectoral intervention of the programme specifics should be governed through accountability to deliver quality care for PLWHA, and improve their health outcomes.
- Evidence-informed—integrated and PLWHA-centred nutrition and food policies and strategies should have guided by the best available evidence and

supported over time through the assessment of measurable objectives for improving quality and outcomes.

- Led by whole-systems thinking—nutrition and food intervention programme envisages intersectoral collaboration, thus the health system has to consider it as a whole and tries to understand how its component parts interact with health service deliveries, and network with a health system that influence the programme and service delivery.
- Ethical—the PLWHA-centred nutrition and food security should optimise the risk-benefit ratio in all interventions, respects the individual's right to make autonomous and informed decisions, safeguards privacy, protects the most vulnerable and ensures the fair distribution of resources.

6.3.6 The context of the conceptual framework

The people-centered and integrated health service conceptual framework adopted the WHO's application of framework (WHO 2015a:13) in the following contexts:

- Individual PLWHA, families and communities at its centre, placed within nutrition and food security integrated with HIV prevention, treatment and care service delivery context that supports universal and equitable health services that can be delivered through integrated networks and linkages within the health sector, as well as direct inputs from communities within the context of the governance, financing and resources of the sector.
- Intersectoral action in tackling the malnutrition and food insecurity and the close collaboration that is required between health, social care, education and the wider range of local services that can all contribute to better health for PLWHA, families, and communities.
- Enabling policy environment that supports the implementation and promotes nutrition and food security programmes integration with HIV prevention, treatment, and care, that paves the way for universal health care and a commitment to equity, and encourages close collaboration between health and other sectors to improve health and wellbeing of PLWHA.
- Environmental context application- the integration of nutrition and food security with HIV prevention, treatment and care is aligned to NNP and

in accordance with national health and development policies and strategies.

6.3.7 Strategic approach of the framework

The framework proposes five interdependent strategic directions that need to be adopted in order for health service delivery to become more people-centred and integrated (WHO 2015a:20). These interdependent strategies were also designated by Mareš (2017:2); and EuroHealthNet (2015:1) that the PIHS transform health systems to provide services that are more people-centred and integrated. These strategic directions are: (i) empowering and engaging people living with HIV, family, and community; (ii) strengthening governance and accountability for integrated nutrition, food security and HIV prevention, treatment and care programmes; (iii) reorienting the model of care that is tailored according to with the nutrition and food support: (iv) coordinating the nutrition and food security programmes; (v) creating an enabling environment: policies, strategies and programmes that support integration of nutrition and food security with HIV prevention, treatment and care. These strategic directions are intended to have an influence at different levels, i.e., from the way services are delivered to PLWHA, families, and communities, to changes in the way organizations, care systems and policy-making operate. Figure 6.2 shows the interconnections between the strategic directions to support PIHS.

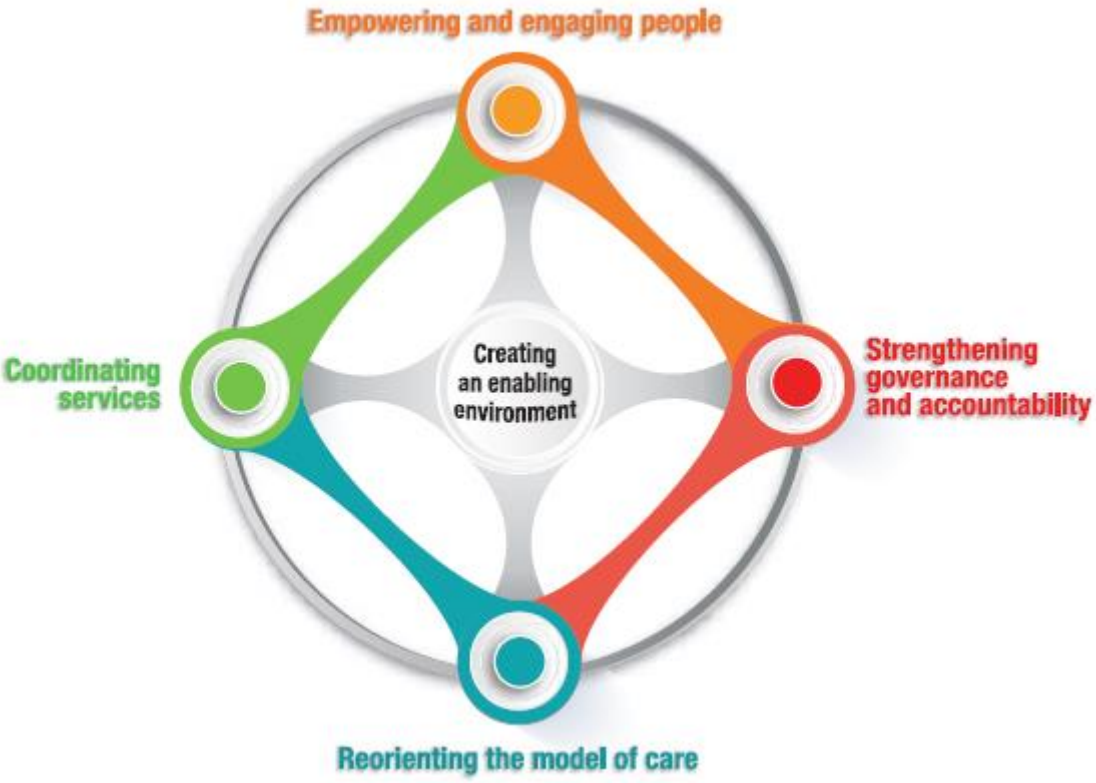

Figure 6.2 The interdependency of the five strategic directions to support people-centred and integrated health services

(WHO 2015a:20)

6.4 SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE

Based on the WHO's people-centred and integrated health services conceptual framework strategic direction and context, the support programme for integrating nutrition and food security with HIV prevention, treatment and care were evolved. The next paragraph discusses the phases of the programme development inline to the PIHS conceptual framework strategic direction and context:

6.4.1 Empowering and engaging people living with HIV, family and community to co-produce their health through nutrition and food security

Community
Family
Person

6.4.1.1 Rationale

Empowering and engaging people is providing the opportunity, skills, and resources that people need to be articulate and empowered users of health services to unlock community and individual resources for action at all levels (WHO 2015a:21). People, family, and community empowerment refer to the process of enabling communities to increase control over their lives (WHO 2018b:1). Empowerment is the process by which people gain control over the factors and decisions that shape their lives. Enabling implies that people cannot be empowered by others, nonetheless, they can only empower themselves by acquiring more of power's different forms (Laverack 2008 cited in WHO 2018b:1). Thus, empowerment assumes that people are their own assets, and the role of the external agent is to catalyse, facilitate or accompany the community in acquiring power.

Empowering and engaging people living with HIV is about providing the opportunity, skills, and resources to take individual and collective ownership of programmes in order to achieve the most effective HIV responses, and take concrete action to address malnutrition and food insecurity to their broader health. It is the process vesting an opportunity to unlock their potential, their household, and their community to become co-producers of food and nutrition security, and their health. WHO (2015b:5) pronounced that empowering and engaging communities will enable communities to voice their needs and so influence the way in which care is funded, planned and provided.

6.4.1.2 Actions

Empowering and engaging people living with HIV for co-production of their health, family, and community is a responsibility of every sector. It can be implemented by adopting common nutrition and food security indicators in an interconnected multisectoral approach. Programme specifics include:

- Empower, and engage PLWHA, their family and community through information, education, and communication to adapt or strengthen dietary

diversity and healthy eating habits and food preparation, as well as feeding patterns, including breastfeeding.

- Ensure the assistance of PLWHA and their household to enable and produce small-scale food by accessing technologies, inputs, capital goods, credit and markets across sectors such as agriculture, industry, health, etc.
- Ensure access to clean and safe water through the promotion of the use of household water treatment practices, safe and hygienic preparation and handling of food. Support and promote handwashing with soap; and the promotion of safe and clean household environments.
- Health education to help shape and inform the importance of nutrition and food for treatment adherence and enhancing quality of life.
- Co-produce healthy living lifestyles and nutrition promotion.
- Develop nutrition guideline and support tailor-made for PLWHA.
- Develop and promote community-based nutrition assessment, counselling and support programme.
- Advocate for mitigation and reduction of nutrition-specific harmful cultural practice.
- Monitoring, community engagement and support, and referral system.

6.4.2 Strengthening governance and accountability for quality nutrition and food security, and HIV Care

Governance, Financing & Resourcing

6.4.2.1 Rationale

Good governance is key to economic growth, social advancement, and overall development, and is particularly important for health systems where the poorest in society appear to have the least influence and are disproportionately affected by corruption (WHO 2015a:24). Governance and accountability for the provision of universal, equitable, PLWHA-centred and integrated nutrition and food security interventions involves policy dialogue, establishing good governance mechanism, accountability, and leadership. Thus, robust governance and accountability mechanisms are required to achieve coherent and integrated nutrition and food security programmes across HIV prevention, treatment, and care. In this regard, even though all associated multisector are

responsible, the FMOH have to be mandated for overall governance, coordination, accountability and resourcing the programme.

6.4.2.2 Actions

The following are the actions required:

- Promote the engagement and empowerment of PLWHA to participate actively and efficiently in strategic decisions that impact on the way nutrition and food security is resourced, planned and delivered.
- Compassionate and caring provider for delivering nutrition programme integrated with HIV.
- Community engagement to facilitate PLWHA empowerment for nutrition and food security intervention and targeting.
- Sustainable financing for nutrition and food security intervention through the healthcare system and across sectors.
- Fund and support multisectoral HIV programming that incorporates effective food and nutrition interventions as a way of reducing vulnerability to HIV infection and increasing resilience to AIDS and, malnutrition and food insecurity.

6.4.3 Reorienting the model of care for integrating Nutrition and food security with HIV response

Service delivery: networks, facilities & practitioners

6.4.3.1 Rationale

Reorienting the model of care means ensuring that efficient and effective health care services are purchased and provided through models of care that prioritize primary and community care services and the co-production of health (WHO 2015a:27). Thus PLWHA-centred and integrated nutrition and food security programme encompass the shift from inpatient clinical HIV/AIDS management to community-based HIV-health co-production. In this case, it is entailed care to focus on primary care, co-production of health through nutrition and food security in the form of holistic approach and integrated with HIV prevention, treatment and care mainly within health sector with sturdy referral system among service delivery networks.

6.4.3.2 Actions

The PLWHA-centred and integrated nutrition, food security and HIV in the health and across multisector services entail endorsement of an overarching goal of people-centred care aimed at achieving optimal experience and quality of care, quality of life, and positive treatment outcomes for PLWHA. Thus, the model of care have to focus on the principles of people-centred care (USAID 2014:2), such as: (i) respect and compassion for PLWHA, caretakers, and family and service delivery team members have the right to be respected, both in the clinical or service encounter and within the micro and macro systems, i.e., individuals' needs, preferences, values, and autonomy is respected; (ii) choice and empowerment, because people-centred and integrated health service is one in which clients, carers, family, and the entire service delivery team work in partnership when making care decisions; (iii) access and support- all PLWHA must have access to affordable services, responsive to their health care needs;(iv) continuity and coordination of care- care should be coordinated and continuous across stages of care, levels, and types of service delivery such as community, primary clinic, hospital, primary and specialty care, allied social services; and life-cycle phases, for example new-born, infant, child, adolescent, adult, pregnancy, delivery and geriatric; iv) information– accurate, relevant, and comprehensive information should be provided to clients and their carers/family to enable them to make the most informed decision about their health care. Also,

- Ensure adequate Nutritional Assessment, Counselling and Support (NACS) approach integration with HIV programme to improve treatment outcome and quality of life of the PLWHA by community-based service delivery and supplies.
- Promote Community Based Nutrition (CBN) programme that supports new opportunities for intersectoral action at a community level to address the nutrition and food needs of PLWHA.
- Promote community and facility-based nutritional and HIV care, interconnected with livelihood economic strengthening programmes through referral.

- Nutrition and food supplementation to HIV positive individuals using specialized therapeutic products for nutritional rehabilitation of malnourished PLWHA, to prevent early mortality, particularly when initiating ART.
- Lifecycle approach for nutrition intervention targeting pregnant PLWHA and children.
- Community-based nutrition and livelihood support for most vulnerable PLWHA such as children, pregnant and lactating women and elders in the form of food, cash, or voucher transfers to build resilience and address the root causes of hunger.
- Develop and strengthening community-based nationwide strategic information management system tailored to the existing Health Management Information System (HMIS) to strategies the community-based nutrition and food security interventions.

6.4.3 Coordinating nutrition and food security interventions across multisector

Intersectoral and multi-sectorial approach

6.4.4.1 Rationale

Coordinating PLWHA-centred and integrated nutrition and food security interventions is for the purpose of enhancing and overcoming the fragmentations of resource and care that can undermine the ability of health systems to provide safe, accessible, cost-effective, and high-quality interventions to support treatment outcome and improved quality of life. It is all about coordination of multisector and inter-sectoral collaboration for nutrition-specific and nutrition sensitive interventions as well as food security programmes that address the nutrition and food needs of peoples living with HIV.

6.4.4.2 Actions

In order to coordinate the integrated and multisectoral nutrition and food security interventions, the ministry of health have to be responsible for overall programme management, communication and coordinating evidence for shared decision making across health and others. Accordingly,

- Develop integrated vertical nutrition and food security programme with the health programme and across multisector, specifically targeting peoples living with HIV.
- Strengthen the capacity and multisectoral coordination activities for nutrition and food security interventions across the sectorial organization which forms nutrition-sensitive and food security interventions integrated with HIV response programmes.
- Promote the implementation, adapt targeted multisectoral communication for nutrition-specific, nutrition-sensitive, and food security interventions.
- Developing electronic nutrition and food security, e[Nutrition & Food security], database for early warning, assessment and programme monitoring.
- Integrate HIV, nutrition and food security information into agricultural extension programme, similar to health extension programme.
- Develop PLWHA-centred cooperatives and farmers' organizations as entry points for nutrition and food resilience care and support interventions.
- Fund, recognize, coordinate and support initiatives tailored to specific contexts such as school feeding, home or communal gardens, cash transfers, income-generation activities that can benefit PLWHA and assist towards wellbeing and food resilience.
- Develop a referral guideline and network.
- Develop and monitor food market information management system. Addressing excessive food price volatility via established multisectoral coordination improves food market information availability and transparency. Thus, informs the government and the community, and the PLWHA to take an informed decision for the development of positive coping strategy towards nutrition and food security.

6.4.5 Creating an enabling environment for PLWHA-centred and integrated nutrition, food security and HIV programme interventions	**Universal, equitable, people-centred & integrated approach**

6.4.5.1 Rationale

Establishing an enabling environment for PLWHA, their family and community promote and empowers them to co-produce their health through participatory and inclusiveness. The people-centred nutrition and food security programme adheres on the principles of holistic approach serving equally all PLWHA in an environment that promotes the full potential of PLWHA to access or produce, and utilize nutritious food in a socially acceptable way.

6.4.5.2 Actions

The actions require adopting and managing strategic approaches that facilitate the large scale, transformational changes that are needed to support people-centred and integrated health services for all. Many of the features needed to create such an enabling environment for change are known to us, including:

- Political commitment and policy framework for the inclusion of nutrition and food security interventions integrated with HIV prevention, treatment, and care.
- Strengthening leadership and management for quality, equitable, and PLWHA-centred livelihood interventions integrated with HIV programme.
- Policy for gender dimensions of nutrition and food security such as addressing gender issues in nutrition and food security by improving women's access to finance and decision making.
- Develop a guideline for capacity-building for health professionals, health managers, PLWHA and communities so that all key actors are equipped with the necessary skills in nutrition, food, and HIV.
- Innovation and spread of best practices for nutrition, food and HIV programming and interventions.
- Develop a policy framework for institutional implementation, monitoring and multisectoral coordination aimed at promoting and integrating nutrition and food security focused on PLWHA that can be tailor-made across sectors with the set goals at improving treatment outcome and quality of life of PLWHA.

- Develop regulatory directories for overall management of nutrition and food security interventions across sectors.
- Improve the health care systems, promote quality improvement initiatives targeting nutrition and food security, and HIV programme.
- Develop protocols for promoting nutrition communication, dietary diversity and health living concentrated on PLWHA.
- Endorse social protection policy and programme that can equitably serve all PLWHA in the case of lack of nutrition and food security resilience.
- Promote and create a conducive environment for innovative research in nutrition, food and HIV programme.

The schematic arrangement of the programme development as it evolves is illustrated in figure 6.3 as below:

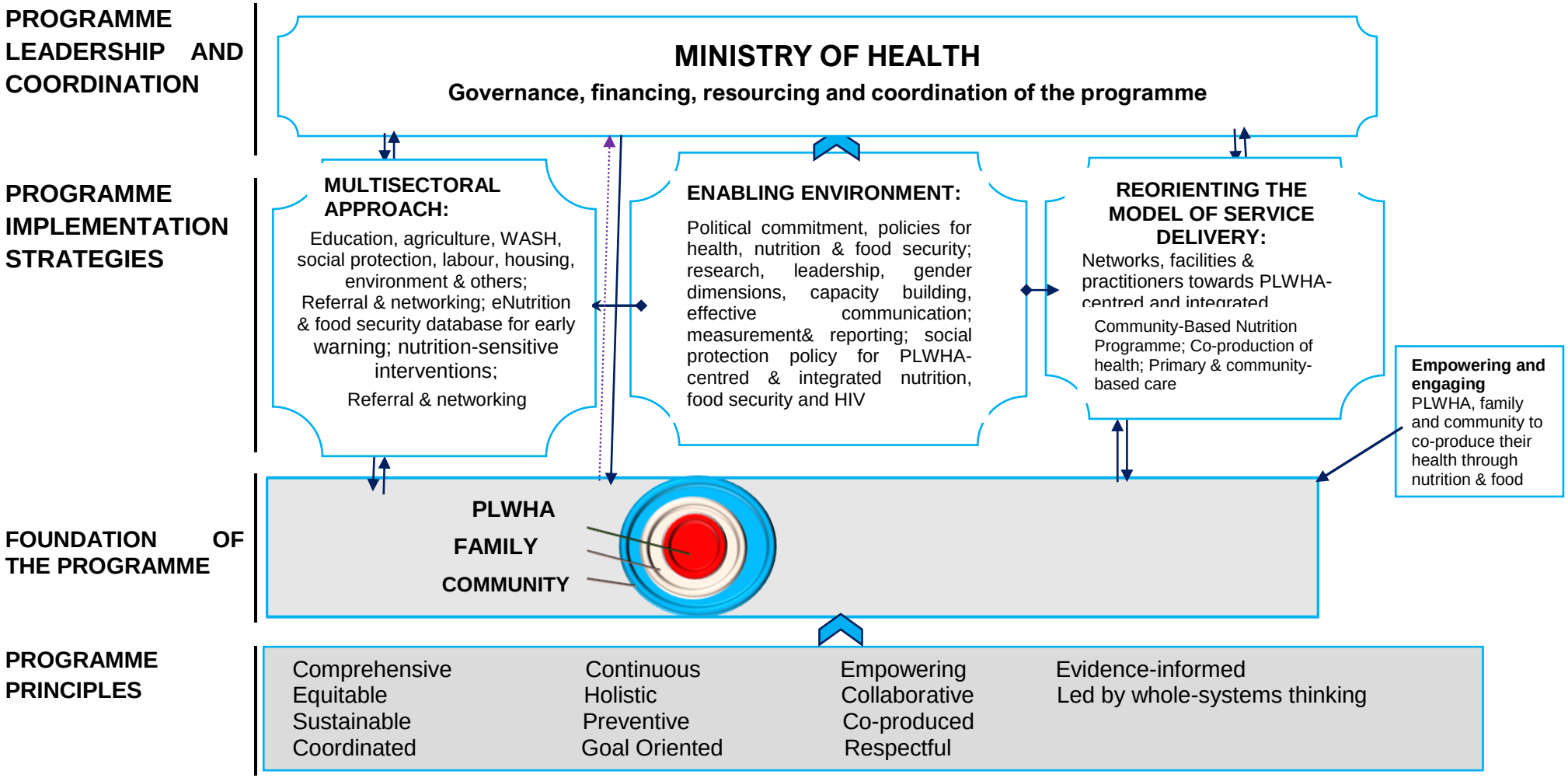

Figure 6: 3 Scheme for a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care

Key to communication flow: ⇄ Bilateral communication, ⟶ Unilateral communication, ⇢ Limited information flow

6.4.6 Leading and managing peoples living with HIV centred and integrated nutrition and food security, and HIV Programme

Delivering high-quality, people-centred and integrated health services requires the creation and nurturing of collective engagement, commonly held values, good communication, teamwork and transparency (WHO 2015a:34). PLWHA-centred and integrated nutrition and food security programme require multisectoral coordination mechanism to succeed, this would have a legitimate institutional arrangement with an authority mandated by country-level policy/decision makers. In this regard, leadership plays a vital role. Because leading and managing PLWHA-centred and integrated nutrition and food security, and HIV programme requires collaborative leadership and goes beyond understanding how to bring together stakeholders with competing views and mindsets. This study envisions the national coordinating body as a health sector vested with appropriate executive power and accountability, with clear action plans, concrete targets and sufficient resources to carry out its function. Thus, FMOH is the preferred organization to coordinate, design and share programme specifics. Multisectoral members would be held accountable, both institutionally and collectively, for the achievement of the nutrition, food security, and an integrated HIV response and intervention goals. The Ministry of Health together with its sub-structures, from bottom-to-down and vice versa to community, should have to take the responsibility of leading multi-stakeholders for PLWHA-centred and integrated nutrition and food security, and HIV; because people-centred and integrated approach, in turn, takes the form of bottom-up approach (Sturmberg & Njoroge 2016: 4).

Achieving people-centred and integrated health services involve many national and international stakeholders. The stakeholders should have to integrate their support for nutrition and food security for peoples living with HIV across their respective targets and sectors. The involvement of such multiple stakeholders, coordinating nutrition and food security interventions for PLWHA requires establishing effective collaboration mechanism. According to WHO (2015a:37) collaboration will be most effective if it: (i) country-led, i.e., strategies for pursuing people-centred and integrated health services should be developed and led by countries, with external support where necessary, and should respond to local conditions and contexts; (ii) equity-focused - efforts to enhance

equity are a required part of people-centred and integrated health care strategies; (iii) ensures that people's voices are heard; (iv) recognizes interdependence- service delivery depends on effective information and financing systems, and the availability of a skilled and motivated health worker; (v) shares knowledge vi) adopts learning/action cycles. Based on these principles, the Ministry of Health could establish effective collaboration between all parties with duly its principal responsibilities of both leadership and coordination.

6.4.7 Monitoring, evaluation and learning

Monitoring, Evaluation, and Learning (MEL) informs programme design and timely adjustments, with active monitoring, internal reviews and adaptive learning embedded as part of programme management (Amos 2015:3).

6.4.7.1 Monitoring

Monitoring PLWHA-centred and integrated nutrition and food security with HIV prevention, treatment and care are complex and multisectoral. According to WHO (2015a:39) people-centred and integrated health services monitoring is conducted at several levels: at the micro-level to examine whether PLWHA are receiving more people-centred care that is coordinated around their needs; and at the meso- and macro-levels to assess whether care is being reoriented towards PLWHA-centred and integrated health services, and an enabling environment is being created. As a result, a key focus on the monitoring of progress of PLWHA-centred and integrated nutrition and food security with HIV programme within people-centred and integrated conceptual framework that includes specific and measurable objectives could have to be developed and endorsed across sectors. Electronic nutrition and food security information management system that, a central and sectorial tailor-made with their regular programmes that capture nutrition, food security, and HIV programme and treatment indicators, that can be collected across multisector at community, individual and facility could have to be established and employed.

A few of the indicators:

- Number of PLWHA assessed for nutrition and food at their home.
- Number of PLWHA counselled for nutrition and food at their home.
- Number of PLWHA assessed and counselled on nutrition and food at their community.
- Number of PLWHA identified as malnourished at their home and in the community.
- Number of PLWHA identified as food insecure at their home and in the community.
- A number of malnourished PLWHA referred for nutritional support.
- A number of food insecure PLWHA referred to or linked to livelihood support programme.
- Number of PLWHA received therapeutic or supplementary food at their community.
- Number of PLWHA received therapeutic or supplementary food at a health facility.
- Number of PLWHA exit from nutritional support due to default, transfer to other location, recovered from nutrition, or died.
- A number of malnourished PLWHA who have graduated from the nutrition support and integrated or referred to community-based sustainable livelihood support.
- Number of PLWHA who has empowered and assisted for self-reliance in terms of nutrition and food.
- A number of female PLWHA empowered and assisted for nutrition and food security self-reliance.
- Amount of capital utilized in relation to the allocated budget for food resilience by an organization in a given year.
- Prevalence of anaemia amongst PLWHA.
- Prevalence of malnutrition and food insecurity among PLWHA.
- Dietary diversity pattern of PLWHA in a given community.

6.4.7.2 Evaluation and learning

Evaluation and learning of PLWHA-centred and integrated nutrition and food security with HIV programme helps the PLWHA, family, community, and Ministry of Health and multisector organizations to understand the progress and impact of their investments and interventions, and assist the development of evolving support programme through continual learning from their work. The people-centred and integrated programme entails developing and strengthening information systems that can deliver timely and reliable data about the nature of services delivered. Learning and evaluation of PLWHA-centred and integrated nutrition and food security and HIV programme requires the execution of implementation research which seeks to address questions of implementation, such as how the programme positively impact the health and wellbeing, and the livelihood of PLWHA; why endorsed strategies are chosen and capable of, and what types of interventions work in the selected area and in the case of integrated programme. WHO (2015a:40) learning and evaluation are increasingly recognized for its potential to enable interventions including policies, programmes, and individual practices–to work better, reach targeted populations, scale-up coverage and impact, and be sustained. As such implementation research is reported to be an important tool for identifying and revising strategies to achieve people-centred and integrated health care.

6.4.8 Experts' review of the support programme

Based on the draft of the proposed support programme for facilitation of the integration of nutrition and food security with HIV prevention, treatment, and care aligned with the findings of the study, literature reviews and conceptual framework, the accessibility and acceptability of programme was reviewed by experts. This was done in order to assess whether the strategies could be acceptable as described, acceptable but with the recommendation, or not acceptable at all.

6.4.8.1 Criteria for rating the support programme

A matrix of convergence was developed to measure the experts' opinion for people-centred and integrated programme development. The people-centred and integrated programme is universal, equitable, accessible and oriented towards people with clear practical applicability. The researcher took clarity and

consistency, relevance to the country and programme, comprehensiveness and adaptability, practicality and usefulness, and importance of the developed programme for research, practice, and evaluation are the criteria the researcher took into consideration to be measured by the experts after reading and internalising the developed programme.

6.4.8.2 Selection of the experts

The process of expert review involved selecting the experts, designing a matrix for data collection, and analysing the responses. Five experts were purposively selected in the areas of nutrition, food security, HIV/AIDS, and health system design and development. They were asked to read a summary of the research findings, review the draft support programme and give their comments on the assessment matrix. The responses were tabulated, analysed and fed into the design of the programmes (see table 6.1).

Table 6.1 Senior health experts profile

Expert	Qualification	Areas of experts	Years of service
TD	BA	Programme officer, food security and development	17
AM	BSc, MPH	Nutrition coordinator	21
DY	MD, Paediatrician	Paediatrician	12
KS	BSC, MPH, MA	Health, Health system strengthening specialist	23
MD	BSc, MPH	Regional Advisor, HIV/AIDS	19

Table 6:2 Experts rating of the programme

Criteria	Not acceptable or needs major revision	Acceptable with recommended changes	Acceptable as described
Clarity and consistency	0% (n=0)	40% (n=2)	60% (n=3)
Relevance	0% (n=0)	0% (n=0)	100% (n=5)
Comprehensiveness and adaptability	0% (n=0)	20% (n=1)	80% (n=4)
Practicality and usefulness	0% (n=0)	0% (n=0)	100% (n=5)
Importance for research, practice and evaluation	0% (n=0)	0% (n=0)	100% (n=5)

6.5 CONCLUSION

This chapter discussed the development of a support programme for the integration of nutrition and food security with HIV prevention, treatment, and care based on the principles of people-centred and integrated health service approach. People-centred and integrated health service approach is a recommended public health-focused, and places a greater emphasis on quality of life as a more meaningful outcome than the quality of care. The importance of communities as co-producers of integrated care has been recently articulated in WHO's people-centred and integrated conceptual framework and also it was described as a futurist healthcare approach.

CHAPTER 7

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

In the previous chapters the research design, methodologies employed, findings and discussions of the research were presented and followed by the development of support programme for integrating nutrition and food security with HIV prevention, treatment, and care. Furthermore, the study was established through the review of literature based on the research orientation. In this final chapter, the researcher presents conclusions drawn from the findings of the study in relation to the research objectives and questions. The chapter also highlights the limitations of the study and list the limitations and outline implications for further research.

The study was emanated from the evidence and recognition that there is strong relationship between malnutrition and HIV/AIDS (Lwabukuna et al 2018:4; Sicotte et al 2014:6; Berhe et al 2013:8; WFP 2016:2), and equally between food insecurity and HIV/AIDS (Aberman et al 2014: 562; Palermo et al 2013:8). This connetion is so intricate and concurrently occurs between malnutrition, food insecurity and HIV where reported to be more rampant in Sub-Saharan Africa affecting treatment outcome and quality of life of PLWHA (UNAIDS 2014a:3) and found to exacerbate the harmful impacts of each other in a vicious cycle (Masa & Chowa 2018:4; Kenea et al 2015: 96; Aberman et al 2014:562; Sicotte et al 2014:6; Palermo et al 2013:8; Hailemariam et al 2013:5; Berhe et al 2013:5). Nevertheless, PLWHA-centred and integrated nutrition and food security programs that can be implemented in a multisectoral approach are rarely evolving. It is alongside this background that the study was undertaken to develop a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment, and care.

More explicitly the objectives of the study were to:

- To investigate the determinants of malnutrition and food insecurity among PLWHA.

- To determine the outcome of nutrition and food security on treatment outcome and quality of life of PLWHA.
- To determine the status of PLWHA with regard to access to nutritious food to meet their dietary needs.
- To explore PLWHA's coping strategies for malnutrition and food insecurity.
- To explore senior health experts' perspective and experience in integrating nutrition and food security with HIV prevention, treatment, and care.

The nutritional, mental health, and behavioural pathways conceptual framework (Ivers 2015:26) was chosen to elucidate the interdependence and interconnectedness of nutrition, food security and HIV/AIDS. The framework mediates the relationship of nutrition and food security on treatment outcome and quality of life through nutritional, mental health and behavioural pathways.

7.2 SYNOPSIS OF THE RESEARCH DESIGN AND METHODOLOGY

The explanatory sequential mixed method design, a sequential mixed method approach where the researcher is interested in following up the quantitative results with qualitative data for the subsequent interpretation and clarification of the results from the quantitative data analysis was employed (Edmonds & Kennedy 2017:196). The method occurs in two distinct interactive phases: starts with the collection and analysis of quantitative data followed by the subsequent collection and analysis of qualitative data (Creswell & Clark 2011:71). The dominant quantitative phase was based on the structured questionnaire for an interview with PLWHA, and the second phase FGD with senior health experts. The quantitative data were analysed using descriptive and analytic statistics. The qualitative data analysis followed a process of synthesis and integration of the recurrent patterns and linkages between and among codes, evolving across all of the data into distinct themes or propositional statements.

This chapter presents the conclusions obtained from the results of the study, and recommendations to improve treatment outcome and quality of life of

PLWHA in relation to nutrition and food security programmes in Ethiopia. The chapter also clearly stipulates on the limitations of the study and concluding remarks.

7. 3 SUMMARY OF THE RESEARCH FINDING

The summary of the study findings is discussed in relation to the study objectives.

7.3.1 To investigate the determinants of malnutrition and food insecurity among peoples living with HIV and AIDS

7.3.1.1 To investigate determinants of malnutrition

The nutritional status of PLWHA was assessed using anthropometric measurement consists of a client's weight and height with subsequent analysis of BMI. The mean BMI of the participants was 18.02 kg/m^2 and standard deviation of 2.9. Malnutrition could occur in different forms and degrees. In this study, 26% of the participants were severely malnourished while 34% of them moderately malnourished. Overall, the prevalence of malnutrition was found to be 60%.

The determinants of malnutrition were found to be female gender, never enrolled to education, lower household income, the source of drinking water, kind of toilet facility, household food insecurity, inadequate dietary diversity, poor asset possession, recurrent episodes of opportunistic infections and shorter duration on ART after initiation were found during bivariate analysis. However, after controlling for variables in the study, the multivariable analysis showed gender— the highest concentration of malnutrition, that is about 63.3% were found among female PLWHA. Living in urban areas, lower or deprived household income, use of spring or open sources of drinking water, absence toilet facility or use of open source, poor asset possession, food insecurity, and shorter duration on ART were also the predictors of malnutrition in PLWHA.

7.3.1.2 To investigate the determinants of food insecurity

The bivariable analyses of the study outlined lower educational status, marital status—those widowed experienced higher food insecurity, higher household dependency, use of spring or open source of drinking water, lack of toilet facility or open use, lack of employment, household's lower income, poor asset possession, and frequent episodes of opportunistic infections as factors for food insecurity. But in the final multivariate analysis, residence in urban areas [β= 0.18, 95% CI: 0.76, 2.0, p<0.0001], lack employment [β= -0.19, 95% CI: -1.34, -0.53, p<0.0001], highest household effective dependency [β= 0.14, 95% CI: 0.15, 0.59, p<0.001], poor asset possession [β= 0.33, 95% CI: 0.55, 0.95, p<0.0001], CD4 count below 350 cell/mm3 [β= -0.1, 95% CI: -0.48, -0.04, p= 0.04] and frequent episodes of opportunistic infection [β= -0.18, 95% CI: -1.3, -0.46, p<0.0001] were among the determinants sustained association with food insecurity.

7.3.2 To assess the outcome of nutrition and food security on treatment outcome and quality of life of peoples living with HIV and AIDS

7.3.2.1 To assess the outcome of nutrition and food security on ART adherence

The study found that malnutrition and food insecurity strongly hampering the desired optimum treatment outcome among PLWHA in the region. Both malnutrition [95% CI: -1.7, -0.45, p=0.001], and food insecurity [95% CI: 1.2, 2.1, p= 0.000] were found to significantly reduce treatment outcome and associated with suboptimal ART adherence in the region. From the result, it is strongly evident that ART non-adherence/suboptimal ART adherence is associated with higher food insecurity score and lower BMI score.

Suboptimal ART adherence is also strongly predominant among those who had never enrolled/attained education, food insecure households, and in those recurrent occurrences of opportunistic infections are manifested. Yet, divorced marital status, lack of employment, meager monthly household income,

inadequate diversified diet, malnutrition, and poor asset possession were also found to affect ART adherence.

The qualitative part of the study delineated that poor ART adherence is a complex phenomenon resulted from multiple factors. As outlined, it includes healthcare workers related; health system related, socio-economic, and PLWHA related factors. It is related to health works when poor ART counselling is given by incompetent service providers; it relates with health system when there is lack of infrastructures such as viral and CD4 analysis machines and laboratories; it relates to socio-economic inequalities when malnutrition and food insecurity diminishes the capacity of PLWHA to co-produce his/her health; and it relates to PLWHA themselves when they lack adequate knowledge on the importance of treatment adherence for healthy living and misses treatment and appointment.

7.3.2.2 To assess the outcome of nutrition and food security on quality of life of peoples living with HIV and AIDS

The study evaluated the outcome of nutrition and food security on HRQoL. The qualitative part of the study explored the factors surrounding the quality of life of PLWHA in multiform. It includes healthcare workers related because of inadequate ART adherence counselling and delays to execute HIV testing by healthcare providers compromise the quality of life of PLWHA. Socio-economic inequalities such as poverty and food insecurity were also reported to affect the HRQoL among those living with HIV. PLWHA related factors such as poor ART adherence deteriorated health as a result of lack of knowledge on the benefit of early HIV test were sightseen during the FGD. The quantitative part studied HRQoL in terms of global physical health summary score and global mental health summary score, and computed against malnutrition and food insecurity, and the remaining variables of the study as follows:

7.3.2.2.1 Physical health-related quality of life

The PHS score of less than 50 as low, and 50 and above as a high were assumed based on PROMIS® global physical health score. Accordingly, the average study participants were found to have below a mean PHS score, with a

mean of 48.8 and standard deviation of 8.89. The study found very weak association between malnutrition and PHS, [β= 0.097, 95% CI: -0.007, 0.56, p= 0.056]. On the other hand, strong association between PHS score and food insecurity, [β= -0.36, 95% CI: -1.8, -1.03, p<0.0001] profusely emerged. Thus, it is generalisable to say that malnutrition, to the lowest degree, and food insecurity particularly affected the PHS score of PLWHA in the region.

PHS score is also found to be affected by socio-demographic, economic and clinical parameters. The study found PLWHA who is a member of Christian faith were found to have higher PHS score. But, those PLWHA who were divorced and widowed were found to have the lowest PHS scores contrary to those married individuals, who have shown higher physical health score and thus marriage support improvement in physical health-related quality of life. The higher household effective dependency ratio is also found with lower PHS score. Similarly, shorter duration on ART was found with lower the physical health-related quality of life. Thus, as PLWHA stays longer on ART, the physical health of PLWHA improves [β= 0.93, 95% CI: 0.58, 5.5, p= 0.045].

7.3.2.2.2 Mental health-related quality of life

Malnutrition and food insecurity were found to affect the HRQoL of PLWHA. Strong association was found between malnutrition and MHS score [β= 0.09, 95% CI: 1.02, 1.2, p= 0.009]. Food insecurity was also demonstrated mostly to be associated with lower mental health score both in bivariate and subsequent multivariate analysis [β= -0.5, 95% CI: 0.56, 0.7, p<0.0001]. Correspondingly, CD4 count was found affect the HRQoL. Those PLWHA who have a CD4 count of below 350 cell/mm^3 were manifested lower mental health-related quality of life. From these findings, it is evident that food insecurity affects the PLWHAs' social participation and empowerment, a measure of mental health-related quality of life.

7.3.3 To determine the status of peoples living with HIV and AIDS with regard to access to nutritious food

Nutritious foods are diversified foods; thus, the study explored the factors determining the status of PLWHA to access diversified diet in terms of dietary

diversity score. In this study, bivariate analysis and subsequent multivariate analysis using robust backward elimination with four models were used to determine the status of PLWHA with access to a nutritious diet based on basic socio-economic and clinical factors. The majority of the respondents, 66.7% of study participants were feed on an inadequately diversified diet. The study revealed that food insecurity [β= -0.4, 95% CI: -0.5, -0.3, p<0.0001], and poor asset possession [β= -0.3, 95% CI: -0.96, -0.56, p<0.0001] were the strong predictors of inadequate dietary diversity. The study also culminated an evidence that inadequate dietary diversity was associated with suboptimal ART adherence and lower HRQoL.

7.3.4 To explore PLWHA's coping strategies for malnutrition and food insecurity

In this study, it was found that strong positive correlation between the coping strategies adopted by PLWHA in the region and household food insecurity (r = 0.67, p = 0.000). The coping strategy index, CSI, was found to be negatively correlated with BMI (r = −0.2, p = 0.000) and HDDS (r = −0.29, p = 0.000) of the study participants. PLWHA were found to feed on an inadequately diversified diet that consequently exposes them to malnutrition by compromising the quality and quantity of food consumption in order to mitigate the adverse effect of food shortage at the household level. More commonly adopted strategies involve changing a dietary habit by consuming less preferred/less expensive food on a daily basis, followed by relying on casual labour for food, limiting portion size at mealtimes and reduce the number of meals eaten in a day. PLWHA forbid themselves or very rarely feed on vegetables, meat, eggs; pulses, legumes, and nuts; milk and milk products; sweets and condiments to cope-up with food insecurity. The most commonly utilized food is feeding on cereal foods.

7.3.5 To explore senior health experts' perspective and experience in integrating nutrition and food security with HIV prevention, treatment, and care.

The study explored senior health experts' perspective and experience on how to to integrate nutrition and food security with HIV prevention, treatment, and

care. Based on their expertise and experience, they have recommended the integrating nutrition and food security with HIV prevention, treatment and care requires enabling factors, and averting factors which require precaution. Enabling factors includes establishing a cordial working relationship with sectors; strengthening partnership; capacity building for the programme implementation; and financing the programme. From their experience and viewpoint, the factors that might lead to programme failure and averting from achieving its objective includes lack of programme ownership and poor collaboration with stakeholders and donors. To help elucidate and improve integration of nutrition and food security issues with HIV programme, the qualitative findings of the study explains the adoption of an integrated approach, i.e., integrating nutrition and food security indicators and interventions across existing multisectoral HIV/AIDS response, and strengthen the health system. The findings also recommend strong leadership and accountability for ensuring improvement in treatment outcomes through co-production of care, and participation of PLWHA and their families to achieve the optimum outcome from the programme, and calls for accountability. The experts recommended programme is analogous with the programme developed by the researcher as culminated by study findings, literature and conceptual framework used for programme development.

7.3.6 Support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment, and care

Growing scientific evidences as well as the findings of this study clearly indicate that nutrition and food security play a leading role in improving the treatment outcome and quality of life of PLWHA. But, Ethiopia's health care system can't afford such affluent programmes to run vertically across the health sector stand alone. Thus, this objective was met by developing and describing an integrated PLWHA-centred nutrition food security programme integrated with HIV prevention, treatment and care that can be realized across multisector through investigation of predictors of malnutrition and food insecurity among PLWHA. The programme was developed based on the WHO's people-centred and integrated health service conceptual framework (WHO 2015a:13). This approach was adopted because it fosters continuum of health promotion,

health protection and disease prevention services, as well as treatment, long-term care, rehabilitation, and palliative care services through the different levels and sites of care within the health system and according to their needs. Furthermore, it puts people, not necessarily patients, into the centre of attention; and the care is operationalised in intersectoral actions (Stein, Barbazza, Tello & Kluge 2013:2).

7.4 CONCLUSIONS OF THE STUDY

Based on the study findings, the researcher makes the following conclusions:

- The intricate vicious connotation of malnutrition, food insecurity, and HIV were profoundly manifested and found to affect the health and wellbeing of the people living with HIV in the Benishangul Gumuz region, Northwest of Ethiopia.
- High prevalence of malnutrition (60%) was found among peoples living with HIV in the region and is completely unacceptable requires a robust response. Comprehensive and targeted nutrition intervention measures are required to halt the negative outcome and improve the wellbeing of the PLWHA.
- Food insecurity was found pervasive and reaches 76% among people living with HIV in the region. This reality should be faced and targeted responsive strategic interventions could have to be developed and implemented.
- Socio-demographic, economic and structural factors such as gender inequalities, lack of schooling, urban residence, poverty, lack of clean drinking water and toilet facilities, food insecurity and delay to start ART were found as predictors of malnutrition. Thus, tackling those inequalities: structural, demographic aspects such as gender disparities and conventional nutrition interventions targeted to PLWHA have to be instigated to ensure nutritional recovery and improve household livelihood.
- Severe food insecurity is strongly widespread in urban areas, among those who lack employment, in those living with highest household effective dependency, poor asset possession and resulted in suppressed CD4 count as a result of the frequent acquisition of opportunistic infections. Thus, nutrition and food security form the

essential dimensions of sustainable urban development. Inadequate food security and nutrition take an enormous toll on individual PLWHA, community, and economies of the country and have negative consequences for the livelihoods and economic capabilities of such vulnerable populations.

- From this finding of the study, highest prevalence of food insecurity is in urban residential area thus the HIV response could have to target food insecurity among PLWHA tailored to urban settings. Because Ethiopia is rapidly urbanizing, as such urbanization makes food insecurity complex issue in urban resident PLWHA with a number of overlapping dimensions.
- Suboptimal treatment outcomes were found and associated with malnutrition and food insecurity. The study found that malnutrition and food insecurity strongly impeding the desired optimum treatment outcome among PLWHA in the region. suboptimal ART adherence was also predominant among those who were food insecure, not educated and/or lower educational status was found with the acquisition of recurrent occurrence of opportunistic infections. Poorer health outcomes can result from lack of adherence to ART which was found secondary to lack of employment, meagre monthly household income, inadequate diversified diet, malnutrition, and poor asset possession. It is apparent that certain ART regimen requires to companion nutritional supplements. Though PLWHA is taking ART, co-existence of malnutrition are predominant features of HIV disease progression and are a strong predictor of mortality and morbidity. In the case of this study setting, where higher malnutrition and food insecurity is prevalent, selecting an alternative regimen that does not significantly require food or providing food with ART is essential to get better treatment outcome for a time. Providing ART with food assist in building a stronger and healthier body that can better resist the opportunistic infections. Yet, PLWHA is taking ART, co-existence of malnutrition and food insecurity are predominant features of HIV disease progression again, and are strong predictor of mortality and morbidity, robust and sustainable response has to be foresighted.

- The HRQoL was found impacted by socio-economic inequalities such as poverty and food insecurity. Lower PHS score was found with malnutrition, food insecurity, higher household effective dependency ratio, and shorter duration on ART. On another hand, food insecurity was established to strongly associated with lower MHS score. Similarly, CD4 count of below 350 cell/mm^3 was demonstrated to lowering the mental health-related quality of life. The study has shown food insecurity were found negatively influenced their physical and mental health and general wellbeing. The inclusion of resources for food assistance in HIV treatment programs may help enrich physical and mental health challenges of poverty-stricken and food insecure PLWHA. There are credible scientific evidence that have shown the potential importance for HRQoL of including nutrition and food assistance programming as part of the standard of care in areas where malnutrition and food insecurity were widespread. Nutrition and food insecurity has harmful consequences on HIV progression and outcome, and health-related quality of life and is a predictor of survival during HIV infection. As a result, deterring structural factors which compromise HRQoL and adoption of PLWHA-centred nutrition and food care and support programme is paramount to improve the overall welfare of PLWHA.

- The highest proportion of PLWHA feeds on an inadequate diversified diet. Lack of a diversified diet was associated with modifiable factors such as food insecurity, and poor asset possession. Such co-existence among HIV and dietary diversity, malnutrition, and food insecurity were also found reducing the treatment outcome and HRQoL of PLWHA, that underscores the importance of dietary diversity and food. A healthy and nutritious diet which includes a variety of nutritious foods in the right amount maintains the health, wellbeing and assist in the attainment of optimal treatment outcomes.

- Peoples living with HIV who has suffered malnutrition and food insecurity in Benishangul Gumuz region, Northwest of Ethiopia do employ negative food consumption coping strategies to cushion malnutrition and food insecurity. While these strategies may provide short-term relief, they are

erosive, unsustainable, and undermine resilience in the long run. Commonly, PLWHA were found to feed on inadequate diversified diet by reducing food intake, borrowing from others and feeding on low quality cheap foods, gathering unusual kinds of wild foods or hunt, relying on casual labour for food, or going begging has dire implications for household members' health because they affect their mental health, dismantle the locally adopted good norms which mandates the need of policies that focus on engaging and empowering PLWHA to co-produce their health and improve resilience to food insecurity.

7.5 RECOMMENDATIONS

The finding of the study provided valuable information on determinants of malnutrition and food insecurity, the outcome of nutrition and food security on treatment outcome and HRQoL. Various factors were found to affect the availability, access and utilization of nutritious foods, thus holistic, people-centred and integrated nutrition and food security programme were developed targeting PLWHA. This approach was selected because it is public health-focused and places a greater emphasis on quality of life as a more meaningful outcome than the quality of care. Based on the findings, the following recommendations were made in relation to nutrition, food security, and HIV:

- Adoption of PLWHA-centred nutrition and food security programme integration with comprehensive HIV prevention, treatment and care and re-invention of the existing NNP by shifting away from the systems designed around diseases, and health institutions towards health systems to systems and institutions transfixed towards people with a sense of strong leadership, coordination, accountability, funding and collaboration at its heart. The strong interdependencies between nutrition and food security and HIV cannot be fulfilled, thus requires intersectoral collaboration across many other parts of a broad sustainable development agenda such as inclusive economic growth, food resilience in agriculture, population dynamics, social protection, energy, water, sanitation, natural resource management and protecting ecosystems by engaging PLWHA, family and community at its core value.

The following programmes are recommended and form the centre of people-centred and integrated intervention for reducing the dire impacts of malnutrition and food insecurity among peoples living with HIV:

- Empower and engage PLWHA, their family and community through information, education, and communication to adapt or strengthen dietary diversity and healthy eating habits and food preparation, as well as feeding patterns.
- Develop and promote community-based nutrition assessment, counselling, and support measures.
- Promote and adopt the implementation of targeted multisectoral communication for nutrition-specific, nutrition-sensitive, and food security interventions across health sectors and others.
- Strengthening leadership and management for quality, equitable, and PLWHA-centred livelihood interventions integrated with HIV programme.
- Continue enforcing the policy for gender dimensions of nutrition and food security such as addressing gender issues in nutrition and food security by improving women's access to finance and decision making.
- Develop guideline and continue capacity-building tasks for health professionals, health managers, PLWHA and communities so that all key actors are equipped with the necessary skills in nutrition, food, and HIV.
- Endorse social protection policy and programme that can equitably serve all PLWHA.
- Develop PLWHA-centred cooperatives and farmers' organizations as entry points for nutrition and food resilient care and support.
- Develop and monitor food market information management system.

7.6 RECOMMENDATION FOR RESEARCH

Study on the challenges and enabling factors for PLWHA-centred nutrition and food security programme interventions in Ethiopia and beyond are the important areas of research to be carried out. There is a need to integrate operational research into the programmatic response to these overlapping crises of malnutrition, food insecurity, and HIV and AIDS in order to identify successful context-specific, sustainable, holistic and participatory interventions.

Some of the predictors considered in this study such as the impact of dietary diversity on treatment outcome and HRQoL requires longitudinal study for the rigorous understanding of the impact interventions such as what type of nutritious foods promotes HRQoL improvements in the case of PLWHA is necessary to be carried out.

7.7 CONTRIBUTION OF THE STUDY

The findings of this study were the foundation for the development of a workable support programme for facilitating the integration of nutrition and food insecurity with HIV prevention, treatment, and care. The study will help government and nongovernment sectors and organizations, programme managers, implementers and provides to understand the core principles, strategic implementation procedures & requirements, and enabling factors of people-centred nutrition and food security intervention for improving the treatment outcome and quality of life through multi and intersectoral interventions focused on PLWHA. The empirical perspective of the study will also contribute to the body of knowledge regarding the intricate vicious association between nutrition, food insecurity and HIV and improves care and practice.

The findings of the study will be presented to the ministry of health, regional health bureau; partners and health care providers in the form of workshop and seminars presentations. The final study findings will be disseminated to relevant parties through FMOH and RHBs. Publications will be done in accredited journals.

7.8 LIMITATION OF THE STUDY

The study had limitations that should be acknowledged. This research is a facility based cross-sectional study that reflects the shortcomings of any cross-sectional study. The cross-sectional nature of the study itself limits conclusions about cause-effect temporal relationships between explanatory variables and malnutrition and food insecurity, and HIV/AIDS. For instance, malnutrition can be both a cause and effect of suboptimal ART adherence and HRQoL, the

same holds with food insecurity. Hence, future longitudinal studies are warranted to ascertain causal directions of these variables. The other limitation includes a limitation of self-reported measures that some aspects of the response may be affected by factors in a respondent's life which are not related to treatment for nutrition, HIV/AIDS or food security but nevertheless affect a respondent's mood and possibly their answers. In spite of these limitations, the other aspects of the results increase confidence in the findings. First, there is internal consistency between the household food insecurity access instruments, household dietary diversity, wealth index questionnaire, and HRQoL measurements and study parameters; second, the use of robust three multivariate linear regression models with study variables and techniques, yielded similar results, supporting the internal validity of the study. The study shows that malnutrition and food insecurity is inversely associated with treatment outcome, HRQoL, and dietary diversity; but positive correlation with coping strategies employed among HIV infected adults.

7.9 CONCLUDING REMARKS

The purpose of the study was to investigate the determinants of malnutrition and food insecurity among PLWHA, assess the outcome of nutrition and food security on treatment outcome and quality of life, and developed support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment, and care. The study followed a mixed (both quantitative and qualitative) approach, and descriptive and explanatory design to analyse the identified variables.

Findings of the study contributed to further understanding of the determinants of malnutrition and food insecurity among PLWHA; and assessed the outcome of nutrition and food security on treatment outcome and HRQoL. The study revealed that much effort is so vital to achieving the global 90-90-90 HIV elimination response which has implications for the key stakeholders such as the Federal Ministry of Health and other Ministerial Offices, Regional Health Bureaus and other regional offices and their respective allied offices and, the like. It is suggested that PLWHA-centred, holistic nutrition, and food security programme interventions integrated with HIV prevention, treatment and care

that can be implemented in the sense of intersectoral collaboration were found paramount to respond to the critical issues presented.

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ANNEXURES

ANNEXURE A: University of South Africa Ethical Clearance Certificate

UNISA university of south africa

RESEARCH ETHICS COMMITTEE: DEPARTMENT OF HEALTH STUDIES
REC-012714-039 (NHERC)

5 October 2016

HSHDC/542/2016
Mr Fikadu Tadesse Nigusso
Student: 4677-392-4

Supervisor: Prof AH Mavhandu-Mudzusi
Qualification: PhD
Joint Supervisor: -

Dear Mr Fikadu Tadesse Nigusso

Decision: Ethics Approval

Name: Mr Fikadu Tadesse Nigusso

Proposal: Development of support programme for facilitating the integration of nutrition and food security with HIV, treatment and care.

Qualification: DPCHS04

Thank you for the application for research ethics approval from the Research Ethics Committee: Department of Health Studies, for the above mentioned research. Final approval is granted for the duration of the research period as indicated in your application.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the Research Ethics Committee: Department of Health Studies on 5 October 2016.

The proposed research may now commence with the proviso that:

1) *The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*

2) *Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the Research Ethics Review Committee, Department of Health Studies. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

3) *The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study.*

4) *[Stipulate any reporting requirements if applicable].*

Note:
The reference numbers [top middle and right corner of this communiqué] should be clearly indicated on all forms of communication [e.g. Webmail, E-mail messages, letters] with the intended research participants, as well as with the Research Ethics Committee: Department of Health Studies.

Kind regards,

Prof L Roets
CHAIRPERSON
roetsl@unisa.ac.za

for Prof MM Moleki
ACADEMIC CHAIRPERSON
molekmm@unisa.ac.za

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ANNEXURE B: A Support Letter from Unisa Ethiopia Regional Learning Centre

UNISA | university of south africa

27 OCTOBER, 2016

UNISA-ET/KA/ST/29/27-10-16

BENISHANGUL GUMUZ REGIONAL STATE HEALTH BUREAU

ASOSA

Dear Madam/Sir,

The University of South Africa (UNISA) extends warm greetings. By this letter, we want to confirm that Mr. Fikadu Tadesse Nigusso (student number 46773924) is a PhD student in the Department of Health Studies at the University of South Africa (UNISA). Currently, he has finalized his proposal and is about to go out for data collection on his doctoral research entitled "***Development of support programme for facilitating the integration of nutrition and food security with HIV, treatment and care.***"

This is therefore to kindly ask you to assist the student in any way that you can. We would like to thank you in advance for all the assistance that you will provide to the student.

Sincerely,

Tsige GebreMeskel Aberra

Deputy Director – Academic and ICT Support

University of South Africa
Regional Learning Center
P.O. Box: 13836, Addis Ababa, Ethiopia
Telephone: +251 11 435 2244 / +251 11 435 0078
Facsimile: +251 11 435 1242/ 43/ 44
Mobile: +251 912 19 1483
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ANNEXURE C: Request for Permission Letter to Conduct the Study

REQUEST FOR PERMISSION TO CONDUCT RESEARCH AT HEALTH FACILITIES IN BENISHANGUL GUMUZ REGION

DEVELOPMENT OF SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE

25 July 2016

BENISHANGUL GUMUZ REGION HEALTH BUREAU

ASSOSA, ETHIOPIA

Dear Sir/Madam,

I, Fikadu Tadesse Nigusso, am doing research with Professor Azwihangwisi Mavhandu-Mudzusi, a professor in the Department of Health Studies towards a Doctor of Literature and Philosophy at the University of South Africa. I wish to apply to carry out a study on "**DEVELOPMENT OF SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE**", among selected health facilities in Benishangul Gumuz Regional State. The study will investigate determinants and role of nutrition and food security on treatment outcome and quality of life of peoples living with HIV/AIDS (PLWHA) in Benishangul Gumuz Region, Ethiopia with the view of developing a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care.

Primary data will be collected from PLWHA who are on comprehensive HIV care among the selected health facilities. Participants will be randomly selected during ART refill at the study facilities.

The study will inform the Ethiopian government on determinants and the role of integrated nutrition and food security on PLWHA treatment outcome and its tendency in improving the quality of their life as well as help in mitigating the national impacts of HIV/AIDS. The result would help the government to evaluate the existing nutrition and HIV/AIDS programme and informs to place the nutrition and food security interventions

within comprehensive HIV/AIDS care programmes. In parallel, the study findings would end up with development of support programme which will help the policy makers and health care administrators as well as partners to come up with national nutrition and food security sensitive interventions integrated into HIV prevention, treatment and care.

The study will not impose any significant risk for participants except minimal discomfort that might be encountered while dealing with sensitive personal profile. With regard to that, if they experience discomfort and wish to receive psychological support, referral counselling will be made by principal investigator.

Up on completion, a copy of the findings/result of the study will be provided to you. Thus, I shall be very pleased if you can grant me the permission to carry-out the study. In case you require any further information or want to contact the researcher about any aspect of this study, don't hesitate to contact me or my supervisor on the contact detail provided below.

Yours sincerely,

Fikadu Tadesse Nigusso (Researcher)
P.O. Box:140 Assosa, Ethiopia
Cell phone: +251911191883
Office tell: +251577752968
Email: 46773924@mylife.unisa.ac.za or fike1f@gmail.com

Professor AH Mavhandu-Mudzusi (PhD)
University of South Africa
Tel: +27 (0) 12 429 2055
Fax: +27 (0) 12 429 6688
Email:.mmudza@unisa.ac.za

ANNEXURE D: Ethical Clearance letter from Benishangul Gumuz Regional State Health Bureau

Benishangul-Gumuz Regional Health Bureau
የቤንሻንጉል ጉሙዝ ክልል መንግሥት ጤና ጥበቃ ቢሮ
Assosa

ቁጥር 612/ጤ09/12
RefNo.
ቀን 30-02-09
Date

ለአሶሳ አጠቃላይ ሆስፒታል

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ጉዳዩ፡- ድጋፍ እንዲደረግላቸው ስለመጠየቅ፣

ተማሪ ፍቃዱ ታደሰ የተባሉት በአለም ምግብ ፕሮግራም የአሶሳ ፍልድ ኦፊስ ሰራተኛ ሲሆኑ በአሁኑ ጊዜ በደቡብ አፍሪካ ዩኒቨርሲቲ (University of south Africa-UNISA) የዶክትሬት ድግሪ (PHD) ተማሪ መሆናቸውን ገልፀው ለዚሁ ትምህርት ዝግጅት የመመረቂያ ጥናት በመጀመር ላይ እንዳሉና ጥናቱ የሚያተኩረው " DEVELOPMENT OF SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV, TREATMENT AND CARE " በሚል ርዕስ ላይ ሲሆን ለዚህ ጥናት የተመረጡት ጤና ተቋማት ላይ የድጋፍ ደብዳቤ እንዲፃፍላቸው በማመልከቻ ቢሮውን ጠይቀዋል፡፡

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Health Promotion & Disease Prevention Core Process

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057-775-0167/2949/0171/0862/0915 057-775-00 62 61 Asossa Ethiopia
In reply Please Refer to our Ref.No. Stop AIDS Keep the Promise!

ANNEX E: Participants Informed Consent (for Quantitative Study)

PARTICIPANT INFORMATION SHEET

25 July 2016

DEVELOPMENT OF SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE

Dear Participant,

Hello, my name is _____. I am working as data collector for Fikadu Tadesse who is being supervised by Professor Azwihangwisi Mavhandu-Mudzusi, a professor in the Department of Health Studies towards a Doctoral study at the University of South Africa. I am inviting you to participate in a study entitled "**DEVELOPMENT OF SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE"**.

PURPOSE OF THE STUDY

This study is expected to collect important information that could develop support programme which will help the policy makers and health care administrators as well as partners to come up with nutrition and food security sensitive interventions integrated into HIV prevention, treatment and care in Benishangul Gumuz Region, Ethiopia.

PURPOSE OF YOUR PARTICIPATION

During data collection period, every Peoples Living with HIV/AIDS who will visit the Antiretroviral Treatment clinic will be randomly selected to voluntarily participate for this study. You were randomly selected because you're living in this town/village and have a comprehensive HIV/AIDS care follow-up at this facility. In order to study the subject matter, about 394 participants will be involved in this study.

THE NATURE OF YOUR PARTICIPATION IN THIS STUDY

The study involves questionnaires that will approximately take about an hour. You will be asked about you or your household food security status, medical issues, etc., here as in the questionnaires.

PARTICIPATION AND WITHDRAWAL

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY

There will no direct benefit that would be gained by you from attending in this study. However, the results of this study can contribute to the development of strategies to promote workable nutrition and food security integrated with HIV treatment, care and support services.

POTENTIAL RISKS AND DISCOMFORT

The study will not impose any significant risk for participants except minimal discomfort that might be encountered while dealing with sensitive personal profile. Some participants may not be comforted talking about their personal life, if you experience discomfort and wish to receive psychological support, please contact the investigator of the study for a referral.

CONFIDENTIALITY

The interview questionnaire is anonymous and your identity cannot be linked to your responses. Apart from this, you have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research or your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

DATA MANAGEMENT

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet with principal investigator for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable.

PAYMENT FOR ANY PARTICIPATION

Participation on this study is based on volunteerism and there is no payment for participating in this study.

ETHICS APPROVAL

The study will receive a written approval letter from ethical clearance from health studies higher committee of College of Human Sciences at University of South Africa (UNISA). Further permission will be granted from the authorities at the study site.

INFORMATION ABOUT THE FINDINGS/RESULTS OF THE RESEARCH

If you would like to be informed of the final research findings, require any further information or want to contact the researcher about any aspect of this study, please contact Fikadu Tadesse on +251911191883 or fike1f@gmail.com. The findings will be electronically accessible when published on open access journals after completion.

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

Fikadu Tadesse

CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the interview.

I have received a signed copy of the informed consent agreement.

I also understand that if I have any questions or concern about the study, I should contact the researcher (Fikadu Tadese Nigusso) at the following numbers: +251911191883/ +251577750524. I can also contact Prof AH Mavhandu-Mudzusi: (the student supervisor) 0124292055/ 0824062494.

Participant Name & Surname…….. (Please print)
Participant
Signature……..Date……

Researcher's Name & Surname: Fikadu Tadesse Nigusso
Researcher's signature: 10 July 2016

ANNEXURE F: Data Collection Instrument (Quantitative)

Structured interview questionnaires for the development of strategy for facilitating integration of nutrition and food security with HIV prevention, treatment and care in Benishangul Gumuz Region, Ethiopia.

Instruction: You have been selected by chance to take part in this interview. It will take about an hour. Because the study will investigate determinants and role of nutrition and food security on treatment outcome and quality of life of Peoples Living with HIV/AIDS, it is important to ask you some questions about your nutrition and food security status as well as related medical conditions. Your name, address or any identification will not be collected. Your answers will remain confidential so please be honest, frank, and objective as possible. The Principal Investigator knows that there are no write and wrong answers. What is of your interest is your own personal perspective.

Thank you again.

V2.1 **CODE:** | | | |

NAME OF HEALTH FACILITY_____ **Interview start at:** | | |
Interview finished at: | | |

SECTION 1: SOCIO-DEMOGRAPHICS AND HOUSEHOLD EFFECTIVE DEPENDENCY			
NO	**QUESTIONS**	**RESPONSES**	**SKIP**
1	Code of participant	_____	
2	Sex of the participant	1. Male 2. Female	
3	How old are you (in year)?	_____	
4	What is your highest level of education? (Circle one category)	1.Never been to school 2.Primary level 3.Secondary level 4.College/University level	
5	What is your marital Status? (Circle one category)	1.Single 2.Married 3.Divorced 4.Widowed 5.Separated	
6	What is your religious affiliation? (Circle one category)	1. Muslim 2. Orthodox Christian 3. Protestant Christian 4. Catholic Christian 5. Other specify): _____	
7	Where do you live? (Circle one category)	1. Town 2. Village	
8	With whom are you living?	1. Alone 2. Family 3. Parents 4. Other (Specify):_____	
9	The number of your families in the house?	_____	
10	How many of them are under 18 years old?	_____	
11	How many of them are above 68 years of age 65?	_____	
12	Is there a member of your family who have been ill for at least six months as a result of his/her HIV or other illness?	_____	
13	Is there a member of your family who have been disabled and as a result unable to work for at least six months?	_____	
14	Who is main bread winner in your household? (Circle one category)	1.Your partner 2.Yourself 3.Others (specify) _____	
15	What is your occupation? (Circle one category)	1. Unemployed 2. Employed on job for pay	

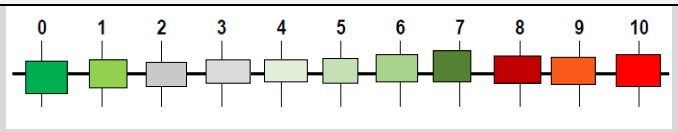
16	What is your source of income?	1. Farming 2. Government employee 3. Remittance 4. Self-financing 5. Other (Specify): __	
17	Your average monthly income (USD)?	_____	
18	What is your families' average monthly income?	_____	
19	What is the approximate distance of the clinic from your home?	_____	
SECTION 2: HOUSEHOLD FOOD SECURITY ASSESSMENT			
20. Now I will ask you about your households' food security status. You can respond to the question by saying "yes" if you agree to the statement, or "No" if you do not agree to the statement or "I don't know" if you are not sure.			
A	In the past four weeks, did you worry that your household would not have enough food?	1. Yes 2. No 3. Don't know	
B	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	1. Yes 2. No 3. Don't know	
C	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	1. Yes 2. No 3. Don't know	
D	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	1. Yes 2. No 3. Don't know	
E	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	1. Yes 2. No 3. Don't know	
F	In the past four weeks, did you or any household member have to eat fewer meals in a day because there was not enough food?	1. Yes 2. No 3. Don't know	
G	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	1. Yes 2. No 3. Don't know	
H	In the past four weeks, did you or any household member go to sleep at night	1. Yes 2. No 3. Don't know	

	hungry because there was not enough food?		
I	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	1. Yes 2. No 3. Don't know	
SECTION 3: HOUSEHOLD DIETARY DIVERSITY (HDD) ASSESSMENT			
21	**Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night. You respond to the question either as "Yes'' or "No".**		
A	Any local foods: Injera, Bread, 'Genfo', bread, rice, or any other foods made from millet, sorghum, maize, rice, wheat…?	0. No 1. Yes	
B	Any potatoes, yams, manioc, or any other foods made from roots or tubers?	0. No 1. Yes	
C	Any vegetables: cabbage, tomato?	0. No 1. Yes	
D	Any fruits: banana, orange, papaya, mango?	0. No 1. Yes	
E	Any beef, pork, lamb, goat, rabbit wild game, chicken, duck, or other birds, liver, kidney, heart, or other organ meats?	0. No 1. Yes	
F	Any eggs?	0. No 1. Yes	
G	Any fresh or dried fish or shellfish?	0. No 1. Yes	
H	Any foods made from beans, peas, lentils, or nuts?	0. No 1. Yes	
I	Any cheese, yogurt, milk or other milk products?	0. No 1. Yes	
J	Any foods made with oil, fat, or butter?	0. No 1. Yes	
K	Any sugar or honey?	0. No 1. Yes	
L	Any other foods, such as condiments, coffee, tea?	0. No 1. Yes	
SECTION 4: HOUSEHOLD ASSET POSSESSION /WEALTH INDEX			
22	Now I would like to ask you for the possession of the following items. You can respond to the questionnaire by saying "yes" if you or your family have it and "no" if not.		
A	Does your household have … electricity?	1. Yes 2. No	
B	…a mobile telephone?	1. Yes 2. No	
C	…a bed with cotton/sponge/spring mattress?	1. Yes 2. No	
D	…a chair?	1. Yes 2. No	

E	…a television?	1. Yes 2. No	
F	…a radio?	1. Yes 2. No	
G	…a table?	1. Yes 2. No	
H	Does any member of this household have a bank or microfinance saving account?	1. Yes 2. No	
I	What is the main source of drinking water for members of your household?	1. Piped to yard/plot 2. Other	
J	What kind of toilet facility do members of your household usually use?	1. No facility / bush / field 2. Pit latrine with slab 3. Other	
K	Do you share this toilet facility with other households?	1. Yes 2. No	
L	What type of fuel does your household mainly use for cooking?	1. Wood 2. Other	
M	What is the main material of the floor in your household?	1. Earth/sand/dung 2. Other	
N	What is the main material of the roof in your household?	1. Corrugated iron/metal 2. Thatch/Leaf/Mud 3. Other	

SECTION V: HEALTH-RELATED QUALITY OF LIFE

23	**This questionnaire asks how you feel about your quality of life and health. Please respond to each item by selecting the options in the row.**					
		5|Excellent	**4|**Very good	**3|**Good	**2|**Fair	**1|**Poor
A	In general, would you say your health is:	☐	☐	☐	☐	☐
B	In general, would you say your quality of life is:	☐	☐	☐	☐	☐
C	In general, how would you rate your physical health?	☐	☐	☐	☐	☐
D	In general, how would you rate your mental health, including your mood and your ability to think?	☐	☐	☐	☐	☐
E	In general, how would you rate your satisfaction with your social activities and relationships?	☐	☐	☐	☐	☐
F	In general, please rate how well you carry out your usual social activities and roles. (This includes activities at home, at work and in your community, and responsibilities as a parent, child, spouse, employee, friend, etc.)	☐	☐	☐	☐	☐
G	To what extent are you able to carry out your everyday physical activities such as walking, climbing stairs, carrying groceries, or moving a chair?	**5|Compeletely** ☐	**4|Mostly** ☐	**3|Moderately** ☐	**2|A little** ☐	**1|Not at all** ☐

H	**In the past 7 days, h**ow often have you been bothered by emotional problems such as feeling anxious, depressed or irritable?	**5|Never 4|Rarely 3|Sometimes 2|Often 1|Always** ☐ ☐ ☐ ☐ ☐
I	**In the past 7 days, h**ow would you rate your fatigue on average?	**5|None 4|Mild 3|Moderate 2|Severe 1|Very severe** ☐ ☐ ☐ ☐ ☐
J	**In the past 7 days,** how would you rate your pain on average?	 **No Pain** **Worst imaginable pain**

SECTION VI: CLINICAL CHARACTERISTICS

The following statements are regarding your medical status and related issues. You can respond to the questionnaire as they appear

24	Have you started on ART?	1. Yes 2. No (skip to Q26)	
25	How long are you on ART (in months)?	_____	
26	What is your initial (baseline) CD4 cell count?	_____	
27	Could you tell me your most recent CD4 cell count? (Please kindly confirm from ART register)	_____	
28	How much is your weight? (Take the weight of the participant)	_____	
29	How long are you? (Measure the height of the participant)	_____	
30	Have you ever smoked?	1. Yes 2. No	
31	If yes, for how long did you smoked?	1. Yes 2. No	
33	Do you smoke now?	1. Yes 2. No	
34	Is there any episodes of opportunistic infections (Diarrhoea, TB, Oral thrush, etc.) in the last three months?	1. Yes 2. No	
35	Have you been hospitalized over the past 03 months?	1. Yes 2. No	
36	Have you ever missed your clinic appointments in the last o3 months?	1. Yes 2. No	

SECTION VII: COMPETING DEMANDS BETWEEN FOOD AND HEALTHCARE NEEDS

37	**Know I will ask you about your history of giving up medical care for food in case, you can respond to the questionnaire by saying "yes" if you experienced or "no" if not.**		
A	Did you ever escape ART for food?	1. Yes 2. No	
B	Have you ever escape other medications for food?	1. Yes 2. No	
C	Did you ever escape needed outpatient care for food?	1. Yes 2. No	
D	Did you ever give-up needed inpatient care for food?	1. Yes 2.	

		No	
38	**Know I will ask you about your history of giving food for medical care in case, you can respond to the questionnaire by saying "yes" if you experienced or "no" if not.**		
E	Did you ever give-up food for ART?	1. Yes 2. No	
F	Did you ever give-up food to access outpatient care?	1. Yes 2. No	
G	Did you give-up food to access inpatient care?	1. Yes 2. No	

SECTION VIII: HOUSEHOLD FOOD INSECURITY COPING STRATEGY INDEX (CSI)

39	**In the past 7 days, if there have been times when you did not have enough food or money to buy food, how many days has your household had to:**	**Never (1)**	**Seldom [1-2days/wk] (2)**	**Sometimes [3-4days/wk] (3)**	**Often [5-6days/wk] (4)**	**Daily (5)**	
A	Rely on less preferred and less expensive foods?						
B	Borrow food, or rely on help from a friend or relative?						
C	Purchase food on credit?						
D	Gather wild food, hunt, or harvest immature crops?						
E	Consume seed stock held for next season?						
F	Send household members to eat elsewhere?						
G	Send household members to beg?						
H	Limit portion size at mealtimes?						
I	Restrict consumption by adults in order for small children to eat?						
J	Rely on casual labour for food?						
K	Reduce number of meals eaten in a day?						
L	Skip entire days without eating?						

THANK YOU FOR YOUR TIME!

ANNEXURE G: Data Collection Instrument (Quantitative) Amharic Version

<u>በቃለ-መጠይቁ ለሚሳተፉ ተሳታፊዎች የተዘጋጀ የመረጃ ወረቀትና የጽሁፍ ይሁንታ ፎርም</u>

<u>መግቢያ</u>

ጤና ይስጥልኝ። ስሜ_____ይባላል፡፡ **የስነ-ምግብና የምግብ ዋስትና ፕሮግራምን በተቀናጀ መልኩ በፀሬ-ኤችአይቪ ኤድስ ህክምናና ድጋፍ ዉስጥ ለማካተት በሚደረገው ጥናት ላይ እየሰራሁ እገኛለሁ።** ጥናቱን በዋናነት የሚያደርገዉ አቶ ፍቃዱ ታደሰ የተባሉ ሲሆን፣ በአሁኑ ጊዜ በደቡብ አፍሪካ ዩኒቨርሲቲ (University of South Africa-UNISA) የዶክተሬት ዲግሪ ተማሪ ነዉ:: የዚህ ጥናት አስፈላጊነትም የስነ-ምግብና የምግብ ዋስትና ፕሮግራምን በተቀናጀ መልኩ በፀሬ-ኤችአይቪ ህክምናና ድጋፍ ውስጥ በማካተት የተሻለ የህክምና አገልግሎት ለመስጠት የሚያስችሉ ሁኔታዎችን ለማወቅ ነዉ። የሚሰበሰበው መረጃ የመንግስትን አገልግሎት የማሻሻል አቅም ያግዛል ተብሎ ይታመናል። በጥናቱ በርካታ ኤችአይቪ ፖዘቲቭ የሆኑ ወገኖችን ማሳተፍ አስፈላጊ በመሆኑ በተለያየ ቦታዎች የመረጃ ስብሰባው በመከናወን ላይ ነዉ።

በዚህ ጥናት ስለ ግል ህይወትዎ፣ ስለ የስነ-ምግብና የምግብ ዋስትና ሁኔታዎ፣ ስለ ህክምናዎ ሁኔታና ስለ ለሎች ከህክምና ጋር የተያያዙ ሁኔታዎች ይጠየቃሉ። አንዳንድ ጊዜ ለራስ የማይመች ጥያቄ ሊጠየቁ ይችላሉ። የእርሶን ማንነት የሚያመላክት መረጃ ፈጽሞ አይመዘገብም። የሚሰበሰበዉ መረጃ ተጠቃሎ ዋናዉ አጥኝ ጋር በጥንቃቄ የሚቀመጥ ሲሆን ጥናቱ ሲጠናቀቅ ማንም ሰዉ በማያገኜዉ ሁነታ ይወገዳል። መጠየይቁ የሚካሄደዉ በፍጹም ፍቃደኝነት ነዉ።

የሚጠይቁኝ ጥያቄ አለኖት? _ _ _ _ _

በቃለ-ምልልሱ ለመሳተፍ ፈቃደኛ ነዎት?

1. አዎ

/2. አይደለሁም አቁም

አመሰግናለሁ። ወደ ቃለ-ምልልሱ እንገባለን።

ፍቃደኝኔታቸውን የሰጡት ተጠያቂ ስምና ፍርማ:

ስም፡_____ ፊርማ፡_____ ቀን፡ _____

V2.1 የመጠይቁ ኮድ:

<u>በቃለ-መጠይቁ ለሚሳተፉ ተሳታፊዎች የተዘጋጀ የመረጃ ወረቀትና የጽሁፍ ይሁንታ ፎርም</u>

<u>መግቢያ</u>

ጤና ይስጥልኝ። ስሜ_____ይባላል፡፡ **የስነ-ምግብና የምግብ ዋስትና ፕሮግራምን በተቀናጀ መልኩ በፀሬ-ኤችአይቪ ኤድስ ህክምናና ድጋፍ ዉስጥ ለማካተት በሚደረገው ጥናት ላይ እየሰራሁ እገኛለሁ።** ጥናቱን በዋናነት የሚያደርገዉ አቶ ፍቃዱ ታደሰ የተባሉ ሲሆን፣ በአሁኑ ጊዜ በደቡብ አፍሪካ ዩኒቨርሲቲ (University of South Africa-UNISA) የዶክተሬት ዲግሪ ተማሪ ነዉ:: የዚህ ጥናት አስፈላጊነትም የስነ-ምግብና የምግብ ዋስትና ፕሮግራምን በተቀናጀ መልኩ በፀሬ-ኤችአይቪ ህክምናና ድጋፍ ውስጥ በማካተት የተሻለ የህክምና አገልግሎት ለመስጠት የሚያስችሉ ሁኔታዎችን ለማወቅ ነዉ። የሚሰበሰበው መረጃ የመንግስትን አገልግሎት የማሻሻል አቅም ያግዛል ተብሎ ይታመናል። በጥናቱ በርካታ ኤችአይቪ ፖዘቲቭ የሆኑ ወገኖችን ማሳተፍ አስፈላጊ በመሆኑ በተለያየ ቦታዎች የመረጃ ስብሰባው በመከናወን ላይ ነዉ።

በዚህ ጥናት ስለ ግል ህይወትዎ፣ ስለ የስነ-ምግብና የምግብ ዋስትና ሁኔታዎ፣ ስለ ህክምናዎ ሁኔታና ስለ ለሎች ከህክምና ጋር የተያያዙ ሁኔታዎች ይጠየቃሉ። አንዳንድ ጊዜ ለራስ የማይመች ጥያቄ ሊጠየቁ ይችላሉ። የእርሶን ማንነት የሚያመላክት መረጃ ፈጽሞ አይመዘገብም። የሚሰበሰበዉ መረጃ ተጠቃሎ ዋናዉ አጥኝ ጋር በጥንቃቄ የሚቀመጥ ሲሆን ጥናቱ ሲጠናቀቅ ማንም ሰዉ በማያገኘዉ ሁነታ ይወገዳል። መጠየይቁ የሚካሄደዉ በፍጹም ፍቃደኝነት ነዉ።

የሚጠይቁኝ ጥያቄ አሎት? _ _ _ _ _

በቃለ-ምልልሱ ለመሳተፍ ፈቃደኛ ነዎት?

1. አዎ

/2. አይደለሁም **አቁም**

አመሰግናለሁ። ወደ ቃለ-ምልልሱ እንገባለን።

ፍቃደኝነታቸውን የሰጡት ተጠያቂ ስምና ፍርማ:

ስም፡_____ **ፊርማ፡**_____ **ቀን፡** _____

V2.1 የመጠይቁ ኮድ: | | |

የጤና ተቋሙ ስም: _____ ቃለ-መጠይቁ የተጀመረበት ሰዓት: | |
ቃለ-መጠይቁ የተጠናቀቀበት ሰዓት: | |

SECTION I: አጠቃላይ የማህበራዊና ሥነ ሕዝብ ነክ ጥያቄዎች / SOCIO-DEMOGRAPHIC INFORMATION

ተ.ቁ	ጥያቄዎችና መመርያዎች	ምላሾች	የሚታለፉ
1	ዕድሜዎት ስንት ነዉ? (በሙሉ ዓመት ይጻፍ)	☐☐	
2	ጾታ	1. ሴት 2. ወንድ	
3	ዘመናዊ ትምህርት እስከ ስንተኛ ክፍል ተምረዋል?	1. ምንም የቀለም ትምህርት የለኝም 2. የመጀመርያ ደረጃ (1__8)ኛ ክፍል 3. ሁለተኛ ደረጃ (9-12) ክፍል 4. ተከኒክና ሙያ 5. ኮሌጅ/የዩኒቨርሲት ትምህርት ያጠናቀቀ/ች	
4	የጋብቻ ሁኔታ	1. ያላገባ/ች 2. ያገባ/ች 3. የፈታ/ች 4. ባለቤቱ/ቷ የሞተ/ባት 5. የተለያየ/ች 6. ሌላ:_____	
5	በቤት ዉስጥ በዋናነት የምጠቀሙት ቋንቋ የትኛዉ ነዉ?	1. አማርኛ 2. ኦሮምኛ 3. ትግርኛ 4. ሩጣና 5. ጉምዝኛ 6. ሸናሸኛ 7. ሌላ(ይገለጽ):_____	
6	ብሔርዎ ምንድ ነዉ?	1. አማራ 2. ኦሮሞ 3. ትግሬ 4. በርታ 5. ጉሙዝ 6. ሸናሻ 7. ሌላ (ይገለጽ):_____	
7	ሃይማኖትዎ ምንድነዉ?	1. ሙስልም 2. ኦርቶዶክስ 3. ፕሮቴስታንት 4. ካቶሊክ 5. ባህላዊ 6. የለዉም 7. ሌላ (ይግለጽ)_____	
8	ምን ዓይነት አካባቢ ነው የሚትኖሩት?	1. ገጠር 2. ከተማ	
9	ከማን ጋር ነዉ የሚኖሩት	1. ብቻዬን 2. ከበተሰቤ ጋር 3. ሌላ (ይገለጽ):_____	
10	በቤታችሁ ዉስጥ የምኖር የቤተሰብ ብዛት ስንት ነዉ?	☐	
11	በቤተሰቡ ዉስጥ ዕድሜያቸዉ፥	1. ከ18 ዓመት በታች የሆኑ የቤተሰቡ አባል ስንት ናቸው? ☐ 2. ከ19-64 ዓመት የሆኑ የቤተሰቡ አባል ስንት ናቸው? ☐ 3. ከ65 ዓመት በላይ የሆኑ የቤተሰቡ አባል ስንት ናቸው? ☐	
12	ለስድስት ወርና ከዚያበላይ ለሆነ ጊዜ በኤች አይቪ ወይም በሌላ ህመም የታመመ የቤተሰብ አባል አለ?	1. አዎ 2. የለም	
13	በቤተሰቡ ዉስጥ የአካል ጉዳት ደረሶበት ቢያንስ ለስድስት ወርና ከዝያ በላይ ለሆነ ጊዜ ስራ መስራት የማይችል የቤተሰብ አባል አለ?	1. አዎ 2. የለም	

V2.1 የመጠይቁ ኮድ: | | | |

14	የቤተሰቡ ኃላፊ ማን?	1. እኔ 4. አባቴ 2. ባለቤቴ 5. ቤተሰቡ 3. እናቴ 6. ሌላ :_____	
15	በዋናነት ቤተሰቡን የሚደጉም ማነዉ?	1. እኔ 4. አባቴ 2. ባለቤቴ 5. ቤተሰቡ 3. እናቴ 6. ሌላ :_____	
16	ዋና ዋና የቤተሰብ ግዥዎችን የሚወስን ማን ነዉ?	1. እኔ 4. አባቴ 2. ባለቤቴ 5. ቤተሰቡ 3. እናቴ 6. ሌላ :_____	
17	መተዳደርያዎት ምንድነዉ?	1. ምንም ስራ የለኝም 2. በገንዘብ ተቀጥረ ነዉ የሚሰራዉ 3. ሌላ (ይገለጽ):_____	
18	በቀን ረጅም ሰዓት የምያሳልፉት ምን በመስራት ነዉ?	1. የጉልበት ስራ በመስራት በግንባታ ሙያ 2. ተቀጥሮ የመንግስት ስራ በመስራት 3. ተቀጥሮ የግብርና ስራ በመስራት 4. በራሱ መሬት ላይ የግብርና ስራ በመስራት 5. የቤት እመበት 6. የቤት ሰራተኛ 7. ተማር 8. ሌላ (ይገለጽ):_____	
19	አማካይ የወር ገቢዎት ስንት ነዉ?		
20	የቤተሰቦ አማካይ የወር ገቢ ስንት ነዉ?		

SECTION II: የቤተሰብ የምግብ ዋስትና ሁኔታ/ HOUSEHOLD FOOD SECURITY ASSESSMENT

21. አሁን የበተሰብዎን የምግብ ዋስትና ሁኔታን እጥይቆታለሁ፣ ለጥያቀዎቹ የምስማሙ ከሆነ 'አዎ'፤ የማይስማሙ ከሆነ 'የለም' በማለት በማለት መልስ ይስጡኝ።

ባለፉት 4 ሳምንት ጊዜ ውስጥ እርሶ ወይም የበተሰቡ አባል በቂ ገንዘብ በማጣት :-

A.	የምግብ ፍጆታዉን ሚሚላት አቅቶት ተጨንቀዉ ያዉቃል?	1. አዎ 2. የለም	
B.	የተመጣጠነ የምግብ ዓይነቶችን መመገብ/መግዛት አቅቶት ተቸግሮ ያዉቃል?	1. አዎ 2. የለም	
C.	የምፈልጉትን የምግብ ዓይነት **መመገብ/መግዛት ቀንሰዉ ነበር?**	1. አዎ 2. የለም	
D.	ጠቃሚ የሆኑ የምግብ ዓይነቶችን በመተዉ ሪካሸና እምብዛም የማይዘወተሩትን የምግብ ዓይነት ለመመገብ ተገደዉ ነበር?	1. አዎ 2. የለም	
E.	የምትመገቡትን የምግብ መጠን ቀንሰዋል?	1. አዎ 2. የለም	
F.	መደበኛ የምግብ ሰዓታትን ሳትመገቡ ለማለፍ ተገዳችሁ ታውቃላችሁ?	2. አዎ 2. የለም	
G.	ምንም ዓይነት ምግብ ሳይመገቡ ያሳለፉት ግዜ ነበር?	1. አዎ 2. የለም	
H.	ምግብ ሳይመገቡ ያደሩበት ጊዜ አለ?	1. አዎ 2. የለም	
I.	ቀኑንና ሌሊቱን ሳይመገቡ ቀርተዉ ያዉቃሉ?	1. አዎ 2. የለም	

SECTION III: የቤተሰብ የአመጋገብ ብዙሃነት / HOUSEHOLD DIETARY DIVERSITY

22 አሁን ደግሞ እርሶ ወይንም የበተሰቡ አባላት ባለፉት ሰባት ቀናት ውስጥ የተመገቡትን የምግብ ዓይነት እጠይቀዎታለሁ::ለጥያቀዎቹ 'አዎ' ወይም 'የለም' በማለት በማለት ይመልሱ።

A. የአገዳና የብር እህሎች የተዘጋጁ ምግቦች (ዳቦ፣እንጀራ፣ገንፎ፣ ቂጣ፣ ወዘተ?	1. አዎ 2. የለም	
B. ከሥራስር የሚገኙ ምግቦች (ድንች ስኳር፣ ድንች፣ ካሮት፣ ቀይስር፣ ቆጮ፣ ወዘተ)?	1. አዎ 2. የለም	
C. የጓሮ አትክልት (ጎመን፣ሠላጣ፣ዱባ፣ቲማትም)?	1. አዎ 2. የለም	
D. ፍራፍሬ (ሙዝ፣ብርቱካን፣ ማንጎ፣ፓፓያ፣ወዘተ?	1. አዎ 2. የለም	
E. ሥጋ (የበግ፣ፍየል፣ዶሮ፣ከብት፣ወዘተ)?	1. አዎ 2. የለም	
F. እንቁላል?	1. አዎ 2. የለም	
G. ዓሳ?	1. አዎ 2. የለም	
H. ጥራጥሬ፣የቅባት እህሎች (ባቄላ፣አተር፣ምስር፣ ቾሎኔ፣ወዘተ)?	1. አዎ 2. የለም	
I. ወተትና የወተት ተዋፅኦ?	1. አዎ 2. የለም	
J. ዘይት፣ቅቤ፣ስብ?	1. አዎ 2. የለም	
K. ስኳር፣ ማር?	1. አዎ 2. የለም	
L. ለሎች የምግብ ዓይነቶች:- ቡና፡ ሻይ?	1. አዎ 2. የለም	

SECTION IV: የቤተሰብ ሀብት አመልካች / HOUSEHOLD WEALTH INDEX

23 አሁን ደግሞ የምከተሉት ቁሳቁሶች ቤትዎ ዉስጥ ካለዎት 'አዎ' ከለሌዎት 'የለም' በማለት መልስ ይስጡ።

A. ... የኤለክትሪክ አገልግሎት	1. አዎ 2. የለም	
B. ...የግል የሆነ የተንቀሳቃሽ ወይም የሞባይል ስልክ?	1. አዎ 2. የለም	
C. ... የጥጥ/የስፖንጅ/የስፕርንግ ፊራሽ አልጋ?	1. አዎ 2. የለም	
D. ... ወንበር?	1. አዎ 2. የለም	
E. ...ተሌቭዥን?	1. አዎ 2. የለም	
F. ... ራድዮ?	1. አዎ 2. የለም	
G. ... ጠረጴዛ?	1. አዎ 2. የለም	
H. ከቤተሰቡ ዉስጥ የባንክ ወይም የብድርና ቁጠባ ደብተር ያለዉ አለ?	2. አዎ 2. የለም	
I. ለመጠጥ በዋናነት የምንድን ዉሃ ነዉ የምትጠቀሙት?	1. የቧንቧ 2. የምንጭ/ጉድጓድ 3. ሌላ:_____	
J. ቤተሰቡ ምን ዓይነት መጸዳጃ ነዉ የምጠቀመዉ?	1. መጸዳጃ የለንም/ጫካ/ሜዳ ላይ 2. መጸዳጃ ቤት 3. ሌላ:_____	መልሱ 1 ከሆነ ወደ ጥያቄ 23 L ይለፉ

	K. ይህን መጸዳጃ ቤት ከለሎች ሰዎች ጋር ትጠቀማላችሁ?	1. የለም 2. አዎ	
	L. በዋናነት ለምግብ ማብሰያ ምንድነዉ የምትጠቀሙት?	1. እንጨት/ከሰል 2. የኤለክትርክ ኃይል 3. ሌላ:_____	
	M. የቤትዎ/ቤተሰቡ የቤቱ ወለል ምንድ ነዉ?	1. አፈር/አሸዋ 2. ሌላ:_____	
	N. የቤትዎ/የቤተሰቡ የቤት ክዳን ምንድ ነዉ?	1. ቆርቆሮ/ከብረት የተሰራ 2. ሳር/ቅጠላቅጠል 3. ሌላ: _____	
24	ቤተሰብዎ ከዚህ በታች የተጠቀሱትን የቤት እንስሳ አሎት?		
	A. ቤተሰቦ ምን ያህል ዶሮዎች አሉት?	1. ☐ 2. ምንም የላቸዉም	
	B. ቤተሰቦ ምን ያህል ከብቶች አሉት?	1. ☐ 2. ምንም የላቸዉም	
	C. ቤተሰቦ ምን ያህል ፍየሎች አሉት?	1. ☐ 2. ምንም የላቸዉም	
	D. ቤተሰቦ ምን ያህል አህዮች፤ ፈረሶች፤ በቅሎች አሉት?	1. ☐ 2. ምንም የላቸዉም	
	E. ቤተሰቦ ምን ያህል በጎች አሉት?	1. ☐ 2. ምንም የላቸዉም	
25	ከቤተሰቦ ዉስጥ የሚከተሉትን ቁሳቁሶች ያለዉ አለ?		
	A. … ብስክለት?	1. አዎ 2. የለም	
	B. … ምተር ሳይክል?	1. አዎ 2. የለም	
	C. … የእንስሳት ጋሪ?	1. አዎ 2. የለም	
	D. … ባጃጅ?	1. አዎ 2. የለም	
	E. … ጀልባ?	1. አዎ 2. የለም	

SECTION V: ጤና ነክ መረጃዎች / HEALTH-RELATED QUALITY OF LIFE

26	አሁን ደግሞ አጠቃላይ የጤንኔትዎንና የኑሮ እርካታዎን ሁኔታ እጠይቆታለሁ፤ ለጥያቄዉ መልስ ከቀረቡት አማራጮች ይምረጡ።					
	A. በአጠቃላይ ጤንኔትዎ እንደት ነዉ?	5|እጅግ በጣም ጥሩ	4|በጣም ጥሩ	3|ጥሩ	2|በመጠኑ	1|መጥፎ
	B. በአጠቃላይ የኑሮ እርካታ ሁኔታዎ እንደት ነዉ?	☐	☐	☐	☐	☐
	C. በአጠቃላይ አካላዊ ጥንካሬዎ እንደት ነዉ?	☐	☐	☐	☐	☐
	D. በአጠቃላይ አዕምሮዊ ጤንነትዎን እንደት ይገልፃሉ?	☐	☐	☐	☐	☐
	E. በአጠቃላይ ማህብረሰባዊ ተሳትፎዎንና ማህብረሰባዊ ግኑኝነት የእርካታዎን ሁኔታ እንደት ነዉ?	☐	☐	☐	☐	☐
	F. በአጠቃላይ የተለመዱ ማህቤረሰባዊ ተሳትፎዎንና ማህቤረሰባዊ ሃላፊነቶን (ለምሳሌ፦ በቤትዎ ዉስጥ የሚከናዉኑትን፡ በማህቤረሰቡ ያለዎትን ድርሻና ተሳትፎ፡ ቤተሰባዊ ሀላፊነቶን፡ ወዘተ) እንደት ነዉ?	☐	☐	☐	☐	☐

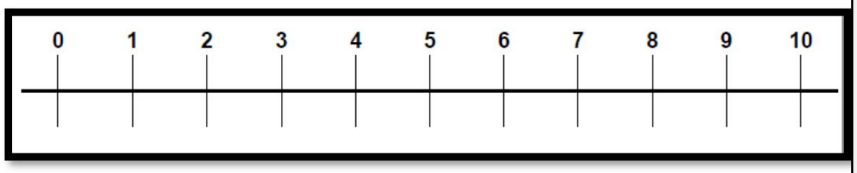
	G. የየዕለት እንቅስቃሴ፦ መራመድ፣ ደረጃ መዉጣት መዉረድ፣ ወንበሮችን ከቦታቦታ ማንቀሳቀስ፣ ወዘተ ምን ያህል ያከናዉናሉ?	5|ሁልጊዜ 4|አብዛኛዉን ጊዜ 3|አንዳንድ ጊዜ 2|ጥቂት ጊዜ 1|ምንም
	H. ባለፉት 7 ቀናት ዉስጥ ምን ያህል ሀሳብ ጉብቶት ነበር፤ ማለትም ምን ያህል ጊዜ ተጨንቆ ወይም ተበሳጭቶ ወይም ተናዶ ነበር?	5|በጭራሽ 4|ጥቂት ጊዜ 3|አንዳንድ ጊዜ 2|አብዛኛዉን ጊዜ 1|ሁል ጊዜ
	I. ባለፉት 7 ቀናት ዉስጥ በአማካይ ምን ያህል የድካም ስሜት ይሰማዎት ነበር?	5|ምንም ጊዜ 4|መጠነኛ 3|መካከለኛ 2|ከፍተኛ 1|በጣም
	J. ባለፉት 7 ቀናት ዉስጥ በአማካይ ምን ያህል የህመም ስሜት ነበርዎት? መልሱ እዚህ ሳጥን/Box ዉስጥ ይሞላ	0 1 2 3 4 5 6 7 8 9 10 በጣም ዝቅተኛ የህመም ደረጃ — በጣም ከፍተኛ/አሰቃቂ የህመም ደረጃ

SECTION VI: ከህክምና ጋር የተያያዙ መረጃዎች / CLINICAL CHARACTERISTICS

አሁን ደግሞ ስለ የህክምናዎትና ከህክምናዎት ጋር የተያያዙ መረጃ እጠይቆታለሁ።

27	የፀሬ-ኤችአይቪ መድኃኒት ጀምሯል?	1. አዎ 2. የለም	መልሱ 2 ከሆነ ወደ ጥያቄ 30 ይለፉ
28	መድኃኒት ከጀመሩ ምን ያህል ዓመት ነዉ?		
29	የመጀመርያ የCD4 መጠንዎት ስንት ነዉ?		
30	የቅርብ ጊዜ የCD4 መጠንዎ ስንት ነዉ? (የCD4 መጠኑ ከፀሬ-ኤችአይቪ መዝገብ ታይቶ ይሞላ)		
31	ክብደትዎ ስንት ነዉ? (የተሳታፊዉን ክበደት ይለኩት)		
32	ቁመትዎ ስንት ሰንቲ-ሜትር ነዉ? (የተሳታፊዉን ቁመት ይለኩት)		
33	ስጋራ አጭሰዉ ያውቃሉ?	1. አዎ 2. የለም	መልሱ 2 ከሆነ ወደ 38 ይለፉ
34	አጭሰዉ የሚያዉቁ ከሆነ፤ ለምን ያህል ጊዜ ነበር ያጨሱት?	1. አዎ 2. የለም	
35	አሁን ያጨሳሉ?	1. አዎ 2. የለም	
36	ባለፉት ሶስት ወራት ዉስጥ የተጓዳኝ ህመም (ተቅማጥ፡ የአፍ መቁሰል፡ ቲቢ፡ ወዘተ) አሞት ነበር?	1. አዎ 2. የለም	
37	ባለፉት ሶስት ወራት ጊዜ ዉስጥ አሞት ሆስፒታል ተኝተዉ ነበር?	1. አዎ 2. የለም	

V2.1 የመጠይቁ ኮድ: | | | |

38	ባለፈው አንድ ወር ጊዜ ውስጥ ከታዘዘልዎት ፀረ ኤች አይቪ መድኃኒት ውስጥ ምን ያህሉን እንደወሰዱ ያስታውሱ። በዚህ መስመር ላይ ከ0 እስከ 10 ይታያል። 0 ማለት ምንም አልወሰዱም ማለት ሲሆን 10 ማለት ደግሞ ሁሉንም ወስደዋል ማለት ነው። 5 ማለት ደግሞ 50 በመቶ ወይም ግማሹን ወስደዋል ማለት ነው።  የእርስዎን የባለፈውን የአንድ ወር መድኃኒት አወሳሰድዎን በመስመሩ ላይ የት ያስቀምጡታል?		መልሱ እዚህ ሳጥን/Box ውስጥ ይሞላ [ ]	
39	ሰዎች የተለያዩ ምክንያቶች ሰገጥሟቸዉ በተደጋጋም በቀጠሯቸዉ ወደ ክሊኒክ ሳይመጡ ይቀራሉ። ይህ በእርሶ ላይ ደርሶ ያዉቃል?	1. አዎ 2. የለም	
40	ባለፉት ሶስት ወራት ጊዜ ዉስጥ ቀጠሮዎትን ስንት ጊዜ አሳልፏል?	1. አንድ ጊዜ 2. ሁለት ጊዜ 3. ሶስትና ከዝያ ባለይ 4. አሳልፎ አያዉቁም	መልሱ 4 ከሆነ ወደ 45 ይለፉ
41	ሰዎች በቀጠሯቸዉ ቀን የማይገኙባቸዉ የተለያዩ ምክንያቶች አሉአቸዉ። እርሶ በቀጠሮ ቀን ያስቀረዎት የትኛዉ ምክንያት ነበር?	1. ከቤተሰቡ/ከስራ ጋር የተያያዘ ለሎች ሀላፍነቶች 2. ለመጓጓዣ ገንዘብ ስላልነበረኝ 3. ለበተሰቡ የምግብ ፍጆታ ለማፈላለግ 4. ሌላ:_____	
42	ለሚቀጥለዉ ቀጠሮ በቀላሉ ወደ ክሊንኩ እንዲመለሱ ሊረዳዎት የምችል ነገር ምንድ ነዉ?	1. የመጓጓዣ ገንዘብ 2. የምግብ ድጋፍ 3. የቤት ዉስጥ ስራዎችን የሚሰራልኝ 4. ሌላ:_____	
43	ዛሬ ወደዚህ ክሊንክ ለመድረስ ምን ያህል ጊዜ ፈጅቦዎት?	1. ሰዓት: [ ][ ] ደቂቃ [ ][ ]	

SECTION VII: የህክምና ክብካቤና የምግብ ፍላጎት ተፅዕኖ / COMPETING DEMANDS BETWEEN FOOD AND HEALTHCARE NEEDS

44 አሁን ደግሞ ድንገት የምግብ ፍላጎቶን ለሚሚላት የህክምና ክብካቤዎትን አቋርጦት ከሆነ በዚህ ዙርያ እጠይቆታለሁ፤ ለጥያቄዎቹ "አዎ" ወይም "የለም" በማለት ይመልሱ።

ባለፉት ሶስት ወራት ጊዜ ዉስጥ በቂ ገንዘብ በማጣት የምግብ ፍላጎትዎን ለሚሚላት ብለዉ፦

A. የፀሬ-ኤችአይቪ መድኃኒትዎን ሳይወስዱ የቀሩበት ጊዜ ኣጋጥሞ ያዉቃል?	1. አዎ 2. የለም	
B. ሌሎች የተጓዳኝ መድኃኒትዎን ሳይወስዱ የቀሩበት ጊዜ ኣጋጥሞ ያዉቃል?	1. አዎ 2. የለም	
C. ተመላላሽ ህክምናዎን ሳያደርጉ የቀሩት ጊዜ ኣጋጥሞ ያዉቃል?	1. አዎ 2. የለም	
D. ተኝቶ የመታከም ህክምናዎን የተዉት/ያቋረጡት ጊዜ ኣጋጥሞ ያውቃል?	1. አዎ 2. የለም	

45 አሁን ደግሞ ድንገት የህክምና ክብካቤዎትን ለሚሚላት የምግብ ፍላጎቶን ገድበዉ ከሆነ በዚህ ዙርያ እጠይቆታለሁ፤ ለጥያቄዎቹ "አዎ" ወይም "የለም" በማለት ይመልሱ።

ባለፉት ሶስት ወራት ጊዜ ዉስጥ በቂ ገንዘብ በማጣት የህክምና ክብካቤዎትን ለሚሚላት ብለዉ፡-

A. ምግብዎን ሳይወስዱ/ሳይመገቡ የቀሩበት ጊዜ ኣጋጥሞ ያዉቃል?	1. አዎ 2. የለም	
B. ሌሎች የተጓዳኝ መድኃኒትዎን ሳይወስዱ የቀሩበት ጊዜ ኣጋጥሞ ያዉቃል?	1. አዎ 2. የለም	
C. ተመላላሽ ህክምናዎትን ሳያደርጉ የቀሩበት ጊዜ ኣጋጥሞ ያዉቃል?	1. አዎ 2. የለም	
D. ተኝቶ የመታከም ህክምናዎን የተዉት/ያቋረጡት ጊዜ ኣጋጥሞ ያውቃል?	1. አዎ 2. የለም	

SECTION VIII: የቤተሰብ የምግብ ዋስትና የማቋቋሚያ ዘዴ ልከት መረጃ / HOUSEHOLD FOOD INSECURITY COPING STRATEGY INDEX (CSI)

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ባለፉት ሰባት ቀናት ውስጥ ቤተሰቡ በቂ ምግብ ወይም ገንዘብ አጥተዉ ከሆነ፤ **ቤተሰብዎ ለስንት ቀናት፥**	በጭራሽ (1)	ጥቂት ጊዜ [1-2ቀናት] (2)	አንዳንድ ጊዜ [3-ቀናት] (3)	አብዛኛዉን ጊዜ [5-6ቀናት] (4)	በየቀኑ (5)	
A. በጥቅቱ የሚዘወተሩና ርካሽ ምግቦችን ተመግበዉ ነበር?						
B. የምግብ እህሎችን ከጓደኛ ወይም ከቤተዘመድ ተበድረው ነበር?						
C. ገንዘብ ተበድረዉ የምግብ እህሎችን ወይም ምግቦችን ገዝተዉ ነበር?						
D. አደን ማደን፤ ከዱሪ የሚበሉ ነገሮችን መሰብሰብ፣ ወይም ያልደረሱ እህሎችን መመገብ?						
E. ለሚቀጥለዉ ዓመት የተቀመጠ የምርጥ ዘር እህሎችን መመገብ?						
F. የቤተሰቡ አባላትን ምግብ እንድመገቡ ወደ ሌላ ቦታ መላክ?						
G. የቤተሰቡን አባላትን ለልመና ማሰማራት?						
H. ምግብ በሚመገቡት ጊዜ የምግብ መጠንዎን መቀነስ?						
I. ህጻናት እንዲመገቡ ከትላልቆቹ የቤተሰብዎ አባላት የምግብ መጠኑን መቀነስ?						
J. ምግብ ለማግኘት የተገኘዉን የጉልበት ስራ መስራት?						
K. ዕለታዊ የምግብ ፍጆታዎን ለመቆጠብ የመመገቢያ ምልልስዎን መቀነስ?						
L. ቀኑን በሙሉ ሳይመገቡ መዋል?						

ይህ የቃለመጠይቁ መጨረሻ ነዉ:: ጊዜዎን ሰዉተዉ ከእኔ ጋር ስለቆዩ በድጋሚ አመሰግናለሁ።

ANNEX H: Respondents Informed Consent (Qualitative Study)

DEVELOPMENT OF A SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE

Dear Colleagues,

Thank you for devoting your time to be part of this Focus Group Discussion. I, Fikadu Tadesse Nigusso, am currently working on a study entitled "development of a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care" towards Doctoral degree being supervised by Professor Azwihangwisi Mavhandu-Mudzusi, a professor in the Department of Health Studies at the University of South Africa. The main purpose of the study is to investigate the determinants of nutrition and food security on treatment outcome and quality of life of peoples living with HIV/AIDS, with the view of developing supportive programme facilitating integration of nutrition and food security with HIV prevention, treatment and care. Developing such support programme will improve the quality of life of peoples living with HIV/AIDS as well as help in mitigating the national impacts of HIV/AIDS.

PURPOSE OF YOUR PARTICIPATION

You were recommended for participation as a member of the senior health experts of Ethiopia particularly for Benishangul Gumuz Region. Senior health experts are deliberately selected to provide their perspective and experience on how best nutrition and food security will be integrated with HIV prevention, treatment and care.

THE NATURE OF YOUR PARTICIPATION IN THIS STUDY

The study involves a focus group discussion that will approximately take about an hour. You will be asked about your opinion how best nutrition and food security programmes will be integrated with the prevailing comprehensive HIV prevention, treatment and care.

PARTICIPATION AND WITHDRAWAL

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY

There will no direct benefit that would be gained by you from attending in this study. However, the results of this study can contribute to the development of a supporting programme facilitating the integration of nutrition and food security HIV treatment, care and support services.

POTENTIAL RISKS AND DISCOMFORT

The study involves no foreseeable physical and psychological discomfort or inconvenience. However, I realise that you are busy therefore appreciate your time and expertise regarding the subject.

CONFIDENTIALITY

All information obtained during the course of this study is strictly confidential. None of the information will be linked to your name. Your identity will not be revealed while the study is being conducted or when the study is reported in scientific journals. All the data information that has been collected will be stored in a secure place after analysing the data.

DATA MANAGEMENT

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet with principal investigator for future research or academic purposes; electronic information will be stored on a

password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable.

PAYMENT FOR ANY PARTICIPATION

Participation on this study is based on volunteerism and there is no payment for participating in this study.

ETHICS APPROVAL

The study will receive a written approval letter from ethical clearance from health studies higher committee of College of Human Sciences at University of South Africa (UNISA). Further permission will be granted from the authorities at the study site.

INFORMATION ABOUT THE FINDINGS/RESULTS OF THE RESEARCH

If you would like to be informed of the final research findings, require any further information or want to contact the researcher about any aspect of this study, please contact Fikadu Tadesse on +251911191883 or fike1f@gmail.com. The findings will be electronically accessible when published on open access journals after completion.

Thank you for taking time to read this information sheet and for participating in this study.

Thank you.

Fikadu Tadesse

ANNEXURE I: Data Collection Instrument (Qualitative)

DEVELOPMENT OF SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE

Dear colleagues,

Thank you for devoting your time to be part of this Focus Group Discussion, which is aimed at development of a support programme for facilitating the integration of nutrition and food security with HIV prevention, treatment and care. I, Fikadu Tadesse Nigusso, is a doctoral student at the University of South Africa.

You were recommended for participation as a member of the senior health experts of Ethiopia particularly for Benishangul Gumuz Region. Senior health experts are deliberately selected to provide their perspective and experience on how best nutrition and food security will be integrated with HIV prevention, treatment and care. Your participation and responses are anonymous because your name, address or any identification will not be collected. Your answers will remain confidential so please be honest, frank, and objective as possible. Thank you for your time and interest.

QUESTIONS FOR FOCUS GROUP DISCUSSION (FGD) WITH SENIOR HEALTH EXPERTS

1. What are the programmatic and service challenges with regard to Antiretroviral treatment (ART) in Benishangul Gumuz Region?
2. Could you kindly share me your perception on the living standards of peoples living with HIV/AIDS (PLWHA) in Benishangul Gumuz Region?
3. What things do you think helps for ART treatment adherence and improve quality of life of PLWHA in the region?
4. Is there any form of nutrition and food supplementation program provided to PLWHA in the region? If yes, what are the barriers with assisting on nutrition and food to meet the minimum dietary needs of food insecure PLWHA?
5. Overall, how can the currently available nutrition programme be used in a better way? and what are the barriers for doing so?
6. What is your view regarding the inclusion of nutrition and food support with HIV prevention, treatment and care?
7. What has been your experience on integrating nutrition and food security with comprehensive HIV prevention, treatment and care in the Benishangul Gumuz region as well as in other regions that you know? What has worked and what has not worked and why? *(We are asking you to reflect on real experiences that you have had or that you are very familiar with.)*
8. Please give us any further thoughts to help explain and improve integration of nutrition and food security issues (proposals, strategies, interventions) with HIV prevention, treatment and care policy agenda to improve the services and ART adherence and quality of life of PLWHA.

DEVELOPMENT OF SUPPORT PROGRAMME FOR FACILITATING THE INTEGRATION OF NUTRITION AND FOOD SECURITY WITH HIV PREVENTION, TREATMENT AND CARE

QUESTIONS FOR FOCUS GROUP DISCUSSION (FGD) WITH SENIOR HEALTH EXPERTS (AMHARIC)

1. የፀረ-ኤችአይቪ ኤድስ ህክምና ና አገልግሎትን **(ART SERVICE DELIVERY)** በተመለከተ በዋናነት የሚያጋጥሙት ችግሮች **(CHALLENGES)** ምንድ ናቸዉ?
2. በክልሉ ዉስጥ ከኤችአይቪ ቫይረስ ጋር የምኖሩ የማህብረሰቡ ክፍል **የኑሮ ጥራት/ደረጃ ሁኔታን (QUALITY OF LIFE) በተመለከተ የእናንተ እይታ ወይም ምልከታ ምን ይመስላል?**
3. በእናንተ እይታ በክልሉ ከኤችአይቪ ቫይረስ ጋር የምኖሩ ወገኖች **ከህክምናቸዉ ጋር ያላቸዉ ቁርኝነት (TREATMENT ADHERANCE)ና የኑሮ ጥራታቸዉ/ደረጃን (QUALITY OF LIFE)** ለማሻሻል የሚረዱት ምንድ ናቸዉ?
4. በክልሉ **ከኤችአይቪ ቫይረስ ጋር ለሚኖሩ ወገኖች የሚሰጥ የምግብ ዋስትና (FOOD SECURITY) ና የስነ-ምግብ ፕሮግራም (NUTRITION PROGRAMME) ወይም አገልግሎት አለ?** ካለ በፕሮግራሙ ወይም በአገልግሎት ዙርያ ያለዉ ክፍተት ምንድ ነዉ?
5. በአጠቃላይ **አሁን ያለዉን የምግብ ዋስትና ና የስነ-ምግብ ፕሮግራም ወይም አገልግሎትን በተሻለ መልኩ እንደት ማሻሻል ይቻላል?** ፕሮግራሙን ወይም አገልግሎቱን ለማሻሻል እንቅፋት ሊሆኑ የሚችሉ ምንድ ናቸዉ?
6. **የምግብ ዋስትና ና የስነ-ምግብ ፕሮግራም ወይም አገልግሎትን** ከኤችአይቪ ኤድስ መከላከልና መቆጣጠር ፕሮግራም ጋር ማካታት/ማቀናጀትን **(INTEGRATION)** በተመለከተ የእናንተ እይታ ምንድ ነዉ?
7. **የምግብ ዋስትና ና የስነ-ምግብ ፕሮግራም ወይም አገልግሎትን** ከኤችአይቪ ኤድስ መከላከልና መቆጣጠር ፕሮግራም ጋር ማካታት/ማቀናጀትን (**INTEGRATION)** በተመለከተ በዝህ ክልልም ይሁን በሌሎች የሀገርቱ አካባቢዎችም ጭምር ያላችሁን ተሞክሮ ብትነግሩኝ?
8. **ከኤችአይቪ ቫይረስ ጋር የሚኖሩ ወገኖች ከህክምናቸዉ ጋር ያለቸዉ ቁርኝት (TREATMENT ADHERANCE) ና የኑሮ ጥራት/ደረጃ ሁኔታን (QUALITY OF LIFE) ለማሻሻል የምግብ ዋስትና ና የስነ-ምግብ ፕሮግራም ወይም አገልግሎትን** በኤችአይቪ ኤድስ መከላከልና መቆጣጠር ፕሮግራም ውስጥ በተሻለና በተሳካ መልኩ ለማካታት/ማቀናጀት ምን ምን መደረግ አለበት ትላላችሁ? (በፖሊሲ ደረጃ፡ እስትራቴጅ፡ፕሮግራም፡ ፕሮፖዛሎች፡ ወዘተ)