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EFFECT OF PSYCHOSOCIAL SUPPORT INTERVENTIONS ON QUALITY OF LIFE AMONG ELDERLY PERSONS ON ANTIRETROVIRAL THERAPY IN THE GREATER ACCRA REGION OF GHANA: A MIXED METHOD STUDY

BY

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DECLARATION

I, **Marijanatu Abdulai** of the University of Ghana School of Public Health, Department of Epidemiology, do hereby declare that except for citations and ideas that have been duly acknowledged and referenced, this thesis is an original work produced by me under the supervision of Prof. Bismark Sarfo, Dr. Harriet Affran Bonful, Dr. Adolphina A. Addo Lartey and Prof. Philip Teg- Nefaah Tabong.

I acknowledge that I have not previously submitted any portion or the entirety of this thesis to obtain any degree from any institution or board.

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DEDICATION

I dedicate this work to my family for their support and encouragement. To my children, Abdul Hakeem Kamara and Munisa Dawale Kamara, thank you immensely for your encouragement and support, especially during my most difficult times.

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ABSTRACT

Introduction

The proportion of Elderly Persons Living with HIV (EPLHIV) is increasing worldwide due to wider access to antiretroviral therapy (ART). In Ghana, individuals aged 50 years and older accounted for 34% of people living with HIV (PLHIV) in 2023, up from 19% in 2020. Although ART has improved health outcomes, psychosocial issues such as depression, stigma, and social isolation continue to diminish quality of life (QoL) among EPLHIV. Targeted psychosocial support interventions (PSSI), including Mobile Health (mHealth) and Differentiated Service Delivery (DSD), may help address these challenges, yet evidence of their effectiveness remains limited. This study therefore assessed the impact of PSSI on the QoL of EPLHIV receiving antiretroviral therapy in three health facilities in Accra, Ghana.

Methods

The study employed a pre- and post-quasi-experimental design, utilizing a sequential exploratory mixed-method approach implemented in three phases. It was carried out in three health facilities, each serving as one arm of the study.

In the first phase, a formative assessment that comprised Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) was conducted to describe the QoL among EPLHIV, identify the barriers and facilitators in accessing ARV services, and assess the feasibility of using mobile technology for delivering psychosocial support to them. Qualitative data was thematically analyzed using NVivo QSR software version 12, following the deductive approach. Findings from this then informed subsequent phases of the study. In the second phase, two PSSIs; Short Voice Messages (SVM) and a face-to-face DSD were developed.

In the third phase, 437 participants were enrolled for the quantitative study, and these participants were divided into three arms. Participants in one arm received SVM on PSSI, the second arm participated in a face-to-face DSD session, and the third received the routine standard of care for PLHIV per the GHS treatment guidelines. Baseline data was collected prior to a 16-week implementation of the interventions. Quantitative data were then collected using a structured questionnaire that allowed adaptability and flexibility and analyzed using STATA version 17. Data was presented using proportions, frequencies, percentages, means, and standard deviations based

on the distributions. Analysis of variance (ANOVA) and t-tests were used to examine the association between background characteristics and QoL. At the multivariable level, multiple linear regression was used to examine the effect of the intervention on QoL, and Difference in Differences (DID) used to estimate the average treatment effect of the intervention on QoL. All variables were considered statistically significant at a 95% confidence interval ($p < 0.05$).

Results

The formative assessment showed that EPLHIV face physical, social, and psychological challenges that affect QoL, compounded by barriers such as inadequate tailored care and limited psychosocial support. However, facilitators like task-sharing, counselling, social support networks, and the feasibility of mobile technology for psychosocial interventions offer promising solutions to improve ART access and QoL. Overall QoL improved from 89.1 to 94.1 post-intervention, with the SVM arm showing the highest increase (88.9 to 98.8), followed by the DSD arm (88.7 to 94.6), while the control arm declined (89.7 to 87.7).

Multiple regression showed that at endline, EPLHIV in the DSD facility had better QoL [DID: +5.17; 95% CI=+1.77, +8.56] compared to controls. Those in the SVM intervention were also more likely [Coeff: 11.58; 95% CI=-7.87–15.29] to have higher QoL than controls. Divorced/separated participants [Coeff: -4.860; 95% CI=-8.57, -1.15] and those on additional HIV medications [Coeff: -10.73; 95% CI=-21.33– -0.12] had lower QoL. DID analysis revealed significant QoL gains for both interventions, with average treatment effects of 12.978 for SVM and 7.952 for DSD. Moreover, 93.9% of SVM and 95.3% of DSD participants found the interventions highly beneficial and recommended continuation.

Conclusions

The study demonstrates that the QoL of EPLHIV is significantly influenced by their social, physical, and psychosocial environments. Psychosocial support interventions such as Voice messages and DSD interventions significantly improved the QoL of EPLHIV. These findings highlight the need for targeted strategies to address the QoL of PLHIV.

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LIST OF ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ART	Anti Retroviral Therapy
ARVs	Antiretrovirals
DSD	Differentiated Service Delivery
EPLHIV	Elderly Persons Living with HIV
FGDs	Focus Group Discussions
GAC	Ghana AIDS Commission
GAR	Greater Accra Region
GHS	Ghana Health Service
GSS	Ghana Statistical Service
HIV	Human Immunodeficiency Virus
HRQOL	Health-Related Quality of Life
KII	Key Informant Interviews
LMICs	Lower and Middle-Income Countries
MARS-5	Medication Adherence Rating Scale - 5
mHealth	Mobile Technology
MHS	Mental Health Services
MHT	Mobile Health Technology
MoH	Ministry of Health
MoH	Model of Hope
NACP	National AIDS/ STIs Control Program
NHIS	National Health Insurance Scheme
PHQ-9	Patient Health Questionnaire 9
PLHIV	Persons Living with HIV
QoL	Quality of Life
SDGs	Sustainable Development Goals
SEM	Social-Ecological model
SMS	Short Message Service
SSA	Sub Saharan Africa
SVM	Short Voice Messages
UNAIDS	United Nations Programme on HIV/AIDS
US	United States
WHO	World Health Organisation
WHOQOL	World Health Organisation Quality of Life
YPLHIV	Young people living with HIV

OPERATIONAL DEFINITION OF TERMS

Interventions: Interventions in this study referred to Differentiated Service Delivery (DSD), which utilized a person-centered approach to deliver ART services to EPLHIV, and Short Voice Messaging (SVM), which involves Robo-calls that deliver educational and counselling messages to EPLHIV.

Quality of Life: How an individual perceives their life circumstances concerning their physical, psychological, social, and environmental well-being concerning their cultural background, personal values, aspirations and expectations.

Psychosocial Support: Intervention aimed at addressing the psychological, emotional, social, and behavioural aspects of individuals living with HIV/AIDS aged 50 years and older who are on antiretroviral therapy.

Feasibility: The extent to which mobile platforms align with the intervention content and delivery methods suitable for the target population.

Acceptability: The willingness of participants to use the intervention and their understanding of how to use it.

Barriers: Obstacles or challenges faced by individuals aged 50 years and older living with HIV who are receiving antiretroviral therapy, which hinders their engagement with psychosocial aspects of care.

Facilitators: factors that promote or enable the engagement of individuals aged 50 years and older living with HIV who are receiving antiretroviral therapy in psychosocial aspects of care.

Adherence to ARVs: Initiating HIV therapy, attending all medical appointments, and adhering diligently to the prescribed regimen of HIV medications.

Disclosure: Sharing one's HIV-positive status with a spouse, friend, family member, or significant other by having open and honest conversations about one's HIV diagnosis.

Depression: A feeling of depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration.

CHAPTER ONE

1.1 Background to the study

The human immunodeficiency virus (HIV) remains a significant global public health challenge (Singh et al., 2022). HIV primarily affects the immune system, predisposing the affected individuals to a variety of opportunistic infections that eventually lead to Acquired Immunodeficiency Syndrome (AIDS) (UNAIDS, 2015). The disease burden varies significantly across regions, countries, and populations (Tian et al., 2023). In 2022, about 39 million people were living with HIV (PLHIV) globally, and 1.3 million new HIV infections were reported in the same year. HIV is most prevalent in low and middle-income countries (LMICs), with Western, Eastern and Southern Africa accounting for about 66% of the global population of PLHIV population and 47% of the new infections as of 2021 (Chibawara et al., 2019; Tesemma et al., 2019; UNAIDS, 2021a, 2022a). In Ghana, as of the end of 2022, the estimated PLHIV was about 350,000, with about 20,000 new infections and a prevalence of 1.66% (GAC, 2023).

The development and introduction of ART have become an important public health intervention for PLHIV, significantly resulting in increased life expectancy (Odongo et al., 2023). Globally, PLHIV on lifelong antiretroviral therapy has tripled from 7.5 million in 2010 to 27.5 million in 2020, with much of the disease burden in Sub-Saharan Africa (Gakhar et al., 2013; UNAIDS, 2021). In Ghana, approximately 70% of PLHIV had access to ART services in 2024.

Access to ART services and adherence to ART regimens are critical for preventing and curbing the spread of HIV/AIDS and for achieving the UNAIDS second 95% target (Jaafari et al., 2022), consequently, limited availability and access to ART services can negatively impact the health outcomes of PLHIV(Ayisi Addo et al., 2018; Jaafari et al., 2022).

Access to ART services and adherence is shaped by a combination of facilitators and barriers. Key facilitating include the free provision of ART services within public health facilities, counselling and social support services, and the growing adoption of mobile health technologies to promote adherence (Manu et al., 2024; Ouner et al., 2025). Conversely, stigma and discrimination, transportation costs, long distances to clinics, inadequate monitoring, treatment side effects, and loss to follow-up remain significant barriers in globally and particularly in Ghana. (Agbeko et al., 2022; Boadu et al., 2023; Belay et al., 2022).

Nonetheless, concerted efforts through effective leadership and governance at health facility levels have improved the responsiveness of healthcare systems. Supportive healthcare providers, strong client–provider communication, and enhanced confidentiality have fostered trust in service delivery, contributing to the sustained effectiveness and success of ART programs (Koirala et al., 2017; Nyato et al., 2019).

This widespread access and effectiveness of ART has resulted in the global HIV population increasingly shifting toward an ageing demographic as a result, the proportion of people living with HIV (PLHIV) aged 50 years and above increased from 8% in 2000 to 16% in 2016 (Autenrieth et al., 2018) and this is projected to increase to up to75% by 2030 (Sarma et al., 2023). In the United States, about 54% of PLHIV were aged 50 years and older as of the end of 2021(CDC, 2021), while in Ghana, approximately 40% of PLHIV were 50 years and above as of December 2022 (GAC, 2022) and in line with this trend, UNAIDS reported that the global population of individuals aged 50 and older living with HIV increased from 5.4 million in 2015 to 8.1 million in 2020 (Longev, 2022).

Though the introduction of ART has improved health outcomes and survival rates among PLHIV, this has not necessarily translated into to an improved QoL for HIV patients especially for EPLHIV.

The World Health Organization (WHO) defines QoL as: *"an individual's impressions of their place in life concerning their objectives, standards, expectations, and worries in the context of the culture and value systems in which they live* (WHO, 1995).

The QoL of EPLHIV is shaped by multiple interrelated factors across the socio-ecological model, including individual, interpersonal, community/structural, and broader psychosocial influences. Adherence to ART, depression, and HIV status disclosure have all been found to significantly affect QoL. For instance, disclosure of HIV status enhances QoL by enabling support from both family and non-family members while depression negatively impacts QoL (Loutfy et al., 2021; Senkoro et al., 2024). Similar findings have been reported in Ghana, where disclosure was associated with stronger social support networks that enhanced adherence to ART and improved QoL, whereas untreated depression was linked to reduced adherence ART and poorer overall well-being (Saah et al., 2024).

Because ART access and effectiveness does not necessarily translate into an improved QoL for PLHIV, PSSI are essential for improving the QoL of PLHIV. PSSIs are designed to directly address the complex psychological and social challenges associated with living with HIVand typically encompass counselling, structured psychological therapies, social support mechanisms, and empowerment initiatives designed to reduce stigma and discrimination (Ninnoni et al., 2023).

Innovative mHealth and DSD PSSI models have shown promise in improving adherence and reducing stigma leading to an enhanced QoL among PLHIV in sub-Saharan Africa and beyond (Ogunbajo et al., 2018;UNAIDS, 2023). Mobile health interventions are designed to provide accessible, remote support to PLHIV, thereby reducing feelings of isolation and promoting better health outcomes(Ali et al., 2023). Similarly, DSD interventions offer tailored care that enhances adherence and overall well-being by adapting service delivery to the specific needs of PLHIV (Godfrey et al., 2022).

Both of these approaches rely on an interplay of integrated components such as clinical treatment, counselling, education, and functional social support networks to maximize impact (Vu et al., 2020) have been shown by research to be scalable, sustainable strategies with growing evidence of benefit (Leeman et al. (2022); Phan et al. (2022). DSD models such as community refill groups and adherence clubs have been shown to consistently maintain or improve retention and viral suppression while reducing system burdens and are now endorsed by WHO and UNAIDS for person-centered HIV care (Bwire et al., 2023; WHO, 2023; UNAIDS, 2023; HIV Policy Lab, 2024). In parallel, mHealth interventions have also been shown to significantly improve ART adherence and related outcomes and recent meta-analyses and trials on these mHealth interventions consistently show meaningful gains in adherence, self-management leading to positive signals of improved QoL among people living with HIV (PLHIV) (Sun et al., 2023; Kim et al., 2025; Ogunbajo et al., 2022).

However, despite their demonstrated effectiveness in generating positive health outcomes in the general PLHIV population, the impact of these mHealth and DSD intervention models on the health outcomes of EPLHIV remains disproportionately limited. This inequity largely stems from insufficient adaptation of these PSSI models to the unique needs of ageing HIV patient populations, diminished patient self-efficacy, persistent stigma, and systemic resource shortages within health systems (Vo et al., 2025; Kuteesa et al., 2014; Kuteesa et al, 2012). In addition, very few of these PSSI initiatives have so far been developed or implemented in low- and middle-income countries even for the general HIV positive population and the scarcity of such interventions is even more pronounced in sub-Saharan Africa, where resource-constrained health systems urgently need tailored, robust, context-specific, clinical, community, and home-based PSSI models to holistically address the unique challenges of ageing with HIV.

For example, A systemic review of HIV care intervention studies in Sub-Saharan Africa found that very few intervention studies and models focused on improving access to care, retention in care, and adherence to ART in people aged 50 and above living with HIV. The review further noted that despite a growing body literature around HIV and ageing, no psychosocial interventions had been designed exclusively for older adults, and most of the available interventions either excluded older age groups or bundled them with younger adults, limiting their usefulness for older HIV patients (Knight L et.al, 2018).

These findings underscore the urgent need to develop and implement evidence-based interventions tailored to older people on ART in Ghana and other low- and middle-income countries, particularly in sub-Saharan Africa. Scalable and sustainable DSD and mHealth-based psychosocial interventions have so far shown success in improving treatment outcomes and QoL among PLHIV globally and should be adapted for elderly people living with HIV as well. With the widespread access to ART shifting the global HIV population toward an ageing demographic, ageing-related psychosocial stressors are emerging as fundamental healthcare challenges (Siegler, 2020), underscoring the urgent need for these targeted interventions.

1.2 Problem Statement

Globally, evidence indicates a demographic shift in the HIV/AIDS landscape, with a growing proportion of people living with HIV (PLHIV) now aged 50 years and older. In 2000, this group accounted for just 8% of all PLHIV, but by 2020 the figure had risen to 21% of all PLHIV. This upward trend is expected to continue, particularly in low and middle-income countries, driven by expanded access to antiretroviral therapy (ART) and the resulting gains in life expectancy (Autenrieth et al, 2018).

In Ghana, this global trend is also increasingly apparent. As of December 2023, an estimated 334,095 individuals were living with HIV, with about 40% aged 50 years and older. Within the same period, 151,520 PLHIV were receiving antiretroviral therapy (ART), of whom 34% were in the ≥50-year age group, a notable increase from 19% in 2020. This sharp rise underscores a growing engagement of older adults in HIV care (GAC, 2023). The Greater Accra region bears the highest burden of this PLHIV population, with almost 31% of them aged ≥50 years (NACP, 2022c).

However, this growing population of EPLHIV continue to experience intersecting challenges including age-associated cognitive decline, multimorbidity, and reduced adherence to ART regimens that negatively impact their wellbeing and QoL. The suboptimal adherence to ART is particularly concerning, as it compromises viral suppression, promotes treatment resistance, and negatively impacts the psychosocial functioning and overall QoL of these EPLHIV(Alford et al., 2021; Biradar et al., 2016; Lasong et al., 2020; Rosenfeld et al., 2021).

In sub-Saharan African countries such as Ghana, challenges related to this suboptimal ART adherence stem from severe disparities in access to HIV care experienced by EPLHIV compared to other PLHIV demographics. (Agbeko et al., 2022; Boadu et al., 2023). This subgroup of patients is also more likely to face psychosocial challenges such as social isolation, family problems, non-disclosure of HIV status, financial constraints, self-stigma, and depression, all of which interact to negatively impact their well-being and QoL (Ninnoni et al., 2023; Twekambe et al., 2023).

To tackle some of the challenges that PLHIV perpetually face,, Ghana has consistently introduced and implemented a range of policy interventions in line with the global goal set by UNAIDS to end the AIDS epidemic by 2030 (GHS, 2022). These policies include the Treat All policy, introduced in 2016 to ensure that all PLHIV receive antiretroviral therapy regardless of CD4 count (NACP, 2022a) as well as a range of DSD policies designed to provide tailored care to meet the unique psychosocial needs of PLHIV(NACP, 2022b, 2022a). The DSD interventions include community-based initiatives such as the Mentor Mothers programme for pregnant women, Community Adolescent Treatment Supports (CATS) for adolescents, Peer Educators, and the Model of Hope program. These initiatives are designed to provide psychosocial support for PLHIV (Cheabu et al., 2023; NACP, 2022b), enhance their QoL and to advance the overarching goal of ending the AIDS epidemic in Ghana.

While these PSSI have been shown to improve the QoL of PLHIV (Abdulai et al., 2023; Bhochhibhoya et al., 2021), evidence regarding their effectiveness in enhancing the QoL of EPLHIV remains limited. This gap exists because policy interventions have yet to be specifically tailored to address the unique needs of older people on ART.

Also, existing research and findings on QoL among PLHIV has largely focused on the general population, adolescents, and pregnant women (Agbeko et al., 2022; Cheabu et al., 2023; Enimil et al., 2016; Nabei et al., 2024). There is, therefore, very limited literature and empirical evidence on the QoL of EPLHIV and the factors that shape it. Consequently, the psychosocial needs and overall well-being of EPLHIV have been largely overlooked in Ghana's HIV/AIDS response, leaving them with insufficient care and support. This neglect has consistently undermined their adherence to ART regimens, resulting in high viral loads and an increased risk of new infections, thereby threatening Ghana's progress toward the global goal of eliminating AIDS by 2030.

These glaring gaps highlight the urgent need for psychosocial interventional studies and models that can specifically target this highly vulnerable group to improve health outcomes and advance HIV policy goals. Without such PSSI, the health outcomes and QoL of this growing demographic will decline, adding to Ghana's overall healthcare burden and costs. Against this backdrop, the present study evaluated the impact of PSSI on the QoL of EPLHIV in Ghana, using two tested complementary approaches: DSD and mobile health (mHealth).

1.3 Significance of the Study

Presently, in Ghana, there is a paucity of data on the impact of PSSI on the QoL among EPLHIV and this limits efforts to better under and improve their health outcomes and as the 2030 United Nations deadline for ending the HIV epidemic approaches, evidence-based research like this one are becoming increasingly critical.

This study and its findings is expected to give stakeholders a better understanding of the effect of psychosocial support intervention on the QoL among EPLHIV, thereby offering crucial information to guide policy decisions. It will also serve as a benchmark and provide directions for policymakers such as the Ghana Health Service (GHS), the National AIDS/STI Control programme, the Ghana AIDs Commission (GAC) and other stakeholders in the HIV treatment landscape when deploying or adapting an intervention to improve the QoL of EPLHIV on ARVs in Ghana.

This study could contribute to existing literature and findings by identifying barriers and facilitators to ART adherence among EPLHIV in Ghana, while also examining the factors influencing their QoL and the role of PSSI. By doing so, it will highlight the specific health-related needs of EPLHIV and inform the design of tailored services to enhance their well-being.

Furthermore, the findings may strengthen healthcare systems by promoting the delivery of comprehensive, integrated services and treatment to EPLHIV, while encouraging health facilities to adopt strategies that can address barriers and facilitate access to the full continuum of HIV care.

Finally, the study may contribute to ongoing efforts to achieve the UNAIDS 95-95-95 targets, required to support key objectives outlined in Sustainable Development Goal 3 (SDG 3), which seeks to ensure healthy lives and to promote well-being for all, with particular emphasis on combating the HIV/AIDS epidemic in Ghana.

A unique feature of this study is the comparison of two thoughtfully selected interventions, differentiated service delivery and psychosocial support via mobile phone against the current standard care model. By evaluating both approaches relative to the usual practice, the study is well positioned to generate new evidence and knowledge especially in the use of mobile technology to advance healthcare delivery for EPLHIV.

1.4 Research Questions

This study sought to address the following research questions.

1. What are the perceptions of EPLHIV on their quality of life?
2. What are the psychosocial barriers and facilitators in HIV care for EPLHIV on ARVs?
3. How feasible and acceptable is the delivery of psychosocial interventions via mobile technology for older adults (≥50 years) living with HIV and receiving ART in Ghana?
4. What factors are associated with the quality of life of EPLHIV (≥50 years) on ARVs?

5. What is the effect of a psychosocial support intervention on the quality of life among elderly people on ARVs in the Greater Accra Region?

1.5 Objectives of the Study

The main objective of this study is to assess the feasibility, acceptability and impact of a mobile-technology-driven and in-person DSD psychosocial support interventions on the quality of life of EPLHIV (≥50 years) on ARVs in the Greater Accra Region (GAR) of Ghana.

The study addresses the following specific objectives.

1. To explore stakeholders' perspective on the QoL of EPLHIV on ART
2. To explore the barriers and facilitators to accessing HIV care among elderly persons on antiretrovirals in the GAR.
3. To assess the feasibility and acceptability of psychosocial support intervention delivered via mobile phone among elderly persons on ARVs in the GAR.
4. To identify factors associated with quality of life among elderly people on ARVs in the GAR.
5. To determine the effect of a psychosocial support intervention on the quality of life among elderly persons on ARVs in the GAR.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a comprehensive review of the literature on QoL and PSSI for EPLHIV, framed within both theoretical and conceptual perspectives. The study applies the PRECEDE-PROCEED and Socio-Ecological Models to examine factors influencing QoL in this population. It also reviews tools for measuring QoL and highlights interventions that may enhance health outcomes, considering social, environmental, and behavioral dimensions, as well as the broader effects of community and societal influences.

2.2 Overview of HIV and AIDS

Human Immunodeficiency Virus (HIV), which causes Acquired Immune Deficiency Syndrome (AIDS), is a chronic, life-threatening disease that emerged in the 1980s (CDC, 1981). Its discovery initially caused a cloud of fear across the globe as HIV infection was associated with reduced life expectancy (Sharp & Hahn, 2011). After the discovery of HIV, there was a poor understanding of the disease condition and a lack of adequate information, and these resulted in several deaths, resulting in a significant challenge, especially in developing countries (Kimera *et al.*, 2020).

Once a person gets infected, the virus gradually and silently overwhelms the host's immune mechanisms, increasing the chances of other opportunistic infections such as tuberculosis, hepatitis, pneumonia, and diarrhoea (Zaongo et al., 2022). The virus impairs immune function by attacking the CD4 T-lymphocytes (Sarah Abbas et al., 2015). Upon entry into the blood cells, the CD4+ cells attach to the cell's genetic material (DNA) and begin to replicate.

The end stage of the HIV disease progression is known as AIDS (Fauci, 1988). HIV transmission is through unprotected sex, oral sex with an HIV- infected person, transfusion of infected blood, sharing of infected syringes, needles, surgical implements, or any other sharp objects (WHO, 2016). In addition, HIV infection is transmitted from mother to child during pregnancy and childbirth, as well as during breastfeeding (WHO, 2016). The time between contact with an infected person and the manifestation of signs and symptoms of the disease can vary significantly in people. It depends on several factors, such as the individual's immune function, lifestyle characteristics (drinking, smoking, etc.), and co-morbidities (Casadevall & Pirofski, 2018). It is estimated to be between 10-15 years, but it may be longer, depending on the individual (Casadevall & Pirofski, 2018).

HIV disease worsens over time if left untreated. There are three stages of HIV contamination - acute HIV contamination, ongoing HIV contamination, and acquired immunodeficiency syndrome (AIDS) (WHO, 2016). Antiretroviral drugs (ARVs) prevent HIV infection from progressing to full blown AIDS but there is currently no cure for the disease despite several clinical trials to identify a cure (WHO, 2016). ARV medications work to reduce the viral loads, thereby reducing the chance of HIV transmission. In addition, adherence to ARV allows people infected with HIV to live longer and healthier lives (Richterman & Sax, 2020).

Since there is currently no cure for HIV, the global goal of eliminating the disease is predicated on the prevention of new infections. To this end, UNAIDS and its development partners have set the 95-95-95 targets to be achieved by 2030. These targets stipulate that by 2030, 95% of all people living with HIV should know their status, 95% of those who know their status should be on antiretroviral therapy (ART), and 95% of those on treatment should achieve viral suppression (UNAIDS, 2022b).

2.2.1 Global Burden of HIV and AIDS

Human Immunodeficiency Virus (HIV) is one of the most common diseases that continues to pose a global public health threat. Since its discovery in the early 80s, the number of persons living with the disease has significantly increased (Sharp & Hahn, 2011). As of the end of 2022, about 39 million people were living with the disease, with 1.3 million infections, including 630,000 deaths from HIV- related causes , n It is also reported that of the estimated number of people living with HIV, 29.8 million of them were accessing antiretroviral therapy, an increase from the 7.7 million reported in 2010 (UNAIDS, 2023).

In the United States, the number of new HIV cases increased from 15.6 cases per 100,000 population in 2010 to 21.0 cases in 2019 (Govender et al., 2021). The number of new infections in the United States has risen from 48,175 cases in 2010 to 67,000 cases in 2019 (UNAIDS, 2022b). In other countries such as Russia, Portugal, Ukraine and Brazil, HIV remains a growing and serious public health problem, with incidence rates among the highest in their regions. Other countries with increasing incidence include Argentina, Mexico, Kazakhstan, Cuba, Australia, the Caribbean Island nations, and the Bahamas (Govender et al., 2021). HIV infection is common among men who have sex with men (MSM), Female sex workers (FSW), and people who inject drugs (Ochonye et al., 2019).

Despite these increases in the incidence rates of HIV, in 2010 and 2020, the AIDS mortality rate decreased by 21%, with an estimated 31,000 adults and children dying from AIDS-related causes in 2020 (UNAIDS, 2022b). The Middle East and North Africa have made significant strides in fighting the AIDS epidemic. Despite these achievements, these areas still lag in meeting the 95-95-95 fast-track targets, with only 61% of individuals living with HIV in these regions aware of their HIV status, 43% undergoing treatment, and 37% achieving viral suppression(UNAIDS, 2022b).

2.2.2 HIV and AIDs Burden in Sub-Saharan Africa

Sub-Saharan Africa remains the most HIV-affected region, home to about 60% of the world's population of PLHIV (UNAIDS, 2022b). In 2020, there were 310,000 deaths related to HIV and 670,000 new infections reported during the same period. High-risk populations such as MSM, FSW, and people who inject drugs accounted for 32% of the new infections (UNAIDS, 2022b).

In recent years, there have been significant advances in HIV treatment across the African region. Overall, the region came very close to achieving the 2020 testing and treatment goals, a remarkable achievement given its high disease burden. Countries such as Eswatini, Namibia, and Zambia have demonstrated strong leadership in pursuing the UNAIDS targets, with Eswatini even achieving its 95-95-95 benchmarks (UNAIDS, 2022b). Overall, there were 50% fewer deaths from AIDS-related causes in 2020 than a decade earlier (UNAIDS, 2022b).

The high HIV burden in sub-Saharan Africa has drawn the attention of numerous stakeholders, including the international community, non-governmental organizations, and researchers, many of whom highlight the connection between poverty and the spread of the disease. Consequently, efforts to control HIV on the continent are closely tied to strategies aimed at reducing and eliminating extreme poverty(Leung Soo et al., 2023).

In Cameroon, HIV and AIDS prevalence is 4.3% (UNAIDS, 2022b) and it is one of the ten countries responsible for 75% of all childhood HIV infections. The rate of mother-child transmission is 14%, and the proportion of antiretroviral treatment rate in adolescents and young adults is still deficient (13%). Due to child marriage and sexual and physical abuse, the country's teens remain at risk of infection. In Zambia, HIV prevalence increased by 5%, from 1,200,000 registered in 2018 to 1,256,000 in 2019. In addition, the number of new cases and deaths in 2019 increased by about 6% and 2%, respectively, compared to the numbers recorded in 2018 (UNAIDS, 2022b).

2.2.3 HIV and AIDS in Ghana

HIV/AIDS has been a significant public health concern in Ghana since the identification of Ghana's first case in March 1986. Over the years, the country has witnessed fluctuations in the prevalence rate, with key populations such as Female Sex Workers (FSWs) and Men who have sex with Men (MSM) being identified as the main drivers of the epidemic (UNAIDS, 2021b; Ali et al., 2019). According to the Ghana AIDS Commission (GAC), there has been a notable increase in HIV cases in Ghana. Between 1986 and 1987, there was a 35% rise, followed by a 60% increase from 1988 to 1989. (GAC, 2021). The 2023 population size estimates and Integrated Biological and Behavioral Surveillance Survey (IBBSS) also reported an HIV prevalence of 26% and 48% among MSM and transgender, respectively (GHS, 2023) and 4.6% for FSW (Dery et al., 2024).

In 2022, Ghana's HIV population was estimated at 354,927, with females comprising 66% and children 7%. The national prevalence was 1.7%, with 16,574 new infections, predominantly in adults (83%). ART coverage for adults (15+) was 62.78%, and PMTCT coverage was 71.59% (Ghana AIDS Commission, 2023). Despite not meeting the 95-95-95 UNAIDS target, Ghana made notable progress, reaching 72%-87%-68% by 2022 (UNAIDS, 2021b). Further estimates from the 2022 HIV and AIDS report by the Ghana AIDS Commission show that the Greater Accra region had the highest number of HIV-positive individuals (85,403) and new infections (3,787). The Eastern region had the highest estimated HIV prevalence at 2.29%, while the Northeast region had a lower prevalence of 0.45%. Eight regions (Ahafo, Ashanti, Bono East, Eastern, Greater Accra, Western, and Western North) exceeded the national prevalence for 2022. Regarding ART coverage, the Upper East region had the highest coverage at 79%, while the Savannah region had the lowest at 53.1% (Ghana AIDS Commission, 2023).

To help control the spread of infection in the country, the NACP was established and operates within the Disease Control and Prevention Department of the Ghana Health Service. Originally established as the National Technical Committee on AIDS, it evolved into the lead agency for HIV/AIDS response in Ghana. NACP implements health sector aspects of the National HIV and AIDS Strategic Plan, delivering interventions to reduce transmission, providing care for PLHIV, disseminating strategic information, and offering technical support to various agencies(Sidibé et al., 2016). (NACP, 2020a)

Ghana adopted the 2016 updated WHO guidelines on ART with a specific strategy to screen and treat all HIV-positive patients regardless of their CD4 count ('Treat All Policy') (Mcrobie et al., 2018; WHO Ghana, 2016). The present National HIV Strategic Plan and Strategic Framework for the Health Sector (2021-2025) include the goal of enrolling at least 95% of people living with HIV on ART and achieving 95% viral load suppression by the year 2030 (NACP, 2020b). This is important to achieve the recommended epidemic control according to the new goals of UNAIDS 95-95-95 (UNAIDS, 2022b).

2.2.4 Introduction of Antiretroviral Therapy

Antiretroviral therapy is a treatment regimen for people infected with HIV (WHO, 2015). It involves using a combination of anti-HIV drugs, often referred to as highly active antiretroviral therapy (HAART), to suppress HIV replication in the body. The primary goal of ART is to reduce HIV-related mortality and morbidity rates, improve the QoL for PLHIV, and prevent HIV transmission by suppressing viral replication, a concept known as "undetectable equals untransmutable" (U=U) (WHO, 2015). The history of ART traces back to the 1980s and early

1990s with the discovery of effective antiretroviral drugs like zidovudine (AZT) (Thomas Ginat & Whitney Schaefer, 2022). Initially, access to ART was limited to developed countries due to high costs and the complexity of treatment regimens. However, as the HIV epidemic spread globally, particularly affecting low-and middle-income countries, the need for widespread access to ART became increasingly evident (El-Sadr et al., 2012; Myburgh et al., 2021).

In Africa, where the HIV epidemic had a profound impact, the scale-up of ART started gaining momentum in the early 2000s (Sharp & Hahn, 2011; Mutevedzi & Newell, 2014; O'Malley et al., 2019). The WHO and international organizations such as UNAIDS advocated for increased access to ART in resource-limited settings, recognizing its potential to save lives and curb the spread (WHO, 2023).

Like many other African countries, Ghana began its journey with ART in 2003 (Ankomah et al., 2016). This introduction was part of a broader international effort supported by organizations like the Global Fund to Fight AIDS, Tuberculosis, and Malaria and initiatives like the President's Emergency Plan for AIDS Relief (PEPFAR) (Hanefeld, 2014). The availability of antiretroviral therapy within the country's healthcare system began in 2003 at two pilot sites in the Manya Krobo district. Treatment centres increased from 2 in 2003 to 175 in 2018 and 715 by 2022 (NACP Report, 2022). The expansion of ART services in many countries, including Ghana, has contributed significantly to reducing HIV-related morbidity and mortality. Despite this, many people are yet to be put on ART. The unmet need for ART in Ghana remains at around 60% and pediatric ART coverage is close to 30% (Ghana AIDS Commission, 2021). The poor quality of ART services provided to people living with HIV is partly responsible for this poor performance in Ghana (WHO, 2022).

The present Ghana National HIV Strategic Plan and Strategic Framework for the Health Sector 2021-2025 includes the goal of enrolling at least 95% of people living with HIV are on ART and achieving 95% viral load suppression by 2030 (Ghana AIDS Commission, 2021).

2.2.5 Policy on HIV and AIDS Management in Ghana

The HIV and AIDS Management Policy in Ghana is a comprehensive framework designed to provide clear guidance and direction for the efficient prevention, care, support and treatment of HIV and AIDS across the country(Ghana AIDS Commission, 2021). Since the detection of the first HIV case in Ghana, significant actions have been taken as part of the national response to the epidemic. In 1987, a year after identifying the first case, the National AIDS/STI Control Programme (NACP) was established under the Ghana Health Service (NACP, 2015) and to serve as the nation's main technical implementation arm.

The Programme has since played a pivotal role in coordinating interventions and in shaping policy directions on the Ghanaian HIV landscape.

However, despite the strength of the institutional architecture of the NACP and the proliferation of its policies. The performance of the NACP has varied, particularly in rural settings and among marginalized populations, where disparities in access to HIV services persist. For example, recent studies show that women in rural areas are significantly less likely to undergo HIV testing compared to their urban counterparts, underscoring inequities that weaken the programme's effectiveness despite strong policy commitments (Essuman et al., 2024; Nketiah-Amponsah et al., 2025).

Most of these findings underscored the need for equity-driven strategies to more effectively translate Ghana's comprehensive policy framework into consistent and inclusive health outcomes, ultimately leading to the establishment of the Ghana AIDS Commission (GAC) in the 2000s.

Operating as a supra-ministerial and multi-sectoral entity chaired by the President of Ghana, the GAC's primary objective is to develop policies related to HIV and AIDS and to oversee, coordinate and elevate the national response to the HIV/AIDS epidemic (Ghana AIDS Commission, 2021). Under the leadership of these institutions, several policies and management guidelines have been developed.

The GAC has been instrumental in developing and implementing five National HIV and AIDS strategic documents, which serve as the cornerstone for executing the country's HIV response. The GAC has since its inception, coordinated and led the development of multiple strategic documents over time like the National HIV and AIDS Strategic Framework (NSF I) for the period 2001-2005, NSF II for 2016-2020 and the National HIV and AIDS Strategic Plan spanning 2011-2015, 2016-2020, and the current 2021-2025.

Other key policy documents developed by the GAC include the policies include the Consolidated HIV Guidelines in 2019, the Free to Shine Campaign in 2019 to reduce the prevention of mother-to-child transmission, the HIV Testing Implementation Guide, the National Acceleration Plan for Pediatric HIV Services in 2020, Workplace HIV and Tuberculosis (TB) Policy for the health sector in 2020, DSD for HIV in Ghana in 2022 and Consolidated Guidelines for HIV Care in Ghana in 2022.

These strategic documents serve as main policy cornerstones of the national HIV/AIDS response reflecting Ghana's commitment to addressing the HIV and AIDS epidemic comprehensively, through the effective utilization of resources and the implementation of interventions tailored to meet the evolving needs of those affected by HIV and AIDS in the country (Ghana AIDS Commission, 2021).

However, while the quantity of policy documents developed has been considerable, there is evidence in recent literature suggesting that policy design seems to have outpaced gains in key outcomes. For example, a systematic review and meta-analysis in 2023 found that ART adherence in Ghana averages approximately 70% (95% CI: 58–81%), substantially below the ≥95% level considered necessary for viral suppression (Boadu et al., 2023). Such substandard adherence undermines the aspirations of these strategic policies. In addition, a study of loss to follow-up among adults living with HIV in Ghana demonstrated that individuals with lower educational attainment were significantly more likely to drop out of care, reinforcing concerns that policies are not adequately responsive to socioeconomic disparities (Mensah et al., 2025).

Alignment with broader global target seems to be another policy implementation weakness. Ghana's 2019 National HIV/AIDS Policy explicitly aims to support progress towards ending AIDS by 2030, in line with Sustainable Development Goals (SDGs) (Ghana AIDS Commission, 2019). Yet, recent research suggest Ghana may struggle to achieve the UNAIDS 95-95-95 targets by 2025, again indicating that these policy ambitions may be far ahead of operational capacities (Boakye et al., 2023).

This implies that, while Ghana's policy framework for HIV and AIDS management reflects strong institutional commitment, Evidence suggests that policy effectiveness is hampered by implementation weaknesses, socioeconomic inequities, and underperformance on critical metrics such as ART adherence and retention in care. Future policy development might therefore benefit from sharper focus on issues like resource allocation, monitoring and evaluation to ensure that these strategic documents translate into meaningful health outcomes for PLHIV.

2.3 HIV Among the Elderly

Due to the effectiveness of ART and the associated success of treatment programmes globally, HIV infection is no longer a life-threatening disease for those who have access to care (Richterman & Sax, 2020). However, this success has an unexpected consequence: A growing demographic of elderly people living with HIV, usually defined as PLHIV who are 50 and older (Wing, 2016).

This population is expanding because both people with HIV are living longer and because new infections within this older population is increasing. Evidence suggests that infection rates and incident rates among these older adults living with HIV are rising faster than in the general population. For example, between 2015 and 2019 in the United States, overall HIV prevalence increased by 8% and new cases fell by 4%, however, among the elderly, prevalence rose by 40% and incidence increased by 15% highlighting the disproportionate effect of HIV/AIDS on this older demographic in spite of the broader gains made in the control of the HIV epidemic(CDC, 2018). Similarly, UNAIDS reports that the number of EPLHIV worldwide has increased from 54 million in 2015 to 81 million in 2020 (UNAIDS, 2022b). and it is projected that by 2050, the proportion of EPLHIV in developing countries will increase to around 20% (UN, 2017).

This means that older people living with HIV will soon constitute a significant share of the population in these developing countries and regional data available already reinforces this projected trend: In Uganda HIV-infected people in their 40s who are receiving ART are expected live into their 60 years and beyond(Takada et al., 2014). Studies in sub-Saharan Africa already indicate that one in eight HIV-infected adults receiving ART is already over 50 years (Negin and Cumming, 2010).

This anticipated increase in life expectancy among HIV-infected individuals is likely to further increase the HIV prevalence rate among older populations. For example, projections in South Africa suggest that HIV prevalence in those over 50 will nearly double in the next 30 years, with absolute numbers potentially tripling (Hontelez et al., 2011). This ageing epidemic of PLHIV will have profound implications for healthcare systems worldwide, particularly in developing countries where services are ill-prepared to meet the needs of a growing population of older HIV-positive people .(Kulisewa et al., 2019).

Current health systems, particularly in developing countries, mostly provide fragmented care with limited integration of HIV management, geriatric care, and non-communicable disease services, and are therefore unprepared for the healthcare burdens of the growing EPLHIV population.Without deliberate policy innovations and systemic reforms to address these shortcomings, the rising healthcare needs of EPLHIV may overwhelm under-resourced health systems and ultimately undermine the gains achieved through ART access and adherence. (Kulisewa et al., 2019).

2.4 Accessing Health Care Services for Elderly People Living with HIV

The impact of HIV on the lives of people has necessitated the need to ensure and sustain a continuum of HIV care through antiretroviral therapy (ART) once someone is diagnosed with HIV. While the introduction and rapid scale-up of ART have contributed to a significant reduction in HIV-associated morbidity and mortality rates, resulting in increasing life expectancy and an ageing HIV population (Alford et al., 2021; Moyo et al., 2023), this success is currently not without challenges. While access to ART has been shown to curb the spread of HIV/AIDS by 95%, inequitable or unavailability of ART services can also significantly impact the health outcomes of PLHIV especially the elderly, who are already vulnerable because of comorbidities and age-related complications

The effectiveness of ART delivery is shaped not only by biomedical availability but also by psychosocial dynamics. Studies across sub-Saharan Africa demonstrate that stigma, social isolation, and fear of disclosure significantly deter ART uptake and adherence, particularly among

EPLHIV who face a double stigma associated with both HIV status and ageing (Jaafari et al., 2022; Nakanwagi et al., 2016).

Gender norms also compound these challenges as women often facing limited autonomy in health decision-making settings, while men are more likely to disengage from care due to cultural perceptions of masculinity (Moyo et al., 2023). Financial constraints, including out-of-pocket costs for transportation and non-communicable disease medications, also act as barriers, especially in rural areas where service access is limited (Owusu et al., 2024).

The persistence of psychosocial barriers and their impact on ART uptake and adherence expose a fundamental weakness in HIV care policy, wherein health systems remain overly biomedical in focus and insufficiently responsive to the complex realities of ageing with HIV and the psychosocial needs of EPLHIV.

2.4.1 Psychosocial Barriers in HIV Care for Elderly People Living with HIV

Psychosocial barriers in HIV care for EPLHIV encompass several challenges that can significantly impact their well-being and access to adequate healthcare. These barriers often arise from social, psychological, and systemic factors that intersect with the ageing process and the complexities of managing a chronic condition like HIV. Stigma/discrimination, social disconnectedness, and depression remain the most prevalent psychosocial issues affecting the QoL of older people living with HIV and this becomes more complicated when comorbidity sets leading to their adherence to ART medication becoming very low (Mendonca et al., (2022), Rosenfeld et al. 2021).

Similarly, stigma and discrimination were noted as key psychosocial barriers faced by EPLHIV They lead to feelings of shame, isolation and reluctance to seek healthcare service in a study conducted to understand depressed elderly persons live experiences of physical health problems (Holm et al., 2014; Stangl et al., 2019).

In the local context, Adjetey et al. (2019) identified stigma and discrimination as major barriers to accessing ART services in Ghana. They argue that fear of being suspected of living with HIV often discourages individuals from seeking care from healthcare providers. Similarly, Choi et al. (2015) reported that social isolation and limited social support networks can exacerbate mental health problems such as depression and anxiety among EPLHIV(Adjetey & Obiri-Yeboah, 2019; Choi et al., 2015).

Also, a systematic review was conducted to examine psycho-social factors that impact how EPLHIV live in China by Zhou et al. (2017). They reported that higher perceived psychological and behavioural barriers to ART adherence were related to lower adherence self-efficacy, which in turn was related to lower ART adherence (Zhou et al., 2017).

Another study examining the comprehensive healthcare needs of older people living with HIV/AIDS proposed seven essential components for programmes targeting this population: HIV management, comorbidity screening and treatment, primary care coordination, attention to ageing-related syndromes, optimization of functional status, support for behavioural health, and improved access to basic needs and services (Frey et al., 2023). Furthermore, Chayama et al. (2020) highlighted the need for greater understanding and tailored care for older adults living with HIV who use drugs, emphasizing critical gaps in research and service delivery related to the unique needs and challenges of this subgroup. Remien et al. (2019) also emphasize the significant role of addressing mental health issues in HIV prevention and care, as mental health problems increase the risk for HIV acquisition and adverse health outcomes among adult people living with and at risk of HIV.

In Nigeria, a study by Ezeanolne et al. (2020) identifies opportunities for integrating mental health care into HIV programmes, highlighting challenges such as stigma, policy gaps, limited workforce, and research gaps that need to be addressed for effective integration (Ezeanolue et al., 2020). In South Africa, A study examining the barriers to accessing healthcare services among older Africans with HIV and non-communicable diseases found physical and structural barriers to accessing the healthcare system. These barriers included multiple appointments, clinics in other communities, non-integration of care for the aged population, long distances to facilities and inadequate space for treatment (Knight et al., 2018).Similarly, A study in Tanzania on HIV prevention interventions also reported that structural barriers such as unfriendly service delivery environment, lack of confidentiality from health workers, stigmatizing attitudes of the health providers and lengthy pre-enrolment sessions serve as barriers to accessing ART services (Nyato et al., 2019).Finally, Studies in Ghana have reported similar structural challenges like distance to health facilities, long waiting times and delays at ART Centers, and preferences of health providers when serving PLHIV as barriers to ART services (Ankomah et al., 2016; Manu et al., 2024; Tanle et al., 2017).

2.4.2 Psychosocial Facilitators in HIV Care for EPLHIV

The role of psychosocial facilitators in HIV care for EPLHIV is essential in promoting holistic well-being, enhancing treatment adherence, and improving health outcomes. Mbuagbaw et al. (2024) studied EPLHIV in Ontario, Canada, and found that psychosocial facilitators play a key role in addressing mental health issues. These included providing virtual care through teleconsultation and face-to-face education on the importance of medication adherence. The study highlighted the relevance and effectiveness of these approaches in promoting engagement and well-being among EPLHIV. Similarly, Ameyaw et al. (2024) emphasized the critical role of social support networks as facilitators of HIV care among pregnant women living with HIV in Ghana. Their study showed that such networks provide essential support, including reminders to take medication and assistance with daily activities, which in turn help improve mental health.

A systematic review by Anderson et al. (2020) reported that reducing stigma faced by EPLHIV requires psychosocial facilitators to create environments free from discrimination, thereby encouraging PLHIV to seek healthcare services and adhere to treatment regimens. Likewise, a study in the United States among older African Americans living with HIV underscored the importance of facilitators in HIV care for EPLHIV, noting that culturally sensitive approaches can address language barriers and cultural beliefs while improving health outcomes (Harris et al., 2020). Also, Evidence from South India shows that empowering EPLHIV to actively participate in care decisions, set realistic goals, and build self-management skills can help address psychological challenges and promote well-being(Blanchard et al., 2013) and in the same vein, a scoping review by Okonji et al. (2020) found that psychosocial facilitators such as knowledge about HIV and ART, supported by educational interventions, are crucial for improving adherence among young people living with HIV.

In Ghana, a study highlighted the importance of psychosocial facilitators such as social support, positive healthcare experiences, knowledge of treatment effectiveness, access to health insurance, and innovative care delivery methods in promoting engagement in HIV care by reducing barriers and building trust. The study indicated that social support and positive healthcare experiences encouraged retention, knowledge of treatment effectiveness reinforced adherence, and access to health insurance and innovative care delivery minimized financial and logistical challenges, making long-term engagement more sustainable(Ogunbajo et al., 2018).Similarly, a cross-sectional qualitative study in Ghana found that support from healthcare providers, patients' knowledge of the disease, and self-motivation facilitated the use of ART services(Ankrah et al., 2016). In the same vein, a systematic review revealed that individual factors such as encouragement from peers and family, along with positive interactions with healthcare providers during the transition to care, also helped facilitate access to services(Tso et al., 2016).

In addition, task-shifting is another critical factor in improving the care received by PLHIV and has become an integral part of health systems, helping to mitigate the impact of staff shortages. In Haiti, task-shifting addressed human resource challenges in ART clinics by reassigning nurses and doctors to assist in providing care for PLHIV, which yielded positive results (Ivers et al., 2011). Similarly, a study in South Africa reported that staff shortages hindered the integration of HIV service delivery, but task-shifting helped bridge this gap. In Tanzania, additional factors such as the availability of transport services from the residences of PLHIV to health facilities, supportive healthcare providers, and peer-support referral networks also facilitated the use of ART services(Nyato et al., 2019; Uebel et al., 2013).

2.5 Psychosocial Support Interventions for Improving Quality of life.

Psychosocial support refers to the assistance provided to meet patients' and their families' mental, emotional, social, and spiritual needs. This holistic approach acknowledges that medical care extends beyond physical treatment and involves addressing the broader aspects of well-being to enhance overall QoL (Legg, 2011). According to the National Cancer Institute, Psychosocial support can be offered in several forms, including counselling, education, and social and spiritual support to patients with chronic health conditions. The integration of PSSI into healthcare frameworks has become increasingly recognized as essential for enhancing the QoL for individuals managing chronic conditions such as HIV/AIDS. This study employed counselling through mobile technology and a DSD approach as the PSSI for improving QoL for individuals living with HIV/AIDS.

2.5.1 Differentiated Service Delivery

Differentiated service delivery is a strategy for HIV programmes aiming to enhance support for PLHIV, alleviate undue strains on healthcare systems, and enhance client outcomes, including their QoL. These adjustments can be made across the entire cascade of HIV care, thus from testing to achieving virological suppression. They may involve tailoring services to cater for distinct population groups, such as the elderly (Ehrenkranz et al., 2021).

The implementation of the DSD approach became necessary due to the setting of ambitious HIV targets, dwindling global funding for HIV programmes, and deficiencies in programme quality and service delivery models that fail to align with the needs and expectations of PLHIV (Sanwo et al., 2021). These shortcomings risk both individual outcomes and public health goals. The DSD approach has proven to be an effective intervention in delivering services for PLHIV in several countries. Still, it needs some modifications with a particular focus on the elderly (Godfrey et al., 2022). DSD intervention approach has been used in several HIV studies in different settings in both developed and developing countries to improve the health of PLHIV (Bwire et al., 2023; Godfrey et al., 2022; Okere et al., 2021; Adjetey & Obiri-Yeboah, 2019). A study conducted to address the healthcare needs of older individuals living with HIV (aged over 50) through DSD models found that such models should accommodate challenges such as co-morbidities and cognitive impairments. The study suggested that DSD models tailored for older PLHIV should consider their specific health needs and adjust educational materials and services accordingly (Godfrey et al., 2022).

Sanwo et al. (2021) conducted a study in Nigeria comparing retention and viral suppression rates between PLHIV in different DSD models and those receiving standard care. They found that PLHIV enrolled in DSD models had higher retention and viral suppression rates, helping to ensure uninterrupted ART access during COVID-19. Similarly, a systematic review evaluating the impact of DSD models, including adherence clubs, on retention and viral suppression among PLHIV in sub-Saharan Africa indicated that these models show comparable effectiveness to standard care in maintaining engagement and achieving viral suppression among stable PLHIV(Bwire et al., 2023). Another study conducted to evaluate sustainability indicators of DSD interventions conducted in sub-Saharan Africa using a comprehensive sustainability framework showed that the highest scoring sustainability domains were design (2.9) and organizational setting (2.8). The domains of resources (2.4) and people involvement (2.3) scored lowest, revealing potential areas for improvement to support DSD sustainability (Okere N et al., 2021).

In Tanzania, a study assessing health-related quality of life (HRQoL) among ART clients accessing different service models found that accessibility factors contributed more to the emotional well-being of DSD participants than those receiving clinic-based care. Satisfactory HRQoL scores (>80% of the maximum) were associated with specific factors among both clinic and DSD participants (Okere N et al., 2021). Similarly, a study on DSD among PLHIV in a tertiary facility in Ghana revealed that many clients preferred facility-based individualized models due to stigma concerns associated with community-based approaches, underscoring the need for further exploration and management of stigma in HIV care(Adjetey & Obiri-Yeboah, 2019).

Differentiated Service Delivery has six essential components: it is client-centred, has risk stratification, service differentiation ability, streamlined service delivery, community engagement, and data-driven decision-making. These components build upon the four key pillars of the DSD model (*What*, *When*, *Where*, and *Who)* to design care that is responsive to clients' specific needs(Okere et al., 2020).

- ***Client-centred approach*****:** service providers ensure that services are flexible and tailored to each person's preferences, health conditions, and circumstances. This personalized care improves both engagement and satisfaction.
- ***Risk stratification:*** This is where clients are categorized based on factors such as their viral load, adherence to medication, or other health risks. This categorization allows for more focused care, as individuals with different risk profiles can receive varying levels of attention and support.
- ***Service differentiation:*** refers to customizing healthcare services based on the risk categories identified during the stratification process. This approach ensures that high-risk clients receive more comprehensive care while low-risk, stable clients can access less intensive services.
- ***Streamlined services:*** focus on simplifying and standardizing healthcare processes to make service delivery more efficient and user-friendly. This includes reducing unnecessary bureaucratic steps, minimizing waiting times, and ensuring clients receive prompt and effective care.
- ***Community Engagement:*** engaging communities in designing and delivering healthcare services is essential to ensuring that services are responsive to the specific needs and preferences of the population they serve. Community engagement fosters trust, improves service uptake, and enhances the cultural relevance of interventions
- ***Data-Driven Decision-Making:*** This allows healthcare providers to monitor outcomes, identify gaps in service, and make evidence-based adjustments to improve care. This

approach collects and analyses key indicators such as viral suppression rates, adherence levels, and client satisfaction.

Together, they create a more personalized and efficient healthcare system that adapts to the unique circumstances of different client groups, improving service accessibility and outcomes.

2.5.2. Mobile Health Interventions

Mobile health (mHealth) interventions, relying on the use mobile technologies such as smartphones and SMS, and voice call applications, have emerged as very relevant tools for delivering psychosocial support, health education, medication adherence reminders, and remote monitoring in HIV/AIDS care (Volpi et al., 2021) and research evidence indicates that these tools can greatly enhance treatment adherence, improve mental health, and strengthen patient engagement.

A systematic review identified 41 studies evaluating 28 mHealth interventions for HIV self-management, targeting adherence, engagement in care, and smoking cessation. Most of these interventions used SMS or voice messaging and were linked to significant improvements in adherence, viral suppression, mental health, and social support(Cooper, Clatworthy, Whetham, et al., 2017). Evidence further highlights the effectiveness of mHealth in areas such as patient education, appointment reminders, adherence support, and partner notification, with positive impacts observed on both biomedical outcomes like viral load and psychosocial well-being (Nelson et al., 2020; Cooper et al., 2017). For example, in Uganda, combining SMS and voice-call interventions was shown to reduce depression while also improving ART adherence among PLHIV, demonstrating the dual psychosocial and biomedical benefits of mHealth(Nabunya et al., 2024).

Despite this promise, implementation challenges remain. For example, the SMS-based Connect for Life mobile intervention, deployed in the Philippines to support ART adherence among HIV patients, was evaluated on its reach, ART doses delivered and received, fidelity, acceptability, and contextual factors influencing its use. While the intervention reported high levels of participant satisfaction and acceptability, it also faced technical barriers that compromised fidelity, such as inconsistent delivery of calls and SMS(O'Connor et al., 2022). These challenges highlight the importance of considering both contextual and fidelity factors when scaling mHealth solutions.

2.5.2.1 The Role of Mobile Technology in Delivering Health Services to PLHIV

As of 2022, approximately 84% of the global population, which amounts to over 6 billion people, were using smartphones, with an estimated 7.26 billion individuals using any mobile phone (Ratan et al., 2022). In Sub-Saharan Africa, approximately 46% of the population utilizes mobile phones (Kemp, 2024). As of January 2024, Ghana had recorded roughly 39 million mobile connections, a decrease from about 44 million in the preceding year. The number of mobile connections in Ghana equates to 113.1 percent of the country's population, accounting for the possibility of individuals using multiple networks simultaneously (Kemp, 2024).

Mobile phones, applications, and digital platforms have revolutionized how healthcare services are accessed and delivered, offering new avenues for improving outcomes and enhancing patient engagement among PLHIV. A study in Mozambique revealed that mobile technology improved the follow-up of patients on ART. The study used mobile technology to remind PLHIV to come for their ART when the time is due (Karajeanes et al., 2023). In a systematic review, mobile technology was found to play a key role in providing self-management support and monitoring medication adherence for PLHIV, particularly among underserved populations

(Mehraeen et al., 2022). Similarly, another study by (Cuadros et al., 2024) identified remote consultations and ART regimen adherence support as key components in bridging the gaps in access to quality HIV care.

A systematic review conducted by (Mbuagbaw et al., 2011) reported that mobile applications and text messaging services are widely used to communicate with PLHIV, providing them with information about their condition, treatment regimens, appointment reminders and lifestyle recommendations.

2.5.2.2 Acceptability and Feasibility of Using Mobile MTech Interventions for PLHIV

The acceptability and feasibility of using mobile technology in healthcare, particularly for PLHIV, have become an essential area of research and implementation of interventions to improve the health and well-being of PLHIV (Crowley et al., 2023). Acceptability refers to the willingness of individuals and communities to adopt and use mobile technology solutions in managing their health conditions. At the same time, feasibility assesses the practicality and viability of integrating these technologies into existing healthcare systems (Louart et al., 2023).

A study conducted to assess the feasibility, acceptability, and clinical outcomes of the Care4Today mHealth app for ART adherence in Florida, the United States of America, found that the Care4Today mHealth app was feasible and acceptable for improving ART adherence among PLHIV Users of the app reported better self-reported ART adherence compared to nonusers at both 30- and 90-day follow-ups. Favourite features of the app included medication reminders, custom reminders, and adherence reports (Escobar-Viera et al., 2020). Similarly, in China, a study conducted to assess the feasibility and acceptability of an mHealth intervention using text messages (SMS) and WeChat among PLHIV reported that the mHealth intervention using SMS and WeChat was feasible and acceptable among PLHIV in China (Guo et al., 2018). In addition, a study examining the feasibility and acceptability of SMS for ART adherence among PLHIV in Central Ethiopia reported a high acceptability of SMS for improving ART medication adherence among PLHIV in central Ethiopia (Endebu et al., 2019).

Factors positively associated with SMS acceptability included young age, disclosing HIV status, having a mobile phone consistently, and belief in SMS aiding adherence. Negative associations included frequent ART clinic visits and concerns about SMS confidentiality. A study in New York City to assess the feasibility and acceptability of adherence connection counselling, education, and support indicated high feasibility and acceptability rates. The study further showed promising adherence and virologic outcome data among HIV+ adolescents and young adults, with high completion rates, client satisfaction, and improvements in self-reported ART adherence and HIV viral load (Navarra et al., 2023).

While mHealth interventions hold promise, evidence for their impact on treatment outcomes in LMICs remains weak. A systematic review by Crowley et al. (2023), which focused on adolescents living with HIV, found limited support for technology-enabled health interventions in improving key clinical outcomes such as viral suppression and treatment adherence. Nonetheless, the review highlighted that most of these interventions were considered acceptable and feasible among adolescents. The limited evidence of effectiveness was attributed to factors such as small sample sizes, short follow-up periods, heterogeneity in intervention design, and contextual barriers in low-resource settings. These findings suggest that while technology-enabled health interventions are generally well received, further large-scale and context-specific evaluations are needed to determine their long-term effectiveness in improving HIV outcomes for adolescents in LMICs.

In line with this, a study assessing a text message–based HIV care navigation intervention for young people living with HIV in San Francisco reported that the intervention was both feasible and acceptable, with many participants showing medium to high levels of engagement and improvements in HIV care engagement, medication adherence, and viral suppression(Trujillo et al., 2020). Similarly, a study conducted in three francophone West African countries found that mHealth interventions for HIV treatment and care were highly acceptable among people living with HIV(Lepère et al., 2019).

2.6 Quality of Life Among People Living with HIV

Quality of life is a crucial component in the evaluation of the well-being of individuals living with HIV and AIDS, especially with the increasing life expectancy of PLHIV. Quality of life is defined as a measure of interrelating factors that is subject to vary over a period of time in response to life events, health events and private experiences (Folasire et al., 2012). The WHO defined QoL as an individual's perceptions of their position in life in the context of their culture and value systems concerning their goals, expectations and standards (WHO, 1995). The WHO QoL includes physical health, psychological health, social relationships, and environment. These domains have Likert scale questions, which are put together to evaluate an individual's QoL.

In addition, Revicki et al., 2014 defined QoL as "a broad range of human experiences related to one's overall well-being". The WHO defines health as a "complete state of physical, mental and social well-being and not merely the absence of disease or infirmity"(WHO, 1946). This definition aligns with the concept of QoL, which considers individuals' perceptions and expectations. Evidence shows that there is a rise in life expectancy among HIV patients attributed to improved access to ARVs, and the significance of measuring QoL within this demographic escalates. These facilitates service providers in integrating interventions to enhance these individuals' well-being. Studies on QoL offer an evaluation of the influence of treatment on chronic diseases such as HIV and AIDS.

Although different tools are used to measure QoL, many share common domains that influence people's lives. A systematic review on ageing and QoL in sub-Saharan Africa among older people living with HIV/AIDS highlighted the importance of social, physical, and health-related domains, concluding that novel approaches are needed to better capture QoL(Siedner, 2019).

In addition to these different dimensions of understanding and measuring QoL, there is a need to incorporate narratives alongside quantitative methods. Narratives provide subjective meaning, offering insight into people's daily experiences. This suggests that combining quantitative and qualitative approaches to understanding QoL yields richer insights and deeper reflections(Rosenfeld et al., 2021).Supporting this perspective, a qualitative study in Greece examined the QoL of people living with HIV and found that participants faced challenges across social, environmental, and physical domains. Many reported worries about their condition, reluctance to disclose their HIV status due to stigma, concerns about declining physical health, and uncertainty about adherence to treatment. They also highlighted barriers within the healthcare system, such as service delays and long waiting times (Vrontaras et al., 2022).

Another study in Portugal to analyze factors related to the QoL of elderly people living with HIV/AIDS identified significant relationships between QoL and various factors, including demographic variables, HIV-related factors, and behavioural aspects emphasizing the need for targeted interventions (Caliari et al., 2018). A meta-analysis to assess the impact of clinical determinants on QoL among people living with HIV/AIDS reported that ART had a positive impact on QoL. In contrast, CD4 count and co-morbidities had varying effects (Ghiasvand et al., 2019). Another study conducted in Rwanda to determine the association between physical and mental health-related dimensions of QoL with behavioural and biological risk factors showed that behavioural and biological risk factors for non-communicable diseases were significantly associated with lower HRQoL, highlighting the need for targeted interventions (Biraguma et al., 2018). In Ghana, a cross-sectional study conducted within the Ho Municipality of the Volta region and the New Juaben Municipality of the Eastern region found varying QoL of PLHIV. However, this study did not target the elderly (Osei-Yeboah et al., 2017) and what interventions will help improve their well-being as PLHIV.

2.6.1 Mental Health Among Elderly Persons Living with HIV

Studies have examined the relationship between HIV and mental health (Felker-Kantor et al., 2019; Schadé et al., 2013). Emotional, psychological, and social well-being (Psychosocial health) are all parts of mental health. Mental health influences thoughts, emotions, and behaviours. And also influences how people respond to pressure, interact with others, and make decisions (Bekalu et al., 2019; Petrillo et al., 2015). Every stage of life, from infancy to adulthood is vital for mental health. When mental health is neglected, over all well-being and QoL decline. Hence, individuals with medical conditions such as HIV need to prioritise their mental health. (WHO, 2022) since they have a greater chance of developing mental health disorders(Nakimuli-Mpungu et al., 2021).

Mental health issues developed by PLHIV are mostly linked to decreased HIV treatment adherence, higher-risk behaviours, and less involvement in HIV prevention (Davison et al., 2021; Remien et al., 2021). One of the major causes of mental health issues in PLHIV is stigma. For people with HIV, stigma continues to be a major obstacle that can negatively impact general well-being and patterns of involvement with HIV health services(Farber et al., 2014). Therefore, appropriately addressing stigma issues is crucial while managing HIV illness clinically.

In line with this, integrating mental health and psychosocial support into HIV services has become a top priority of the Global AIDS Strategy 2021–2026, particularly through community-led interventions(Remien et al., 2021; World Health Organization, 2020). For example, In a study of 48 people living with HIV, Farber et al. (2014) examined changes in perceived stigma following participation in a mental health programme integrated with community-based HIV primary care. Participants completed a self-report tool assessing multiple dimensions of perceived stigma, including alienation, responsibility, and discrimination, at both intake and a three-month follow-up. Findings showed a reduction in self-reported stigma over time, suggesting that participation in HIV mental health services may positively influence perceptions of stigma. These results imply that engagement in HIV mental health treatments may have a positive effect on how HIV stigma is viewed.

Ageing with HIV presents further challenges, as older adults often face increased social isolation, reduced social involvement, and added stressors such as deteriorating health, bereavement, stigma, and discrimination(Brown & Adeagbo, 2021). Major depression affects an estimated 13% of HIV-positive individuals, and it has been associated with worse retention in HIV care and worse cognitive function (Sauceda et al., 2019). Due to age- and HIV-related diseases, elderly and adults living with HIV may have many comorbid conditions and one comorbidity may raise the risk of another, and as the number of illnesses rises, so does the number of medications used, raising the possibility of negative consequences on cognitive, physical, and mental health (Magodoro et al., 2016; Althoff et al., 2016).

The accelerated ageing of people living with HIV therefore underscores the need for integrated screening and care for comorbidities, including mental health and neurological disorders(Boccher-Lattimore et al., 2019). Among these, depression is the most common neuropsychiatric consequence and can occur at any stage of HIV infection and the complex biological, psychological, and social dimensions of HIV make diagnosing major depressive disorder particularly challenging(Nanni et al., 2015). It is therefore important to integrate mental health considerations into HIV care to ensure improved QoL for EPLHIV.

2.6.2 Quality of Life Measurement

Assessing health outcomes demands the inclusion of QoL measures, recognizing its importance, especially for populations with chronic diseases such as HIV. It has become a significant method to gauge the effectiveness of healthcare interventions in situations where a cure may not be feasible in the case of HIV (Khademi et al., 2021). An American psychologist developed the first quality-of-life measurement tool called John Flanagan 1970. The tool was initially designed in English to measure chronic conditions such as rheumatoid arthritis, diabetes mellitus, cardiovascular diseases, etc. That tool was initially developed as a 15-item instrument and later modified into 16 with five domains: physical well-being, relationship with people, social and community activities, personal fulfilment and development.

There are quite a number of tools for measuring QoL. Different instruments are designed to capture various aspects of well-being, health, and satisfaction with life. These instruments can range from simple surveys to complex assessments (Coons et al., 2000). There are currently about 150 instruments available for measuring QoL (Mafirakureva et al., 2016). This was stated in a systematic review protocol on interventions for improving the QoL among EPLHIV by Abdulai et al., (2023), which identified over 150 QoL measurement instruments; however, the review intended to utilize the main and widely used tools specifically. These included The Quality-of-Life Scale (QoLS), the Quality of Life Questionnaire, the WHO Health-Related Quality of Life questionnaire, the World Health Organization Quality of Life Instrument, the WHOQoL BREF tool and the Global Quality of Life Scale (Abdulai et al., 2023). A global systematic review and meta-analysis to assess the use of QoL instruments for PLHIV globally identified 65 different QoL instruments, with the most used being WHOQOL-HIV BREF, the WHO HRQOL questionnaire, Medical Outcomes Study HIV Health Survey (MOS-HIV), 36 item short form survey (SF-36), EQ-5D (An instrument used to evaluate geriatric quality of life), WHOQOL BREF, SF-12 (Short version of the SF-36), and HIV/AIDS Targeted Quality of Life (HAT-QOL). High overall completion rates (95.9%) was reported for the HRQoL instruments (Zhang et al., 2022).

This study adopted the WHO Health-Related Quality of Life (WHOQoL) questionnaire, which encompasses 26 questions, with two questions relating to self-rated overall QoL and general health and 24 satisfaction questions categorized into four main domains; physical, psychological, social, and environmental and each domain is evaluated using a five-point Likert scale. The physical domain includes six questions, the psychological domain includes six questions, the social domain comprises three questions, and the environmental domain consists of eight (appendix 7).

2.6.3 Factors Affecting QOL Among EPLHIV

Quality of Life among people living with HIV/AIDS remains an essential aspect of their overall well-being and healthcare outcomes. As effective ART has transformed HIV into a manageable chronic condition, the focus has expanded beyond mere survival to encompassing a good QoL. However, several factors can significantly influence the QoL of individuals living with HIV, making it a complex and multifaceted area of study. These factors include individual and socio-demographic, psychosocial, community, societal, HIV-related, lifestyle, and structural and policy-related factors.

2.6.3.1 Individual and Socio-Demographic Factors

Several sociodemographic factors can affect the QoL of PLHIV, and understanding these factors is essential for tailoring interventions to improve their well-being. These include sex, age, educational level, marital status and employment status. These factors have an impact on how PLHIV go about their daily lives, including how they manage pain and suffering, financial resources, nutrition, social relationships, and psychological consequences. A meta-analysis conducted to summarize the available evidence on the social and demographic determinants of Qol for HIV-infected populations also found poverty together with adulthood, years spent in education, and unemployment to be the most important socioeconomic determinant factors of QoL among PLHIV (Ghiasvand et al., 2019).

A study conducted to evaluate the physical and mental QoL of PLHIV and to explore the link between QoL and individual- and family-level factors in rural China found that male PLHIV had better physical and mental QoL than their female counterparts (Xiao et al., 2019). Similarly, in Ethiopia, (Tesfay et al., 2015) found that females had lower QoL scores than males. In addition, older men were reported to have a higher QoL in the United Kingdom and Brazil than women (Caliari et al., 2018; Catalan et al., 2017). The difference could be attributed to the domestic work that women are engaged in as well as the culture that limits women's autonomy in social participation. These factors physically and emotionally drain women,, worsening their QoL (Caliari et al., 2018).

Age is also another individual factor that was found to affect PLHIV's physiological functioning. Natural ageing of body organs may result in declined body functions. A study conducted to assess socio-demographic characteristics and, social support and QoL in individuals diagnosed with HIV and AIDS in Ghana identified that age was associated with QoL (Abrefa-Gyan et al., 2016). A study in Kenya found that older age was independently associated with lower physical QoL for both genders (van der Kop et al., 2018).

Regarding education, a study among HIV-infected patients in two health regions in Togo revealed that QoL was better in patients with a higher level of formal education. In general, education plays a key role in understanding and communicating information related to well-being. It allows people to possess a better perception of health and follow doctors' instructions to maintain health, thus improving their QoL (Yaya et al., 2019).

On marital status, a study in Ethiopia found that being separated or divorced was associated with poor QoL. Similarly, other studies have reported that married people are more likely to have a good QoL than those who are not married and divorced. Married people tend to have people around them who sometimes comfort and get the opportunity to socialize by serving as social support, thereby contributing to the overall improvement of their QoL (Ding et al., 2021; Khademi et al., 2021). Dings et al study reported that women who were divorced or separated and single had poorer QoL than those who were married. They argued that a stable family provides the necessary emotional and social support for bonding, which can help improve people's QoL.

In Brazil, a study reported that elderly people who had retired were more likely to have a good QoL than those who were currently employed. They argued that retirement improves the psychological well-being of people since they are not into active work, and that promotes their QoL (Caliari et al., 2018). In contrast, Agbeko et al. (2022) study found that employment increases the QoL of PLHIV in Ghana. Being employed is a source of financial self-sufficiency and stability, enabling people to provide for their basic needs, manage their lives and make good life choices, thereby improving their QoL. In addition, having a job can enhance their socio-economic status, facilitating their social integration by giving them better opportunities (Algaralleh et al., 2020).

2.6.3.2 HIV Related Factors

Several HIV-related factors have been noted to contribute to the QoL of PLHIV. These factors include years of living with HIV, viral load, comorbidity and living with someone with HIV/AIDS in the household (Caliari et al., 2018).

Evidence shows that years of living with HIV is positively associated with QoL. Persons living with HIV over time through their experiences may see the condition as a learning situation, and they can overcome some factors that could negatively impact their lives to improve their QoL (A. Ahmed et al., 2021; Caliari et al., 2018; Shriharsha & Rentala, 2019).In addition, having a person with HIV living in a household with others often potentiates a poor QoL as other members in the household tend to stigmatize these HIV positive individuals negatively impacting their QoL (Shriharsha & Rentala, 2019).

On the issue of viral load, a study by (Caliari et al., 2018) found that those with undetectable viral load are more likely to have a good QoL. In Pakistan (A. Ahmed et al., 2021) reported that suppression of viral load is associated with improvement in QoL. Viral load suppression reduces or stops the transmission of HIV to a non-HIV partner, and this potentially has an impact on improving the health of the individual and contributes to the overall QoL of an individual.

Various HIV and AIDS comorbidities, like tuberculosis, tumour, hepatitis, and opportunistic infections, all severely compromise the QoL of PLHIV and a study by (Algaralleh et al., 2020; Xiao et al., 2019) found that living with comorbidities is negatively associated with

QoL. In contrast, a study found that older persons with more than one non-communicable disease are associated with increased QoL. They explained that because the elderly were aware of their situation, they were very frequently at the hospital receiving healthcare, which could positively impact their QoL (Senkoro et al., 2024).

2.6.3.3 Lifestyle Factors

The behaviours, lifestyle and attitudes of HIV patients influence their QoL. HIV gradually overpowers and weakens the host's defense mechanisms to the extent that the host becomes prone to AIDS-related opportunistic diseases (Bhatti et al., 2016).For example, a lifestyle of regular exercise engagement positively impacts the QoL of PLHIV. Martin et al. (2019) conducted a case-control study comparing Physical Activity (PA) levels in PLHIV to HIV-negative control and found that PLHIV with higher PA levels were linked to improved self-rated QoL scores. Similarly, Ibeneme et al.(2019) also reported that moderate-intensity aerobics exercise significantly improves PLHIV activity limitation and QoL domains. Furthermore, a cross-sectional study conducted by Mbada et al. (2013) showed a positive impact of exercise on physical, mental and functional status in the QoL of adults living with HIV (ALHIV). However, a study conducted by Olson et al., (2019) found no association between physical activity and QoL of older PLHIV.

Da Frota Santos et al., (2017) evaluated the influence of alcohol on ART adherence and QoL of PLHIV. They found that harmful alcohol use was associated with altered QoL domains but did not affect ART adherence negatively (Da Frota Santos et al., 2017). Pokhrel et al.,(2018) explained that persons who take alcohol are less likely to adhere to their ART drugs. When they become seductive, they might forget to take their drugs, and they are also less likely to receive support from their family and friends. Alcohol use, therefore, might deteriorate their physical condition as it also leads to an increase in CD4 count and viral load. This situation and other factors could negatively impact QoL.

Evidence also show that smoking is associated with lower QoL (Barger et al., 2023). For instance, those who smoke are more likely to have a lower QoL and smoking tends to have a negative effect on the internal organs of people, thereby negatively impacting their QoL(Barger et al., 2023).

2.6.3.4 Psychosocial Determinants of Quality of Life among PLHIV

Quality of life involves a holistic assessment of an individual's overall well-being, including psychosocial determinants (Yorke et al., 2018). Many older persons living with HIV experience psychological distress in the disease process, leading to depression, non-adherence to ART and poor disclosure of their HIV status, which affects their sense of well-being and overall QoL.

2.6.3.4.1 Depression

Depressive disorder, commonly referred to as depression, is a prevalent mental illness characterized by persistent feelings of sadness, disinterest, or loss of pleasure in activities. Unlike typical mood fluctuations, depression significantly impacts various life domains, such as relationships with family, friends, and community, as well as performance at school or work and the QOL an individual (Fernandes et al., 2023). Depression affects more than 300 million individuals, thus about 5% of the world's population.(Mossie et al., 2016).

Depression ranks as the third most common non-fatal disease burden globally, and its rising prevalence is expected to make it the leading cause of disease burden by 2030 (Yang et al., 2023). Depressive disorders affect about 12% to 66% of PLHIV, with approximately 50–60% of cases remaining undiagnosed (Fernandes et al., 2023).A study conducted to determine psychosocial factors influencing QoL of PLHIV on ART at Udupi District, India, found that anxiety, depression, and social support significantly impact all HRQOL domains.(Amankwah-Poku et al., 2021). The study found that anxiety and depression are negatively correlated with HRQOL. Similarly, another study conducted to explore psychosocial factors contributing to poorer QoL among PLHIV reported that mental health difficulties are prevalent psychosocial issues contributing to poorer QoL among PLHIV (Mendonca et al., 2022). Also, Cai et al., (2020) investigated the levels of depression, anxiety, psychological symptoms, and HRQOL among PLHIV. The findings of their study show that depression and anxiety were associated with poorer HRQOL, especially in physical functioning and mental health domains (Cai et al., 2020).

2.6.3.4.2 Adherence to ARVs

Evidence suggests that the QoL of PLHIV plays an integral role in ART retention, adherence to treatment, and overall survival (Busi et al., 2021). Adherence refers to a patient's capacity to observe the treatment regimen by following prescribed medication schedules, taking medications at specified times and frequencies, and adhering to any dietary or medication restrictions (Achappa et al., 2013). Even though ART has led to a rise in life expectancy among PLHIV, it is important to note that ART is a lifelong treatment. This long-term commitment often leads to medication fatigue among HIV patients, which can result in non-adherence and poor viral suppression, which subsequently impacts their QOL (Boadu et al., 2023).To effectively suppress viral load and thereby reduce the risk of transmitting HIV to another person, as well as maintain good treatment outcomes, adherence levels of ≥95% are recommended (Addo et al., 2022).

Despite this, adherence to ART among PLHIV is low, especially in sub-Saharan Africa and Ghana to be specific. Factors such as medication complexity, side effects, forgetfulness, cost of medication, and cognitive decline among EPLHIV are associated with adherence (Ghidei et al., 2013). Numerous studies have highlighted suboptimal adherence rates among PLHIV in Ghana. For instance, adherence rates of 42.9% (Sefah et al., 2022), 53.1%(Adu et al., 2022) and 62.2% (Obirikorang et al., 2013) have been reported.

It is, therefore, essential to address adherence issues among EPLHIV by developing targeted interventions, especially with the ageing population of people living with HIV in mind. This proactive approach ensures that sufficient support and resources are accessible to foster optimal adherence and enhance overall well-being within this population.

2.6.3.4.3 Disclosure of HIV-Positive Status

HIV-positive status disclosure is the act of revealing a person's HIV status to others, either with or without the individual's consent (Melis Berhe et al., 2020). Algaralleh et al. (2020) found that those who disclose their HIV status are more likely to have a better QoL than those who fail to disclose their status. This is because disclosure offers PLHIV the chance to get support from their immediate family and friends, which can help make life better for them.

A study in Ghana argued that disclosure serves as a stage for creating a platform that could help get support from others and also provides an opportunity to minimize stigmatization and discrimination(Agbeko et al., 2022) and a study in China to explore the link between disclosure and QoL of PLHIV also argued that non-disclosure limits the utilization of health care as people may feel shy and stigmatized, while disclosure of HIV status improves the utilization of health by reducing the barriers to accessing care through social support or networks (Loutfy et al., 2021).

2.6.4 Comorbidities and Polypharmacy

Comorbidities are the occurrence of one or more additional health conditions or diseases alongside a primary condition in a patient. These accompanying conditions can affect the progression, treatment, and outcomes of the primary illness, often making medical management more complex (Skou et al., 2022).

Polypharmacy, on the other hand, is the use of multiple medications at the same time, often to treat complex or multiple health conditions. It typically refers to the use of five or more medications and can increase the risk of drug interactions, side effects, and poor adherence, especially in older adults (Maher et al., 2014).

HIV infection has been shown to accelerate the ageing process in PLHIV, potentially predisposing them to multimorbidity (MM), with a high disease burden, poor QoL, and risk of premature death (Guaraldi et al., 2015; Obimakinde et al., 2020). Multimorbidity in PLHIV increases healthcare costs since it is associated with the number of hospitalizations. In a case-control study in France, the mean total hospitalisation cost in PLHIV patients with other comorbidities was sixfold higher than in matched controls (Pourcher et al., 2020).

The most common morbidity conditions documented in their study include cancer, diabetes, dyslipidemia, chronic renal disease, and viral hepatitis B and C were identified as the most typical HIV comorbidities. Another study conducted by Guaraldi et al. (2019) discovered that the rates of non-communicable diseases (NCDs) were higher in older adults with HIV than in younger adults(Guaraldi et al., 2011). Similar to these findings is the study by Justice et al., (2021), who found that older people with HIV were more likely to be hospitalized as a result of polypharmacy-related adverse events(Justice et al., 2021). In addition, a study conducted in Uganda to find out the survival status of individuals elderly 50 and older who were HIV-negative, HIV-positive not on ART, and HIV-positive on ART discovered that older adults living with HIV on ART had nearly twice the chance of mortality as HIV-negative adults (Mugisha Okello et al., 2020).

2.6.5 Community and Societal Factors Impacting the Quality of Life of PLHIV

Community and societal factors play a significant role in shaping the QoL of PLHIV. These factors encompass various social, cultural, economic, and structural elements that can either support or hinder the well-being of PLHIV.

A cross-sectional study conducted among African American elderly people living with HIV showed that stigma was a significant barrier to social support and engagement in care among older people living with HIV(Harris et al., 2020). A systematic review conducted to examine psycho-social factors that impact how EPLHIV live, cope, and age with the disease also reported that stigma, loneliness, and social isolation, along with concerns about depression, were the main psycho-social factors that affect the care of EPLHIV(Rubtsova et al., 2017). In China, a study reported that higher perceived psychological and behavioural barriers to ART adherence were related to lower adherence self-efficacy, which in turn was related to lower ART adherence (Zhou et al., 2017). A study to provide insights into the intricate relationship between psychosocial well-being, HIV stigma and immune health outcomes among older adults with HIV highlighted that lower HIV stigma was associated with better psychosocial well-being and immune health outcomes. The study concluded by underscoring the importance of adherence to treatment and the need to address stigma-related barriers that may hinder treatment adherence (Rzeszutek et al., 2021).

A review to explore the psychosocial factors contributing to poorer QoL among EPLHIV found that stigma/discrimination, social disconnectedness, and depression remain the most prevalent psychosocial issues affecting the QoL of older people. Adults living with HIV often hesitate to disclose their status to partners and relatives. This lack of disclosure can strain social relationships and reduce the family or relational support they need to manage the disease effectively (Mendonca et al., 2022). Evidence shows that social support plays a critical role in improving outcomes for people living with HIV (PLHIV). For example, a scientific review of 1,963 HIV-positive individuals in the United States found that higher levels of social support were strongly associated with better QoL. This support helped reduce HIV-related risk behaviors, improved coping strategies, and enhanced psychological well-being (Zhu et al., 2020). Similarly, a study conducted at a regional HIV/AIDS treatment center in southern Brazil reported that lack of social support and unhealthy family relationships were significantly linked to poorer QoL among PLHIV(Passos & Souza, 2015).

Evidence from other regions supports this link between social factors and QoL. In China, discrimination and abandonment were identified as key contributors to poor QoL among PLHIV(Xu et al., 2017). In southeast Iran, social support was shown to be positively and independently associated with improved psychological well-being and was also linked to reduced HIV-related stigma(Sargolzaei et al., 2018) while a study in Portugal examining age-related differences in QoL and depressive symptoms among HIV-infected patients aged 50 and older reported that middle-aged and older adults experienced lower QoL in their physical, independence, and social relationship domains. Conversely, higher education, employment, shorter duration since HIV diagnosis, ART use, and fewer depressive symptoms were associated with better QoL outcomes (Monteiro et al., 2016).

2.6.6 Structural and Policy-Related Factors

A study conducted to review ART initiation criteria from national guidelines in 70 countries, to determine consistency with WHO recommendations, and analyze factors influencing

ART eligibility and coverage found that many countries' published guidelines do not align with WHO recommendations, suggesting the need for quick adaptation to reflect emerging science on the benefits of earlier ART access (Gupta et al., 2013). A study evaluating structural interventions for primary HIV prevention among PLHIV examined policy-level barriers and facilitators, the involvement of PLHIV in prevention strategies, and the influence of structural factors on prevention outcomes found that policy interventions can function either as barriers or as facilitators, underscoring the importance of involving PLHIV in policy development and in assessing the broader structural factors that shape HIV prevention efforts(Izquierdo et al., 2023).

Also, a study to determine whether an information system for managing PLHIV can improve QoL and medication adherence showed that implementing the information system led to significantly higher scores in all QoL domains and improved medication adherence(Panayi et al., 2024). Another study to appraise the evidence for interventions improving QoL of PLHIV receiving ART reported that existing interventions showed improvement in several domains. Still, quality evidence was insufficient to support overall QoL improvement(Bhatta et al., 2017).

2.7 Theoretical Foundation and Analytic Framework of the Study

This study adopted two models, the PRECEDE-PROCEED MODEL and the Socio-Ecological Model. These models were triangulated to explore the barriers and facilitators of HIV care.

The choice of the PRECEDE–PROCEED Model and the SEM was deliberate because together they provide complementary strengths for understanding complex health issues. The PRECEDE PROCEED Model offers a structured framework for planning, implementing, and evaluating health interventions (Green & Kreuter, 2005), making it useful for designing and assessing psychosocial support strategies. The SEM, on the other hand, captures the various multilevel psychosocial influences that shape the experiences of EPLHIV (McLeroy et al., 1988). Their combination therefore allowed this study to examine both the systematic processes of intervention planning and the layered contextual factors influencing barriers and facilitators of HIV care.

These models are, however, not without limitations. The PRECEDE–PROCEED Model is often criticized for being resource-intensive and overly prescriptive, which may pose challenges in low-resource contexts such as Ghana (Glanz et al., 2015). Similarly, while the SEM is valuable for mapping determinants of health at multiple levels, it fails to provide a step-by-step process for intervention implementation, which is why combining it with the PRECEDE–PROCEED Model was necessary.

Alternative models, such as the Health Belief Model or the Theory of Planned Behavior, were considered; however, these models focus more narrowly on individual-level determinants (Rosenstock, 1974; Ajzen, 1991) and do not adequately address the broader contextual and structural factors that affect EPLHIV. The PRECEDE–PROCEED Model and SEM combination was therefore selected as the most conceptually appropriate and pragmatic framework for exploring barriers, facilitators, and delivery approaches to psychosocial interventions in this study.

2.7.1 The PRECEDE-PROCEED Model

The PRECEDE-PROCEED Model was employed as a construct for this study. The model provided the structure and concepts which were used as a guide. First, the term PRECEDE is an abbreviation that means Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation, while the term PROCEDE means Policy, Regulatory, Organizational and Constructs in Educational Development (Mills, 1983).

The PRECEDE-PROCEED Model provides guidelines for determining, identifying, and implementing targeted interventions within public health settings or specific populations(Cooper et al., 2017; Mills, 1983). It serves as a roadmap for conducting needs assessments and exploring policy intervention strategies (Mills, 1983). This model rests on two key propositions: first, that health and health risks have multiple determinants; and second, that efforts to change behavioral, physical, and social environments must be both multidimensional and participatory.(Mills, 1983). The model is made up of eight Phases: social assessment, epidemiological assessment, educational/ecological assessment, administrative/policy assessment, intervention planning, implementation, process evaluation, impact evaluation, and performance evaluation. It outlines a systematic process for creating and executing health promotion initiatives and has been applied to advance such programmes over the past 30 years (Kim et al., 2022).

Considering the diverse health and psychosocial challenges faced by EPLHIV, primarily arising from their behaviours, this model was specifically chosen for the study. The model was modified into four (4) phases - Assessment, Interventions, Determinants, and Outcomes, to align seamlessly with the study's methodology, providing the most suitable framework and explanations for the research.

Assessment Phase

Assessment in health and healthcare involves the process of identifying the specific needs of patients and healthcare facilities and the processes involved in addressing the identified challenges to improve health and healthcare services. Assessment may also involve the systematic collection, review, and use of information about healthcare programmes to improve health outcomes. (Ajibade, 2021; Cooper, Clatworthy, Harding, et al., 2017).

The assessment stage emphasizes the significance of recognizing the socio-demographic traits of PLHIV and conducting health and epidemiological evaluations to gain insight into their QoL (Busi et al., 2021; Masquillier et al., 2012). Following this approach, the study began with formative research to assess the barriers and facilitators to HIV care among the elderly, with particular attention to their psychosocial health needs. It also examined the primary outcome of interest which was QoL alongside independent variables such as sociodemographic characteristics, clinical information, adherence, depression, and lifestyle factors. Recognizing the health challenges faced by PLHIV, especially EPLHIV, is essential for effective epidemic control and should remain a priority(Moradi et al., 2014; UNAIDS, 2020).

During the assessment phase, significant health concerns were identified, including self-reported health needs, the presence of co-morbidities, access to healthcare, service quality, and issues of psychosocial support, as detailed in the study by (Sutherland et al., 2018). The barriers and facilitators (predisposing, reinforcing & enabling) factors of the proposed PSSI for HIV among the study population were explored.

Intervention Phase

This phase of the model involves several key components that are vital for developing and implementing effective health interventions. These components provided a structured approach to address identified health issues and improve health outcomes within a specific population (Handyside et al., 2021). Based on the objectives of this study, interventions were developed, packaged, and piloted before implementation based on the components of psychosocial support. This was achieved through findings from formative assessments and literature review. The intervention package focused on providing psychosocial support through health care providers and the use of mobile technology in the form of SVM.

Sustainability Determinants

Sustainability determinants refer to factors that shape the long-term effectiveness and continuity of interventions or programmes designed to enhance public health outcomes (Bodkin & Hakimi, 2020). In this study, sustainability determinants are defined as elements that may support the implementation and maintenance of the interventions in the short and long term. These factors included the consideration of lifestyle characteristics, community and environmental level factors (cultural norms and values, religion etc.), existing structures from the healthcare perspective, policy and resource availability and capacity of service providers may act in concert to support the implementation of the interventions to improve on the outcomes of interest.

Recognizing the structural and policy determinants is critical for intervention alignment, development of intervention strategies, and planning for implementation. Likewise, policies and resources that may facilitate or hinder programme implementation would be examined to ensure a smooth rollout of the proposed interventions. Similarly, other factors such as predisposing, reinforcing, and enabling factors that can affect the sustainability of any proposed interventions among EPLHIV were examined.

Evaluation Phase

The Evaluation phase in the PRECEDE-PROCEED model is a components that focus on assessing the effectiveness and impact of the implemented interventions on chosen health outcomes (Kim et al., 2022). During this Phase, the effectiveness of the tailored interventions is evaluated. In the context of this study, both quantitative and qualitative methods were employed to comprehensively evaluate the interventions' effectiveness.

Quantitative measures, such as changes in scores related to the key outcome (Quality of Life) and other independent variables, such as adherence, depression, and disclosure at baseline and end line, were analyzed. Quantitative assessments in the precede proceed model provide numerical data, allowing for a statistical comparison of the participants' conditions before and after the interventions (Moshki et al., 2022). By quantifying changes in these parameters, researchers gain insights into the effectiveness of the psychosocial support programs, enabling a structured assessment of their impact.

In addition to quantitative measures, qualitative data in the form of personal views were collected. These qualitative insights offer a nuanced understanding of the participants' experiences and perceptions regarding the intervention, allowing researchers to grasp the interventions' real-life impact on the participants and health outcomes.

2.7.2 Socio-Ecological Model (SEM)

The study also utilized the SEM as evidenced by the literature.

This model serves as a comprehensive tool for analyzing health behaviours, linking health outcomes to various factors operating at multiple levels, including individual characteristics. It shows the complex interplay of interrelated factors that affect the outcomes of interest (QoL) as well as some of the independent variables like adherence, disclosure, depression, and social support.

To ensure the effectiveness of an intervention, it must address not only individual-level factors but also their interactions with others, groups, and the wider community. This comprehensive approach includes five stages: intrapersonal (individual-level factors), interpersonal, community, institutional/organizational, and policy-level factors, highlighting the importance of triangulating the SEM with the PRECEDE-PROCEED model for this study.

Individual factors

The individual factors that may influence QoL include demographic characteristics (marital status, age, educational level, sex), clinical characteristics, personal beliefs, attitude, health-seeking behaviours, substance use, and the risks and benefits of engaging in positive health behaviours. For example, adhering to HIV medication, how long one has lived with HIV infection, disclosure, etc. These factors affect how PLHIV performs activities of daily living, coping with pain and discomfort, financial resources, nutrition, social relationships as well as psychological effects. These factors have an overall effect on the health and well-being of the patient. Other individual-level factors include their ability to exercise, work, manage pain and discomfort, and deal with comorbidities and polypharmacy.

Interpersonal factors

The interpersonal factors are the social relationships an individual has with friends, caregivers, families, etc. This is important because neglect by the social cycle can lead to issues such as stress, depression, stigma, and social isolation. This can also lead to non-adherence and subsequent low viral suppression, which can compromise their QoL(Chapman Lambert et al., 2022).

Non-disclosure of EPLHIV status to their partners and relations is often a problem affecting their social relationships and the support they may require coping with the disease progression. Self-stigma of HIV also affects their relationship, which eventually affects their QoL.

Community level factors

According to this model, a community represents the culmination of numerous groups within a specific geographic area. To enhance community health, these members can collaborate and pool resources and ideas together to help community members.

They can organize health fairs and events which are intended to inform and provide accurate information and resources to aid in the prevention of diseases within the community. This can be done bearing in mind the cultural values, norms, beliefs, and religiosity and how these affect a person's health-seeking behaviours and their overall QoL. For example, opinion leaders of a community can organize to have community health nurses come over to educate members of the community on good mental health and how this can help improve their QoL.

Organizational/Institutional

The institutional level factors include healthcare facilities, accessibility, resources, and staff behaviours to patients. The possibility of reaching more individuals in all facets of the community is available at the organizational level. Persons Living with HIV have access to ART clinics across all 16 regions in the country, where they receive comprehensive HIV care.The attitude of service providers, the structure of the health facility, and the package of interventions they offer, including PSSI, can affect the health outcomes of patients, especially the elderly, who are more vulnerable due to their health state.

Policy

The final level of the model looks at how the preventive effort is under the control of the regulating bodies. At every level of government, organizations and regulations are set up to study the spread of diseases and identify more efficient ways to address the issue. They also look at effective policies that can be integrated into health systems to improve individuals' health. Individual behaviours, according to this model, are influenced by existing policies and programmes provided to support PLHIV. Programmes may include the cost of care and availability of drugs at healthcare facilities. Integration of support interventions such as mental health in the comprehensive care of patients.

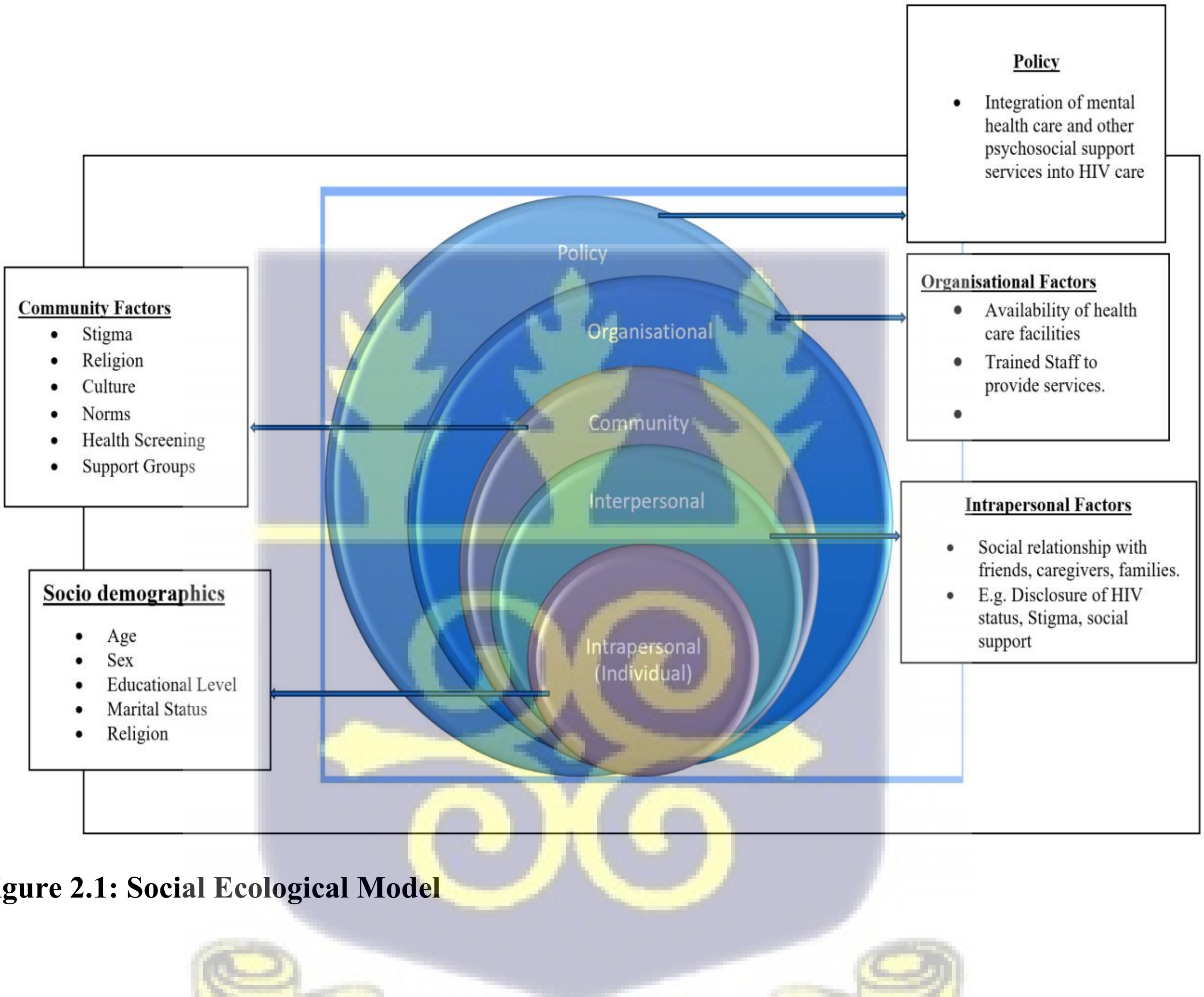


Figure 2.1: Social Ecological Model

2.8 Conceptual framework

The conceptual framework in this study was drawn from the socio-ecological model

The SEM is a tool for addressing health behaviours by attributing health outcomes to a range of factors. It recognises individual behaviour (adherence to ART) as being influenced by a dynamic complex interaction of factors in the ecosystem of the person's life (Figure 1). The SEM includes six levels: individual-level (intrapersonal) factors, interpersonal, community, institutional and policy-level factors (Salihu et al., 2015). This study focussed on the intrapersonal, interpersonal, community factors and structural factors that influence patient adherence behaviour.

The conceptual framework shows that several background factors indirectly and directly influence EPLHIV's QoL. These factors include socio-demographic characteristics, community and societal factors, HIV-related factors, and lifestyle activities. The factors could directly or indirectly impact QoL through health outcomes such as depression, disclosure, and adherence. The framework also shows that the interventions of the study, such as the DSD and the mhealth intervention have an influence on the health outcomes, which could also impact on the QoL. However, there could also be a direct relationship between background characteristics and QoL among EPLHIV individuals.

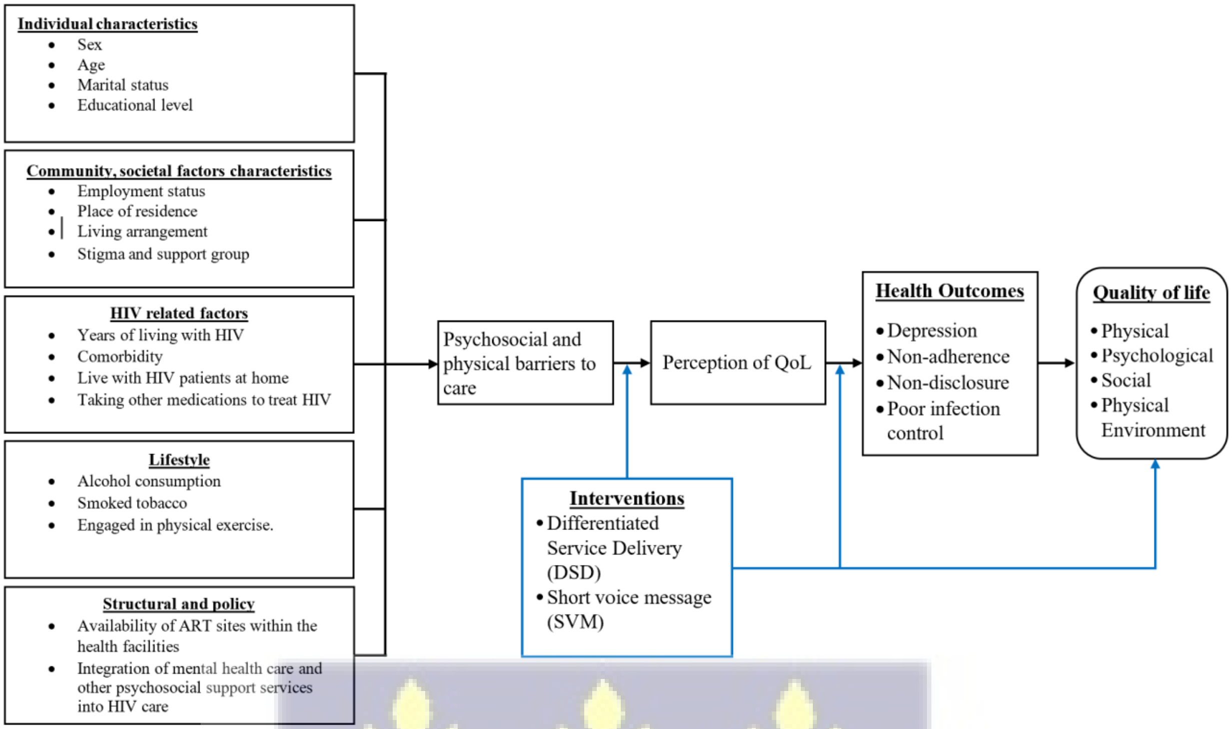


Figure 2.2: Conceptual Framework of the Study

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter provides a detailed methodology of the study. It is structured into various sub-sections, each addressing key components of the research process. These sections include the study's design, study area and sites, study approach, study phases, and ethical clearance. The study design described the framework or procedures guiding the study, followed by the study area and description of study facilities.

The study was conducted in three phases: phase one describes the process for the formative stage, phase two describes the development of the intervention, and Phase three describes the quasi-experimental design, including the procedures for the baseline and end-line survey, as well as the intervention deployment and evaluation. The final part of the methodology discusses the ethical clearance for the study.

3.2 Philosophical Paradigm

Philosophy in research refers to the beliefs, values, and assumptions that shape the conceptualization of a study, the methodology of investigations, and the interpretation of findings (Žukauskas et al., 2018). Philosophy plays a significant role in shaping research methodologies. Different philosophical perspectives provide distinct frameworks for understanding the nature of reality, knowledge, and the relationship between the researcher and the subject (Moon & Blackman, 2017). Several philosophical paradigms underpin research. However, the most commonly used paradigms are positivism, post-positivism/Interpretivism, and pragmatism (Saunders et al., 2015).

The philosophical paradigm underpinning this study is pragmatism. It acknowledges the diverse interpretations of the world and research methods, understanding that no single viewpoint can fully capture the complexity of reality and there might be multiple truths (Kivunja & Kuyini, 2017). Pragmatism embraces a practical and versatile approach, emphasizing the practicality and relevance of research findings instead of rigidly adhering to exclusive philosophical positions. This flexibility empowers researchers to explore objectives that span philosophical frameworks, allowing the incorporation of various perspectives (qualitative or quantitative) for different study aspects (Kaushik & Walsh, 2019). This frequently results in studies employing a mixed-method approach, combining various data types and analysis methods to enhance the research outcomes.

In application, this philosophical paradigm was used to understand the psychosocial health of EPLHIV and devise effective interventions to enhance their QOL. First, EPLHIV's lived subjective experience was explored using a qualitative approach. This involved understanding how they perceive their QoL, the factors influencing it, existing PSSI, and their preferences for an intervention that will improve their psychosocial health and overall QoL. Simultaneously, objective measurements, thus, a quantitative approach using established global tools, can complement this subjective reality.

As a result, a mixed-methods approach, integrating both quantitative and qualitative methods, was adopted for this study. This combination allowed for a thorough exploration of the experiences of EPLHIV to provide a holistic understanding these experiences and to enrich the research findings effectively.

3.3 Study Design

The study employed a three-arm quasi-experimental design, implemented in three phases and carried out in three health facilities, each serving as one arm of the study. Quasi-experimental study designs are research methods used to assess the effectiveness of intervention programmes (Schweizer et al., 2016). It allows researchers to implement interventions in a real-world setting and assess the cause-and-effect relationship between the implemented interventions and study outcomes without imposing strict experimental controls (Sileo et al., 2022).

Several studies with a comparable approach have been undertaken, employing the quasi-experimental design to assess how interventions affect the QoL among people living with HIV (Fuster-RuizdeApodaca et al., 2023; Maynard et al., 2023).

In quasi-experimental designs, a control group similar to the intervention group is selected, enabling researchers to attribute any differences in outcomes between the intervention and control groups to the intervention implemented (Handley et al., 2018). Even though quasi-experimental studies have no randomization, techniques are recommended to ensure a valid comparison group. Propensity Score Matching (PSM) and the Regression Discontinuity Design (RDD) are methods used to reduce selection bias. They help minimize the risk that any observed differences between the intervention and control groups result from inaccurate matching rather than the actual impact of the intervention (Odden et al., 2022). Despite being well-established strategies for reducing selection bias in quasi-experimental research (Rosenbaum & Rubin, 1983; Imbens & Lemieux, 2008), Propensity Score Matching (PSM) and Regression Discontinuity Design (RDD) were not applied in the present study due to methodological constraints.

PSM requires large samples and a big overlap in baseline covariates between treatment and comparison groups to generate valid matched pairs (Stuart, 2010) and these conditions that were not met in this study. While RDD relies on the presence of a clearly defined cutoff score or eligibility threshold to be used in assigning participants to treatment or control conditions (Lee & Lemieux, 2010.), which was also not met in this study.

There are various types of quasi-experimental methods, with the primary designs being the Pre-post with nonequivalent groups design, the regression discontinuity design, the interrupted time series design and the stepped wedge design (Miller et al., 2020). The pre-post design with a non-equivalent control group involves using a control group without randomization. Usually, the control group for this design is selected to closely resemble the intervention group to ensure comparability. This study therefore utilized the pre-post design with a non-equivalent control group because the study population was not randomised.

Because randomization was not feasible in this study, potential biases and issues of experimental validity were handled by matching participants in the intervention and comparison groups on key demographic and clinical variables, as well as baseline measures of mental health, socioeconomic status, and ART adherence, which were then statistically controlled for during the analysis (Shadish, Cook, & Campbell, 2002; Stuart, 2010). This strategy provided a pragmatic and contextually appropriate means of strengthening internal validity during the study.

The three facilities used all provide ART services administered by trained health care providers and are located within the greater Accra region of Ghana. Participation in the study was limited to only HIV-positive clients who were 50 years and above receiving ART treatment services from either Tema General, La General and Achimota hospitals, respectively. The study measured the outcome of interest (QoL) at both baseline and end-line after the intervention. The average measurements of the outcome variables were then compared to identify differences attributed to the implemented interventions.

3.4 Study Approach

The study employed a sequential exploratory mixed-method approach, integrating qualitative and quantitative research methods. This methodological approach involved two sequential stages: initially, qualitative data was collected and analyzed, and subsequently, quantitative data was gathered and analyzed based on insights from the qualitative phase(Dawadi et al., 2021).

In the qualitative phase, the study adopted a qualitative descriptive design (Sandelowski, 2000). Open-ended, conversational methods were employed, including semi-structured interview guides for KIIs and FGDs. These methods enabled exploration of knowledge, perceptions of QoL, and barriers and facilitators of HIV care among EPLHIV EPLHIV (Forman et al., 2008). In addition, the feasibility and acceptability of using mobile technology to deliver PSSI were examined. This design allowed for rich, detailed accounts within participants' natural settings, supporting a deeper understanding of their lived experiences (Klassen et al., 2012).

In the quantitative phase, a structured survey design was utilized. Predetermined questions with predefined response options allowed for standardized data collection through objective measures. This structured approach enhanced precision in measurement and strengthened the potential for generalizing the study's findings to broader populations (Djamba & Neuman, 2002).

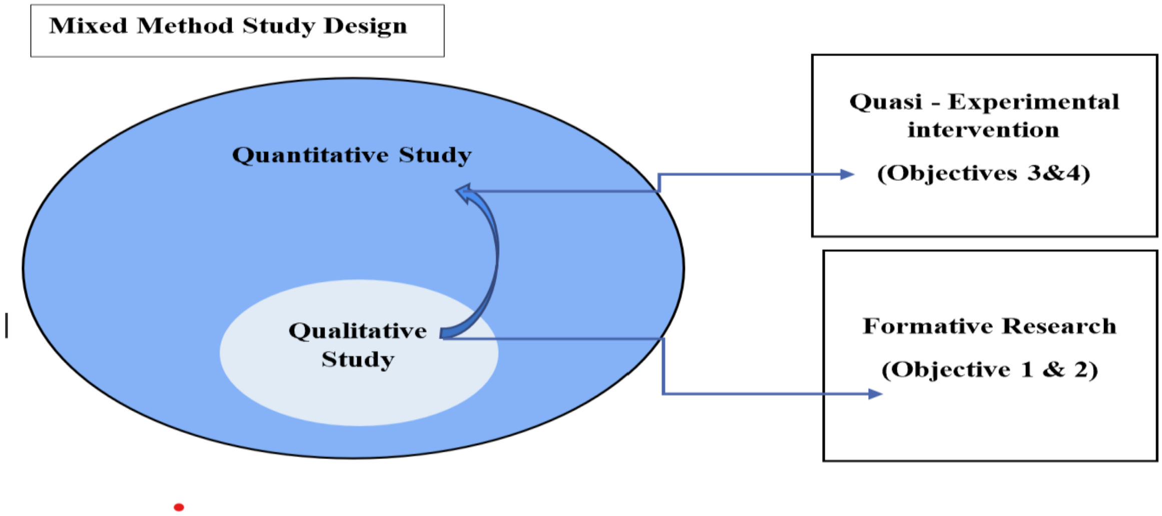


Figure 3.1: Diagram of the Research Design and How it Relates to the Study.

3.5 Study Area and Sites

The study was conducted in Accra, in the Greater Accra region of Ghana. Accra is the capital city of Ghana and is in the Southern or coastal part of the country. The region is one of the 16 administrative regions in the country and the smallest in terms of landmass. The Greater Accra region occupies a total land surface of 3,245 square kilometres or 1.4 %of Ghana's total land area, with 1,236 persons per square kilometre, significantly higher than other regions. However, it is the most populated region, with a population of five million, four hundred and forty-six thousand, two hundred and thirty–seven (5,446, 237), accounting for 17.7 % of Ghana’s total population (Ghana Statistical Service, 2021). It has thus taken over from the Ashanti region, the most populous region in Ghana, from 1970 to 2020 (Ghana Statistical Service, 2021).

Greater Accra region is bordered to the North by the Eastern Region, to the East by the Volta region, to the South by the Gulf of Guinea, and to the West by the Central Region and is is a cosmopolitan region encompassing people from diverse backgrounds seeking greener pastures. The region is highly urbanized, with about 92% of its population living in urban areas. The Greater

Accra region has the highest burden of HIV in the country. It reported the largest estimated HIV population and new infections for 2022, constituting 24.1% and 22.9%, respectively. Within the same period, the region also recorded an HIV prevalence of 2.1% among adults aged 15-49 years, exceeding the national prevalence of 1.66% (GAC, 2023).

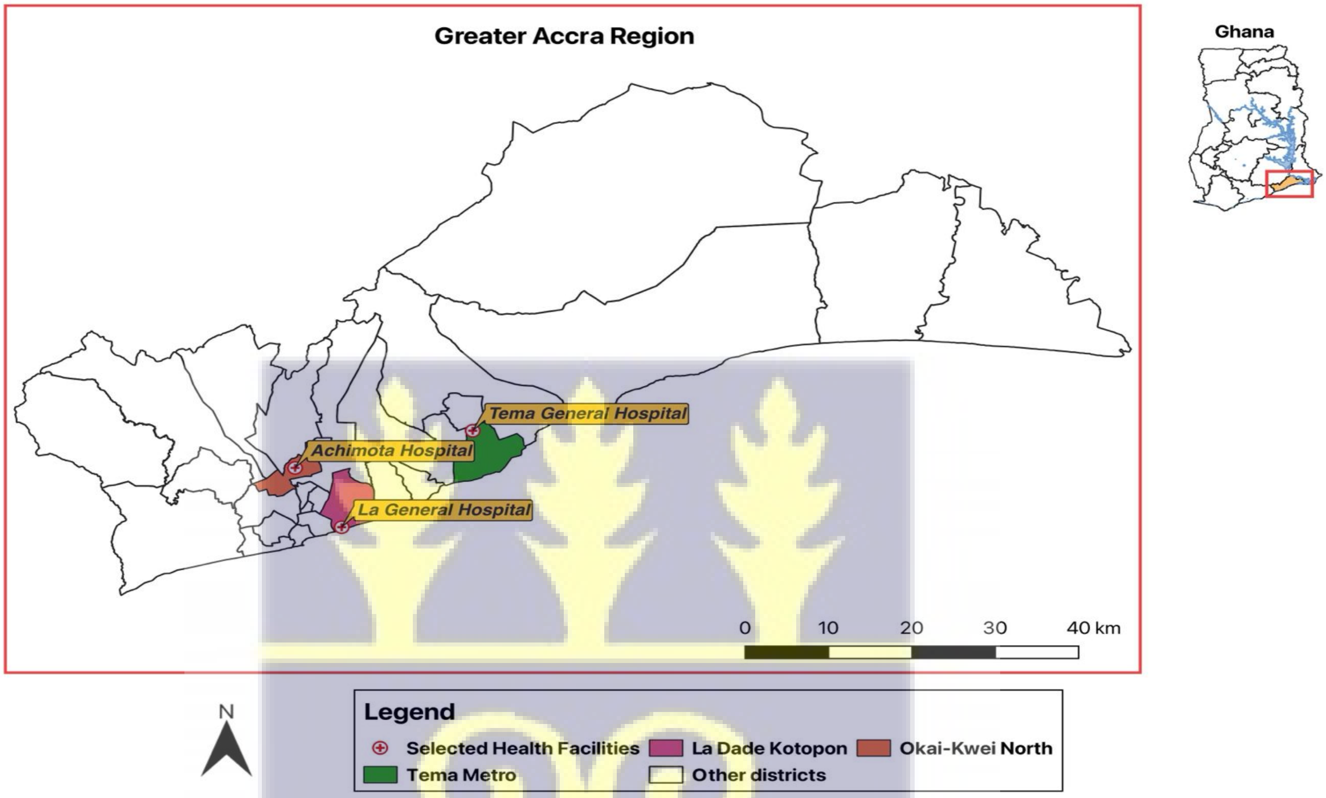


Figure 3 2: Map of Greater Accra Showing the Study Sites

The NACP, per the National AIDS/STI Strategic Plan, 2021-2025, oversees HIV interventions in Ghana. Its core mandate is to deliver a package of interventions to help reduce HIV transmission as well as provide care and support for PLHIV in Ghana (Ghana AIDS Commission, 2021). As of the end of December 2022, the NACP had trained healthcare providers across 715 sites/facilities across all 16 regions in the country to provide ART services to all persons living with HIV. Within the same period, about 150,000 persons were receiving treatment, of which 34% were over 50 years old.

The Greater Accra region also has the highest number of EPLHIV (NACP, 2022) and this informed the decision to purposively select the region for the study. To identify the study facilities, ART facilities within the region with a client load of 300 or more EPLHIV cases were selected. After which, simple random sampling using the lottery approach was employed to select the three study facilities: Tema General Hospital, La General Hospital, and Achimota Hospital.

3.5.1 Description of the Study Facilities

The study was conducted across three healthcare facilities providing ART services: Tema General, La General, and Achimota Hospitals, all in the Greater Accra region of Ghana.

Tema General Hospital

Tema General Hospital, built in 1954, was initially constructed to provide healthcare services to workers involved in the construction of Tema Harbour. Later, the hospital was handed over to the government for public use (Sekyi, 2017). It now serves the communities of Nungua, Sakumono, Tema township, and the Dangme West district. The hospital offers a wide range of services, including internal medicine, general surgery, paediatrics, obstetrics, gynaecology, theatre, and accident and emergency care.

The ART Clinic was established in 2010 to deliver ART services to residents of Tema and nearby areas. The clinic currently cares for approximately 2,500 PLHIV clients, ranging from children to adults, with about 600 of them aged 50 years and above. Medication reviews and pickups are scheduled every 2 weeks to 6 months, depending on the clinical needs of the patients. Clinic services are available on Mondays, Tuesdays, Thursdays, and Fridays. The team consists of 15 health professionals, including two prescribers, six nurses, two Models of Hope (MoH), two data managers, and a case manager.

Achimota Hospital

The Achimota Hospital was established in 1927 by the Achimota School authorities, ten (10) years after the establishment of the Achimota School in 1917. It is situated within the Achimota School in the Okaikoi North Municipality. The facility was built to provide the health needs of the students, staff, and other institutions within its catchment area. In 1974, the hospital was handed over to the Ministry of Health and declared a public facility (Addo-Fening, 2013). The hospital provides services that range in complexity from secondary to tertiary-level care. They provide curative, health promotion, and preventive services to patients. In addition, it serves as a practical site for nursing training schools within the country.

The ART Clinic was established in 2015 to provide ART services to residents within the area and its environs. The clinic currently cares for approximately 1,000 clients, ranging from children to adults, with about 300 PLHIV clients aged 50 years and above. The ART clinic runs every day thus, from Monday to Friday, except weekends. The ART team consists of 6 health professionals, including one prescriber, two nurses, one MoH, and a data manager.

La General Hospital

The La General Hospital is located in the La Dade Kotopon Municipal area of Accra, Ghana. The La General Hospital was established in the early 1960s to provide healthcare to the public in and around Accra, the capital city of Ghana. The hospital offers services that range in complexity from secondary to tertiary-level care, including internal Medicine, Obstetrics, Gynecology, and Child Health and Surgery. Both facilities have staff trained in HIV services and specialized units (ART units) dedicated to providing services for PLHIV.

The ART Clinic at the La General Hospital was established in 2001 to deliver ART services to PLHIV within La and its surrounding communities. The clinic currently has a client load of about 900, including children and adults, with about 350 PLHIV accessing ARVs aged 50 years and above. Clinic reviews and medication pickups for clients are scheduled every month to 6 months, depending on the individual clinical needs. Clinic services are available every day. The ART team consists of eight health professionals, including one prescriber, three nurses, two MoH, one data and a case manager.

3.6 Study Population

A study population represents a subset of the target population from which the participants were selected (Martínez-Mesa et al., 2016).

The target population for this study are all people living with HIV (PLHIV) aged 50 years and above who were receiving antiretroviral therapy (ART) services in the Greater Accra Region of Ghana.

The study population consist of EPLHIV aged 50 years and above who were receiving ART services at the three selected health facilities namely Tema General Hospital, La General Hospital, and Achimota Hospital in the Greater Accra Region of Ghana. These facilities were purposively selected because of their large and diverse caseloads of older PLHIV, accessibility to the research team, and their representation of different service delivery contexts within the Greater Accra Region.

3.7 Study Phases

The study was conducted in three phases, guided by the PRECEDE-PROCEED framework and the Social Ecological Model. The first phase involved formative research, followed by the development of an intervention in the second phase. In the third phase, a quasi-experimental design was employed, where baseline data was collected before implementing the intervention. After 16 weeks of implementation, an endline evaluation was conducted to determine the effect of the interventions. Below is a flow chart of the study.

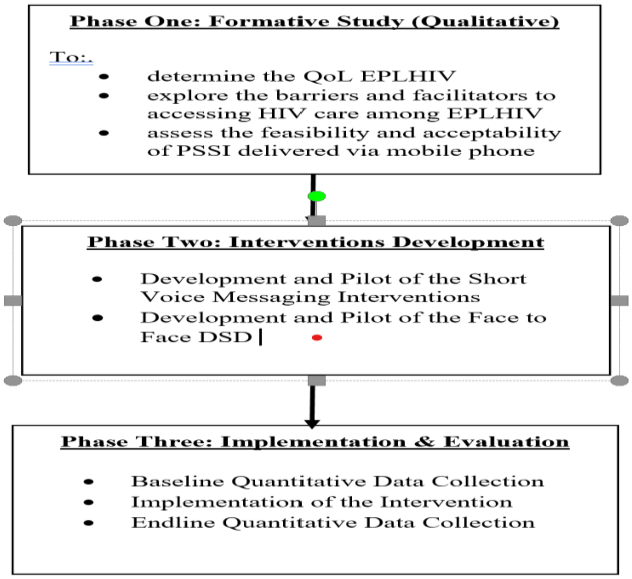


Figure 3.3: Flow Chart of the Study Phases.

3.7.1 Phase One: Formative/ Qualitative Study

In the first phase, a qualitative approach was employed to explore the psychosocial barriers and facilitators in HIV care and the feasibility and acceptability of using mobile technology for delivering PSSI to EPLHIV. Key Informant Interviews and FGDs were conducted among EPLHIV with service providers and implementers in HIV services. Findings from the qualitative study informed the subsequent phases of the study. The process of selecting participants, collecting data, and analyzing the qualitative data are discussed below.

3.7.1.1 Qualitative Study Population

The study population for the qualitative component included EPLHIV, Recipients of Care (ROC)[1], healthcare providers working at the ART clinics, implementers in HIV services, and officers from the National AIDS/STI Control Programme.

3.7.1.2 Inclusion and Exclusion Criteria for the Qualitative Component of the Study

The study included EPLHIV and key stakeholders in HIV service delivery. For EPLHIV,

- Participants should be HIV positive.
- Be 50 years or older.
- Have been on ARVs for at least six months.

Regarding Key Informants;

- Participants should have at least one year of experience in HIV service delivery or implementation.
- Recipients of Care and involved in national leadership positions for Persons Living with HIV.

For the exclusion criteria, all PLHIV who were 50 years and above and hospitalized, seriously sick or not mentally stable were excluded from this study.

3.7.1.3 Sampling Procedure and Sample Size for the Qualitative Study

Participants for the study were selected using the stratified purposive sampling method. They were selected based on the judgment of who was most suitable for the study (Mason, 2017). The stratified purposive sampling technique is widely used in qualitative research and is well-suited for identifying and selecting information-rich cases, enhancing the utilization of limited resources most effectively (Palinkas et al., 2015). Elderly Persons Living with HIV were recruited from the three health facilities (Tema Hospital, La General Hospital, and Achimota Hospital) where they routinely receive healthcare.

This ensured that the participants had first-hand experience with HIV and its impact on their lives. Focus group participants were then stratified by facility to capture diverse perspectives across different care settings. The choice of stratified purposive sampling was to ensure that participants were both information-rich and directly relevant to the study objectives. This strategy is appropriate for our research, which was qualitative and relies on in-depth understanding of lived experiences and contextual factors for results instead of statistical generalizations (Palinkas et al., 2015).

Key Informants were also purposively selected based on their expertise and experience in providing services to PLHIV at the facility level and their involvement in the implementation of HIV interventions at the national and sub-national levels. In addition, representatives of social network groups for PLHIV were included as key informants. These categories of key informants were chosen because they are integral stakeholders in developing and implementing HIV policies. The approaches used in the selection of Focus Group Participants and Key Informants maximized the entire range of perspectives covered by the study as it provided a holistic understanding of psychosocial barriers and facilitators. This aligned with the study's goal of exploring QoL among elderly people living with HIV.

Data collection for both FGDs and KIIs continued until thematic saturation was reached. This saturation point is achieved when no new codes or themes emerge from additional discussions or interviews. Thematic saturation was deemed most appropriate for this study because the focus was on capturing the breadth of perspectives across diverse participant groups rather than achieving exhaustive depth within individual narratives) (Guest, Namey, & Chen, 2020). This confirmed that the sample was sufficient to comprehensively address the study objectives.

The diverse groups of participants included in the study provided valuable perspectives on the topics under investigation. In all, a total of 37 people participated in the qualitative study. Specifically, twenty-nine (29) people participated in the FGDs and eight (8) key informants for the interviews. The in-depth interviews and FGDs were stopped upon reaching data saturation, indicating a comprehensive exploration of the research topic.

3.7.1.4 Data Collection

The qualitative study employed two main methods for data collection. These were FDGs and KIIs. Data collection for the formative study was carried out in April 2023 using an interview guide developed and pre-tested at the Adabraka health facility that provides service for HIV patients within the region. Eight (8) EPLHIV and three KII (3) were used for the FGDs and In-depth interviews, respectively, for the pretesting. This facility was, however, not included in the study. Participants for the study were selected through the following processes: permission was first sought from the management of the selected health facilities to conduct the study, and the management then assisted in recruiting EPLHIV.

For both the KIIs and FGDs, permission to be included in the study was then sought from eligible participants. The purpose of the study and the benefits and risks of participating were explained to them. In addition, participants were informed and assured of anonymity and strict confidentiality of their responses. Participation in the study was voluntary, and all participants signed a written informed consent form indicating their willingness and agreement to participate in this study. Permission was sought from all participants to record the interviews and FGDs.

Focus Group Discussion (FGDs)

Focus Group Discussion is a qualitative data collection technique where one or two researchers engage with a group of 6-12 participants to collaboratively discuss a predefined research topic (Djamba & Neuman, 2002).

In this study, four FGDs consisting of two male and two female' groups were conducted to examine the knowledge and perception of QoL among EPLHIV and investigate the barriers and facilitators of HIV among EPLHIV. The sex disaggregation became necessary following feedback from the pretest assessments on the need to separate males from females to enable interactive discussions. In addition, the feasibility and acceptability of using mobile technology to deliver

PSSI were explored, gathering perceptions directly from the participants through these interactive methods**.** Each group comprised 7-8 individuals (N=29), and the participants were arranged in a horseshoe position, with the moderator and note-taker sitting in the centre.

All the FGDs were conducted in the local language, with each meeting lasting between 45 and 60 minutes. During the discussions, participants were allowed to express their views on any question posed before moving to the next one. Probing techniques were employed to clarify any ambiguous points or explore emerging areas of interest. The FGDs were moderated by trained research assistants with expertise in qualitative research. All FGDs were audio-recorded. At the end of each FGD, the moderator summarized the key issues that emerged to be validated by the discussions.

Key Informant Interviews (KIIs).

Key informant interviews were carried out with personnel from the NACP, leadership of ROC, implementers of HIV programmes and service providers at the facility level to gather perceptions into psychosocial barriers and facilitators in HIV care for individuals living with HIV and the QoL of EPLHIV. In addition, the feasibility of using mobile technology to deliver an intervention was explored. These participants were selected due to their perceived knowledge of HIV programming and interventions in Ghana. In all, eight (8) KIIs were conducted.

All key informant interview guides were drafted in English. The interviews were conducted one-on-one with key stakeholders. Each interview session lasted approximately 45 to 60 minutes, and participants were asked for permission to audio-record the discussions. The PI and trained research assistants conducted the interviews. Member checking was done by summarizing the key issues that emerged at the end of the interview.

Table 3.1: Summary of Number of In-Depth Interviews and FGDs

Data collection	**One-on-one interview**	**FGDs (EPLHIV)**	**Total**
EPLHIV	-	4 groups	4groups
Key Informants	8	-	8
Total	**8**	**4 groups**	

3.7.2 Phase Two: Developing and Piloting the Interventions

The results from the qualitative study highlighted psychosocial challenges faced by elderly people living with HIV. These findings informed the development of interventions aimed at improving the QoL of EPLHIV. For example, measures to address digital accessibility concerns were incorporated during the formative phase, where participants were consulted on potential barriers to mobile technology use. These included challenges related to literacy, language, confidentiality, and network availability. Based on this feedback, SVM in multiple local languages were adopted to enhance accessibility, while neutral message content was designed to protect confidentiality

In the second phase of the study, two PSSIs were developed and implemented. These interventions were developed to offer counselling and educational messages using bulk SVM and a face-to-face approach utilizing a DSD tailored towards EPLHIV. The goal was to enhance their adherence to ARVs, facilitate disclosure of their HIV-positive status, and address aspects of physical, psychological, social, and environmental health, ultimately aiming to improve their overall QoL.

The study comprised three arms, with each arm for a specific facility. The first arm was at the Tema General Hospital, where participants were offered the intervention utilizing a face-to-face approach to deliver DSD, while participants at La General Hospital received the intervention via SVM three times a week. Wigal Frog Ghana Limited hosted the platform for the SVM services. The third arm, Achimota Hospital, was the control facility, and no intervention was applied. All facilities continued to receive the standard treatment of care.

3.7.2.1 The Voice Messaging Intervention Programme

The voice messaging programme dubbed ***"ageing with grace"*** refers to the established platform set up for the messages delivered during the study's intervention phase. This non-interactive voice messaging programme targeted EPLHIV receiving ART at the La General Hospital. Wigal Frog Service Ghana Limited, a local telco provider based in Accra, Ghana, hosted the voice messaging program. The VMS programme was categorized into six main themes thus:

a. Adherence to ARVs
b. Disclosure of HIV-positive Status
c. Physical Health
d. Psychological Heath
e. Social Relation
f. Physical Environmental

Each theme or domain had three sub-sets of different messages. Messages from these themes were developed from four main documents.

1. *The Ghana Health Service consolidated guidelines for ART care in Ghana, 2023 version*
2. *Differentiated Service Delivery for HIV care in Ghana, 2023 version.*
3. *WHO's Document on Integration of Mental Health and HIV Interventions, 2021*

4. *The WHO QoL Bref Assessment Tool*

Additional information was sourced from experts in HIV care and management. The bulk SVM was sent out three times a week (Monday, Wednesday, and Friday), including public holidays, spanning 12 weeks. The sender ID was designated as ***(0271000000).*** The messages were strategically organized for delivery sequentially to align with the content of the main and sub-themes. Consequently, each week focused on delivering all the sub-themes within each domain, ensuring participants comprehensively understood the discussed subject matter. Each SVM had a duration of not more than 2 minutes and aimed to address three key aspects under each sub-theme: a) Identifying the problem, b) Exploring the consequences of the problem, and c) Proposing steps to resolve or address the problem.

3.7.2.1.1 Developing the Short Voice Messaging Programme

This study adopted Abroms et al., (2015), recommended five (5) steps for developing a text messaging programme for a health intervention. These sequential steps encompassed: (a) conducting formative research to gain insight into the target audience and the health behaviour in focus, (b) crafting the Voice Messaging Programme, (c) subjecting the SVM to pre-testing, (d) revising the SVM based on the findings from the pre-testing, and (e) launching the SVM (Abroms et al., 2015). When crafting an educational messaging programme for health interventions, it is essential to employ an iterative process, allowing for continuous refinement and enhancement of the programme's effectiveness (Leon et al., 2021).

An iterative process was used to formulate a set of 20 voice messages, actively involving stakeholders such as EPLHIV, service providers in HIV care and management, and content development experts. This collaborative engagement ensured that the voice messages were crafted systematically, drawing on the invaluable insights and expertise of those directly impacted by HIV and professionals with specialized knowledge in healthcare and content development.

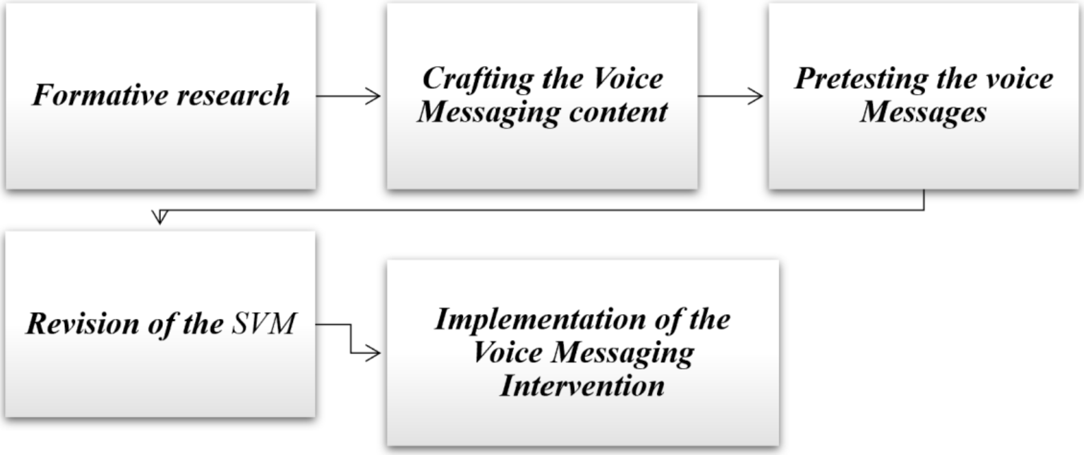


Figure 3.4: Processes Used to Develop and Implement Short Voice Message

- **Formative research**: Understanding the diverse needs of PLHIV is essential for developing and implementing effective interventions. In this regard, using voice messages is a potent tool for disseminating vital information and offering support, as identified through formative research (Catalani et al., 2013). This study highlighted challenges related to the QoL for EPLHIV and underscored the necessity for a holistic psychosocial support intervention. Participants expressed that they received such intervention through non-interactive voice messages.

  A significant factor considered in this study phase was the prevalence and ease of access to mobile phones among the target population. Baseline data indicated that more than 95% of participants in the study possessed a mobile phone, aligning with the results of a study by Kuranchie et al.., (2022) on the utilization of mobile phones among older individuals in Ghana, where all participants (100%) were found to own mobile phones(Kuranchie, 2022).

- **Crafting the Voice Messaging content.** A desk review was done to inform the draft of voice messages, focusing on the six key thematic areas that can be used to improve the psychosocial needs of EPLHIV. This involved an extensive exploration of existing literature on medication adherence Catalani et al., (2013), psychosocial aspects of disclosure Smith et al., (2017), holistic physical health considerations (WHO,2016), mental health interventions Sherr et al., (2011), social relations Logie & Gadalla (2009), and the impact of physical environmental factors Earnshaw et al., (2013). The synthesized understandings from this comprehensive review were instrumental in developing voice messages that addressed the complex needs of the target population(Catalani et al., 2013; Logie & Gadalla, 2009; Sherr et al., 2011; Smith et al., 2017; Stangl et al., 2019).

- ***Choosing the Behavior Change Goal:*** Based on the comprehensive desk review, behaviour change messages aimed to enhance ***the psychosocial well-being of EPLHIV*** were crafted. These messages were designed to promote medication adherence, facilitate positive disclosure experiences, advocate for holistic physical health practices, encourage mental health awareness, foster positive social relations, and empower individuals to navigate their physical environments effectively.
- ***Consensus-building workshop:*** A one-day consensus-building workshop was conducted to assess the draft content's acceptability, appropriateness, and validation. Employing an iterative process involving stakeholders such as ROC service providers in HIV care and management, the leadership of the HIV control programme, and content development experts. Twelve participants participated in this workshop.

These were the lead persons for this study and two research assistants, two experienced HIV counsellors from Ridge and Adabraka hospitals, four (4) ROCs, two from the NACP, and a content development expert from the Ghana Broadcasting Corporation (GBC). Participants visualized their perspectives and contributed suggestions for improvements. This collaborative approach, crucial for both motivation and learning, aimed to enhance the intervention by seeking participants' opinions on optimal delivery methods and content packaging. The discussion, centred around the six thematic domains, also involved exploring preferences for the frequency and ideal timing of message delivery. This innovative strategy, adapted from successful initiatives in the Philippines and China, underscores a commitment to tailoring the intervention based on participant feedback for enhanced effectiveness.

- ***Designing the Framework and Messaging Library***: Participants collaboratively developed the programme framework and messaging library during the workshop. This framework established a comprehensive strategy for delivering messages to users, providing guidelines for message delivery timing, frequency, and content. It outlined the types of messages to be included and the duration of each voice message, contributing to an effective communication plan within the programme. See ***Appendix 4 for the messaging library.***
- ***Developing the voice messages:*** Expanding on the collaborative efforts from the workshop, an expert was engaged to transform the developed programme framework and Messaging Library into concise and impactful voice messages, with each message carefully designed to last no more than two minutes. This approach ensures the information is delivered in a digestible and engaging format, enhancing user receptivity and understanding. The duration of each voice message aligns with best practices for maintaining user attention and facilitating effective communication within the programme (Ogawa et al., 2022). The messages were initially composed in English and later translated into three local languages (Twi, Ewe and Ga) to accommodate the language preferences observed among participants in the baseline data.

1. **Pretesting the voice Messages:** The voice messages generated were pre-tested in two health facilities (Legon and Adabraka Hospital) among 20 EPLHIV on ART. Participants

recruited for the pilot received a comprehensive explanation of the project, outlining their expected involvement. Three messages were sent daily to each of the 20 participants for one week. This approach aimed to ensure that every participant received a complete set of messages within each thematic domain, facilitating the collection of meaningful feedback at the end of the testing period.

2. **Revision of the SVM:** Participants engaged in the pretest responded to questionnaires administered through Kobo Collect, and the generated data was exported to both Excel and Stata version 21 for thorough analysis. The feedback obtained from the initial pretesting phase played a crucial role in refining the voice messages and incorporating participant suggestions to enhance the content. Further adjustments were made to these messages through virtual engagement with the same stakeholders during the consensus-building workshop. Subsequently, a finalized message library consisting of 20 validated messages was crafted and employed during the implementation phase of the study.

3.7.2.2 Developing a Psychosocial Intervention Utilizing Differentiated Services Delivery Approach for the Elderly

The development of psychosocial intervention using a DSD approach for the elderly was informed by the findings from the formative assessment of this study. The intervention incorporated four of the six DSD components: a client-centred approach, risk stratification, service differentiation, and streamlined services.

This was implemented by designating a specific clinic day for elderly patients, during which healthcare providers (ART staff) delivered health education and comprehensive counselling in alignment with the four DSD components. As part of the intervention, participants were encouraged to interact with their peers, engaging in peer-to-peer interactions during each visit to share their experiences and challenges. The development and packaging of this intervention involved a multi-faceted approach encompassing key stages such as stakeholder engagement to discuss the intervention and support needed, training content, training of healthcare providers, piloting of interventions, and finally, the implementation of the intervention.

Stakeholder Engagement

Key stakeholders critical in the development of this intervention were identified and contacted. Acknowledging their demanding schedules, all parties agreed to a two-hour virtual engagement. Consequently, a zoom meeting involving the research team, ROC leadership, leadership of the study facilities and the head of the clinical care team of the NACP was conducted to discuss the proposed intervention. A comprehensive overview, seeking support from key stakeholders for specific aspects, was provided:

- Collaborating with TGH management to assess the feasibility of dedicating a separate ART clinic day for the intervention and providing integrated services for HIV and NCD among this target group.
- NACP will support facilitating training content alignment with their guidelines.
- Soliciting full support from the ROC leadership.

Also, deliberations on the intervention's sustainability post-project completion were part of the agenda. The management of the TGH agreed to dedicate Wednesdays as the ART clinic day for the elderly. The NACP team also agreed to facilitate some components of the training content.

Training of Health Care Providers

Training before the rollout of a behaviour change intervention is crucial as it equips participants with the necessary knowledge and skills to implement the intervention effectively. This preparation ensures a smoother and more informed execution, enhancing the intervention's impact and increasing the likelihood of successful behaviour change outcomes (Hatfield et al., 2020). For this study, a three-day training was organized at the NACP conference room for ART staff of the TGH to take them through the provision of comprehensive psychosocial support for elderly clients. The training involved ten (10) participants, comprising two ART prescribers, two ART nurses, a pharmacist, two data managers, two models of hope, and a laboratory technician.

Facilitators for the Training

The Center for Psychological Services and Professional Development (PsyPro) was engaged in training service providers (ART staff) on how to assess the cognitive and mental health functioning of EPLHIV. This organization is in Accra, Ghana, and is operated by a group of licensed psychologists with a wide range of expertise, including the provision of individual psychotherapy, family and child health, training organizations and health care workers on mental health etc. The clinical care team of NACP also facilitated the training by educating participants on counselling strategies on the importance of adherence, disclosure, and maintaining good physical health for EPLHIV.

Training content

The training content was structured around the components of the DSD and the WHOQOL Bref tool. This structure was guided by the four main domains outlined in the WHOHRQoL questionnaire, the guidance document on "addressing the needs of older patients in HIV care" by Siegler (2020), and the Geriatric 5Ms, which include Mind, Mobility, Medications, Multi-complexity, and Most Matters (Handayani et al., 2019; Siegler, 2020; Tinetti et al., 2017). These frameworks collectively provide a comprehensive and well-rounded approach to the training, ensuring coverage of essential aspects related to psychosocial well-being and care for older individuals, particularly those affected by HIV. The training content and tools used can be found in Appendix 5

The training content was structured across three sessions, providing participants with a comprehensive overview and practical guidance.

Session 1: Introduction and Core Concepts

On the first training day, participants were acquainted with the study's purpose, objectives, and anticipated outcomes. This initial session aimed to establish a foundational understanding of the context and goals of the training, fostering engagement and alignment among the participants. After this, a pretest was conducted to assess the baseline knowledge of service providers on the training content. Following the introduction, the National AIDS Control Programme took participants through essential counselling strategies. The focus areas included adherence to medication, disclosure practices, and the need to provide integrated services for other non-communicable diseases, such as hypertension and diabetes, to manage multimorbidity for EPLHIV as outlined in the Geriatric 5Ms framework. They were also trained in the need to counsel participants on maintaining good physical health and nutrition. By covering these critical aspects on the first day, participants were equipped with the fundamental knowledge and skills necessary for effective support and care for individuals, especially those affected by HIV.

Session 2: Cognitive and Mental Health Assessment

The second day, facilitated by PsyPro Ghana, took participants through the cognitive and mental aspects of individuals living with HIV. Participants were provided with tools and techniques to assess the cognitive and mental states of EPLHIV. This session aimed to enhance participants' ability to understand and respond to the unique psychosocial challenges faced by this population.

Additionally, PsyPro Ghana conducted counselling sessions focusing on social isolation, recognizing the impact of mental health on social connections. Strategies for creating an enabling environment were explored, emphasizing the importance of supportive surroundings for the well-being of individuals, especially those living with HIV.

Session 3: Integration and Practical Application

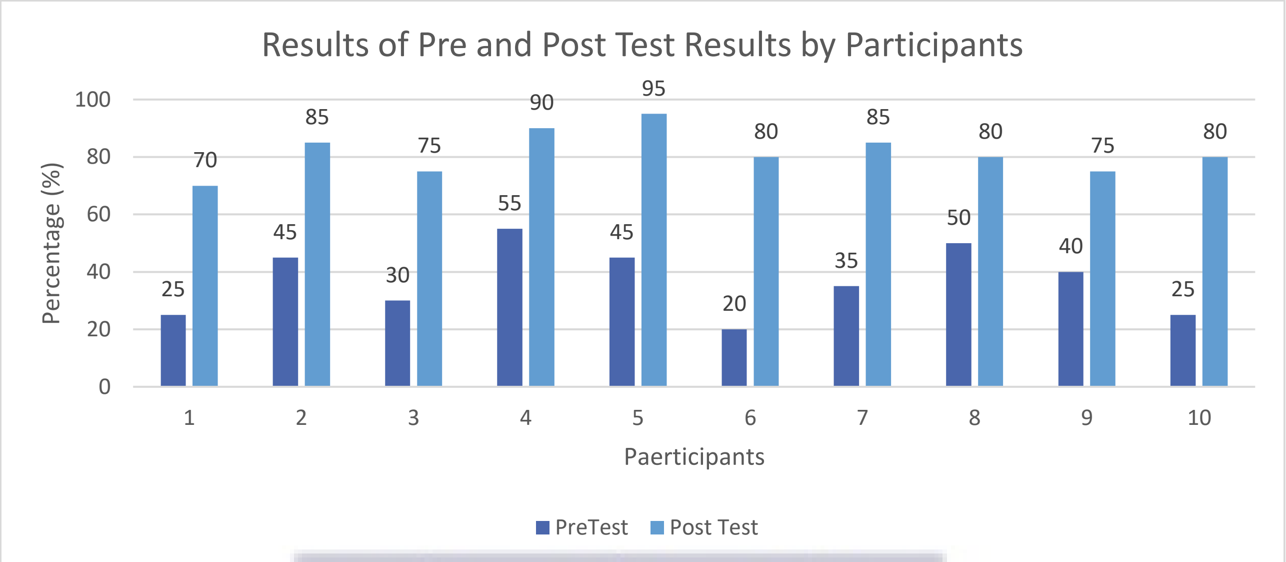
The final day of the training integrated the concepts covered in the previous days. Participants engaged in practical exercises and case studies, applying the counselling strategies and assessment techniques discussed earlier. This hands-on approach allowed participants to consolidate their learning and gain confidence in applying their knowledge in real-world scenarios. Throughout the training, an interactive and participatory approach was maintained, encouraging questions, discussions, and sharing experiences among participants. The facilitators ensured a supportive learning environment, fostering collaboration and skill development among attendees.

Pre and Post-Test Evaluation

Pre and post-tests serve as tools to measure the change in knowledge after a training session. Service providers at the Tema General Hospital (ART Nurses, Model of Hope, Laboratory Technicians, Pharmacists, data managers and prescribers) were trained by Psyro Ghana.

The pretest assessed participants' baseline knowledge, allowing facilitators to structure the content to meet specific learning needs (see Appendix 6 for the pre and post-test assessment/questionnaire). The post-test, administered at the end of the training, provided insights into the knowledge gained and the effectiveness of the training in achieving the study objectives (De Vries et al., 2022). The comparative analysis of pre and post-test results offered a tangible measure of the participants' progress and the overall success of the training programme (Shivaraju et al., 2017). Figure 3.4 shows the pre-post-test results.

Figure 3.5: Results of Pre and Post-Test Results of Service Providers Trained to Provide the DSD Components of the Psychosocial Support Intervention.



Piloting the intervention

The intervention was piloted on a designated day, specifically Wednesdays. The initiative targeted 62 EPLHIV who were scheduled for appointments during the week of 12th June 2023. ART staff called these individuals and invited them to attend their clinic appointments on the designated Wednesday of that week, provided it doesn't distract their routine. The aim was to ensure minimal disruption to their regular schedules while introducing and testing the effectiveness of the intervention.

Out of the 62 invited clients, an encouraging turnout was observed, with 49 clients attending their appointments on the designated Wednesday. This response rate indicated high interest and participation among the targeted individuals. This finding was consistent with the feedback gathered from participants in the qualitative study regarding the need to establish a specific clinic day for EPLHIV. This also aligned with responses from participants during the qualitative study on the need for a designated clinic day for EPLHIV.

The pilot phase assessed the feasibility and practicality of implementing the intervention and provided valuable insights into the reception and engagement of the clients. It offered an opportunity to identify any logistical challenges as well as refine the delivery of the content. The feedback received from both participants and service providers during the pilot phase indicated that no significant modifications were required before the full rollout.

3.7.3: Phase Three: Quasi-Experimental Design/ Survey

In the quasi-experimental phase of the study, baseline data was collected using a structured questionnaire. Following the baseline assessment, the developed PSSI were deployed to the target groups. An evaluation was then conducted post-deployment to measure the effectiveness of the interventions by comparing post-intervention data to the baseline.

3.7.3.1 Quantitative Baseline Data Collection

Prior to the implementation of the developed interventions, quantitative baseline data was collected between May and June 2023 in all three study sites (La General, Tema General and Achimota hospitals). Below is the methodology used for the quantitative survey.

3.7.3.1.1 Study Population

The population for this study was elderly persons (≥50 years) living with HIV and are on antiretroviral therapy. Elderly patients living with HIV face multifaceted issues compromising their QoL, hence the need to target them for this study to inform decisions.

3.7.3.1.2 Inclusion and Exclusion Criteria

The inclusion criteria for this study were elderly HIV patients (≥50 years) who are on antiretroviral therapy for at least six months and have registered and received ARVs at any of the selected study facilities. Participants designated to receive SVM (participants from La General

Hospital) were required to own a mobile phone. Patients who were mentally unstable, severely ill, or referred to other facilities for treatment were excluded from participation in both the interventions and the control groups.

3.7.3.1.3 Sample Size Determination

For the sample size calculation, the outcome variable, QoL, was treated as a continuous variable, with a mean difference between the study groups. The statistical formula below for intervention studies with continuous outcomes proposed by Singh et al.., (2012) was used to determine the sample size for the study.

$$N= \frac{(\alpha_1^2+\alpha_2^2).\ [^{z}{}_{1-\alpha/2} + {}^{z}{}_{1-\beta}]2}{(M_1 - M_2)}$$

Where.

N= required sample size for one group

M1= mean of the outcome variable (QoL) in group 1

M2= mean of the outcome variable (QoL) in group 2

σ1 Standard deviation of the outcome variable (QoL) in group 1

σ2= Standard deviation of the outcome variable (QoL) in group 2

Z_(1-(α)/2) = confidence level at 95% (standard value of 1.96)

$Z_{1-\beta} = Z_{0.20}$ = 0.84 at 80% power to detect the difference in the QoL between the groups.

With a baseline mean QoL level of 77.43, a standard deviation (SD) of 9.03, and a post-intervention QoL of 82.54 with an SD of 12.03, as reported by Zeng et al., (2022), the required was

$$N= \frac{(\alpha_1^2+\alpha_2^2).\ [^{z}{}_{1-\alpha/2} + {}^{z}{}_{1-\beta}]2}{(M_1 - M_2)}$$

$$\frac{[(9.03)^2+(12.03)^2].\ [1.96+0.84]^2}{(77.43-82.54)^2}$$

$$[(\underline{81.54+144.72].\ [7.84]}$$

(22.09)

[(81.54+144.72]. [7.84]
(22.09)

[1773.8789]
(22.09)

N = 80

Considering the sample size allocation ratio of 1:1:1 for the two intervention groups and the control group, the required sample size for both groups would be 80 participants multiplied by 3, resulting in a total of **240** participants. Considering a 45% attrition rate, as observed in a similar study(Minn Oo et al., 2016) and utilizing the drop rate formula (Kang, 2021), Nd=N/(1-d) where Nd represents the calculated sample size after considering the drop-out rate, N is the initial sample size, and d is the expected drop-out rate, a sample size of **437** was calculated.

3.7.3.1.4: Sampling and Enrolment

Facility Selection

Three ART facilities, Tema General, La General, and Achimota Hospitals, were selected based on two approaches. First, a list of all ART facilities in the Greater Accra Region at the time of the study was obtained from the NACP, and their corresponding clients' load was disaggregated by age. Facilities with over 300 EPLHIV and above client load were considered for inclusion. Simple random sampling using the lottery approach was then used to select the three facilities.

Participants Recruitment

Once the health facilities were identified, contact was made with the head of the ART clinics. With assistance from the ART clinic staff, potential eligible participants (meeting inclusion criteria) at each health facility were determined by reviewing ART clinic records manually and electronically.

A systematic sampling approach with a sampling interval of two was used to identify a total of 463 potential participants in all three selected health facilities. Participants were contacted on the phone by the head of the ART clinics and informed about the research. Where a third party answered the phone call, a call-back was politely requested. They were invited to the ART clinic, where the study protocol was explained comprehensively to the best of their understanding.

Participants were given time to ask questions and seek clarification of the study. All questions and concerns raised were addressed to the participants' satisfaction.

Of the total 463 eligible participants identified, 10 declined participation due to a lack of interest in the study, the team was unable to reach out to 12 eligible participants, and 4 were seriously sick. The process of study enrollment is outlined in Figure 7. Eligibility checks were conducted before providing information about the study. The study protocol was then thoroughly explained to participants, ensuring their understanding, before they were enrolled upon providing written informed consent.

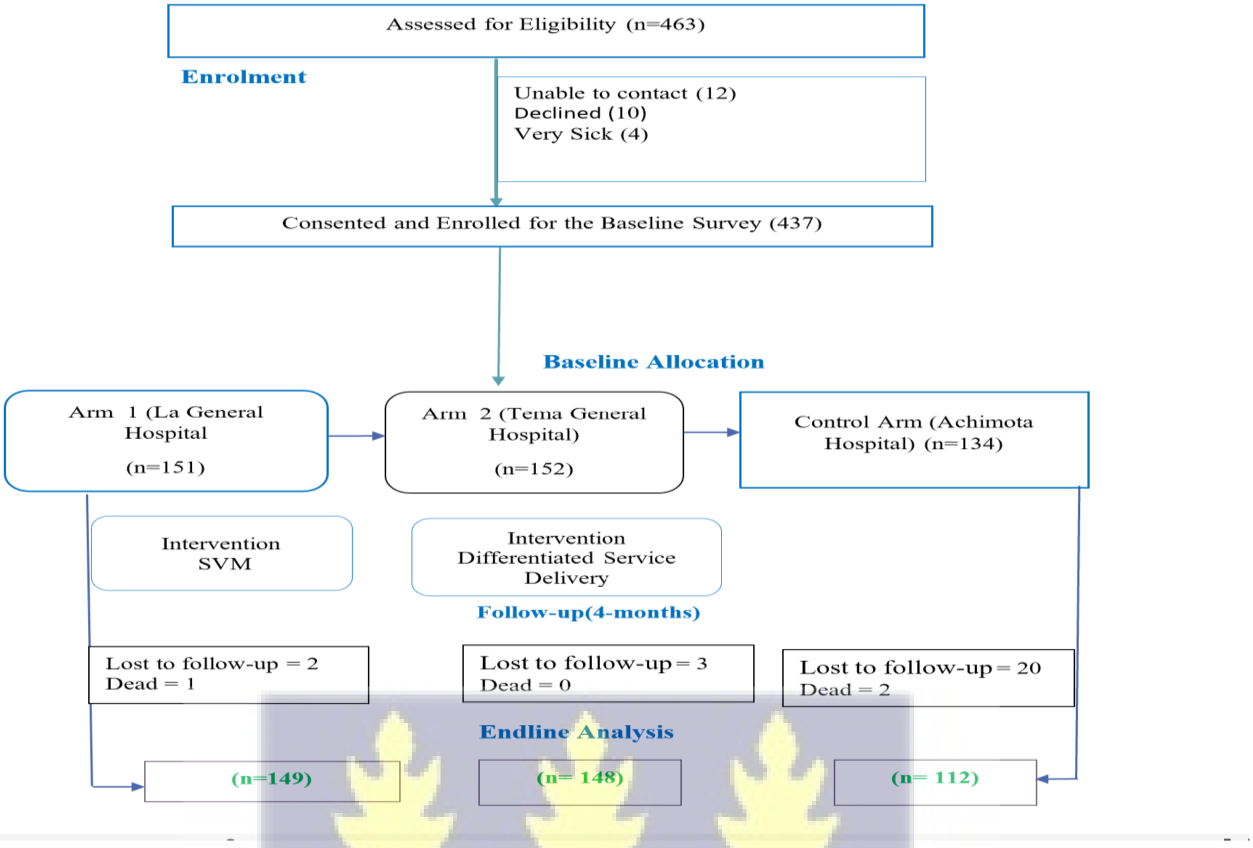


Figure 3.6: Participants Enrollment Chart using the Transparent Reporting of evaluation with non-randomized designs

3.7.3.1.5: Measurement of Variables

3.7.3.1.5.1: Dependent Variable

The primary outcome variable for the study is the QoL. The standard tool, the WHO HRQOL questionnaire, was used to measure EPLHIV's QoL. There are twenty-six (26) items in the WHO HRQL questionnaire tool, with two of the questions relating to self-rated overall QoL and general health and 24 satisfaction questions categorized into four main domains. The physical domain has six (6) items and measured pain and discomfort, energy and fatigue, and symptoms of HIV associated with PLHIV. The social domain has three (3) items, which measure personal relationships, sex life, and support from friends. In addition, the psychological domain has six (6) items and examined components of positive feelings, thinking, learning, memory and concentration, self-esteem, bodily image and appearance, and negative feelings. Lastly, the environmental domain has eight (8) items and assessed physical security and protection, home environment such as housing, financial resources, access to information, accessibility to quality health and social care, satisfaction with transport, participation in and opportunities for recreation and leisure activities. See Appendix 7. The responses were coded on a 5-point Likert scale from the lowest one (1) to the highest (5). The responses to negative questions were reverse-coded to ensure uniformity of all the questions in a positive direction. For instance, the lowest response "1" was recoded as "5", "2" was recoded as "4", "3" was left uncoded, "4" was recoded as "2" and "5" was recoded as "1".

To generate the QoL variable, the responses from all the items were put together to generate a continuous variable. Other studies assessing the QoL among PLHIV have used the variable as continuous (Deribew et al., 2013; Shriharsha & Rentala, 2019). The Cronbach alpha for baseline QoL is 0.87, and the endline is 0.88.

3.7.3.1.5.2: Independent Variables

The main independent variables are disclosure, adherence to antiretrovirals (ARVs), and depression.

Disclosure: Participants were asked if they had disclosed their status to someone. This was categorized as a dichotomous variable, "yes" and "no". Those who responded that they disclosed their status were classified as "yes", while those who did not were classified as "no".

Adherence to antiretrovirals (ARVs): A standard tool, the Medication Adherence Rating Scale 5-(MARS-5) was used to measure adherence to ARVs in both the intervention and control groups during the baseline recruitment and after participants' treatment (Stone et al., 2021). The scale consists of 5 items, which examine forgetfulness to take drugs, altering dose, stopping taking medications for a while, missing out on my dose and taking fewer drugs than instructed. The responses to these items were coded on a 5-point Likert scale. These are "1" as always, "2" as often, "3" as sometimes, "4" as rarely and "5" as never.

These variables were categorized based on the standard scoring scale for the MARS-5 tool, where a score of >= 20 is considered "adherence", and a score of < 20 is considered "non-adherence."

Depression: A standard tool, Patient Health Questionaire-9 (PHQ-9), was used to measure depression in both the interventions and control groups during the baseline recruitment and after participants completed treatment. The tool consists of nine (9) items measuring depression with four-point responses. The responses are "0" as not at all, "1" as several days, "2" as more than half the days and "3" as nearly every day.

The items assessed pleasure in doing things, feeling down and depressed, difficulty sleeping, energy, poor appetite or overeating, feelings about failure, trouble concentrating, talking or being so fidgety and thoughts of hurting oneself. The PHQ-9 can be measured as a categorical variable where a score of 0-4 is classified as "Not Depressed", 5-9 "Minimal Depression", 10- 14 "Moderate Depression", 15 – 19 "Moderately Severe Depression" and from 20 -27 "Severe Depression". It can also be measured on a continuous scale using the mean (Kroenke et al., 2016). The study's scores were put together to create a continuous variable as the data was heavily skewed and was further categorised as binary using the average scores. Those who fall below the mean were categorised as not depressed and otherwise as depressed.

The PHQ-9 allows for both categorical classification of depression (from "not depressed" to "severe depression") with continuous scoring based on categorical cut-offs but while these categorical cut-offs are clinically meaningful, their application is context-dependent and may not always provide sufficient statistical power when data is skewed as was observed in this study.

To therefore address the observed skewness in the study's data, the PHQ-9 scores were first treated as a continuous variable and then dichotomized into a binary variable at the sample mean to distinguish between participants with relatively higher versus lower depression. This approach is consistent with established practices where a binary outcome is from a continuous variable to ensure model simplicity while retaining explanatory power and interpretability so that results are easy to communicate to practitioners and policymakers in a quasi-experimental study like this one (Manea, Gilbody, & McMillan, 2012; Pence, O'Donnell, & Gaynes, 2012).

Also collapsing the depression data into a binary measure is an analytic strategy used in research to avoid compromising statistical stability and to capture notable relative differences across intervention groups, which was the objective of this study (Chibanda et al., 2015). The other independent variables are sex, age, marital status, occupation, living alone, belonging to an HIV support group, type of intervention exposed to, facility accessing ART, viral suppression, and years of living with HIV social support, among others. The variable description and level of measurement are shown in Table 3.2.

Table 3.2: Measurement of Variables

Variables	Operational Definition	Level of Measurement
Dependent Variables		
Quality of life	A standard tool, the WHOHRQoL questionnaire, was used to measure the quality of life in both the intervention and control groups during the baseline recruitment and after participants' completion of treatment.	Continuous
Independent Variables		
Disclosure of HIV Status	This accessed if a participant had disclosed their HIV-positive results to any relative, friend or loved one	Binary
Adherence to ARVs	A standard tool, the Medication Adherence Rating Scale (MARS-5) was used to measure adherence to ARVs in both the intervention and control groups during the baseline recruitment and after participants' completion of treatment. This was categorised as adherence and non-adherence	Binary
Depression	A standard tool, Patient Health Questionaire-9 (PHQ-9) was used to measure depression in both the interventions and control groups during the baseline recruitment and after participants' completion of treatment. This was categorised as depressed and not depressed.	Binary
Control Variables		
Sex	Biological attributes associated with being male or female. This was categorised as "male" and" female"	Binary
Age	The chronological age is calculated from the time of birth to the present. The age was categorised as "50-54", "55-59", "60-64", and 65 years and above.	Categorical
Marital Status	This was used to collect information on whether the individual was married (or cohabiting) or not (separated, divorced or widowed). This was classified as "married", "never married", divorced/separated", and "widowed"	Categorical
Educational Level	This measured the highest educational level of participants. The variable was categorised as "no education", "primary", JHS/MSLC", " secondary/Technical/Vocational", and "tertiary."	Categorical
Employment status	This measured whether the respondent is currently working or not. The response was categorised as employed and not employed.	Binary

Years of living with HIV	Measures the number of years participants have been living with HIV and AIDS. This was categorised as “less than 1 year”, “1-4 years”, “5-9 years”, and “10 years and above”	Categorical
Viral Suppression	Accessed if participants had a viral suppression of 1000 copies per ml or less. This was categorised as “viral suppressed”, unsuppressed”, and “results pending” for those who were not aware of their viral suppression. These are people who had done the test and were waiting for the results.	Categorical
Living alone	This variable measured whether the participants were living with someone or not. Those who were living with someone were classified as “yes”, while those living alone were classified as “no”.	Binary
Type of Facility	Accessing ART at either Tema, General, Achimota Hospital or La General Hospital	Categorical
Type of intervention	Receiving psychosocial support either through an SVM or from the health facility, thus differentiated service delivery.	Binary
Morbidity	This measures the number of illnesses or conditions. Those with one disease were classified as “no comorbidity”, and those with two or more conditions were classified as “co-morbidity.”	Binary
Alcohol	Participants were asked if they had ever or currently taken alcohol. This was classified as non-consumers, ever consumers and currently consuming.	Categorical
Tobacco	Participants were asked if they had ever smoked before. This was categorised as non-smokers, currently smoking and ever smoked.	Categorical
Engaged in Physical activity	This measures the physical activity, either moderate or intensity, in which participants engage. Those who were engaged in physical activities regardless of the frequency were classified as “yes”, while those who were not engaged in physical activity were classified as “no.”	Binary
Living with HV patients	Participants were asked if they were living with people with HIV in their households or structures. Those who were living with a person with HIV were classified as “yes” and otherwise “no.”	Binary
Place of residence	Respondents were asked about their location. This was categorised as urban and rural	Binary
Taking other medication to treat HIV	Respondents were asked if they use any other medication apart from the ARVs to treat HIV. Those who were using other medications were classified as “yes” and “no” for those who were not using any medication.	Binary

3.7.3.1.6 Data Collection at Baseline

***Instrument for data collection*:**Quantitative data were collected utilizing a structured questionnaire with most questions being closed-ended and a few being open-ended through the Kobo Collect software. The questionnaires served as instruments to collect data from participants, comprising five (5) sections for the baseline. The initial section focused on socio-demographic characteristics such as sex, age, educational background, marital status, religion, ethnicity, occupation, etc. The second section encompassed clinical and HIV-related information, including years living with HIV, drug regimen, disclosure of HIV-positive status, presence of comorbidities, and more.

Lifestyle characteristics, such as smoking, drinking, and exercise, were assessed in the third section. The fourth section measured the participants' QoL using the four domains of the WHO HRQoL questionnaire.Furthermore, the questionnaire included sections for measuring depression (utilizing the PHQ-9 tool) and adherence (using the MARS-5 tool) in the fifth section. The questionnaire utilized both closed and open-ended questions and was administered to participants at the time of recruitment.

The questionnaires were designed using the Kobo Collect platform, an electronic data collection software. Kobo Collect is a cost-free and open-source application designed for creating and gathering data electronically, employing mobile phones or tablets as Personal Digital Assistants (PDAs) (https://kf.kobotoolbox.org/accounts/login/). This platform enables the seamless collection of data, automatically storing it on the mobile device and subsequently uploading it to an online server.

***Training Research Assistants*:** Six research assistants, including three ART nurses and three data managers,, were recruited and trained for both the baseline and endline data collection. The research assistants' educational backgrounds ranged from certificates in health courses to bachelor's degrees in various health-related areas.

The research assistants demonstrated fluency in the local languages pertinent to their respective study sites. Two days of training were conducted for the research assistants. The training focused on the study's purpose, the questionnaire, ethical issues in research and ways of collecting data using tablets. Practical sessions during this training utilized printed structured questionnaires.

***Pretesting of Questionnaire*:**

Following the training, the questionnaires were pretested at a non-study facility (Adabraka Polyclinic) a day after the training among 20 EPLHIV. The researcher and all the research assistants conducted the pretesting. The outcome of the pretesting was used to make changes in the questionnaire for the final rollout.

Data collection: All study participants were informed that participation in the study is fully optional and that they were free to drop out at any time (with the option of not disclosing their reasons for doing so). Before being enrolled in the study, all participants had to complete a signed informed consent form. The study's objectives and particulars were communicated to the participants, affording them sufficient time to seek clarification before expressing their consent to participate. Individuals who were not proficient in English had the study explained in their preferred language. Those who could read and write signed the consent form, whereas those unable to do so used thumbprints (Appendix 8). Data collected from the study was treated as confidential as possible. Electronic data was stored in a password-protected file, and hard data was stored in locked cabinets, which were only accessible to the principal investigator and supervisors. Study codes were assigned to each participant, and these were used as a form of identification on abstraction forms, questionnaires, and audio-recorded interviews. Data collected from this study is only for academic or publication purposes. The data will be destroyed after ten years. Participants were assured that their involvement in this study posed no associated risks. However, they were informed that the study could offer them direct or indirect benefits. All participants continued to receive the standard treatment of care for HIV in Ghana. Those in the intervention group received comprehensive psychosocial support through SVM, while others received support from healthcare workers through the facility. Additionally, participants were made aware that the study findings could be translated into policies for implementation, potentially benefiting all individuals living with HIV in the long run.

Reimbursements:

Participants were not paid for their participation in this study; however, participants were provided with snacks and a GHS 50.00 for transport.

Quality Control Measure: Quality control includes all the efforts and measures aimed at guiding the researcher to uphold the quality of the collected data (Gliklich et al., 2014). These measures involve training research assistants and the pretesting of the questionnaires for quantitative data collection and processing.

3.7.3.2: Implementation of the Developed Interventions

After the baseline data collection, the two developed interventions (SVM and DSD) were concurrently implemented at the La and Tema General hospitals concurrently for a period of 16 weeks.

Both the SVM and DSD interventions started on the 12th of July to the 17th of November 2023.

- **Implementation of the Voice Messaging Intervention:** The intervention took place at La General Hospital, specifically targeting 150 EPHIV who were receiving ARVs at the facility. The primary objective of the intervention was to provide a platform for delivering educational messages focused on psychosocial support. Through this initiative, participants were exposed to a comprehensive set of messages covering various thematic areas, including medication adherence, positive disclosure experiences, holistic physical health practices, mental health awareness, fostering positive social relations, and effective navigation of physical environments. The delivery of messages occurred three times a week, specifically on Mondays, Wednesdays, and Fridays, at 8 PM. This schedule was informed by the qualitative study and pretest feedback, ensuring optimal timing for participant engagement. To cater to the participants' language preferences, the voice messages were delivered in Twi, Ga, and Ewe based on responses from the baseline assessment. The content of the messages covered all six domains and their respective sub-domains, offering a holistic approach to psychosocial support. The structured delivery plan (message library) ensured that all messages within each domain were delivered over eight weeks. Following this initial phase, the messages were repeated for another eight weeks, resulting in a comprehensive intervention duration of 16 weeks. To enhance participant accessibility and engagement, the system was configured to resend all missed calls 30 minutes after the initial attempt automatically. This thoughtful feature aimed to maximize the impact of the educational messages, ensuring that participants had repeated opportunities to receive and engage with the psychosocial support content. As a backup, a line list of call subscribers was made available each day to track those whose calls had not gone through.

- **Implementation of the Differentiated Services Delivery Approach**

The intervention was rolled out at the ART clinic of TGH. The implementation involved rescheduling the clinic visits for this specific age group to align with establishing a dedicated clinic on Wednesdays catering to their unique needs. This restructuring did not alter the frequency of clinic visits for these individuals but separated them from the usual mixed clinic environment. This deliberate move aimed to create a supportive setting for them, recognizing their unique healthcare needs. Participants received comprehensive counselling sessions during each visit within the 16-week intervention period. The counselling covered various aspects such as adherence, disclosure, physical, social and psychological health, and creating an enabling environment.

Furthermore, participants underwent screening for their cognitive and mental health status, ensuring a holistic assessment of their well-being. The intervention extended over multiple clinic visits, allowing participants to engage with the tailored services provided. Notably, each participant attended the clinic between 2 to 3 times before reaching the end of the intervention phase. This approach allowed for ongoing support and engagement, ensuring participants received continuous care and guidance.

3.7.3.3: Evaluation of the Two Psychosocial Interventions/Endline Data Collection

The endline data collection took place in November 2023, four months after the interventions were implemented. This time frame was considered to ensure that participants were exposed to the entire intervention cycle to allow for a cumulative assessment that will align with both the nature of the intervention and the study objectives which was to capture meaningful behavioural and psychosocial changes while minimizing potential external factors.

By setting the endline measurements for four months after the start of the intervention, the study ensured enough time to strengthen internal validity and ensured that observed changes can be attributed to the intervention rather than unrelated external influences (Hill et al. 2016). Also, the four-month time frame is consistent with common practice in psychosocial and mHealth research, where outcomes are measured within a span of a few months to reflect an intervention's effects without being overly susceptible to confounders (Nimmagadda et al. 2019; Chmitorz et al. 2018),

From an ethical point of view, there should have been a follow-up implementation of the interventions after endline data collection to extend the intervention to the control group, but this was not done due to resource constraints. However, the findings of the study and the impact of the interventions have been discussed with both control and intervention facilities, and are there plans to continue the intervention or extend it to the control facilities depending on the availability of resources.

The same study approach used for baseline data collection was also applied for endline data collection. However, while the same study variables from baseline were repeated, at the endline a sixth section was added to assess the delivery of the implemented interventions, and the sociodemographic characteristics were excluded. Details can be found in Section Six of the quantitative data collection tool in Appendix 3.

3.7.1.5 Qualitative Data Analysis

Interviews conducted in English and Twi were recorded and transcribed verbatim. Transcripts and audio files were stored in computerized folders, with backup files generated in cloud accounts for security purposes. The data was analyzed using thematic analysis and the deductive approach recommended by Braun and Clarke (2006). A coding framework was developed deductively by reading through selected transcripts. NVivo QSR software version 12 was used for the data analysis. This was based on themes, which involved searching through the transcripts to find a repeated pattern of meaning and organizing them into various levels of themes, such as basic, organized, and global themes. The thematic data analysis process consists of three interrelated stages: data reduction, data display, and data conclusion/drawing/verifying. It involved familiarization with the data, gathering initial codes, searching for themes, reviewing themes, defining and naming themes, and producing results (Braun & Clarke, 2006).

First, each transcript was read multiple times to familiarize with the data while noting emerging issues. A codebook was created from these transcripts. The codebook listed different data themes, definitions, and examples of when to use each theme while coding the data. After being examined by the research team, the codebook was imported as nodes into QSR NVivo version 12 and used as a guide in coding the data. Emerging themes were reviewed and finalized to produce the qualitative results for this study.

3.7.3.4 Data Management and Analysis

3.7.3.4.0 Data Management

Daily supervision of data collection was implemented, involving re-sampling and re-interviewing of some respondents by the Principal Investigator, with comparisons made against the work conducted by the research assistants. This process was aimed at maintaining consistency and accuracy of the data collection process. The submission of the data on the online platform was exported as Excel files. These files containing the data were imported into STATA version 16 for analysis.

3.7.3.4. 1: Adjustments For Missing Data

During data cleaning, missing data were carefully assessed. Records with incomplete responses on the primary outcome variable (quality of life) were cross-checked against Kobo Collect records, and inconsistencies were corrected where possible. For analyses requiring complete information, a complete-case analysis approach was employed, ensuring that only participants with valid baseline and endline QoL scores were included in the Difference -in -

Differences and regression models. Sensitivity analyses was then done to compare descriptive statistics between included and excluded participants and this showed no significant systematic differences, minimizing the risk of bias from missing data

3.7.3.4.2: Data analysis

Quantitative data was transferred from the KoboCollect software to Microsoft Excel prior to analyses. Data were cleaned, and analysis was performed using STATA version 17.0 for Windows.

Different analytical techniques were used to achieve the objectives of the study. First, the proportion of each variable was described using frequencies, percentages means and standard deviation.

Categorical variables were described using frequencies and percentages, while continuous variables were described using means and standard deviation at both the aggregate and disaggregated level based on the health facilities.

At the bivariate level, Analysis of Variance (ANOVA) and t-test were used to compare the means QoL across the socio-demographic variables at the aggregate level of the data. A one-way ANOVA was used because the dependent variable, QoL, was treated as a continuous variable.

At the multivariable level, multiple linear regression was used to examine the effect of the intervention on the QoL of the EPLHIV. Multiple linear regression is appropriate mainly for continuous variables. The dependent variable for this study is continuous; therefore, it is very appropriate to use multiple linear regression to examine the effect of the intervention on the outcome. To ensure valid comparisons, separate regression models were estimated for each intervention-control pairing (SVM vs. control, DSD vs. control, and SVM vs. DSD). For example, with the control facility designated as the reference group, SVM intervention was compared against the control in Table 4.12. In Table 4.13, the DSD intervention was compared against the control while Table 4.14 directly compared the two interventions (SVM vs. DSD), again using one group as the reference category. This ensured that group-level variation was statistically accounted for.

In addition, a regression analysis DID was used to estimate the Average Treatment Effect on the Treated group (ATET) by comparing the difference across time in the differences between QoL means in the control facility (Achimota Hospital) and treatment groups (La General and Tema General Hospital). By doing this, the DID models incorporated interaction terms between group membership and time (baseline vs. endline) to capture treatment effects while accounting for both temporal trends and baseline group differences.

All variables were considered statistically significant at a 95% confidence interval ($p < 0.005$).

3.7.3.4.3 Statistical Assessment of the various Objectives of the study.

Objective 3: *Identify the factors associated with the quality of life of EPLHIV (≥50 years) on ARVs*

For this objective, three multiple linear regressions were run to identify the factors associated with QoL across the three arms of the study. The first model compared the control facility and those who received the SVM intervention to identify the factors associated with QoL of EPLHIV. The second model also compared the control facility and the DSD intervention to identify the factors associated with QoL of EPLHIV, while the third model compared the two interventions (SVM and DSD) to identify the factors associated with QoL of EPLHIV. A paired T-test was used to compare the mean QoL within the groups.

Objective 4: *Determine the effect of a psychosocial support intervention on the quality of life among EPLHIV (≥50 years) on ARVs.*

Difference in Differences regression was run to estimate the effect of the interventions (DSD and SVM) on the QoL of EPLHIV. The DID analysis measures the impact of an intervention by comparing the changes in a parameter over time between two groups. It calculates the difference in the parameters between baseline and end-line for both the control and intervention groups, then subtracts the difference between the control group and the intervention group. This approach isolates the effect of intervention by accounting for common trends that affect both groups. The main components of DID are the treatment group, control group, pretreatment period, post-treatment period and the outcome variable. In this study, there were two treatment or intervention groups (SVM and DSD) and a control group with the treatment or outcome of study being QoL.

The DID analysis was conducted using the regress command in STATA with interaction terms of time and treatment. Quality of life was measured as a continuous variable. The DID provides information on the effectiveness of the intervention in improving the QoL. To determine the effect of the PSS Intervention, a DID was performed by comparing the two "Intervention" arms with the "Control" arm. A separate DID regression was fitted for each of the two interventions; thus, each intervention was fitted against the control group. Thus, the SVM intervention was compared with the control arm, which was followed by the DSD intervention. In addition, a third DID regression was run to compare the effect of the two interventions combined against the control facility to estimate the effect on QoL of EPLHIV.

3.7.3.4.4: Adjustments for Missing Data and Potential Confounders

Confounding occurs when the observed relationship between an intervention and an outcome is distorted by the presence of extraneous variables that are associated with both. Potential confounders were therefore identified, and systematic adjustments were made for these potential confounders as well as any effect modifiers during the analysis phase.

These Potential confounders were identified using the study's theoretical frameworks, existing literature on determinants of QoL among EPLHIV, and variables collected in the study. Notable confounders included Socio-demographic factors like age, sex, marital status, education, employment status, and living arrangement, clinical characteristics like viral load suppression, comorbidities, and concurrent medication, lifestyle factors like alcohol use, tobacco use, and physical activity and facility-level characteristics like site of ART care (Tema, La, or Achimota hospitals) and type of intervention received (SVM or DSD).

These variables were considered important confounding factors because they were independently associated with both exposure (intervention type) and the outcome (quality of life). Adjusting for these confounding factors was then made to reduce bias and improve the validity of causal inference. Also, by accounting for socio-demographic, clinical, and facility-level characteristics, the models provided a clearer estimate of the independent effect of the PSSI (SVM and DSD) on QoL among EPLHIV.

Two complementary strategies were applied to statistically adjust for these confounders. Multiple Linear Regression and Difference-in-Differences Regression. The Multiple Linear Regression Model was used to adjust for the identified confounders while estimating the association between intervention type and QoL allowing for the isolation of intervention effects by holding other covariates constant.

A Difference-in-Differences Regression Model was used to estimate the Average Treatment Effect on the Treated and this inherently adjusts for unobserved confounders like genetics, baseline health characteristics, or unchanging social status. These confounding factors cancel out during analysis because DID focuses on within-group changes across time.

By simultaneously adjusting for socio-demographic and clinical confounders, these two regression models accounted for both baseline imbalances and other trends to help isolate the required net effect of the interventions for further analysis.

3.8 Ethical Clearance

A proposal was sent to the Ethical Review Committee of the Ghana Health Service Research and Development Division, and approval was granted with the number **GHS-ERC: 033/08/22. (Appendix 9).** The study participants were also provided with the names and telephone numbers of the principal Investigator, the primary academic supervisor, and the secretary of the ethics committee of the Ghana Health Service. This information was provided to facilitate communication on any matters pertaining to the study.

***Informed Consent**:* Participation in the study was based on the willingness of the respondents. No respondents were forced into participation. Informed written consent was obtained from each participant before the interviews were conducted (Appendix 8). The aim and details of the study were explained to each participant. They were allowed ample time to seek clarification before indicating their willingness to participate. Participants who did not understand English had the study explained to them in their preferred language. Literate participants signed, while those who could not sign thumb printed. All participants were informed that their participation was voluntary, and they reserved the right to withdraw from the study at any point without any consequence.

***Conflict of Interest**:* There was no conflict of interest on the part of the researcher and the supervisors. The research is a PhD thesis required by the University of Ghana School of Graduate Studies.

Privacy and Confidentiality: Information collected for the study was treated as confidential. To ensure the confidentiality of the participants, the names of the participants were not collected. The identities of the respondents were not disclosed in the report.

Risk and Benefits: The objectives, risks and benefits of the study were explained to participants in the language they understood. All questions asked were addressed appropriately before they were recruited to take part in the study.

Dissemination Plan: The findings of this study will be disseminated to various stakeholders through several channels. Firstly, the results will be presented to key stakeholders responsible for HIV policy development and implementation, including the Ghana AIDS Commission and the National HIV/STI Control Programme. Abstracts summarizing the findings will also be developed and presented at both local and international AIDS conferences to reach a wider audience within the scientific community. Additionally, manuscripts describing each objective will be developed and submitted to reputable journals for publication, ensuring broader dissemination within the academic and research community.

An abstract titled: ***Comparative Analysis of the Effectiveness of Two Psychosocial Support Approaches in Enhancing the Quality of Life of Elderly Persons Living with HIV In Ghana; a Quasi-Experimental Study*** was accepted and presented in July 2024 at the 25th International AIDS Conference held in Munich, Germany.

Again, two manuscripts developed from this study have been submitted for review and publication. The first manuscript is titled "***Barriers and Facilitators of Comprehensive Care Service Utilization for Elderly Persons Living with HIV in Ghana".*** This has been submitted to the Journal of the International AIDS Society. The second manuscript, which is titled

"Unveiling the Hidden Struggles: Exploring Quality of Life Among Elderly Persons Living with HIV in Accra, Ghana", has been submitted to PLOS ONE.

Efforts will also be made to disseminate the findings to the local or general community through accessible formats in collaboration with relevant stakeholders, thus ensuring that the study's impact extends beyond academic circles to benefit the broader community.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the study's findings. The chapter is divided into three main sections with sub-sessions corresponding to the objectives of the study. The first session presents the formative assessment results, which employed the qualitative method to explore the QoL of EPLHIV, identify the barriers and facilitators to HIV care among EPLHIV and assess the feasibility and acceptability of delivering a psychosocial intervention through mobile technology.

The second section provides the quantitative findings regarding the impact of PSSI such as DSD and SVM on the QoL among EPLHIV, along with determining the factors associated with the QoL of EPLHIV. Furthermore, the chapter concludes with the last section, which summarizes the DID analysis on the impact of the interventions on QoL.

4.2 Objective 1: Results of the Qualitative Study

This first section presents the study's qualitative findings. The background characteristics of the study respondents are followed by the presentation of the findings according to the objectives of the study. The formative study assessed the: Knowledge and Perception of the QoL of EPLHIV, psychosocial barriers and facilitators in HIV care for EPLHIV (≥50 years) on ARVs and finally, the feasibility and acceptability of using mobile technology for delivering PSSI to EPLHIV (≥50 years) on ARVs.

4.2.1 Background Characteristics of Respondents (Qualitative Study)

Table 4.1 shows the background characteristics of respondents for the KIIs and FGDs. Thirty-seven (37) participants were recruited for this study. The participants included Key Informants (n=8) and FGDs (n=29). The results revealed that many (n=24) of the FGD participants were within the age range of 50-59 years while the KII was within 40-49 years. Most participants were females (n=20), and many of the respondents had attained formal education (n=35). In addition, many of the participants were married (n=17), and a relative number were separated/divorced or widowed (n=18). Majority of the respondents from the FGDs works in the informal sector (n=22), and the highest number of years living with HIV among them was 25 years.

Table 4. 1: Background Characteristics of Participants

Background Characteristics	Key Informants	%	FGD (EPLHIV)	%	Total
Sex	4	50.0	13	44.8	17
Male	4	50.0	16	55.2	20
Female					
Age (in years)					
30-39	2	25.0	0	0.0	2
40-49	4	50.0	0	0.0	4
50-59	1	12.5	24	82.8	25
60-69	1	12.5	4	13.8	5
70+	0	0.0	1	3.4	1
Educational Level					
No formal Education	0	0.0	2	6.9	2
Primary	0	0.0	14	48.3	14
Secondary	0	0.0	10	34.5	10
Tertiary	8	100.0	3	10.3	11
Marital Status					
Never married	1	12.5	1	3.4	2
Married	7	87.5	10	34.5	17
Separated/Divorced	0	0.0	9	31.0	9
Widowed	0	0.0	9	31.0	9
Occupation					
Unemployed	0	0.0	4	13.8	4
Informal employment	0	0.0	22	75.9	22
Formal employment	8	100.0	2	6.9	10
Retired/Pensioner	0	0.0	1	3.4	1

No. of years. living with HIV					
1-3	0	0.0	5	17.2	5
4-6	0	0.0	10	34.5	10
7-9	0	0.0	1	3.4	1
10+			13	44.9	13
Total	**8**	**100.0**	**29**	**100.0**	**29**

4.3: Objective 1: Exploring the Perception of Quality of Life of EPLHIV

This section describes the perception of QoL from the perspective of EPLHIV and key informants (Leadership of the recipient of care, implementers of the HIV programmes, and service providers at the national and sub-national levels) at the formative stage of the study. This was explored utilizing the main domains of the WHOQL tool. Four main domains of the WHO quality of life were identified as themes. These are physical, psychological, social, and environmental health. The themes are represented in a thematic network as shown in Figure 4.1.

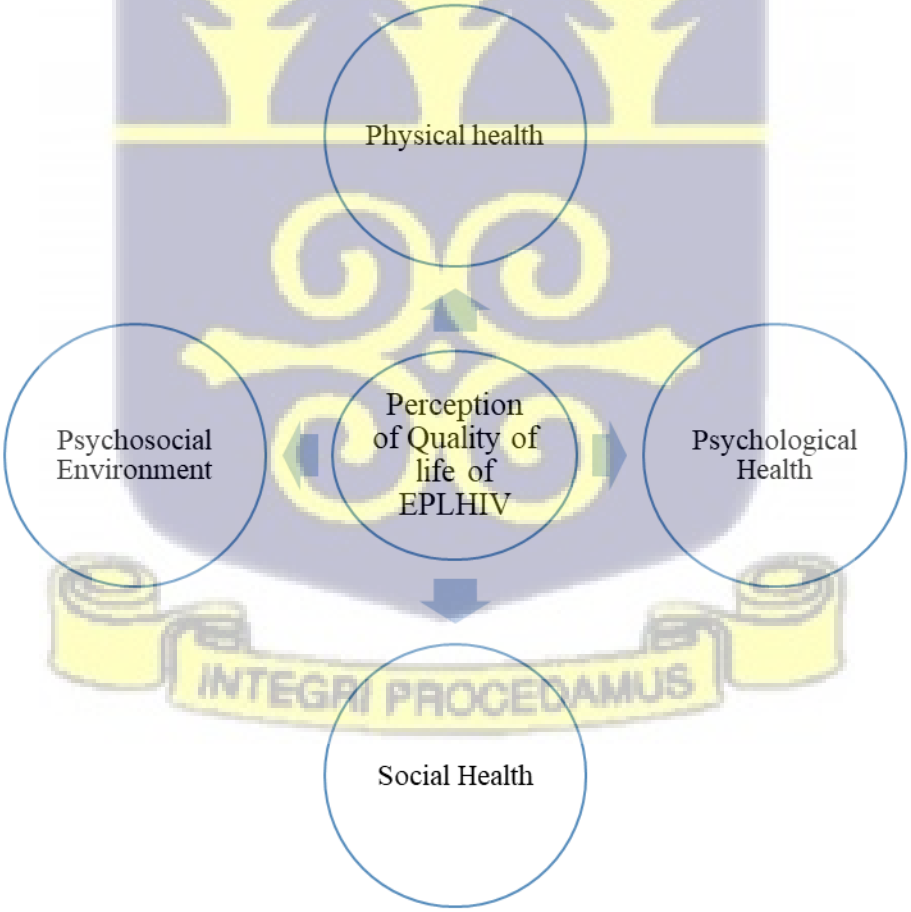


Figure 4.1: Thematic Network Showing the Perception of the Quality of Life of EPLHIV.

For all the WHOQoL domains, there were mixed results, but EPLHIV from the FGDs had the highest frequencies for all the quality-of-life domains (Figure 4.2). However, when all frequencies from the FGDs and KIIs were put together, social health had the highest frequencies, followed by physical health, environmental health, and psychosocial health.

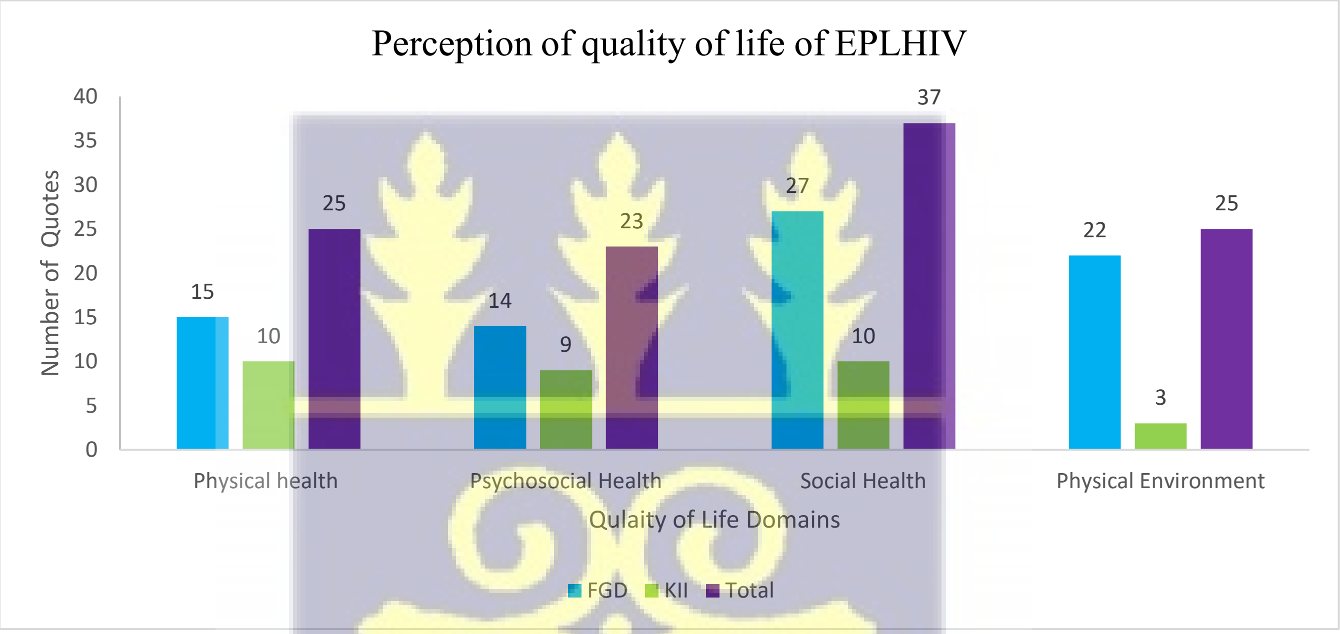


Figure 4.2: Frequencies of Quotes for Perception of the Quality of Life of EPLHIV

4.3.1 Perception of Physical Health Domain of QoL

Most EPLHIV expressed that they have challenges with their physical health, while few had no challenges. The views of the KIIs and FGDs supported these challenges. The challenges include pain and lack of physical strength. Some participants compared their current strength to friends who have no HIV condition and concluded on their poor physical health.

> *"...As I am here today, I don't have much strength. At first, I was very healthy and worked a lot as a car mechanic. But now, I don't have enough energy and feel weak always"* **(R7, FGD, Male, Facility 2).**

> *"...The majority of people with HIV experience poorer physical health compared to their peers who do not have HIV. In addition to facing non-communicable diseases like hypertension and diabetes, they also encounter challenges from the medications used to treat HIV"* ***(R2, KII, Male)***.

4.3.2 Perception of Psychological Health Domain of QoL

Most EPLHIV complained of thinking a lot about their condition and get worried and scared as persons living with HIV. Both the KII and FGD respondents mentioned issues of stigma, isolation, loneliness, and depression affecting EPLHIV.

> *"Sometimes when I remember that I am HIV positive, I panic and get depressed"* **(R1, FGD, Female, Facility 1).**

> *"When you are told that you have something inside you that cannot be removed from you... People get anxious, they are worried, and some of them are very depressed, especially if they don't have the right support. So, their psychological status is not the same as that of somebody who does not have the disease. So, a lot of them are worried and depressed"* ***(R2, KII, Male)."***

4.3.3 Perception of the Social Health Domain of QoL

The social health of EPLHIV was also explored. The findings revealed that many EPLHIV are unable to disclose their status to their family or social circles for fear of stigma and being discriminated against. While few EPLHIV had fully disclosed their status, others had partially disclosed their status, mostly to their immediate family members, thus, their partners and children.

> *"With me, I have really kept it a secret because people hardly keep secrets; even your children might forget and disclose it to someone, and there it goes. It becomes a rumour in*

> *your vicinity. So, keeping it a secret is a perfect deal, and I must free my mind from any personal hunt from within"* ***(R2, FGD, Male, Facility 2).***

> *"Okay, so, generally, HIV has its associated stigma. So, most people are unable to disclose their status to their partners. For those who can do that, and their partners accept it, their social condition is much better than those who did not disclose it to their partners. For the obvious reason of also being infected and therefore leaving them, their social life is not very conducive, because the condition is now serving as a reason for their partner to either divorce or separate from them"* ***(R3, KII, Male).***

4.3.4 Perception of Physical Environment Domain of QoL

Concerning the physical environment of EPLHIV, participants indicated that they have a challenge accessing health facilities due to the distance and cost of transporting themselves to the facilities. Others mentioned the challenge of accessing health care due to the long hours spent at health facilities getting treatment and care.

> *"With me, I have a problem with how long we stay here before we get our medicine. You will come here, and people will be passing and staring at you; it is something I am not comfortable with. I wish something can be done about it to improve the way we take our drugs (****R3, FGD, Male, Facility 1).***

> *"So, the facilities that are available to take care of them holistically are not adequate.….so, apart from the hospitals providing the ARVs, they need to have spiritual connections, they will need to have, NGOs in the community that would help them get the needed support. That is not found everywhere. It is concentrated in maybe the Regional, then probably the district and the National capitals. So, some of them who are infected and living in very remote areas don't have access to those facilities. Okay, so the physical environment is not built to support them"* ***(R2, KII, Female)****.*

4.4:Objective 2: Psychosocial Barriers and Facilitators in HIV care for EPLHIV (≥50 years) on ARVs.

Two main organizing themes relating to the global theme, namely, barriers and facilitators in comprehensive HIV care for EPLHIV on ARTs, were identified. The basic and sub-basic themes associated with each organizing theme are discussed below. See Figure 4.3

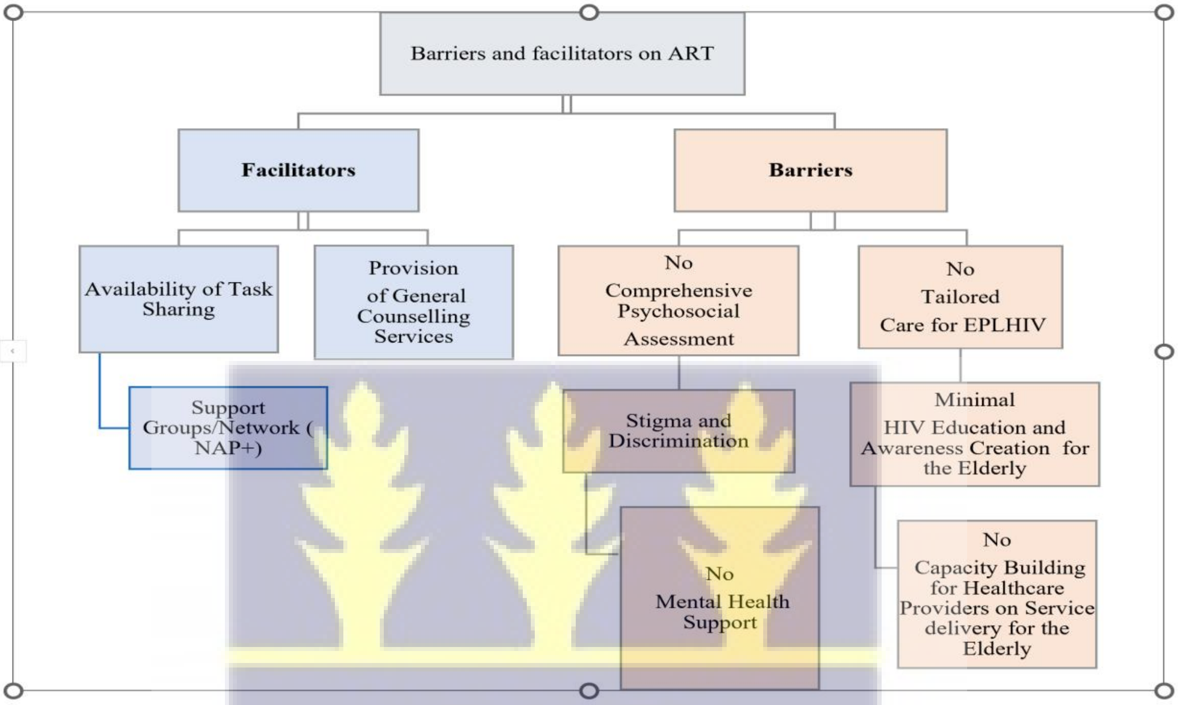


Figure 4.3:.Thematic Network Showing the Barriers and Facilitators in HIV Care on ART for EPLHIV

4.4.1 Facilitators in HIV care for EPLHIV on ART

The findings of the study revealed that the implementation of the task-sharing policy, general counselling in health facilities and the use of social support can be leveraged to improve comprehensive care and the psychosocial health of EPLHIV in Ghana. There were more views or frequencies from FGDs than from KII in Figure 4.4.

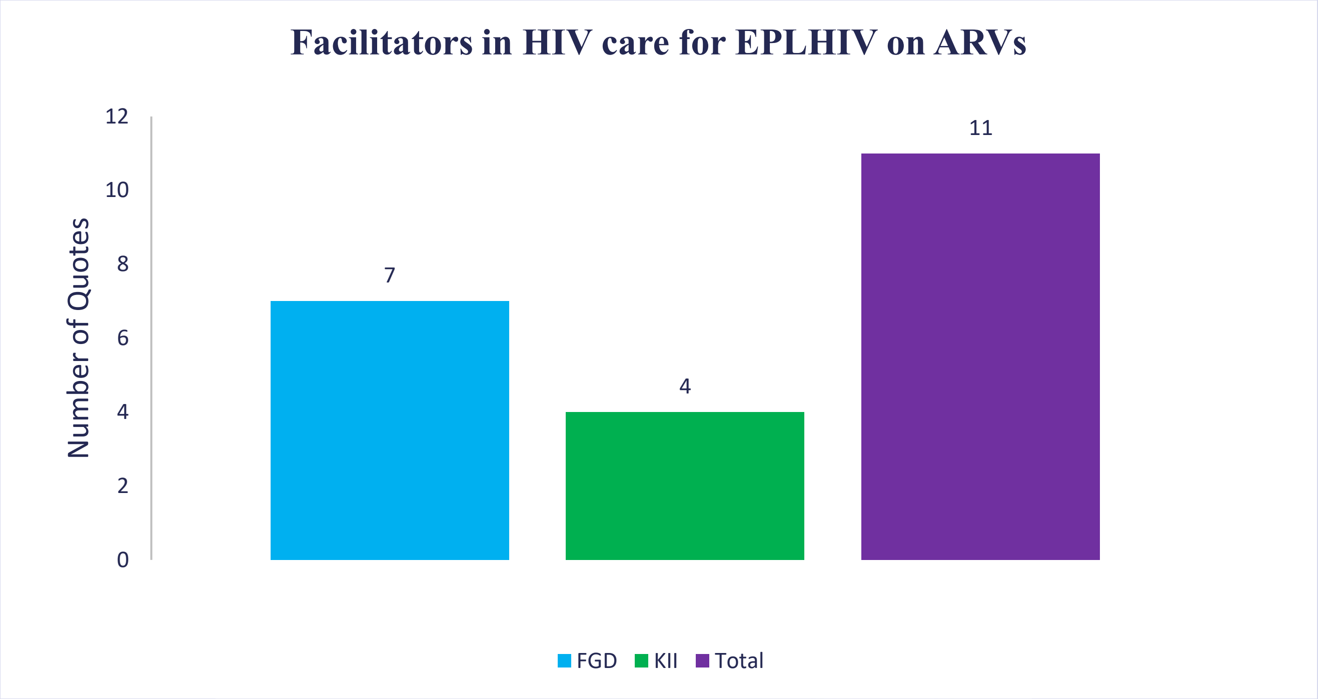


Figure 4.4: Frequencies of quotes for Facilitators in HIV Care for EPLHIV on ART.

Psychological counselling: This is a vital component of the services provided at ART clinics for people living with HIV. One participant emphasized the significance of offering counselling to empower and support individuals affected by HIV. This counselling not only strengthens the bond between those affected and others in their lives but also provides hope, valuable education, and motivation to adhere to their medication regimen, as acknowledged and appreciated by several participants in the quotes below.

> *"Looking at how the nurses motivate us when we come around for counselling gives us hope about the disease condition. They motivate us by telling us that those with high blood pressure and diabetes also take medicine every day just like us, so we shouldn't be despair"* **(FGD, Female).**

Another participant said.

> *"The education provided by the healthcare workers here is very encouraging. They do an excellent job, which is why everyone prefers to come to the General Hospital. They provide*

> *guidance on taking medication, talk to us, and offer encouragement. I highly recommend them to everyone"* **(FGD, Female).**

A participant indicated that he used to have a problem with his social health but through the education, counselling, and teachings given to him at the health facility, he has been able to overcome all those challenges.

> "*At first, I used to have a problem with my family, but the education given me here has strengthened me and allowed me to teach the other clients some of the coping mechanisms*" **(FGD, Male).**

Task shifting: Addressing the human resource challenges faced by the country's health system, including the limited availability of clinical psychologists in every facility, the task-sharing approach was highlighted as a crucial facilitator in delivering comprehensive HIV services. This approach becomes essential when providing psychological counselling to PLHIV on ARVs, especially the elderly. A participant noted that in situations where there are shortages of human resources within the health system, employing task-sharing methods can bridge the gaps and ensure the delivery of necessary services. A key informant stated,

> *"The country has implemented a task-sharing policy allowing lower cadres of staff to be trained to provide tasks typically handled by highly qualified professionals under supervision. This means that for providing psychosocial support to clients at ART sites, we may not necessarily need psychologists or psychosocial counselors. Instead, we can train ART staff to understand the basic psychological needs of clients and provide those services" **(KII, Male).***

Social support: In addition to the above, the use of support groups in the past was also mentioned as an intervention that can be used to support the psychosocial health of EPLHIV. For instance, a participant noted that CSOs had assisted them in the past by actively participating in their meetings and exchanging ideas. This collaborative effort enabled them to establish a robust network where they could readily identify if someone was absent from a meeting, fostering a sense of community and mutual support among participants. A few key informants stated.

> *"Years back, we had CSO groups helping clients cope with their disease condition. They had meeting days where they gather and share their problems in terms of adherence, disclosure and lifestyle. So, if one person was not seen, another person knows exactly where to find that person, and sometimes they even report to us, the health care providers, to make a follow-up. But that was not sustainable"* ***(KII, Female).***
>
> *"So, when it comes to elderly people living with HIV, we have some of them being models of hope or who have provided adherence support when they were younger to other people living with HIV. So we can leverage these expert clients who have the experience and train them to provide care for their peers. I think it is something we can leverage when it comes to providing psychosocial support to the aged"* **(KII, Male)**.

During the FGDs, EPLHIV emphasized the crucial importance of support groups. They specifically pointed out that while there are existing support groups for adolescents, there is a pressing need to establish a similar group for the elderly population as well.

> *"For now, the focus is on the adolescents, and they have even established adolescent groups, which is a nice thing, but what about the aged group? so I think Ghana AIDS Commission should be able to find a way of helping us out with this since we have a lot of unique challenges"* **(FGD, Male).**

4.4.2 Psychosocial Barriers in HIV Care for EPLHIV on ART

The psychosocial barriers in comprehensive care service utilization for EPLHIV explored also revealed that stigma, no tailored needs for EPLHIV, lack of comprehensive psychosocial assessment, lack of capacity building for healthcare providers, and lack of HIV education and awareness creation were identified as major barriers. Key Informants respondents reported the highest frequencies or quotes (Figure 4.5) within this thematic area compared with FGD respondents.

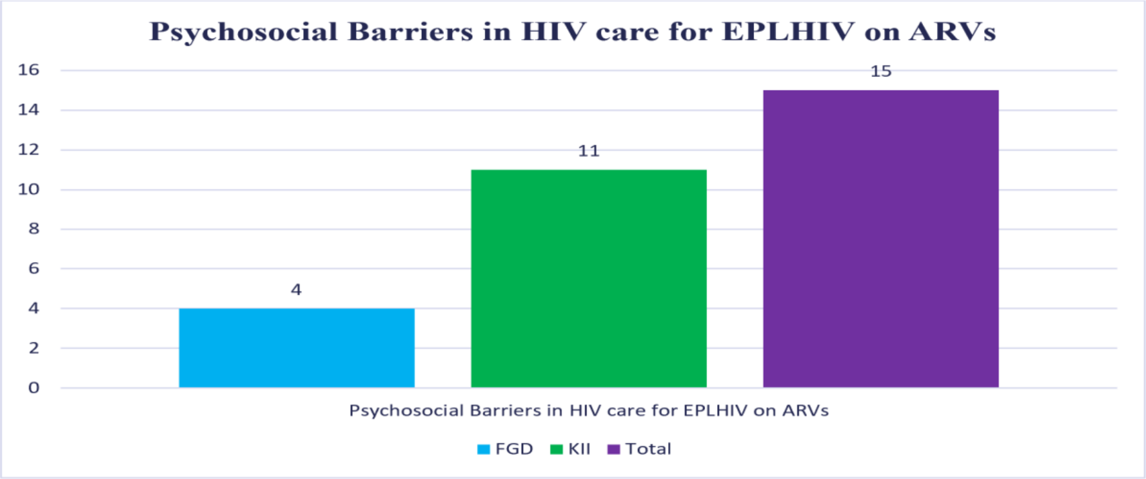


Figure 4.5: Frequencies of Quotes for Psychosocial barriers in HIV Care for EPLHIV on ART

Though the disclosure of one's HIV status could lead to the person receiving assistance from family and close friends, some participants expressed their unwillingness to disclose their status due to stigmatization and the negative consequences. They expressed concerns about potential discrimination from people in their communities. A participant raised concern about clients being stigmatized not only by some health workers but also by individuals who spread information about their HIV status to others, highlighting the need for greater confidentiality and sensitivity in handling such sensitive information.

> *"I think people with HIV will be more than willing to disclose their status to their partners and significant others to get the needed support or assistance. But the current environment we are in where people, including some health care workers, tend to stigmatize and stay away from people living with HIV impacts negatively on their social lives."* **(KII, Male*)*.**

During FGD, a participant said,

> *"I am concerned about social interactions related to HIV, though personally unaffected. I know some of the staff members have received stigma training, yet some still engage in gossip and breach confidentiality. This situation poses a significant problem, as sensitive*

> *information is being shared without consent, compromising privacy and trust."* **(FGD, Male).**

Participants expressed concerns about the lack of tailored services for EPLHIV when seeking healthcare. They receive services alongside all persons affected by HIV without specific provisions to address their unique needs. Participants emphasized the importance of prioritizing care for EPLHIV due to their double burden of disease, including HIV and conditions like hypertension and diabetes, as expressed in the quotes below.

> *"I think because we don't have a special intervention designed specifically for the Elderly to address their needs, they are managed as just all persons living with HIV. So, their peculiar needs are not taken care of. This lack of specific attention means that their psychosocial care requirements are not adequately addressed, indicating a significant gap in the support system for elderly individuals living with HIV in the country"* **(KII, Male)**.

Another Key Informant said:

> ***"****So, when you look at the service delivery in Ghana, the healthcare system falls short in addressing the unique needs of the elderly population. There is a lack of appropriate and integrated services and support to cater for the specific health challenges faced by this population. The existing system lacks proper training and structured service delivery for the elderly, making it difficult to identify and treat their health issues effectively"* **(KII, Male).**

At FGD, a participant said:

> *"We as elderly people living with HIV face several challenges. As I have mentioned before, waking up early to come to this place and staying long here are my challenges. If an elderly person like me comes and sits here with the younger ones, we start bickering. If authority can give priority to us, the aged persons, it will be good, so we won't have to join the queue or wake up at dawn, that kind of priority would be good"* **(FGD, Male).**

Furthermore, participants noted a lack of comprehensive psychosocial assessment for EPLHIV. Due to this absence, healthcare workers had to counsel clients on their medication, its side effects, and the importance of adhering to treatment. Some participants emphasized the necessity for specialized counselling tailored to address the unique needs of the elderly population living with HIV.

> *"The existing healthcare system, thus the ART clinics primarily offers ARVs and general counselling but lacks a comprehensive approach to assess the psychological state of EPLHIV. Service providers do not address factors like community, family, and interpersonal relationships and activities that would affect their ability as patients to cope with their conditions. Discussions about these issues occur only when there are problems with treatment adherence, revealing a gap in understanding and addressing the broader challenges individuals face beyond medication management"* **(KII, Male**).

Another Key informant stated,

> *"Yeah. So, once again, the current support system for elderly individuals at ART facilities is insufficient. Specialized counselling tailored to the elderly's unique challenges and involving their families is lacking. There is a need for personalized counselling that addresses both the elderly and their support network, ensuring comprehensive care for their specific needs"* **(KII, Male**).

Furthermore, participants expressed that the lack of capacity building for healthcare providers to adequately provide psychological support is one of the barriers to providing comprehensive HIV care for EPLHIV.

> *"I think Healthcare workers lack adequate knowledge and training to provide psychosocial and mental health support to people living with HIV. There is a significant gap in understanding their challenges and offering appropriate assistance. Detection of mental health needs is challenging, and even when identified, the necessary care is lacking within the health system"* **(KII, Male)**.

> *"Many trained psychosocial counsellors have left due to retirement or other reasons, leaving a gap in the system. Consequently, the counselling available lacks actual*

> *psychosocial support, as it requires personalized assessments to address individual needs. The absence of continuous capacity building programmes contributes to this issue"* **(KII, Female)**.

Lack of HIV education and awareness creation was also realized to be another psychosocial barrier in HIV care for EPLHIV. Participants indicated that, due to the lack of continuous HIV education and awareness creation, the issue of stigma still exists in seeking HIV care and treatment, which consequently affects their psychological health. During FGD, a participant said;

> *"The limited health education and awareness on HIV publicly makes it challenging for PLHIV to discuss their HIV status openly. There is a crucial need for more widespread information dissemination. Increasing education and awareness on HIV. This can empower people to feel more confident and less hesitant about testing and disclosing test results." (FGD, Male).*

Another said;

> *"…In Kenya, regular HIV education, especially on Saturdays, has created awareness, even among young children, who are unafraid to get tested. However, in Ghana, there is a lack of such education, which contributes to a lack of awareness. Furthermore, self-discrimination in our community intensifies the psychological distress experienced by individuals living with HIV."* **(FGD, Male)**.

4.5: Objective 3 : Feasibility and Acceptability of Using Mobile Technology for Delivering Psychosocial Interventions to EPLHIV (≥50 years) on ARVs.

Two main themes emerged from the feasibility and acceptability of using mobile technology. These are the acceptability of using mobile technology and the use of support groups for delivering psychosocial support intervention.

4.5.1 Feasibility of Using Mobile Technology

The findings indicated that participants perceived the feasibility of using Mobile Technology for the intervention with some challenges . There were dissenting views from the FGD and KII respondents (Figure 4.7). Most of the FGD respondents, thus EPLHIV, had the highest frequency of not perceiving the possibility of using mobile technology for the intervention. Those who perceived the feasibility of using mobile intervention indicated that phone calls would help, but they had some challenges related to how the intervention would be rolled out in terms of language and the mode of delivery of messages.

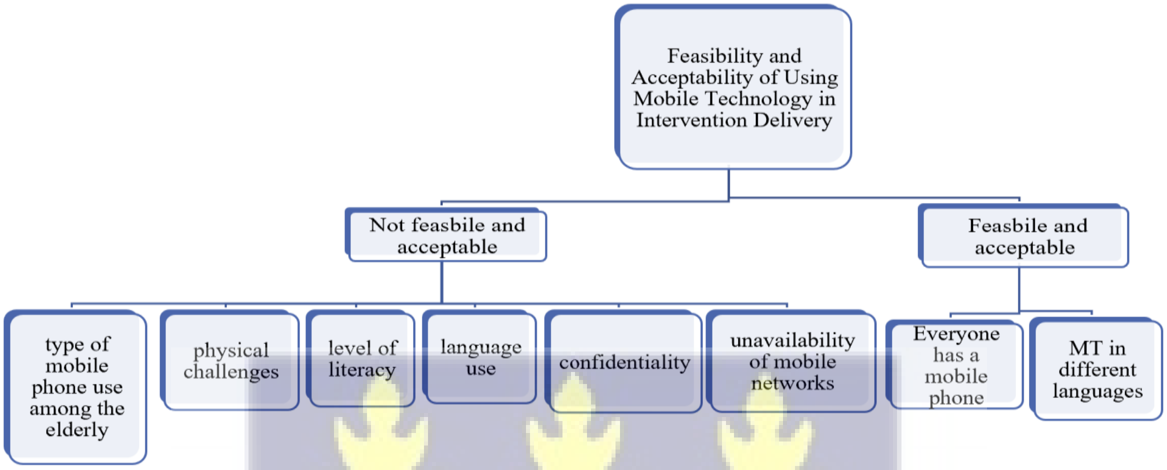


Figure 4. 6: Thematic Network Showing Feasibility and Acceptability of Using Mobile Technology in Intervention Delivery

Some participants expressed that phone calls would be important to them since they were unable to read and write. Hence, sending messages to them will be difficult for them to read.

> *"The mobile intervention, specifically phone calls, is beneficial for me. Since I cannot read, receiving messages isn't helpful, but a phone call reminder would be effective in keeping me informed and reminded of important information"* ***(R3, FGD, Male, Facility 2).***

In contrast, most of the participants mentioned that the use of mobile technology is not feasible. The type of mobile phone use among the elderly, physical challenges such as vision impairment and level of literacy, and language use were identified as some of the challenges.

With regards to the type of phone, some participants indicated that most elderly people use an analogue phone, and that may not be possible for the intervention. This could only be possible if they are not going to use an application on either Android phones or iPhones. Two participants indicated that.

> ***"****When considering interventions for elderly people living with HIV, we need to consider the fact that many of them, especially those in need of support, primarily use basic "yam" phones. These individuals may not have access to or be able to afford smartphones like Android phones, particularly since many are retired or not employed. Therefore, we need to consider the channels through which interventions can effectively reach this Population****".*** ***(R1, KII, Female)****"*
>
> *"it could happen if in an audio format, but these people most of them, like myself, were born before the computer; I don't know if there is a way of getting all of them to join a WhatsApp video meeting or something as we do with the video call because that one is effective". **(R4, KII, Female)***

Some participants mentioned that ageing comes with challenges, such as visual impairment, and this will make it very difficult for those with visual impairment to read messages.

> *"Some individuals may have visual impairments, either age-related or due to complications of HIV, which could hinder their ability to access and read messages shared via phone. While they may possess the necessary equipment, their ability to use it may be limited". **(R7, KII, Male)**"*

There were instances where some participants indicated that most elderly people are illiterate, and language could be a barrier to intervention. A participant mentioned that some people cannot read and write and will, therefore, prefer voice messages or phone calls. In contrast, those who prefer phone calls also cited the language barrier as one problem that could be encountered.

> *"To me, not all of us here are literate, so those of us who can't read and write would prefer a voice message or call, so I wish it would be delivered on preferences of everyone so there will be a uniform distribution" **(R4, FGD, Male, Facility 2)***

> *"I think the call will help because I can't read, so if the message comes, I'll just give it to someone to read for one"* ***(R3, FGD, Female, Facility 1)***.
>
> *"If you call and speak English, I don't understand English, so I'll hang up. So if you call me then you speak Twi"* ***(R2, FGD, Female, Facility 1)***.

Other issues concerning feasibility that were realized from the study include challenges with technology in situations where the unavailability of mobile networks will affect the use of mobile technology:

> *"So, our telephone or mobile technology penetration still has challenges. It might be good in the cities, but in the villages where networks are poor, then it will be difficult to use mobile technology to deliver the intervention* ***(R3, KII, Male)****"*.

Also, the issue of confidentiality was identified as another significant challenge with the use of mobile technology in the delivery of psychosocial intervention to EPLHIV. The quotes below indicate some expressions from participants:

> *"You also have to be very careful if you're using voice messaging with somebody. If the person can read and the phone is limited to that person, then that's fine. I mentioned that stigma is an issue, so if the phone call came and... "Hello..." That sort of communication is sent out if the elderly person is in public or is in a place where there are others, and you can imagine what will happen. You know, that will be selling out the man…and if the people who cannot read, then that even makes it worse. If you write it, somebody will have to read to them and in that way, you are disclosing the status without intentionally planning to do that* ***(R2, KII, Male)****"*
>
> *"Now people have access to other people's phones, especially in our homes, and not everyone is this close to everybody around them. For some of these older people, they may have disclosed to one child who is not even living with them as we speak, but they may be living with a grandchild or some other person, and such people sometimes have access to their phones because …so my fear here is audio that has been sent, it could be downloaded and another person may hear the content of the audio* ***(R4, KII, Female)****"*.

> *"I think the support group is good, and the radio also is good, but the phone will bring problems because it's a sickness that even your family members you are keeping it from your children or husband"* ***(R9, FGD, Male, Facility 2)***

Few participants, however, mentioned that mobile technology could rather be used to support other forms of intervention, such as support groups so the clients can call health facilities to request or follow up on information and vice versa.

> *"So, that is also another way of providing them with some post-clinic intervention or follow up, where, from time to time, you could put a call through to just see how they're doing in the community, if they had any challenges, and so forth. The other thing we can do is reverse it, so instead of calling them, we can also provide a hotline so that they can call in and get some support from us at any time. So, if the person is confused or needs first aid or firsthand information, that person can call that line and get service from us. That's another way we can also look at it* ***(R3, KII, Male)****"*.

"How many people have access to Android phones? I feel like the calling would be the best after the support group has been established because not all individuals have access to those phones and not all of us read that much ***(R4, FGD, Male, Facility 2).****"*

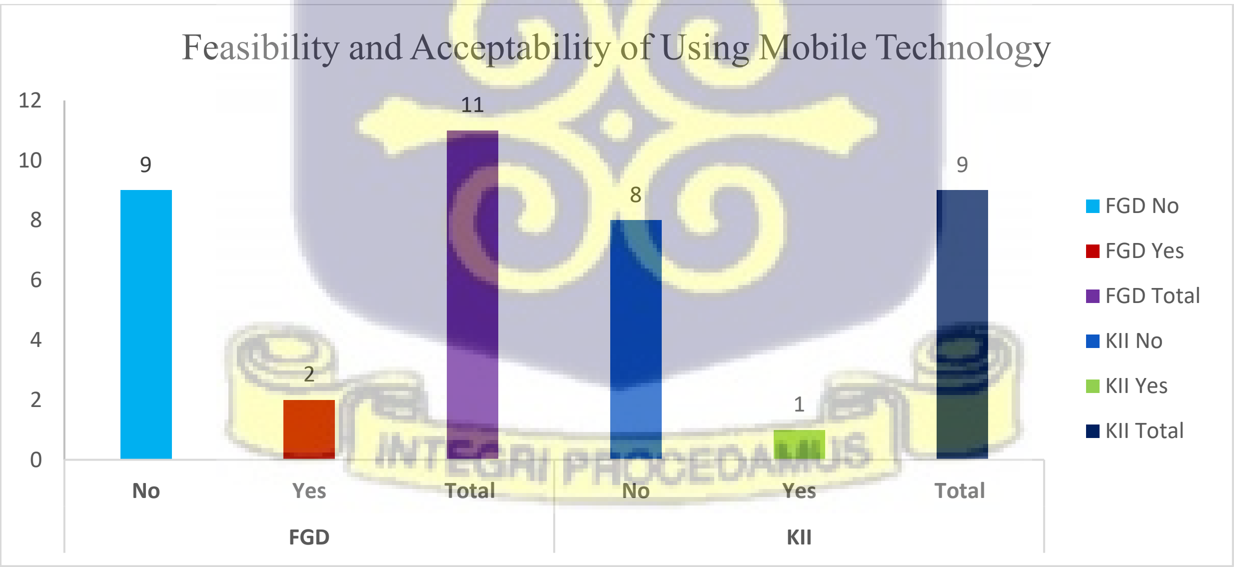


Figure 4.7: Frequencies Showing Quotes for Feasibility and Acceptability of Using Mobile Technology

4.5.2 Use of Support Group for Delivering Psychosocial Intervention for EPLHIV

The use of support groups in delivering the psychosocial intervention to EPLHIV was predominantly realized from the study. Both respondents from the FGDs and KIIs suggested the use of a support group to provide psychosocial intervention for EPLHIV (Figure 4.8). However, the frequencies were more from the FGDs than the KIIs. Many of the participants expressed the need for the use of support groups in the delivery of psychosocial intervention instead of mobile technology.

This will help them interact with their peers, share ideas, and receive education from service providers, all of which will improve their social and psychological health and general well-being. This is expressed in some participants' quotes below:

> *"Years ago there were support groups, support groups in the facilities during which clients could meet at least once a quarter or something for interactions, discussions and when they are with their peers they feel so happy, they share their problems and when the problem is shared, I mean if it's not completely solved, it is half solved so I think we have to bring back that thing, that support groups system* ***(R4, KII, Female)****".*
>
> *"We don't want you leaving here like a one-day show where you will suddenly forget about everything we have discussed here. With me, we will need more psychological support in terms of counselling in case someone says something which will affect us. Sometimes, nutritionists will come over and help us with our diet, which will also help us a lot, and more experts will come over to interact with us; all this can help motivate us. It's not only money that can help us* ***(R4, FGD, Male, Facility 1)***
>
> *"At first, when we started taking the drugs, we had groups where when we come, we meet and have discussions about ourselves. At that time, the government was also funding us, so after that, they gave us something, but now all these meetings have stopped. So for me, I think if the groups are formed again, that will help* ***(R2, FGD, Female, Facility 2)****".*

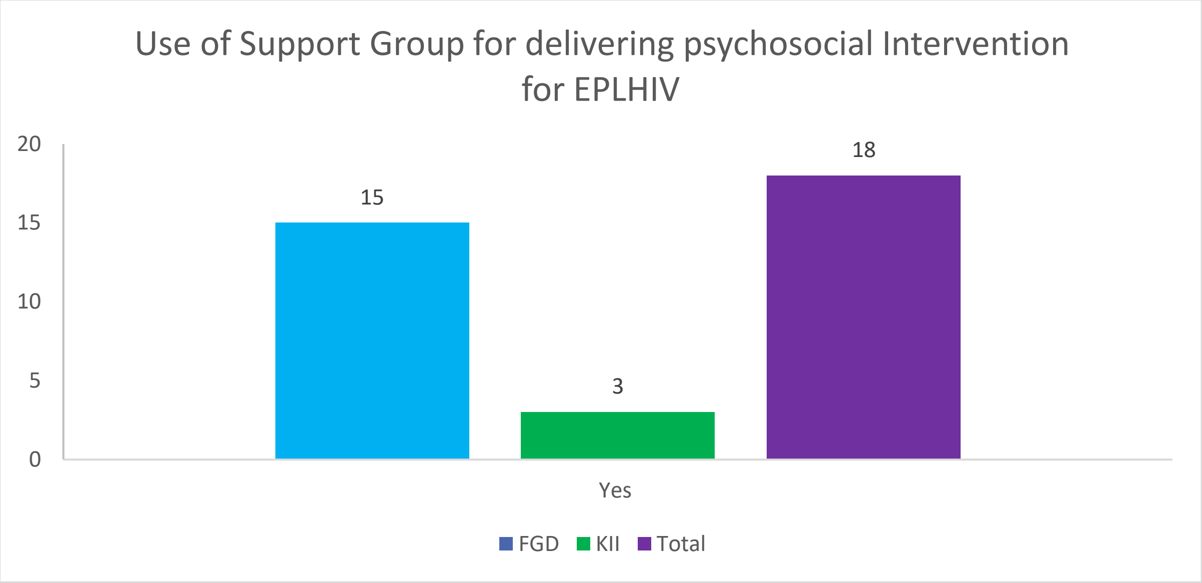


Figure 4.8: Frequencies Showing Quotes for the Use of Support Groups for Delivering Psychosocial Intervention for EPLHIV

Regarding the frequency of meetings for the support group, according to Figure 4.9 most participants indicated that it should align with their existing clinic or meeting days:

> *"It should meet their refill days, yes, that should be looked into and should be ensured that it holds. **(R4, KII, Female)**".*

However, some people suggested that it should be scheduled on a different date so many people can participate:

> *"Since we don't stay here for long hours, I suggest some time will be added so that when we come, we listen to information and any advice they have for us. With what I am saying, it will be quite difficult for it to work because we do not all come here on the same day, so if provisions can be made and one particular day in a month can be selected, then we can meet for such discussions. So, if one actual month is being selected, then it can be of an advantage to all of us since we do not arrive here on equal times and days **(R1, FGD, Male, Facility 1)**".*

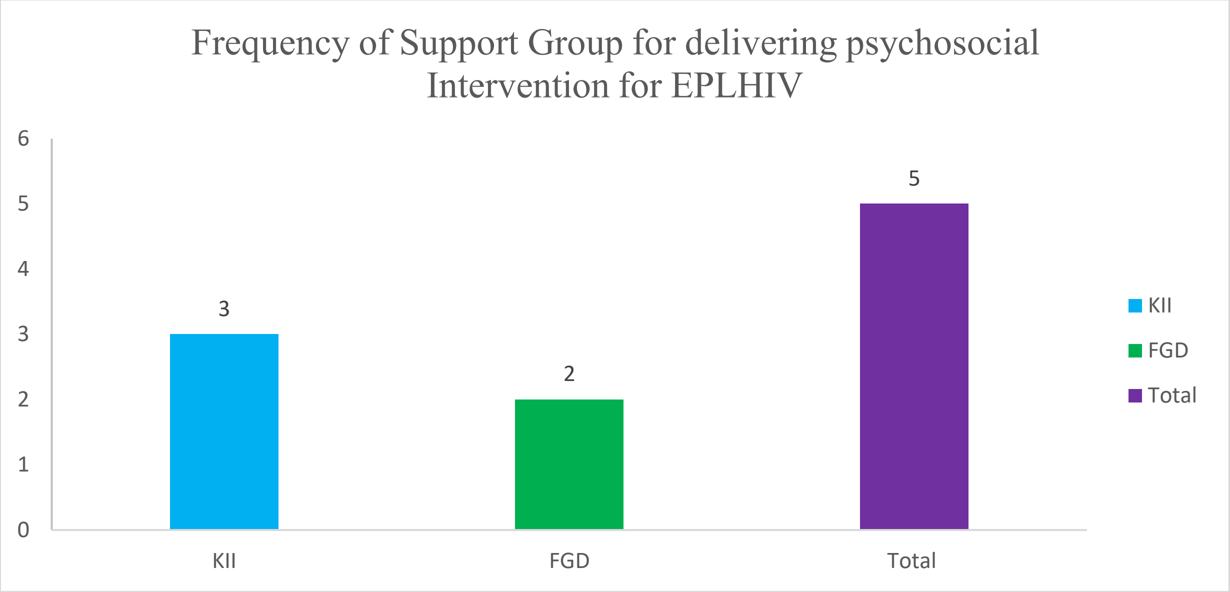


Figure 4.9: Frequency of Support Group for Delivering Psychosocial Intervention for EPLHIV

And the duration of the support group meeting should be about 2hours:

"Members debated on the contact hours, and they ended up picking 2 hours" ***(FGD, Male group, Facility 1)"***.

4.6 Phase Three: Results of the Quantitative Study for Both the Baseline and Endline Assessment.

This section presents the quantitative findings of the study, including the baseline and end-line results. The quantitative results of the study aimed to determine the effects of a psychosocial support intervention on the QoL of EPLHIV patients who are on antiretroviral treatment. The first part describes the background characteristics of the respondents, followed by the description of the QoL among the respondents and the bivariate association between the background characteristics and QoL. The next sub-section describes the effect of a psychosocial support DSD and mobile health intervention on the QoL among EPLHIV (≥50 years) on ARVs.

4.6.1 Sociodemographic Characteristics of Respondents

The sample size at baseline was 437 and reduced to 409 at the end-line as 28 (7%) EPLHIV were lost to follow-up (LTFU) due to sickness, death, and difficulty in contacting participants The response rate of the pre-intervention (baseline) and post-intervention (end-line) surveys were 97% (437/450) and 93.5% (409/437), respectively. The sociodemographic characteristics of respondents are shown in Table 4.2. The results showed that at the baseline, 34.8% of respondents received the DSD intervention, 34.6 % received the SVM intervention, and 30.7% were in the control arm. At the end of the study, 27.4% were from the control facility, 36.4% from those who received the DSD intervention, and 36.2% from respondents who received the SVM intervention.

Except for age, there was a significant difference in sex, marital status, educational level and employment status across all the arms of the study at baseline and end-line.

About two-thirds of the respondents were females at both baseline (66.1%) and end-line (66.5%), and this was across all the study arms. Regarding age, the highest proportion of respondents for both baseline and end-line was between 50-54 years, with the smallest proportion 65 years and above.

With regards to age and the various arms of the study, the highest proportion (38.9%) of the EPLHIV seeking treatment were within the age group of 50-54 years in all the arms of the study at both the baseline and end-line; specifically, approximately 43.3% were in the control arm, 39.5% received the DSD intervention, and 34.4% received the SVM intervention for the baseline while 46.4% received the control facility, 39.6% for the DSD facility and 34.4% for the SVM for the landline.

In terms of marital status, more than one-third (38.2%) of the EPLHIV were married, two out of ten (22.0%) were divorced/separated, and less than one-tenth (9.2%) were never married at both the baseline and end-line. Across the facility, the highest proportion was married for all the arms for the endline and baseline.

In addition, the highest proportion of the EPLHIV had JHS/MSLC (baseline=47.1% and endline=47.0%), and the lowest proportion had tertiary education (baseline=3.2% and endline=3.4%) at both the baseline and end-line. The same trend of a higher proportion of JHS/MSLC EPLHIV was observed in all three arms for both the baseline and end-line. Furthermore, close to 8 out of 10 respondents were employed at both the baseline (76.4%) and endline (76.0%). Across the facilities for the baseline, about eight out of ten (82.1%) employed EPLHIV were in the control and SVM facilities, while 65.8% employed EPLHIV received treatment in the DSD facility.

Table 4.2: Socio-Demographic Characteristics of Study Participants

	Baseline (N= 437)					Endline (N=409)				
Socio Demographic characteristics	**ALL**	**Control Facility**	**DSD Facility**	**SVM Facility**	**P value**	**Endline**	**Control Facility**	**DSD Facility**	**SVM Facility**	**P value**
	N (%)	**N (%)**	**N (%)**	**N (%)**		**N (%)**	**N (%)**	**N (%)**	**N (%)**	
Sex					**0.002**					**0.007**
Male	148 (33.9)	61 (45.5)	39 (25.7)	48 (31.8)		137(33.5)	50 (44.6)	39 (26.2)	48 (32.4)	
Female	289 (66.1)	73 (54.5)	113 (74.3)	103 (68.2)		272(66.5)	62 (55.4)	110 (73.8)	100(67.6)	
Age (years)					0.773					0.570
50-54	170 (38.9)	58 (43.3)	60 (39.5)	52 (34.4)		162(39.6)	52 (46.4)	59 (39.6)	51(34.4)	
55-59	116 (26.5)	34 (25.4)	37 (24.3)	45 (29.8)		107(26.2)	25 (22.3)	37 (24.8)	45(30.4)	
60-64	89 (20.4)	26 (19.4)	31 (20.4)	32 (21.2)		83(20.3)	22 (19.7)	30 (20.1)	31(21.0)	
≥ 65	62 (14.2)	16 (11.9)	24 (15.8)	22 (14.6)		57(13.9)	13 (11.6)	23 (15.5)	21 (14.2)	
Marital status					**<0.001**					**0.001**
Married	167 (38.2)	66 (49.3)	58 (38.1)	43 (28.5)		157(38.4)	57 (50.9)	57 (38.3)	43 (29.1)	
Never married	40 (9.2)	10 (7.5)	13 (8.6)	17 (11.2)		36(8.8)	7 (6.2)	13 (8.7)	16 (10.8)	
Divorced/Separated	96 (22.0)	36 (26.9)	26 (17.1)	34 (22.5)		88(21.5)	30 (26.8)	25 (16.8)	33 (22.3)	
Widowed	134 (30.7)	22 (16.2)	55 (36.2)	57 (37.8)		128(31.3)	18 (16.1)	54 (36.2)	56 (37.8)	
Educational level					**0.002**					**0.005**
No education	56 (12.8)	13 (9.7)	28 (18.4)	15 (9.9)		52(12.7)	11 (9.8)	27 (18.1)	14 (9.5)	
Primary	91 (20.8)	27 (20.1)	25 (16.5)	39 (25.8)		88(21.5)	25 (22.3)	24 (16.1)	39(26.4)	
JHS/MSLC	206 (47.1)	60 (44.8)	84 (55.3)	62 (41.1)		192(47.0)	50 (44.6)	82 (55.0)	60 (40.5)	
Secondary	70 (16.0)	30 (22.4)	11 (7.2)	29 (19.2)		63(15.4)	23 (20.6)	12 (8.1)	28(18.9)	
Tertiary	14 (3.2)	4 (3.0)	4 (2.6)	6 (4.0)		14(3.4)	3 (2.7)	4 (2.7)	7(4.7)	
Employment status					**<0.001**					**<0.001**
Employed	334 (76.4)	110 (82.1)	100 (65.8)	124 (82.1)		311(76.0)	92 (82.1)	98 (65.8)	121(81.8)	
Not employed	103 (23.6)	24 (17.9)	52 (24.2)	27 (17.9)		98(24.0)	20 (17.9)	51 (34.2)	27 (18.2)	
Total	**437 (100.0)**	**134 (30.7)**	**152 (34.8)**	**151 (34.6)**		**409 (100.0)**	**112 (27.4)**	**149 (36.4)**	**148 (36.2)**	

4.6.2 HIV-Related Factors among Study Respondents

From Table 4.3, slightly more than one-third (34.3%) of the study participants had lived with HIV for more than 10 years, while 6.4% had lived with HIV for less than 1 year at baseline. Similarly, at the end line, a greater proportion (36.2%) of them had lived with HIV for 10 years, and the smallest proportion (6.8%) had lived with HIV for less than a year. Across the facilities for the baseline, a higher proportion of 51.5% in the control facility had lived with HIV for 1-4 years, while a higher proportion of 40.8% and 47.0% were in the DSD and SVM facilities, respectively. A similar trend was observed from the end line.

With regards to viral load, at baseline, more than half (58.4%) of the respondents had their results pending. This reduced to 39.4 percent at the endline. Viral load suppression increased from 28.8% at the baseline to 48.9% at the endline. Regarding the differences in the various arms of the study, viral load suppression increased from 39.5% at baseline to 61.8% at the end of the study for respondents who received the DSD intervention. Among respondents who received the SVM intervention, 47.7% did not know their viral load status at baseline, and this reduced to 27.7% at the endline. Regarding living arrangements, slightly less than two-thirds of the respondents were living with someone at baseline (65.2%) and this increased to 65.8% at the endline. Across the health facilities for both the baseline and endline, a higher proportion of the EPLHIV were living with someone.

Additionally, approximately 35% of the EPLHIV had comorbid disease at both baseline and at the end of the study. For the baseline, the highest proportion of the EPLHIV had no comorbidity across the three arms and a similar trend was observed for the endline. Moreover, 15.1% of EPLHIV were living in the same house as someone with HIV at baseline, and this percentage increased marginally to 15.9% at the end of the study. Approximately 4.8% were using other medication to treat HIV at baseline, and this percentage increased to 5.1% at the end of the study. The results show that there is a significant relationship between all variables used for the baseline and endline data measurements.

Table 4.3: Distribution of HIV-Related Factors among Study Respondents

	Baseline (N= 437)					Endline (N=409)				
	ALL	**Control Facility**	**DSD Facility**	**SVM Facility**	**P value**	**Endline**	**Control Facility**	**DSD Facility**	**SVM Facility**	**P value**
	N (%)	**N (%)**	**N (%)**	**N (%)**		**N (%)**	**N (%)**	**N (%)**	**N (%)**	
Years of living with HIV					**<0.001**					**<0.001**
< 1	28 (6.4)	8 (6.0)	13 (8.5)	7 (4.7)		28(6.8)	8 (7.1)	13(8.7)	7(4.7)	
1-4	131 (30.0)	69 (51.5)	39 (25.7)	23 (15.2)		116(28.4)	56 (50.0)	37(24.8)	23(15.6)	
5-9	128 (29.3)	40 (29.8)	38 (25.0)	50 (33.1)		117(28.6)	31(27.7)	38(25.5)	48(32.4)	
≥ 10	150 (34.3)	17 (12.7)	62 (40.8)	71 (47.0)		148(36.2)	17(15.2)	61(41.0)	70(47.3)	
Viral load					**<0.001**					**<0.001**
Virally suppressed	126 (28.8)	8 (6.0)	60 (39.5)	58(38.4)		200(48.9)	19 (17.0)	92(61.8)	89(60.1)	
Unsuppressed	56 (12.8)	3 (2.2)	32 (21.0)	21 (13.9)		48(11.7)	3 (2.7)	27(18.1)	18(12.2)	
Results Pending	255 (58.4)	123(91.8)	60(39.5)	72(47.7)		161(39.4)	90 (80.3)	30(20.1)	41(27.7)	
Living arrangement					**<0.001**					**<0.001**
Live alone	152 (34.8)	44 (32.8)	73 (48.0)	35 (23.2)		140(34.2)	36(32.1)	71(47.7)	33(22.3)	
Live with someone	285 (65.2)	90 (67.2)	79 (52.0)	116 (76.8)		269(65.8)	76(67.9)	78(52.3)	115(77.7)	
Morbidity					**0.003**					**0.008**
No comorbidity	282 (64.5)	102 (76.1)	90 (59.2)	90 (59.6)		265(64.8)	86(76.8)	89(59.7)	90(60.8)	
Comorbidity	155 (35.5)	32 (23.9)	62 (40.8)	61 (40.4)		144(35.2)	26(23.2)	60(40.3)	58(39.2)	
Living with HIV patients at home					**0.001**					**0.001**
Yes	66 (15.1)	7 (5.2)	28 (18.4)	31 (20.5)		65(15.9)	6(5.4)	28(18.8)	31(20.9)	
No	371 (84.9)	127 (94.8)	124 (81.6)	120 (79.5)		388(84.1)	106(94.6)	121(81.2)	117(79.1	
Taking other medications to treat HIV					**<0.001**					**<0.001**
Yes	21 (4.8)	0 (0)	17 (11.2)	4 (2.7)		21(5.1)	0 (0)	17(11.4)	4 (2.7)	
No	416 (95.2)	134(100.0)	135 (88.8)	147 (97.3)		388(94.9)	112(100.0)	132(88.6)	144(97.3)	
Total	**437 (100.0)**	**134 (30.7)**	**152 (34.8)**	**151 (34.6)**		**409 (100.0)**	**112 (27.4)**	**149 (36.4)**	**148 (36.2)**	

4.6.3 Lifestyle Activities among Study Respondents

Table 4.4 shows the lifestyle activities of the study respondents. There is a significant difference between all the variables at both the baseline and end-line, apart from physical activities, which were not significant at the baseline. The results showed that more than half of the respondents had never consumed alcohol before at baseline (58.4%) and (57.75%) at the end of the study. For the three arms of the study, 80.6% and 66.5% non-consumers of alcohol were observed for the control and DSD facilities at the baseline. Similar trend was observed at the endline. For tobacco, 94.5% and 94.4% of EPLHIV had ever smoked tobacco at the baseline and endline, respectively, while 5.5% and 5.6% were currently smoking tobacco at the baseline and endline, respectively. Across the various arms, the proportion of non-consumers of tobacco was high at both baseline and at the end of the study. In terms of physical activity, 68% were engaged in physical activities, while 32.0% were not involved in any physical activity for both baseline and endline and across the health facilities.

Table 4.4: Distribution of Lifestyle Activities Among Study Respondents

	Baseline (N= 437)					Endline (N=409)				
	ALL	**Control Facility**	**DSD Facility**	**SVM Facility**	**P value**	**Endline**	**Control Facility**	**DSD Facility**	**SVM Facility**	**P value**
	N (%)	**N (%)**	**N (%)**	**N (%)**		**N (%)**	**N (%)**	**N (%)**	**N (%)**	
Alcohol					**<0.001**					**<0.001**
Non consumers	255 (58.4)	108 (80.6)	101 (66.5)	46 (30.5)		236(57.7)	93(83.0)	98(65.8)	45(30.4)	
Ever consumed	149 (34.1)	19 (14.2)	47 (30.9)	83 (55.0)		142(34.7)	13(11.6)	47(31.5)	82(55.4)	
Currently consuming	33 (7.6)	7 (5.2)	4 (2.6)	22 (14.5)		31(7.6)	6(5.4)	4(2.7)	21(14.2)	
Smoked Tobacco					**<0.001**					**<0.001**
Non consumers	413 (94.5)	132 (98.5)	147 (96.7)	134 (88.7)		386(94.4)	111(99.1)	144(96.6)	131(88.5)	
Currently consuming	24 (5.5)	2 (1.5)	5 (3.3)	17 (11.3)		23(5.6)	1(0.9)	5(3.4)	17(11.5)	
Engaged in Physical exercise					0.051					0.044
Yes	297 (68.0)	97 (72.4)	92 (60.5)	108 (71.5)		278(68.0)	82(73.2)	90(60.4)	106(71.6)	
No	140 (32.0)	37 (27.6)	60 (39.5)	43 (28.5)		131(32.0)	30(26.8)	59(39.6)	42(28.4)	
Total	**437 (100.0)**	**134(30.7)**	**152 (34.8)**	**151(34.6)**		**409(100.0)**	**112(27.4)**	**149(36.4)**	**148(36.2)**	

Source: Field work, 2023

4.6.4 Distribution of Other Health Outcomes Among Study Respondents

As shown in Figure 4.10, at baseline, more than half (51.3%) of respondents were depressed, and this reduced to (33.7%) at endline. For the respondents in the various arms, there was a reduction in the baseline proportion of respondents who were depressed at the endline; the rate of depression among respondents who received the DSD intervention decreased from 52% at baseline to 15.4% at the endline, while those who received the SVM intervention decreased from 74.2 % to 14.2 %. A significant difference was observed in the baseline (p = < 0.001), while no significant difference was observed at the endline (p = 0.476)

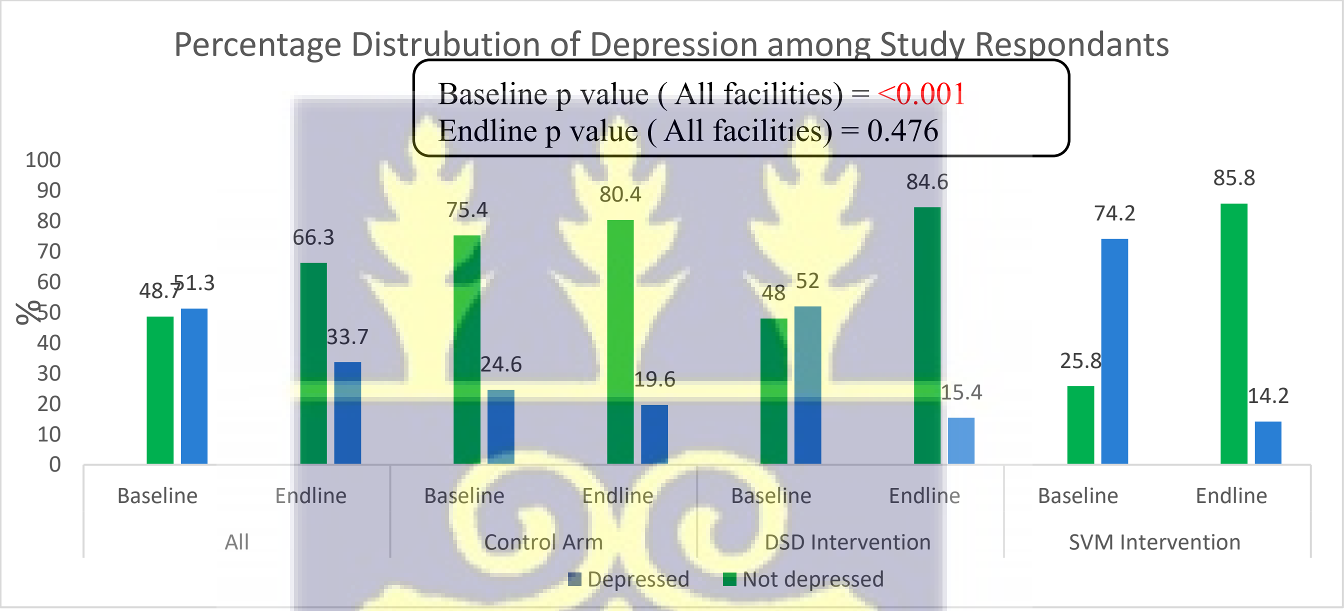


Figure 4.10: Percentage Distribution of Depression Among Study Participants.

In addition, Figure 4.11 shows that 78.7% of respondents adhered to their ARVs at the baseline survey, and this percentage increased to 80.2 % at the end of the survey. Regarding the distribution among respondents in the various arms, there was an increase in adherence at the endline for all the arms of the study. For instance, adherence increased from 52.0% and 53.6% to 86.6% and 82.4% for respondents who received DSD and SVM interventions, respectively. No association was observed for adherence at the baseline (p = 0.152) and the endline (p = 0.527).

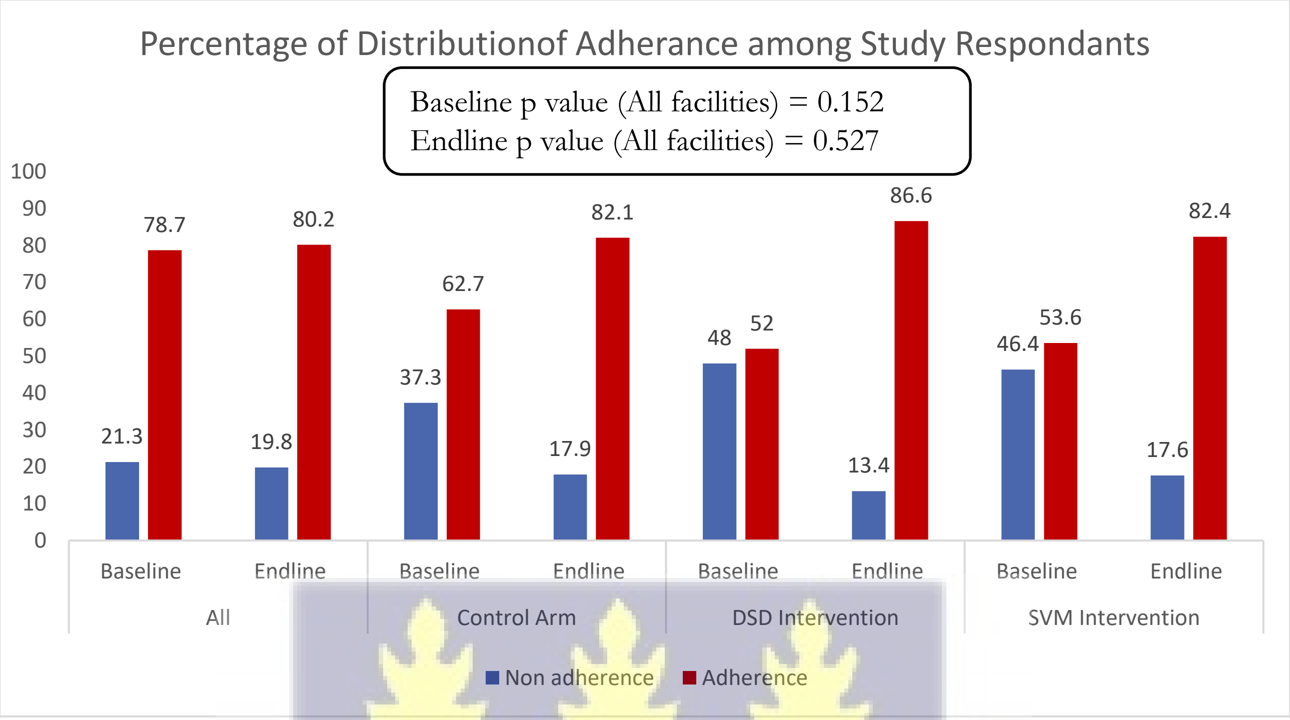


Figure 4. 11: Percentage Distribution of Adherence Among Study Participants

Furthermore, disclosure increased from 76.4% at baseline to 84.1% at the end of the study period (Figure 4.12). Among the various arms, there was an increase in disclosure at the endline survey. There was a percentage point difference of 4.4, and 5 among respondents who received the DSD intervention and SVM intervention, respectively.

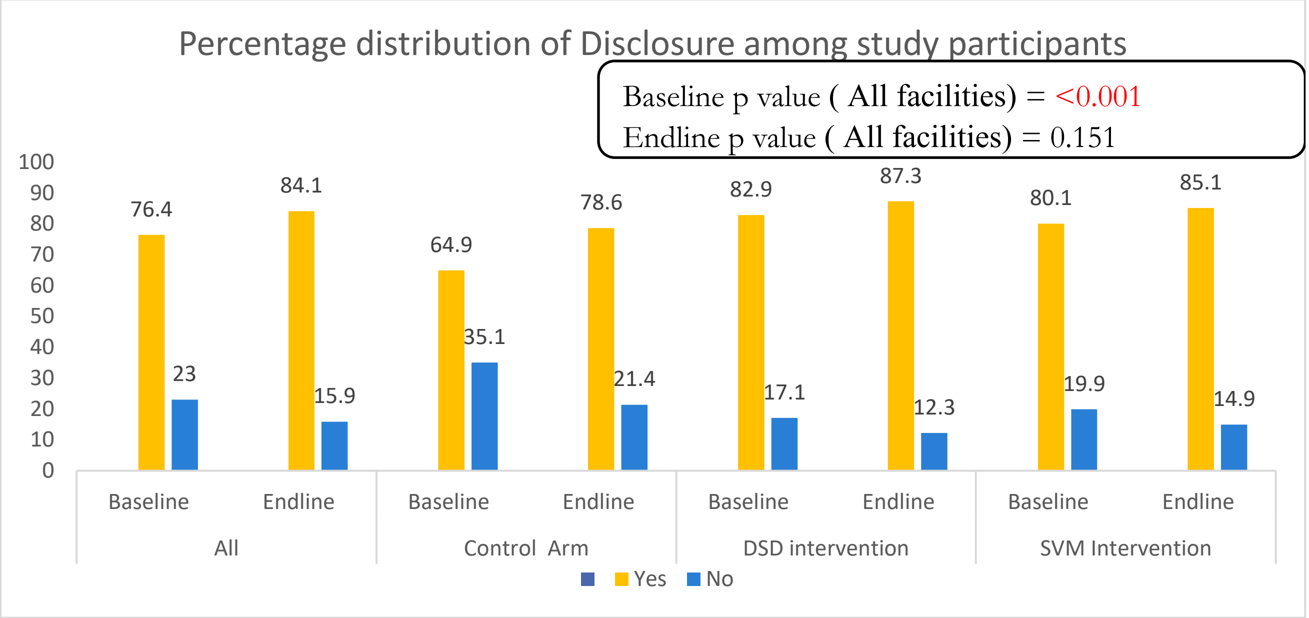


Figure 4.12: Percentage Distribution of Disclosure Among Study Participants.

4.6.5 Quality of Life Domains

Figure 4.13 shows the QoL of the study respondents. The results show that the mean QoL for the domains increased from the baseline at the end of the study. The mean score in the physical domain increased from 24.9 at baseline to 25.2 at the end of the study. Similarly, the mean score for the psychological domain at baseline was 24.3, which marginally increased to 24.9 at the end of the study. Again, at baseline, the social domain mean was 10.6, increasing to 12.1 at the endline. The overall mean QoL increased from 89.1 at baseline to 94.2 at the end of the follow-up period.

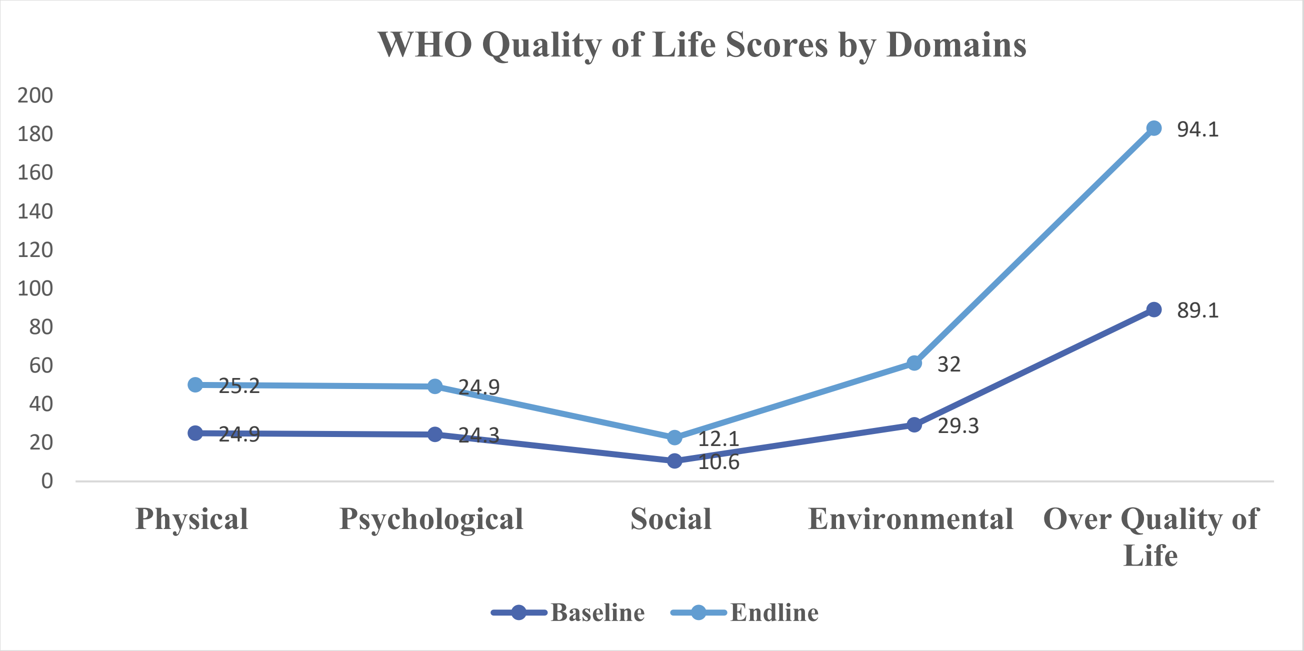


Figure 4.13: Line Graph Showing Percentage Distribution of WHO Quality of Life Domains

4.6.6. Health Facility Differentials in Quality of life

As shown in Table 4.5, except for the psychological domain, which increased at the end of the study period at the control facility, all the other domains did not. The overall mean QoL decreased from 89.9 to 87.7 for the control arm of the study. For the facility that implemented the DSD, there was an increase in all the mean scores for all domains at the endline; the mean for the social domain increased from 9.8 to 12.3, while the environmental domain increased from 30.2 to 32.9 at the endline. The overall mean QoL domain increased from 88.7 to 94.6, with a mean difference of 5.9. Similarly, the means for all the domains among respondents for the SVM intervention increased. For instance, the mean for the physical domain increased from 24.7 to 26.2, that for the psychological domain increased from 24.2 to 24.9, and that for the social domain increased from 11.2 to 13.3. The overall mean QoL domain increased from 88.9 to 98.8, with a mean difference of 9.9. The overall mean difference between the baseline and endline was highest in the SVM intervention (mean = 9), followed by the DSD intervention (mean = 5.9). A decline in mean (-2.2) was observed at the control facility.

Table 4.5: Mean Distribution of Quality-of-Life Domains by Study Arms

QoL	Control		DSD Intervention		SVM Intervention	
	Baseline N= 143 Mean (St. d)	Endline N=112 Mean (St. d)	Baseline N=152 Mean (St. d)	Endline N=149 Mean (St. d)	Baseline N=151 Mean (St. d)	Endline N=148 Mean (St. d)
Physical	25.7 (3.07)	24.2 (6.60)	24.2 (3.16)	24.8 (3.92)	24.7 (2.58)	26.2 (3.45)
Psychological	24.4 (2.43)	25.5 (1.08)	24.4 (2.91)	24.5 (2.06)	24.2 (3.18)	24.9 (2.09)
Social	10.9 (1.63)	10.4 (3.15)	9.8 (2.17)	12.3 (1.49)	11.2 (1.92)	13.3 (1.85)
Environment	28.8 (3.73)	27.6 (4.67)	30.2 (4.27)	32.9 (1.60)	28.9 (4.1)	34.5 (1.91)
Overall Quality of Life	89.9 (7.5)	87.7 (13.1)	88.7 (10.7)	94.6 (5.29)	88.9 (9.2)	98.8 (7.25)

4.6.7 Associations between Socio-Demographic Characteristics and Quality of Life among Study

Table 4.6 shows the associations between the socio-demographic characteristics and QoL at both baseline and at the end of the study. At baseline and at the end of the study period, marital status was significantly associated with QoL. Respondents who were married had the highest mean (mean=91.6) of QoL, followed by those who were divorced/separated (mean=88.8) and those who were never married (mean=88.4). At the end of the study, EPLHIV who were widowed had a higher mean (mean=95.4) of QoL, followed by those who were never married (95.0) and those who were married (mean=94.5). Other factors such as age, sex, educational level, and employment status were significantly associated with QoL but only at baseline. Specifically, males had higher means (Mean=90.8) of QoL than females.

EPLHIV aged 50-54 years had the highest mean (mean=91.1) of QoL, followed by individuals aged 55-59 years (mean=90.2), with the least being those aged 65 years and above (mean = 84.6). For educational level, EPLHIV students who had secondary/technical/vocational education had the highest mean (Mean = 91.1), and the lowest mean was recorded by those with no education (Mean=85.3).

Table 4.6: Associations between Socio-Demographic Characteristics and Quality of life among Study Respondents

	Baseline			Endline		
Background characteristics and	**Mean**	t/F	P value	**Mean**	t/F	P value
Sex		2.65	**0.008**		0.68	0.498
Male	90.8			94.6		
Female	88.3			93.9		
Age (years)		9.77	**<0.001**		0.25	0.865
50-54	91.1			93.8		
55-59	90.2			94.9		
60-64	87.3			94.3		
≥ 65	84.6			94		
Marital status		8.01	**<0.001**		2.77	**0.041**
Married	91.6			94.5		
Never married	88.4			95.0		
Divorced/Separated	88.8			91.7		
Widowed	86.5			95.4		
Educational level		3.39	**0.01**		0.43	0.788
No education	85.3			93.9		
Primary	89.4			95.4		
JHS/MSLC	89.4			93.9		
Secondary/Technical/Vocational	91.1			93.8		
Tertiary	89.2			93.9		
Employment status		2.63	**0.009**		0.68	0.499
Employed	89.8			94.4		
Not employed	87.1			93.6		

4.6.8 Associations between HIV Related Factors and Quality of life among Study Respondents

As shown in Table 4.7, participants who currently live alone, those with comorbidity and those who live with other known HIV patients were associated with QoL at baseline, while years lived with HIV, viral load, and taking other medication to treat HIV were associated with QoL at the end of the study. At only baseline, EPLHIV who were not currently living together had a greater mean (mean=90.7) than those who were living alone. The mean EPLHIV score in patients who had no comorbidities was greater (mean=89.9) than that in patients who lived with comorbidities. Additionally, those who were living with someone with HIV had a greater mean (mean=91.2) than those who were not living with any comorbidity. Furthermore, at the endline, those who had lived with HIV for 10 years or more had a higher mean QoL (mean=96.9), followed by those who lived with HIV for 5-9 years (mean=94.8). Regarding viral load, those who had their viral load suppressed had a higher mean QoL, than those whose viral load was unsuppressed (mean =95.0). Participants who were taking other medications in addition to ARVs to treat HIV had a greater mean (mean=98.4) QoL than those who were not taking any medication to treat HIV.

Table 4.7: Association between HIV Related Factors and Quality of life among Study respondent's

	Baseline			Endline		
HIV Related Factors	**Mean**	**t/F**	**P value**	**Mean**	**t/F**	**P value**
Years living with HIV		0.17	0.914		10.9	**<0.001**
<1	89.7			93.4		
1-4	89.3			90.3		
5-9	88.7			94.8		
≥ 10	89.3			96.9		
Viral load		2.85	0.059		12.6	**<0.001**
Virally suppressed	87.6			96.4		
Unsuppressed	89			95.0		
Results pending	89.9			91.3		
Currently live alone		-4.9	**<0.001**		0.72	0.472
Yes	86.3			94.7		
No	90.7			93.9		
Morbidity		2.42	**0.016**		-0.3	0.778
No comorbidity	89.9			94.1		
Comorbidity	87.7			94.4		
Living with HIV patients at home		1.99	**0.047**		1.04	0.296
Yes	91.2			95.4		
No	88.8			94		
Taking other medication to treat HIV		1.85	0.065		8.66	**0.044**
Yes	92.8			98.4		
No	89			94.0		

4.6.9 Associations between Lifestyle Characteristics and Quality of life among Study Respondents

According to Table 4.8, alcohol consumption was associated with QoL at both baseline and at the end of the study, while physical activities were associated with QoL at only baseline. For alcohol consumption, those who were currently consuming alcohol had a higher mean of QoL at both baseline (mean=92.2) and at the end of the study (mean=96.1). With regard to physical activities, those engaged in physical activities had a greater mean (mean=90.2) of QoL than those not engaged in any physical activities (mean=86.8%).

Table 4.8: Associations between Lifestyle Activities and Quality of Life among EPLHIV

	Baseline			Endline		
Lifestyle Activities	**Mean**	t/F	P value	**Mean**	t/F	P value
Alcohol consumption		6.5	**0.002**		5.87	**0.003**
Non-consumers	89.9			92.8		
Ever consumers	87.1			96.1		
Currently consuming	92.2			96.1		
Smoking		1.84	0.069		-1	0.306
Non-consumers	89.3			94.1		
Currently consuming	85.8			96.3		
Ever engaged in Physical Exercise		3.67	**0.001**		-0.3	0.765
Yes	90.2			94.1		
No	86.8			94.4		

4.6.10 Associations between Health Outcomes and Quality of Life among Study Respondents

As shown in Table 4.9 at the baseline, depression was associated with QoL, while disclosure was associated with QoL only at the end of the study. At the baseline, those who were not depressed had a greater mean (mean=90.1) QoL than those who were depressed. For disclosure, participants who had disclosed their HIV-positive status had a greater mean (mean=94.7) of QoL than those who had not disclosed their HIV-positive status.

Table 4.9: Associations between Health Outcomes and Quality of life among EPLHIV

	Baseline			Endline		
Conditions	**Mean**	t/F	P value	**Mean**	t/F	P value
Depression		2.63	**0.008**		0.23	0.819
Not depressed	90.1			94.3		
depressed	88.0			94.0		
Adherence		-1.8	0.070		-0.8	0.434
Non-adherence	88.2			93.4		
Adherence	89.8			94.4		
Disclosure		1.75	0.081		2.11	**0.035**
Yes	89.6			94.7		
No	87.8			91.9		

Source: Fieldwork, 2023

4.6.11 Association between of Intervention Arms and quality of life

Table 4.10 shows the association between the 3intervention arms and QoL. The results show that there was no significant difference (p=0.491) for the baseline, but a significant difference (p = <0.001) was observed at the endline.

Table 4.10: Association between of Intervention Arms and quality of life

	Baseline			Endline		
Study facilities	**Mean**	F	P value	**Mean**	t/F	P value
Baseline		0.71	0.491		52.6	**0.001**
Control	89.9			87.7		
SVM	88.7			98.8		
DSD	88.9			94.6		

4.7 Objective 3: Factors Associated With the Quality of Life of EPLHIV (≥50 years) on ARVs

In this section, multiple linear regression analysis was conducted to explore the significant relationship between independent variables (facility type, age, sex, marital status, educational level, employment status, years of living with HIV, viral load status, disclosure of HIV-positive status, adherence to ARVs, depression, morbidity, living alone, alcohol consumption, smoking tobacco, physical activity, living with other known HIV patients, location of residence as well as taking other medications to treat HIV) as against the QoL of study participants before and after the implementation of the two psychosocial interventions (SVM and DSD). The crude and adjusted odds ratios were used to explain the significant variables.

The results on the factors predicting QoL for both the baseline and end-line are described first, followed by the short voice messaging intervention, the DSD intervention and lastly, factors predicting the QoL for the two interventions.

4.7.1 Factors Associated with Quality of Life

The results in Table 4.11 show the factors associated with QoL for all three arms at both baseline and end-line for the unadjusted and adjusted multiple linear regression. For the unadjusted regression of the baseline, depression, sex, age, marital status, educational level, employment status, viral load, currently living alone, morbidity, alcohol consumption, engaging in physical activities and living with HIV patients were significantly associated at the baseline while facility, disclosure, marital status, viral load, alcohol consumption, and taking other medications to treat HIV were significantly associated at the endline. For the adjusted regression results, depression, age, educational level, current living status, alcohol consumption, physical activity, location and taking other medications in addition to ARVs to treat HIV were significantly related to QoL at the baseline. At the end of the intervention, health facility (study arms), marital status and taking other medication to treat HIV were significantly associated with QoL.

At baseline, respondents who experienced depression had a decrease [Adjusted Coeff: -2.58; 95 CI=-4.40 - -0.77] in QoL compared to those who were not depressed. EPLHIV who were 65 years and above had a lower [Adjusted Coeff: -4.56; 95 CI=-7.25 - -1.87] QoL than those aged 50-54 years. EPLHIV who had JHS/MSLC [Adjusted Coeff: 2.73; 95% CI= 0.12-5.35] and Secondary/Technical/Vocational education had higher [Adjusted Coeff: 3.35; 95% CI= 0.06-6.64] QoL than those with no education. Respondents not living alone had higher [Adjusted Coeff: 3.95; 95% CI= 2.13-5.77] QoL than those living alone. EPLHIV who had ever consumed alcohol had a decrease [Adjusted Coeff: -2.14; 95% CI= -4.07- -0.20] in QoL than those who had never consumed alcohol. In addition, EPLHIV who had not engaged in physical activity had lower [Adjusted Coeff: -2.13; 95% CI= 4.11- -0.52] QoL compared to those who engaged in physical activity. Respondents living in urban areas had a higher [Adjusted Coeff: 3.52; 95% CI= 0.50-6.54] QoL than those living in rural areas. EPLHIV who were not taking other medication aside from ARVs to HIV had lower [Adjusted Coeff: -4.05; 95% CI= -8.07- -0.03]. For the endline, respondents who received SVM intervention [Adjusted Coeff: 10.88; 95% CI=-8.01 -13.75] and DSD intervention [Adjusted Coeff: 5.82; 95% CI=-3.09-8.56] had higher QoL than the control facility. EPLHIV who were divorced/separated were likely to have a decrease of 3.37 units [Adjusted Coeff: -3.37; 95% CI=-5.96, -0.77] in QoL than those who were married. Respondents who were not taking other medications to treat HIV had lower [Adjusted Coeff: -5.21; 95% CI=-9.42- -1.00] QoL than those who were taking other medications to treat HIV

Table 4.11: Multiple Linear Regression Showing Factors Predicting Quality of Life

	Baseline				**Endline**			
	Unadjusted Coeff [95%CI]	**P value**	**Adjusted Coeff [95%CI]**	**P>t**	**Unadjusted Coeff [95%CI]**	**P>t**	**Adjusted Coeff [95%CI]**	**P value**
Facility								
Control	ref				ref			
DSD Intervention	-1.26 [-3.41-0.89]	0.250	1.37 [-1.08-3.82]	0.272	6.89 [4.74-9.03]	**<0.001**	5.82 [3.09-8.56]	**<0.001**
SVM Intervention	-0.96 [-3.11-1.19]	0.382	1.29 [-3.87-3.94]	0.342	11.18 [9.04-13.32]	**<0.001**	10.88 [8.01-13.75]	**<0.001**
Depression								
Not depressed	ref				ref			
Depressed	-2.31 [-4.03- -0.58]	**0.009**	-2.58 [-4.40- -0.77]	**0.005**	-0.30 [-2.89-2.28]	0.817	0.05 [-2.32-2.43]	0.964
Adherence								
Non adherence	ref				ref			
Adherence	1.61 [-0.13-3.35]	0.070	0.85 [-0.84-2.53]	0.323	1.02 [-1.55-3.61]	0.434	0.62 [-1.82-3.07]	0.615
Disclosure								
Yes	ref				ref			
No	-1.81 [-3.85-0.22]	0.081	-1.77 [-3.85 – 0.31]	0.095	-2.77 [-5.36- -0.19]	**0.035**	-1.99 [-4.40-0.43]	0.106
Sex								
Male	ref				ref			
Female	-2.45 [-4.27- -0.63]	**0.008**	-0.79 [-2.93 – 1.36]	0.471	-0.69 [-2.70-1.31]	0.498	-1.66 [-3.94-0.61]	0.151
Age (years)								
50-54	ref				ref			
55-59	-0.90 [-3.02-1.21]	0.402	-1.08 [-3.14 – 0.98]	0.304	1.02 [-1.37-3.42]	0.402	0.26 [-1.95-2.46]	0.818
60-64	-3.81 [-6.11- -1.52]	**0.001**	-2.16 [-4.47- 0.14]	0.066	0.50 [-2.10-3.09]	0.706	0.23 [-2.23-2.69]	0.854
≥ 65	-6.46 [-9.07- -3.85]	**<0.001**	-4.56 [-7.25- -1.87]	**0.001**	0.21 [-2.75-3.17]	0.890	-0.67 [-3.53-2.19]	0.645
Marital status								
Married	ref				ref			
Never married	-3.20 [-6.31- -0.09]	**0.044**	-1.82 [-4.96 – 1.32]	0.256	0.48[-3.04-4.00]	0.788	-1.24 [-4.62-2.14]	0.471
Divorced/Separated	-2.80 [-5.06- -0.53]	**0.016**	-0.92 [-3.31- 1.47]	0.449	-2.80 [-5.33- -0.26]	0.031	-3.37 [-5.96- -0.77]	0.011

Widowed	-5.05 [-7.11- -3.00]	**<0.001**	-1.94 [-4.33-0.44]	0.110	0.94 [-1.33-3.21]	0.416	-1.22 [-3.73-1.28]	0.337
Educational level								
No education	ref				ref			
Primary	4.11 [1.07-7.15]	**0.008**	2.22 [-0.72-5.16]	0.138	1.49 [-1.87-4.85]	0.385	1.16 [-1.94-4.26]	0.463
JHS/MSLC	4.12 [1.42-6.82]	**0.003**	2.73 [0.12-5.35]	**0.040**	-0.03 [-3.04-2.98]	0.984	0.15 [-2.62-2.93]	0.913
Secondary/Technical/Vocational	5.82 [2.62-9.04]	**<0.001**	3.35 [0.06-6.64]	**0.046**	-0.13 [-3.74-3.47]	0.942	0.44 [-3.06-3.95]	0.804
Tertiary	3.92 [-1.42-9.28]	0.150	2.07 [-3.08-7.23]	0.430	-0.85 [-5.87-5.71]	0.977	-1.89 [-7.26-3.49]	0.490
Employment status								
Employed	ref				ref			
Not employed	-2.71 [-4.74- -0.68]	**0.009**	-0.72 [-2.80-1.37]	0.499	-0.77 [-2.99-1.46]	0.499	-0.80 [-2.99-1.38]	0.470
Years living with HIV								
< 1	ref				ref			
1-4	-0.44 [-4.22-3.34]	0.819	-1.26 [-4.85-2.32]	0.489	-3.08 [-6.98-0.82]	0.121	-1.48 [-5.23-2.27]	0.439
5-9	-1.04 [-4.83-2.75]	0.589	-0.77 [-4.41-2.87]	0.677	1.41 [-2.49-5.31]	0.478	0.86 [-2.90-4.62]	0.654
≥ 10	-0.39 [-4.13-3.34]	0.836	-0.19 [-3.84-3.46]	0.919	3.50 [-0.31-7.32]	0.072	1.82 [-1.88-5.51]	0.335
Viral load								
Virally suppressed	ref				ref			
Unsuppressed	1.47 [-1.42-4.36]	0.318	1.10 [-1.62-3.81]	0.427	-1;31 [-4.31-1.69]	0.392	-1.86 [-4.73-1.01]	0.203
Results pending	2.38 [0.42-4.34]	**0.018**	0.79 [-1.29-2.87]	0.457	-5.01 [-6.98- -3.03]	**<0.001**	-0.88 [-3.01-1.25]	0.419
Currently live alone								
Yes	ref				ref			
No	4.38 [2.61-6.16]	**<0.001**	3.95 [2.13-5.77]	**<0.001**	-0.73 [-2.733-1.27]	0.472	-1.64 [-3.58-0.31]	0.098
Morbidity								
No comorbidity	ref				ref			
Comorbidity	-2.22 [-4.02- -0.42]	**0.016**	-1.72 [-3.55-0.11]	0.066	0.29 [-1.70-2.27]	0.778	-1.35 [-3.28-0.58]	0.169
Alcohol consumption								
Non consumers	ref				ref			
Ever consumers	-2.80 [-4.65- -0.96]	**0.003**	-2.14 [-4.07- -0.20]	**0.031**	3.31 [1.30-5.33]	**0.001**	-0.62 [-2.71-1.47]	0.559
Currently consuming	2.29 [-1.02-5.59]	0.175	2.00 [-1.33-5.33]	0.239	3.27 [-0.35-6.89]	0.077	-0.79 [-4.30-2.71]	0.657
Smoking								

Non consumers	ref				ref			
Currently consuming	-3.54 [-7.33-0.25]	0.067	-2.59 [-6.29-1.12]	0.171	2.16 [-1.95-6.27]	0.304	-0.94 [-4.86-2.99]	0.638
Ever engaged in Physical exercise								
Yes	ref				ref			
No	-3.41 [-5.24- -1.58]	**<0.001**	-2.31 [-4.11- -0.52]	**0.012**	0.31 [-1.73-2.34]	0.765	0.88 [-1.08-2.83]	0.380
Living with HIV patients								
Yes	ref				ref			
No	-2.43 [-4.85- -0.28]	**0.047**	0.22 [-2.25 -2.69]	0.861	-1.37 [-3.97-1.21]	0.297	2.07 [-0.51-4.64]	0.116
Location								
Rural	ref				ref			
Urban	2.88 [-0.30-6.07]	0.075	3.52 [0.50-6.54]	**0.023**	3.48 [-0.14-7.11]	0.060	1.49 [-1.86-4.84]	0.382
Other medication to treat HIV								
Yes	ref				ref			
No	-3.80 [-7.84-0.24]		-4.05 [-8.07- -0.03]	**0.048**	-4.38 [-8.66- -0.10]	**0.045**	-5.21 [-9.42- -1.00]	**0.015**

4.7.2 Factors Associated with Quality of Life for Short Voice Messaging Intervention

Table 4.12 shows the factors associated with QoL at both baseline and at the end of the short-term voice message intervention. For the unadjusted regression, depression, adherence, sex, age, marital status, educational level, employment status, co-morbidity, and alcohol consumption were significant at the baseline, while facility, viral load, alcohol consumption, location and other medications to treat HIV were significant at the endline.

Regarding the adjusted regression, the findings showed that depression, adherence and age were significantly associated with QoL at baseline. However, at the end of the study, health facility, marital status, living with HIV patients and taking other medications besides ARVs to treat HIV were significantly associated with QoL after the intervention for the adjusted regression.

At baseline, the adjusted results show that EPLHIV who were depressed had a significantly lower [Adjusted Coeff: -4.42; 95%CI=-6.71-2.13] QoL than those who were not depressed. In addition, those who were adherent had a significantly higher [Adjusted Coeff: 2.72; 95%CI=-6.33-4.81] QoL than those who were not adherent. Again, respondents who were 65 years or older had a significantly lower [Adjusted Coeff: -3.90; 95%CI=-7.20 -0.60] QoL than those who were 50-54 years.

At the endline, respondents who received the SVM intervention were significantly more likely [Adjusted Coeff: 11.58; 95% CI=-7.87-15.29] to have a higher QoL than those receiving care at the control facility. EPLHIV who were divorced/separated were likely to have a decrease of 4.86 units [Adjusted Coeff: -4.860; 95% CI=-8.57, -1.15] in QoL than those who were married. EPLHIV who were not living with persons with HIV in their household were more likely to have an increase of 4.97 units in QoL than those [Adjusted Coeff: 4.97; 95% CI= 0.83-9.11] who were living with persons with HIV in their household. Participants who were not taking other medications to treat HIV had lower [Adjusted Coeff: -10.73; 95% CI=-21.33- -0.12] QoL than those who were taking other medications to treat HIV.

Table 4.12: Multiple Linear Regression Showing Factors Predicting Quality of Life for Short Voice Message.

.	Baseline				Endline			
Quality of Life	Unadjusted Coeff [95% CI]	P>t	Adjusted Coeff [95%CI]	P>t	Unadjusted Coeff [95% CI]	P>t	Adjusted Coeff [95%CI]	P>t
Facility								
Control	ref				ref			
SVM Intervention	-0.96[2.92-1.01]	0.339	0.91[-1.81-3.63]	0.511	11.18[8.67-13.69]	**<0.001**	11.58[7.87-15.29]	**<0.001**
Depression								
Not depressed	ref				ref			
Depressed	-4.33[-6.23- -3.42]	**<0.001**	-4.42[-6.71- -2.13]	**<0.001**	-1.35[-5.16-2.46]	0.485	-1.36[-4.78-2.07]	0.436
Adherence								
Non adherence	ref				ref			
Adherence	3.76[1.82-5.71]	<**0.001**	2.72[0.63-4.81]	**0.011**	2.10[-1.60-5.80]	0.264	0.91[-2.53-4.36]	0.602
Disclosure								
Yes	ref				ref			
No	-0.13[-2.34-2.09]	0.911	-0.08[-2.37-2.21]	0.945	-3.16[-6.85-0.53]	0.093	-1.68[-5.13-1.77]	0.337
Sex								
Male	ref				ref			
Female	-3.12 [-5.11- -1.13]	**0.002**	-0.34 [-2.75-2.08]	0.783	-1.58[-4.50-1.33]	0.286	-2.722[-5.92-0.48]	0.095
Age (years)								
50-54	ref				ref			
55-59	-1/94[-4.31-0.44]	0.110	-0.97[-3.36-1.42]	0.425	1.52[-2.02-5.07]	0.399	1.01[-2.23-4.25]	0.539
60-64	-3.54[-6.15- -0.92]	**0.008**	-1.75[-4.47--.97]	0.207	0.38[-3.49-4.244]	0.848	1.47[-2.22-5.17]	0.433
≥ 65	-6.44 [-9.47- -3.41]	<**0.001**	-3.90[-7.20- -0.60]	**0.021**	1.30[-3.23-5.82]	0.573	1.06[-3.34-5.45]	0.636
Marital status								
Married	ref				ref			
Never married	-1.80[-5.27-1.67]	0.308	-1.56[-5.15-2.04]	0.395	-0.14[-5.39-5.11]	0.959	-2.45[-7.47-2.57]	0.337
Divorced/Separated	-2.64[-5.11- -0.61]	**0.037**	-1.76[-4.44-0.93]	0.198	-3.17[-6.82-0.49]	0.089	-4.86[-8.57- -1.15]	**0.011**
Widowed	-5.16[-7.54- -2.77]	<**0.001**	-2.44[-5.39-0.51]	0.104	0.10[-2.49-4.48]	0.573	-2.89[-6.86-1.07]	0.152
Educational level								
No education	ref				ref			
Primary	4.66[0.97-8.35]	**0.014**	2.57[-1.21-6.35]	0.182	2.02[-3.38-7.42]	0.462	0.18[-4.91-5.27]	0.944

JHS/MSLC	5.37[1.94-8.80]	**0.002**	3.48[-0.07-7.03]	0.055	-0.39[-5.46-4.68]	0.880	-0.98[-5.81-3.84]	0.688
Secondary/Technical/Vocational	6.21[2.45-9.96]	**0.001**	2.21[-1.95-6.37]	0.296	0.89[-4.69-6.48]	0.753	-0.16[-5.65-5.34]	0.956
Tertiary	4.83[-1.20-10.86]	**0.116**	3.20[-2.78-9.18]	0.293	1.22[-7.34-9.78]	0.779	-2.85[-10.70-4.50]	0.475
Employment status								
Employed	ref				ref			
Not employed	-3.86[-6.39- -1.33]	**0.003**	-0.42[-3.13-2.30]	0.763	-1.55[-5.22-2.13]	0.407	-1.58[-5.15-1.99]	0.384
Years living with HIV								
< 1	ref				ref			
1-4	1.78 [-2.85-6.42]	0.449	0.29[-4.11-4.69]	0.897	-5.14[-11.13-0.86]	0.093	-3.62[-9.34-2.10]	0.214
5-9	2.26[-2.38-6.90]	0.339	2.02[-2.44-6.48]	0.374	0.14[-5.85-6.13]	0.962	-1.09[-6.79-4.61]	0.706
≥ 10	2.32[-2.33-6.96]	0.327	3.04[-1.54-7.63]	0.193	5.63[-0.31-11.58]	0.063	3.06[-2.69-8.81]	0.296
Viral load								
Virally suppressed	ref				ref			
Unsuppressed	1.16[-2.80-5.12]	0.565	1.03[-2.80-4.85]	0.597	1.54[-3.71-6.79]	0.564	1.22[-3.67-6.12]	0.623
Results pending	0.80[-1.57-3.17]	0.506	-0.71[-3.25-1.83]	0.583	-5.91[-8.78- -3.05]	**<0.001**	0.47[-2.56-3.50]	0.761
Currently live alone								
Yes	ref				ref			
No	-0.55[-2.74-1.65]	0.626	-0.57[-2.75-1.61]	0.604	-0.84[-4.05-2.36	0.606	-1.65[-4.63-1.33]	0.276
Morbidity								
No comorbidity	ref				ref			
Comorbidity	-3.17[-5.23- -1.10]	**0.003**	-1.37[-3.52-0.78]	0.212	-0.31[-3.34-2.71]	0.838	-1.95[-4.83-0.94]	0.184
Alcohol consumption								
Non consumers	ref				ref			
Ever consumers	-0.51[-2.62-1.60]	**0.634**	-0.16[-2.49-2.18]	0.896	5.23[2.25-8.20]	**0.001**	-2.15[-5.31-1.02]	0.184
Currently consuming	-0.96[-0.39-.30]	**0.083**	2.74[-0.72-6.19]	0.120	4.61[-0.08-9.31]	0.054	-0.91[-5.45-3.63]	0.694
Smoking								
Non consumers	ref				ref			
Currently consuming	-3.14[-7.07-0.79]	0.117	-2.03[-6.06-2.00]	0.322	3.01[-2.56-8.57]	0.288	-0.89[-6.31-4.52]	0.746
Ever engaged in Physical exercise								
Yes					ref			
No	-3.52[-5.67- -1.36]	**0.001**	-1.91[-4.15-0.34]	0.096	-0.16[-3.33-3.00]	0.919	0.21[-2.83-3.25]	0.893
Living with HIV patients								

Yes	ref							
No	-2.02[-4.91-0.86]	0.168	-0.21[-3.34-2.92]	0.896	-1.79[-5.83-2.26]	0.385	4.97[0.83-9.11]	0.019
Location								
Rural	ref				ref			
Urban	4.21[0.30-8.12]	**0.035**	1.71[-2.23-5.64]	0.393	7.28[1.08-13.49]	**0.022**	2.25[-3.48-7.97]	0.440
Other medication to treat HIV								
Yes	ref				ref			
No	1.42[-6.94-9.79]	0.738	0.22[-7.92-8.37[	0.957	-15.20[-26.55- -3.85]	**0.009**	-10.73[-21.33- - 0.12]	0.047

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4.7.3 Factors Associated with Quality of Life for Differentiated Service Delivery.

The factors associated with QoL for DSD are shown in Table 4.13. The findings show that different variables were significant at both baseline and end-line for unadjusted and adjusted regressions. For the unadjusted regression, depression, sex, age, marital status, educational level, employment status, viral load, currently living alone, alcohol consumption, engaging in physical activities and taking other medications to treat HIV were significantly associated at the baseline while facility, marital status, educational level and viral load were significantly associated at the endline.

For the adjusted regression, depression, sex, age, educational level, current living status, morbidity status, alcohol consumption status, involvement in physical activity, place of residence and the use of other medications in addition to ARVs to treat HIV were significantly related with QoL at the baseline. At the end of the intervention, health facility, marital status and viral load were significantly associated with QoL.

At baseline, respondents who experienced depression and those who hadn't disclosed their HIV-positive status exhibited lower QoL compared to those who were not depressed or had disclosed their HIV-positive status, respectively. The coefficient for depression [Adjusted Coeff: -3.16; 95 CI=--5.36 - -0.95] shows that there was a decrease in QoL for EPLHIV who were depressed compared to those who were not depressed. EPLHIV who had not disclosed [Adjusted Coeff: -2.59; 95% CI=-4.96-0.22] their HIV status had a decrease in QoL compared to those who had disclosed their HIV status. In addition, respondents who had JHS/MSLC education had higher [Adjusted Coeff: 3.29; 95% CI= 0.32-6.26] QoL than those with no education. Similarly, respondents who were not currently living alone had higher [Adjusted Coeff: 5.10; 95% CI=2.92-7.28] QoL than those who were living alone, while respondents who had comorbidity had lower

(Adjusted Coeff: -2.56; 95% CI=-4.82- -0.31) QoL than those with no comorbidities. Furthermore, respondents who consume alcohol had lower [Adjusted Coeff: -3.39; 95% CI=-5.85- -0.92] QoL than non-consumers. For physical activity, respondents who had not engaged in any physical activity had lower [Adjusted Coeff: -2.97 95 CI=-5.10- -0.84] QoL than those who engaged in physical activity. Elderly people who were living in urban areas had an increase of 4.09 units in QoL [Adjusted Coeff: 4.09; 95% CI=0.91-7.28] than those who were living in rural areas. Respondents who were not taking any medication to treat HIV had lower [Adjusted Coeff: -5.70; 95% CI=-10.22- -1.18] QoL than those who were taking other medications to treat HIV.

At the end of the study (endline), respondents seeking care at the DSD intervention facility had better [Adjusted Coeff: 5.17; 95% CI=1.77–8.56] QoL than those seeking treatment at the control facility. In addition, respondents who were divorced/separated had a lower QoL [Adjusted Coeff: -4.39; 95% CI=-7.80 - -0.99] than those who were married. ELPHIV, whose viral status results pending a decrease of 3.12 units in QoL [Adjusted Coeff: -3.12; 95% CI=-6.20 - -0.04] than those whose viral load was suppressed.

Table 4.13: Multiple Linear Regression Showing Factors Predicting Quality of Life for Differentiated Service Delivery

.	Baseline				Endline			
Quality of Life	Unadjusted Coeff [95% CI]	P>t	Adjusted Coeff [95%CI]	P>t	Unadjusted Coeff [95% CI]	P>t	Adjusted Coeff [95%CI]	P>t
Facility								
Control	ref							
DSD Intervention	-126[-3.41-0.89]	0.252	2.30[-0.44-5.03]	0.099	6.89[4.56-9.21]	**<0.001**	5.17[1.77-8.56]	**0.003**
Depression								
Not depressed	ref							
Depressed	-2.22[-4.41- -0.03]	**0.047**	-3.16[-5.36- -0.96]	**0.005**	1.69[-1.55-4.93]	0.305	1.05[-2.09-4.19]	0.510
Adherence								
Non-adherence	ref							
Adherence	-1.37[-3.54-0.80]	0.214	-2.01[-4.07-0.05]	0.056	-0.06[-3.46-3.34]	0.974	-0.34[-3.74-3.06]	0.844
Disclosure								
Yes	ref							
No	-2.33[-4.78-0.13]	0.063	-2.59[-4.96- -0.22]	**0.033**	-3.70[-6.97- -0.43]	0.027	-2.60[-5.81-0.61]	0.111
Sex								
Male	ref							
Female	-2.67[-4.91- -0.44]	**0.019**	-2.20[-4.76-0.36]	0.092	-1.15[-3.73-1.43]	0.381	-1.79[-4.87-1.301]	0.255
Age (years)								
50-54	ref				ref			
55-59	-0.07[-2.76-2.61]	0.956	-0.55[-3.04-1.94]	0.666	0.87[-2.274-4.013]	0.586	0.59[-2.46-3.64]	0.702
60-64	-2.79[-5.68-0.10]	0.058	-1.41[-4.14-1.32]	0.310	1.29[-2.038-4.63]	0.445	1.17[-2.12-4.46]	0.484
≥ 65	-5.08[-8.35- -1.80]	**0.002**	-3.23[-6.34- -0.11]	0.430	1.45[-2.35-5.26]	0.453	0.16[-3.59-3.90]	0.935
Marital status								
Married	ref				ref			
Never married	-5.05[-9.07- -1.02]	**0.014**	-2.33[-6.25-1.60]	0.245	0.82[-3.88-5.52]	0.732	-0.14[-4.99-4.70]	0.954
Divorced/Separated	-2.36[-5.12-0.40]	0.093	-0.06[-2.86-2.75]	0.969	-5.29[-8.48- -2.11]	**0.001**	-4.39[-7.80- -0.99]	0.012
Widowed	-5.07[-7.64- -2.50]	**<0.001**	-2.60[-5.41-0.21]	0.070	-0.46[-3.38-2.46]	0.756	-2.69[-6.01-0.64]	0.113
Educational level								
No education	ref				ref			
Primary	3.58[-0.20-7.36]	0.063	2.95[-0.56-6.47]	0.099	-2.05[-6.30-2.20]	0.342	-1.39[-5.60-2.83]	0.518

JHS/MSLC	3.64[0.43-6.84]	**0.026**	3.29[0.32-6.26]	**0.030**	-1.51[-5.13-2.11]	0.411	-1.81[-5.36-1.74]	0.317
Secondary/Technical/Vocational	4.98[0.98-8.97]	**0.015**	3.02[-0.95-6.99]	0.135	-5.27[-9.88- -0.67]	**0.025**	-3.18[-8.00-1.64]	0.194
Tertiary	2.52[-4.47-9.52]	0.478	-1.69[-8.21-4.83]	0.610	1.44[-6.65-9.53]	0.727	1.57[-6.62-9.75]	0.707
Employment status								
Employed	ref				ref			
Not employed	-1.33[-3.77-1.10]	**0.282**	-0.07[-2.51-2.37]	0.955	0.76[-1.99-3.51]	0.587	-0.62[-3.53-2.30]	0.675
Years living with HIV								
< 1	ref							
1-4	-1.72[-6.06-2.63]	0.437	-2.42[-6.51-1.66]	0.243	-2.35[-7.05-2.34]	0.325	-0.44[-5.22-4.34]	0.856
5-9	-2.98[-7.46-1.50]	0.191	-2.40[-6.55-1.76]	0.258	2.41[-2.44-7.25]	0.329	2.93[-1.94-7.80]	0.236
≥ 10	-1.42[-5.89-3.05]	0.531	-0.84[-5.06-3.39]	0.697	1.58[-3.20-6.36]	0.517	095[-3.95-5.86]	0.703
Viral load								
Virally suppressed	ref				ref			
Unsuppressed	2.98[-0.75-6.71]	0.117	2.83[-0.60-6.25]	0.106	-2.79[-6.69-1.11]	0.161	-3.69[-7.75-0.38]	0.075
Results pending	4.11[1.56-6.65]	**0.002**	2.45[-0.31-5.21]	0.081	-6.17[-8.66- -3.67]	**<0.001**	-3.12[-6.20- -0.04]	0.047
Currently live alone								
Yes					ref			
No	5.30[3.20-7.40]	**<0.001**	5.10[2.92-7.28]	**0.000**	-3.32[-5.78- -0.86]	0.008	-2.45[-5.02-0.11]	0.061
Morbidity								
No comorbidity	ref				ref			
Comorbidity	-1.64[-3.93-0.64]	0.158	-2.56[-4.82- -0.31]	0.026	0.96[-1.64-3.56]	0.469	-0.69[-3.4-2.03]	0.618
Alcohol consumption								
Non-consumers	ref				ref			
Ever consumers	-5.11[-7.60- -2.61]	**<0.001**	-3.39[-5.85- -0.92]	**0.007**	2.12[-0.80-5.03]	0.155	-0.06[-3.12-3.00]	0.969
Currently consuming	2.97[-2.50-8.43]	0.286	2.31[-2.78-7.39]	0.373	3.42[-2.98-9.81]	0.294	2.08[-4.08-8.24]	0.507
Smoking								
Non-consumers	ref				ref			
Currently consuming	-5.81[-12.75-1.12]	0.100	-3.65[-510-2.80]	0.266	-1.13[-9.30-7.40]	0.786	-4.82[-12.79-3.15]	0.235
Ever engaged in Physical Exercise								
Yes	ref							
No	-2.44[-4.70- -0.18]	**0.034**	-2.97[-510- -0.84]	**0.006**	1.59[-0.98-4.17]	0.224	0.89[-1.77-3.56]	0.510
Living with HIV patients								

Yes	ref				ref			
No	-1.55[-4.83-1.73]	0.354	1.60 [-1.60-4.81]	0.325	-0.22[-3.86-3.42]	0.905	2.98[-0.721-6.67]	0.114
Location								
Rural	ref				ref			
Urban	2.62[-0.83-6.07]	**0.136**	4.09[0.09-7.28]	**0.012**	0.88[-3.14-4.90]	0.668	0.36-3.56-4.28]	0.856
Other medications to treat HIV								
Yes	ref				ref			
No	-4.93[-9.45- -0.42]	0.032	-5.70[-10.22- -.18]	**0.014**	-4.48[-9.51-0.35]	0.069	-3.33[-8.62-1.96]	0.216

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4.7.4 Factors Associated with Quality of Life for the Two Interventions.

Table 4.14 shows the factors associated with QoL according to comparisons of the two interventions. For the adjusted regression results, age and current living status were significantly associated with QoL at the baseline, while at the end of the study, age, education level and the use of other medications to treat HIV were significantly associated with QoL. This finding implies that only age was significant at both baseline and at the end of the study.

Respondents who were 65 years and above had a decrease of 5.12 [Adjusted Coeff: -5.12; 95% CI=-8.57- -1.66] at the baseline and a decrease of 3.249 units at the end line in QoL [Adjusted Coeff: -3.25; 95% CI=-85.75- -0.75] than those who were 50-54 years. At the baseline, respondents who were not currently living alone had a unit increase of 6.64 [Adjusted Coeff: 6.64; 95% CI=4.27–9.00] in QoL compared to those who were living alone.

At the end of the study, EPLHIV who received the SVM had a unit increase of 4.62 in QoL [Adjusted Coeff: 4.62; 95% CI=2.82 – 6.41] than those who received the DSD. Compared with those with no education, respondents with primary education had an increase of 2.70 units [Adjusted Coeff: 2.70; 95% CI=0.12–5.28] in QoL. In addition, those who were not taking any medication other than ARVs to treat HIV had a negative [Adjusted Coeff: -4.04; 95% CI=-7.17 – -0.92] QoL compared with those who were taking other medications to treat HIV.

Table 4.14: Multiple Linear Regression Showing Factors Predicting Quality of Life for the two interventions.

	Baseline				Endline			
Quality of Life	Unadjusted Coeff [95% CI]	P>t	Adjusted Coeff [95%CI]	P>t	Unadjusted Coeff [95% CI]	P>t	Adjusted Coeff [95%CI]	P>t
Facility								
DSD Intervention	ref				ref			
SVM Intervention	0.30[-1.94-2.54]	0.079	-1.57[-4.09-0.95]	0.222	4.29[2.85-5.74]	**<0.001**	4.62[2.82-6.41]	**<0.001**
Depression								
Not depressed	ref				ref			
Depressed	-0.40[-2.72-1.92]	0.735	-1.18[-3.40-1.04]	0.295	-0.82[-2.97-1.33]	0.455	-0.02[-2.19-2.14]	0.984
Adherence								
Non adherence	ref				ref			
Adherence	2.34[0.11-4.57]	0.039	1.99[-0.07-4.04]	0.058	0.93[-1.18-3.04]	0.388	1.13[-1.08-3.34]	0.314
Disclosure								
Yes	ref				ref			
No	-3.50[-6.36- -0.65]	0.016	-2.24[-5.25-0.77]	0.144	-0.87[-3.08-1.35]	0.443	-1.05[-3.28-1.17]	0.352
Sex								
Male	ref				ref			
Female	-1.41[-3.87-1.06]	0.263	0.78[-2.11-3.67]	0.595	0.01[-1.67-1.69]	0.990	-0.75[-2.80-1.30]	0.473
Age (years)								
50-54	ref				ref			
55-59	-0.72[-3.43-1.99]	0.600	-1.44[-4.07-1.19]	0.282	-0.05[-1.97-1.86]	0.956	-0.88 [-2.76-0.10]	0.356
60-64	-5.06[-8.00- -4.46]	**<0.001**	-2.63[-5.62-0.37]	0.085	-0.56[-2.65-1.54]	0.601	-1.18[-3.33-0.98]	0.283
≥ 65	-7.72[-10.99- -4.46]	**<0.001**	-5.12[-8.57- -1.66]	**0.004**	-2.28[-4.62-0.07]	0.057	-3.25[-5.75 -0.745]	**0.011**
Marital status								
Married	ref				ref			
Never married	-3.07[-7.04-0.90]	0.129	-1.66[-5.69-2.38]	0.420	-0.02[-2.80-2.76]	0.988	-0.85[-3.71-2.01]	0.557
Divorced/Separated	-3.45[-6.56- -0.34]	0.030	-1.78[-5.05-1.49]	0.284	-0.37[-2.54-1.81]	0.741	-0.52[-2.93-1.88]	0.669
Widowed	-4.99[-7.61- -2.37]	0.000	-1.96[-5.01-1.10]	0.209	0.99[-0.82-2.82]	0.281	1.67[-0.50-3.84]	0.131
Educational level								
No education	ref				ref			
Primary	4.34[0.55-8.14]	**0.025**	1.24[-2.33-4.81]	0.495	3.82[1.23-6.41]	**0.004**	2.70 [0.12-5.28]	**0.040**
JHS/MSLC	3.65[0.31-6.99]	**0.032**	1.70[-1.43-4.83]	0.286	1.70[-0.59-3.99]	0.145	1.62 [-0.65-3.89]	0.162

Secondary/Technical/Vocational	6.68[2.45-10.91]	**0.002**	4.08[-0.05- -8.21]	0.053	3.34[0.47-6.21]	**0.023**	2.25[-0.75-5.26]	0.141
Tertiary	4.51[-2.25-11.26]	0.190	3.35 [-3.05-9.75]	0.304	-2.25[-6.64-2.13]	0.313	-3.34[-7.76-1.08]	0.138
Employment status								
Employed	ref				ref			
Not employed	-3.17[-5.70- -0.65]	0.014	-2.28[-4.88-0.32]	0.086	-1.59[-3.32-0.14]	0.071	-0.19[-2.0-1.65]	0.839
Years living with HIV								
< 1	ref				ref			
1-4	-0.77[-5.79-4.24]	0.762	0.26[-4.35-4.87]	0.912	-0.60[-3.96-2.76]	0.726	-0.06[-3.38-3.26]	0.972
5-9	-1.84[-6.68-2.99]	0.454	-0.10[-4.77-4.57]	0.966	1.21[-2.02-4.45]	0.461	1.36[-1.97-4.69]	0.421
≥ 10	-1.15[-5.83-3.53]	0.629	-0.07[-4.68-4.54]	0.976	2.31[-0.82-5.43]	0.148	2.46[-0.75-5.67]	0.133
Viral load								
Virally suppressed	ref				ref			
Unsuppressed	0.86[-2.35-4.06]	0.599	0.35[-2.61-3.30]	0.817	-1.49[-3.69-0.70]	0.181	-1.956[-4.13-0.22]	0.078
Results pending	2.29[-0.16-4.75]	0.067	0.19[-2.19-2.57]	0.875	-0.34[-2.19-1.50]	0.714	0.11[-1.72-1.94]	0.907
Currently, live alone								
Yes	ref				ref			
No	7.62[5.45-9.79]	**<0.001**	6.64[4.47-9.00]	**<0.001**	1.19[-0.41-2.79]	0.143	-0.89[-2.61-0.83]	0.308
Morbidity								
No comorbidity	ref				ref			
Comorbidity	-1.83[-4.10-0.44]	0.114	-0.76[-3.05-1.52]	0.512	-0.48[-2.04-1.08]	0.544	-0.82[-2.43-0.79]	0.319
Alcohol consumption								
Non-consumers	ref				ref			
Ever consumers	-3.25[-5.56- -0.94]	0.006	-1.71[-4.04-0.62]	0.149	0.59[-1.01-2.19]	0.470	-0.63[-2.32-1.06]	0.463
Currently consuming	1.68[-2.41-5.76]	0.420	1.90[-2.23-6.02]	0.366	0.17[-2.69-3.03]	0.905	-1.85[-4.79-1.09]	0.216
Smoking								
Non-consumers	ref				ref			
Currently consuming	-3.12[-7.42-1.18]	0.154	-1.47[-5.58-2.64]	0.482	0.72[-2.20-3.64]	0.628	0.02[-2.91-2.95]	0.989
Ever engaged in Physical Exercise.								
Yes	ref				ref			
No	-4.22[-6.53- -1.90]	0.000	-2.27[-4.52- -0.01]	0.048	-0.49[-2.10-1.13]	0.554	0.78[-0.88-2.45]	0.354
Living with HIV patients								
Yes	ref				ref			

No	-3.49[-6.29- -0.69]	0.015	-0.62[-3.47-2.24]	0.671	-0.80[-2.72-1.11]	0.411	-0.82[-2.86-1.22]	0.428
Location								
Rural	ref				ref			
Urban	2.14[-2.36-6.64]	0.349	3.25[-0.92-7.41]	0.126	2.77[-0.34-5.88]	0.081	1.27[-1.77-4.30]	0.413
Other medications to treat HIV								
Yes	ref				ref			
No	-4.25[-8.63-0.12]	0.057	-2.137[-6.45-2.17]	0.330	-1.81[-4.79-1.16]	0.232	-4.04[-7.17- -0.92]	**0.011**

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4.8 Objective 4: Effect of a Psychosocial Support Intervention on the Quality of Life Among EPLHIV (≥50 years) on ARVs

This section presents the difference in differences analysis to determine the effect of the intervention on the QoL. It is presented in three sections. The first section describes the results of independent t-test regression comprising the study for the three arms, followed by a description of the influence of the intervention on the quality of EPLHIV in the three facilities using DID regression. A p-value of 0.05 or less was considered significant.

4.8.1 Paired Sample t-Test DID Result For the Three Arms of the Study

The paired samples t-test result in Table 4.15 shows that there was a statistically significant difference in the baseline and endline QoL for SVM intervention [MDID =10.07; 95%CI= [8.3-11.8]; p<0.001] and DSD intervention [MDID =5.75; 95%CI= [3.8-7.7]; p<0.001]. This result suggests that the two interventions can improve the QoL among EPLHIV.

Table 4.15: Paired sample t-test DID results for the three arms of the study.

Study Arms	Baseline Mean (95% CI)	Endline Mean (95% CI)	DID Mean (95% CI)	P value
Control	90.1 [88.6-91.5]	87.7 [85.2-90.1]	-2.2 [-4.9-0.1]	0.0573
SVM Intervention	88.7 [87.3-90.3]	98.9 [97.7-100.0]	10.2 [8.3-11.8]	**<0.001**
DSD Intervention	88.80 87.1-90.5]	94.56 [93.7-95.4]	5.76 [3.8-7.7]	**<0.001**

4.8.2 Difference in Difference Regression for mhealth Intervention

Table 4.16 presents the results of the DID analysis to determine the effect of the mhealth intervention on the QoL between the baseline and end line for respondents in the control arm and those who received the SVM. The regression results also show a statistically significant relationship between the impact of the intervention on QoL between the two arms. The mHealth intervention has a positive impact on the QoL of ELPHIV patients. The coefficient of 12.478 indicates that receiving psychosocial support through SVM is associated with an increase in QoL by approximately 12.48 units.

Table 4.16: Difference in Difference Regression for mhealth Intervention

Quality of Life	Coefficient	t	P value	95% Confidence interval
ATET SVM Intervention v Control	12.978	5.75	0.000	8.204 – 16.753

4.8.3 Difference in Difference Regression for DSD Intervention

According to Table 4.17, the results of the DID analysis to determine the effect of the DSD intervention on the QoL among EPLHIV in the control facility and those who received the DSD show a positive impact of the intervention. The results suggest that receiving the DSD intervention is associated with an increase in QoL by 7.952 units.

Table 4.17: Difference in Difference Analysis for DSD Intervention

Quality of Life	Coefficient	t	P value	95% Confidence interval
ATET DSD Intervention v Control	7.952	3.64	0.000	3.747 – 12.577

4.9 Mode of Delivery of the Interventions Deployed for the Study.

This section evaluates the mode of delivery for the two interventions. Each intervention is presented in sub section below.

4.9.1. Evaluation of mhealth Intervention by Participants

This section describes the evaluation of the participants' mode of intervention. Table 4.18 shows the frequency of the messages sent to the participants during the intervention. The results show that 90.5% of participants received the messages at least three times a week. In addition, a higher proportion (80.4%) of the EPLHIV indicated that the time of the messages was convenient for them. About 55.4% of respondents missed any of the voice calls. Out of those who missed the voice SMS, 76.8% had a returned call.

Table 4.18: Percentage Distribution of Frequency of Voice Messages

Frequency of Messages	N (%)
How often were the messages coming in	
Twice or less	14 (9.5)
Three times	134 (90.5)
Were the messages constant and delivered at the same time of the day?	
Yes	118 (79.7)
No	30 (20.3)
Was the time that the voice messages were sent convenient for you?	
Yes	119 (80.4)
No	28 (19.6)
During the period of the voice SMS did you miss any of the calls?	
Yes	82 (55.4)
No	66 (44.6)
Did you get a return call to ensure you got the message for that day?	
Yes	63 (76.8)
No	19 (23.1)
Total	**149**

From Table 4.19, the intervention benefited or impacted 93% of the participants. The areas that the intervention benefited them include seeing HIV more as a chronic sickness than a death sentence (94.6%), followed by reaching out more to my peers and family members for support (66.9%), improvement in social connections (62.2%), more concern about my health now (51.4%) and the least proportion in improvement in physical activity (19.6%).

In addition, about 81.1% sought help or clarification regarding their illness from a healthcare provider because of the intervention. The component of the intervention that was beneficial to the respondents was mental/psychological health (77.0%), followed by adherence and health-seeking behaviour (68.9%), social health (67.6%), disclosure (45.3%) and the least proportion indicated physical environment (32.4%). The majority (94.6%) of the respondents indicated that the SVM intervention should be continued.

Table 4.19: Percentage Distribution of the Benefits of the Intervention

Benefits of the intervention	**N (%)**
Has the intervention impacted or benefited you?	
Yes	139 (93.9)
No	9 (6.1)
****How has the intervention impacted or benefited you?**	
More concern about my health now	76 (51.4)
Improvement in lifestyles	54 (36.5)
Improvement in health seeking behaviours	71 (48.0)
Improvement in social connections	92 (62.2)
Improvement in physical activity	29 (19.6)
Reaching out more to my peers and family members for support	99 (66.9)
Adhering to my medications	78 (52.7)
Disclosing my HIV status is more beneficial to me than I taught	51 (34.5)
Seeing HIV more as a chronic sickness than a death sentence	140 (94.6)
Did you seek help or clarification regarding your illness from your healthcare provider as a result of the intervention?	
Yes	127 (85.8)
No	21 (14.2)
****Which component (s) of the educational messages was beneficial to you?**	
Mental / Psychological health	114 (77.0)
Physical Health	53 (35.8)
Physical Environment	48 (32.4)
Social Health	100 (67.6)
Disclosure	67 (45.3)
Adherence and health seeking behaviour	102 (68.9)
Nutrition and lifestyle	55 (37.2)
Do you think the intervention should be continued?	
Yes	140 (94.6)
No	8 (5.6)
Total	148

Source: Field work, 2023   ***Multiple responses*

4.9.2 Evaluation of DSD Intervention by Participants

Table 4.20 shows that about 55% of EPLHIV involved in the intervention had at least three times interaction with the health care providers within the period of the study. From the interactions they had with the healthcare providers, 93% of respondents indicated that it was extremely helpful. In addition, more than half of the respondents (53.7%) rated the counseling sessions with the healthcare providers as very good while 36.9% rated it as excellent. Regarding the quality of services provided by health care workers, 69.8% of the respondents rated the services as excellent while 18.8% rated it as very good.

Table 4.20: Percentage Distribution of Delivery of the Intervention

Delivery of the DSD Intervention	N (%)
How many times have you had these interactions within the period with your health care provider?	
Three times	82 (55.0)
Four and more times	67 (45.0)
How helpful was your interactions with your health care providers within the intervention period?	
Slightly helpful	10 (6.7)
Extremely helpful	139 (93.3)
How would you rate the delivery of the counselling sessions with your health care provider?	
Good	14 (9.4)
Very good	80 (53.7)
Excellent	55 (36.9)
How would you rate the quality of services provided by the health care workers after the deployment of this intervention?	
Good	17 (11.4)
Very good	28 (18.8)
Excellent	104 (69.8)
Total	149 (100)

The benefits of the intervention are shown in Table 4.21. The results show that the components of the counselling session that were beneficial to the respondents were physical health (80.5%), followed by nutrition and lifestyle (77.9%), adherence and health-seeking behaviour (69.8%), and the least proportion was disclosure (13.4%). Most of the EPLHIV indicated adherence to their medications (68.6%) as the main benefit of the intervention, followed by shorter waiting time at the health facility

(72.5%), more concern about their health (55.0%), and the least proportion was additional services being rendered at the same place (17.4%).

Table 4.21: Percentage Distribution of the Benefits of DSD Intervention

Benefits of the Intervention	Frequency	Percentage
****Which components of the counselling was most beneficial to you?**		
Mental / Psychological health	98	65.8
Physical Health	120	80.5
Physical Environment	54	36.2
Social Health	72	48.3
Disclosure	20	13.4
Adherence and health seeking behaviour.	104	69.8
Nutrition and lifestyle	116	77.9
****What are some of the benefits from interactions within the period with your health care provider?**		
Shorter waiting time at the facility	108	72.5
Comprehensive services targeting our needs rendered.	52	34.9
Additional Services being rendered at the same place.	26	17.4
More concern about my health now	82	55.0
Improvement in lifestyles	55	36.9
Improvement in health seeking behaviours.	72	48.3
Improvement in social connections	67	45.0
Improvement in physical activity	52	34.9
Reaching out more to my peers for support	52	34.9
Adhering to my medications	102	68.5
Seeing HIV more as a chronic sickness than a death sentence	46	30.9

***Multiple responses*

According to Table 4.22, about 92% of the EPLHIV receiving the intervention interacted with their peers. With regards to how convenient the peer interaction was, 33.6% indicated that the interaction with their peers was not convenient. For satisfaction of the meetings, more than half (61.7%) of the respondents were very satisfied. In addition, 94% had their needs met following the interactions with the health service providers and 95.3% believed the intervention should continue.

Table 4.22: Percentage Distribution of an Interaction of EPLHIV with Peers

Interaction of EPLHIV with Peers	**N (%)**
Did you engage with your peers at the facility during health visits to discuss your personal issues and share ideas regarding your health condition?	
Yes	137 (91.9)
No	12 (8.1)
How convenient was the peer group meetings?	
Very convenient	47 (31.5)
Somewhat convenient	50 (33.6)
Not convenient	52 (34.9)
How satisfied were you with the group discussion?	
Very satisfied	92 (61.7)
Somewhat satisfied	23 (15.5)
Not satisfied	34 (22.8)
Do feel your needs as EPLHIV were met following your interactions with your health service providers as well as your peers?	
Yes	140 (94.0)
No	9 (6.0)
Do you think the intervention should be continued?	
Yes	142 (95.3)
No	7 (4.7)
Total	149 (100.0)

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This study employed a mixed method approach to assess the effect of psychosocial support intervention on QoL among EPLHIV and are on antiretroviral therapy in the Greater Accra Region of Ghana.

Theory triangulation was utilized in this study because no single theory could comprehensively address the research questions. Therefore, the study was guided by two models: the Socio-Ecological Theory and the PRECEDE-PROCEED model, which were employed to inform the study's constructs and the conceptual framework.

The findings of the study showed that factors such as task sharing, psychosocial counselling, and the use of support groups were facilitators in HIV care for EPLHIV on ARVs, while lack of comprehensive psychosocial assessment, lack of tailored care, stigma and discrimination, lack of HIV education, lack of mental health support and capacity building for health care were barriers in HIV care for EPLHIV on ARVs. In addition, findings from the qualitative component of the study indicate that EPLHIV may experience lower QoL due to other health conditions associated with both HIV and ageing and that key domains of QoL such as social, psychological, physical, and environmental factors all play an important role in shaping the overall well-being of EPLHIV.

The findings of the study showed an increase in the mean QoL from the pre- to post-intervention periods with overall QoL increasing from 89.1 at the pre-intervention stage to 94.1 at the post-intervention stage. An increase in QoL measure was observed in both the SVM and DSD interventions. Factors influencing the QoL among EPLHIV enrolled for both the DSD and mhealth interventions after implementation include marital status, living arrangement, viral load and taking other medications in addition to ARVs to treat HIV.

This section provides a detailed discussion and analysis of the study's findings, structured around the stated research objectives to ensure a systematic understanding

5.2 Psychosocial Barriers and Facilitators in HIV Care for EPLHIV on ARVs

This section discusses the psychosocial barriers and facilitators for EPLHIV in accessing ARV services in health facilities with the barriers discussed first, followed by the facilitators.

5.2.1 Barriers in HIV Care for EPLHIV on ARVS.

The study's findings revealed that barriers to HIV care for EPLHIV on ARVs include the absence of comprehensive psychosocial assessment, limited tailored care, stigma and discrimination, inadequate HIV education, insufficient mental health support, and a lack of capacity building for healthcare providers.

The stigma associated with accessing HIV care and myths surrounding antiretroviral treatment deter persons living with HIV from accepting linkage to HIV care. The findings of this study are similar to other studies (Jaafari et al., 2022; Nyato et al., 2019; Tso et al., 2016). Stigma can cause significant delays in seeking treatment at a health facility. The delay is prolonged if the person has previously experienced stigmatization at that facility. At the individual level, derogatory comments and discrimination by friends and family members could deter PLHIV from assessing the needed care. To improve services of EPLHIV, there is a need to address the attitudes of people by educating and creating awareness of the HIV condition. This could be done through support groups or mobile outreach services to help reduce the stigma associated with accessing HIV care at various health facilities.

Furthermore, EPLHIV emphasized the lack of tailored care for them at the health facilities as they receive services with PLHIV without specific provisions to address their unique needs. They sometimes have to queue with younger people, and this sometimes increases their waiting time and places more burden on them due to their general health. This finding is very critical considering their age, which often predisposes them to comorbidity, thereby necessitating the need for tailored services.

These findings are similar to that of other studies that have reported on the need for tailored services for the aged HIV patients(Kiplagat et al., 2019).While EPLHIV conditions require a continuum of care, the provision of non-tailored services could limit the frequency of them accessing ARVs, thereby limiting their well-being. Providing differentiated services for the elderly, according to Chayama et al., (2020) could increase the understanding of how older adults manage their conditions alongside comorbidities, especially through geriatric models of HIV care and thereby understand the barriers to accessing care for improvement (Chayama et al., 2020).

Mental health support for EPLHIV is also essential due to their age and the consequences of HIV. In this study, EPLHIV reported on the need to get mental health support to improve their general well-being. They mentioned some of the mental health conditions, such as depression and anxiety and this also aligns with findings from other studies (Mwangala et al., 2021). Provision of such support to them is therefore very essential to improve their well-being. In Ghana, mental health services run parallel to ARV services, creating challenges for EPLHIV in accessing care due to disclosure concerns. Though the EPLHIV are counselled on mental health, the findings of this study suggest that the counselling is not enough and hence, there should be more essential services on mental health to help improve the condition of the aged population.

The findings of the study relates to the socio-ecological theory by emphasizing on the interplay between personal, organizational, and community factors in the HIV care continuum. This theory postulates that an individual's behaviour and well-being are influenced by multiple levels of influence, including personal, organizational, and community factors. Personal factors include individual characteristics and behaviours, such as task sharing and personal coping strategies. For instance, engaging in task sharing can enhance the provision of services to improve the utilization of ARVs among EPLHIV and organizational factors involve the structures and processes within organizations that support individuals. Psychosocial counselling provided by organizations can offer critical emotional support and mental health resources, enhancing access to ARVs. Community factors encompass the broader social and environmental context in which individuals live. Support groups within the community can provide a sense of belonging and shared experiences, which are crucial for emotional and psychological well-being. The barriers of accessing ARVs that relate to stigma and discrimination, which are interpersonal factors and the lack of mental health support and capacity building for health care workers which are often organizational factors all contribute to hinder the utilization of ARVs by aged HIV patients.

The socio-ecological theory advocates for a holistic approach in addressing access to ARVs and highlights that interventions should not only focus on the individual but also on the organizational and community contexts that influence the well-being of care recepients. This comprehensive perspective ensures that all relevant factors are addressed, leading to more effective and sustainable improvements in access to ARVs in health facilities, consequently improving QoL.

5.2.2 Facilitators in HIV Care for EPLHIV on ARVS.

The study's findings showed that psychosocial facilitators in HIV care for EPLHIV include task sharing, psychosocial counselling, and the use of support groups and participants expressed that when these factors are taken into consideration, their utilization of ARVs at health facilities will be enhanced.

Task sharing was identified as a key facilitator for the utilization of ARVs. Both key informants and EPLHIV indicated its relevance. The findings of this study are consistent with other studies highlighting task-sharing as an effective strategy for scaling up HIV care (Ivers et al., 2011; Tso et al., 2016)In Ghana, task sharing has been adopted as an integral part of health care delivery and its applied in ART clinics to address shortage of staff in some (Okyere et al., 2017).When implemented effectively task sharing can help mitigate staff shortages and ensure the provision of essential services to EPLHIV, especially in the remote and rural areas. However, other studies have reported some challenges which need to be taken into consideration when using the task sharing method because some healthcare providers lack the specialization and essential qualities needed to provide optimal care. For example, Uebel et al. (2013) reported on challenges of integrating non-HIV specialized nurses in task sharing environments in South Africa and indicated that HIV patients expressed concerns about stigma from these non-specialized health workers and always preferred to be attended to by specialized HIV nurses on task sharing. This implies that task sharing would be more effective if health workers were given at least some basic training on caring for PLHIV.

Consistent with previous studies (Anaba et al., 2022; Koirala et al., 2017), participants revealed that psychological counselling is a key factor in caring for EPLHIV and stakeholders emphasized that PLHIV should always be counselled on the myths associated with the conditions, what they can do to avoid infecting people with the virus, and how they can live peacefully with their family and friends.

The EPLHIV emphasized on the need to enhance psychological counselling as it improves their QoL. Effective provision of psychological and adherence counselling is very essential as they help to alleviate PLHIV from mental and other stressors. Though the provision of psychosocial counselling is lacking in many national policy guidelines in Africa, its impact cannot be underestimated (Tenkorang et al., 2019). In Ghana, psychological counselling is part of the integrated service for PLHIV. The findings of this study reflect the need to strengthen the counselling services to help to improve the conditions of EPLHIV. These services can be effective in helping PLHIV reduce stress, anxiety, and isolation, promote a healthy lifestyle and thereby motivate them to frequent the health facility for care.

The use of support groups was identified as a facilitator in HIV care for EPLHIV. Due to the vulnerability of PLHIV, especially the elderly, they often need help in taking care of themselves and sharing ideas and experiences to encourage others. The findings of this study corroborate other studies that identified the use of support groups or social support systems in helping to improve HIV care for EPLHIV (Ameyaw et al., 2024; Ogunbajo et al., 2018; Okonji et al., 2020a; Tavares et al., 2019; Zhou et al., 2017).For instance, in Ghana, Ameyaw (2024) reported that social support groups are essential as they provide reminders to PLHIV and assist them in improving their health. The plausible reason in this study for the use of the support groups could be the impact and the potential benefits it provides to the EPLHIV.

Most of the EPLHIV faced challenges that required some form of needed support through interactions and care to provide their basic needs and enable them to access their ARVs service. Also, Ogunbajo et al (2018) indicated that social support serves as one keyway of promoting engagement and encouragement in HIV care as it improves adherence, interaction, bonding and collectiveness. Such collectiveness, according to Tso et al (2016) from PLHIV and positive interactions with care providers facilitate access to health care and services by EPLHIV. As PLHIV share their ideas in a support group, they become more engaged in their care and feel a sense of belongingness(Tavares et al., 2019).

Due to the benefits that social support groups provide, Ghana has adopted the use of this system as part of the continuum of care for PLHIV (Ministry of Health, 2010). In a systematic review of social support for PLHIV, Bateganya et al., (2015) reported that about 90% of the articles they reviewed provided positive results on the impact of support group interventions on morbidity, mortality, retention, and QoL(Bateganya et al., 2015a).

5.3 Quality of Life Among Elderly Persons on ARVs In the Greater Accra Region of Ghana.

Respondents from the qualitative component of the study perceived EPLHIV to have a low QoL due to other health conditions associated with HIV and ageing. However, improving these populations' QoL is paramount due to the burden of diseases associated with ageing. This finding contradicts studies that have reported a good QoL among EPLHIV in the Netherlands (Romijnders et al., 2022) but is similar to studies that have reported that the general well-being of EPLHIV is perceived to be low (Tesemma et al., 2019).The overall perceived low QoL might be attributed to several factors, including physical pain, depression, anxiety, long waiting hours at health facilities, and the non-disclosure of HIV-positive status, among others.

In the context of physical health, EPLHIV reported experiencing pain, reduced physical strength, and the need for constant medication to manage blood pressure. Stakeholders also echoed these concerns, emphasizing that the physical condition of EPLHIV is compromised due to ageing, the dual burden of HIV and other health conditions, and ongoing medication use. These findings align with previous studies (Rosenfeld et al., 2021; Vrontaras et al., 2022) that have highlighted the poor physical well-being of EPLHIV. Given that most participants in our study fell within the 50-59 age range, which is associated with non-communicable diseases like diabetes and hypertension, it is unsurprising that they face these challenges. HIV itself can also contribute to other health issues, further exacerbating their overall physical health.

On the physical environment, challenges faced by EPLHIV are often linked to the cost of transportation and the long distances to the health facilities. These difficulties are compounded by the extended hours spent at Health Centers and the limited number of hospitals that offer services for PLHIV. As a results many patients must travel for long distances to access services. For instance in Ghana, ART services are available in only 715 facilities out of the over 8,000 health facilities nationwide. This implies that significant travel , financial strain and time lost in accessing services can negatively undermine QoL. HIV services are primarily provided at polyclinics, district hospitals, regional hospitals, and teaching/tertiary hospitals. For example, services such as PMTCT, HIV testing and counselling services, ART patient counselling, and other critical services are available at tertiary and regional hospitals. Meanwhile, Early Infant Diagnosis (EID) sample collection and testing are occasionally conducted at health centres (Ayisi Addo et al., 2018).

However, this distribution of services poses challenges for individuals residing in areas where only Community Health and Planning Services (CHPS compounds) and health centres are available. Such individuals must travel to locations with district hospitals or better-equipped facilities to access comprehensive HIV care services. Knight et al. (2018) also reported similar difficulties in South Africa, where PLHIV face obstacles in accessing healthcare due to geographical distance, resulting in reduced contact hours between PLHIV and healthcare workers(Knight et al., 2018). In addition, the long waiting period could be attributed to the lack of targeted services for the aged population. Almost all ART services in Ghana do not provide targeted services for the aged(Adjetey & Obiri-yeboah, 2019).

This, therefore, causes delays as they queue with all persons with HIV, thereby leading to long hours spent at the health facility for medical care. Their age sometimes makes it very difficult for them to wait for long.

With regards to the social domain, EPLHIV face the dilemma of disclosing their status to their family members and friends due to stigma and discrimination. Their social life is impacted by HIV-related stigma, which can lead to isolation and fear. Hence stigma acts as a barrier not only relationships with friends and family but also to health care access (Alford et al., 2021; Vrontaras et al., 2022). Though the disclosure of HIV status would help elderly persons to get the needed social support from family and friends, most of them fear that the outcomes of the disclosure experiences could potentially negatively impact the acceptance of their HIV status which will then in turn limit social support, leading to rejection and consequently loneliness (Alford et al., 2021). Due to these consequences, most people, therefore, prefer dying with the condition rather than disclosing their status to family and friends.

Psychological health contributed to the general well-being of the EPLHIV. Participants indicated loneliness, depression and anxiety as some of the emotional or psychological stress they go through. The finding is consistent with other studies. For instance, Wang et al.., (2023) reported loneliness as a major factor for depression among elderly people living with HIV(Wang et al., 2023). Similarly, Alford et al., (2021) explained that depression and anxiety among PLHIV is major challenges which could be attributed to the overall QoL. In addition, the findings of this study are similar to other systematic reviews. In sub-Saharan Africa, Mwangala et al., (2023) reported of high depression and cognitive impairment, which affects EPLHIV psychological health. The probable reason for the psychological health among the elderly persons in this study could be attributed to the trajectory of the HIV disease, the dilemma of disclosure, self-denial about their condition, and the side effects of HIV medications. All these factors collectively influence the psychological health of EPLHIV and ultimately affect their QoL.

The domains of QoL encompass personal, interpersonal, community, and organizational factors within the socio-ecological framework, each reflecting their relevance to overall well-being. Factors such as physical pain, psychological disorders, disclosure, depression, and anxiety influence different dimensions of QoL and are therefore critical considerations in efforts to improve the well-being of individuals.

5.4 Feasibility and Acceptance of Using Mobile Technology in Intervention Delivery

The findings of this study show that the use of mobile technology among the aged was feasible; however, challenges may arise in delivering psychosocial interventions for EPLHIV. These challenges are linked to barriers associated with mobile phone use, including physical limitations such as vision impairment, low literacy levels, language barriers, concerns about confidentiality, and the unavailability of mobile networks.

These findings are consistent with those of Similä et al. (2018) and Wildenbos et al. (2018), who also reported challenges with the feasibility and acceptance of mobile technology among the aged population living with HIV. These studies highlighted that older adults' attitudes, limited technological skills, and health-related barriers deterred them from adopting mobile technology. Wildenbos et al. (2018) further argued that the complexity of medical conditions, including diminished eyesight and physical limitations, could make it difficult for many older adults to accept mobile technology.

However, the findings of this study contrast with those of Pai et al. (2020) and Endebu et al. (2019), who reported that mobile technology interventions were both feasible and acceptable among the aged population. In those studies, participants were generally comfortable with mobile technology and accepted its use for interventions (Endebu et al., 2019; Pai & Alathur, 2019). Among adolescents, Crowley et al. (2023) reported weak evidence that technology-enabled health interventions for EPLHIV in LMIC improved treatment outcomes."

The results of the study show that participants supported the use of support groups for delivering the psychosocial intervention. Several studies have demonstrated the effectiveness of support group systems in intervention programmes (Bateganya et al., 2015; Mazambara et al., 2022; Tavares et al., 2019). Bateganya et al. (2015) reported that small groups can positively impact morbidity, mortality, and QoL among PLHIV. They also noted that support groups improve disclosure of HIV status and contribute to QoL, though participation may sometimes interfere with individual treatment care. Tavares et al. (2019) emphasized that support groups act as a protective factor in old age, where shared experiences foster resilience as a coping mechanism. Similarly, Joo et al. (2022) found that even individuals not enrolled in support groups were encouraged to seek care, highlighting their role in improving QoL. In addition, support groups can provide platforms for identifying research priorities (Mazambara et al., 2022).

5.5 Quality of Life of EPLHIV

The findings of the study show an increase in the mean QoL from the pre- to post-intervention. The overall QoL increased from 89.1 at the pre-intervention to 94.1 at the post-intervention. An increase was observed in the SVM and DSD interventions. For the SVM intervention, the mean QoL increased from 88.9 to 98.8, while the DSD intervention QoL mean increased from 88.7 to 94.6. This implies that there was a mean difference of 5 for the overall QoL, a 9.9 mean difference of QoL for SVM and a 5.9 mean difference of QoL for DSD. In addition, no significant relationship was observed between the facilities and QoL at the pre-intervention stage, but a significant relationship was observed between the facilities and QoL at the post-intervention.

The findings of this study are consistent with other research that has employed DSD models and mobile health (mHealth), particularly short message and voice message (SVM) interventions, to assess the QoL of EPLHIV (Li et al., 2022; Panayi et al., 2024; Zeng et al., 2022). For example, Zeng et al. (2022) implemented a mobile-based psychosocial support program in China by sending weekly messages to participants, and their results demonstrated a notable improvement in QoL following the intervention. Similarly, Li et al. (2022) reported positive outcomes in South China, where a nine-month mHealth intervention led to significant improvements in the QoL of PLHIV. In another study, Panayi et al. (2024) also observed enhancements in QoL after applying an mHealth intervention, reinforcing the potential of mobile-based platforms to support psychosocial and clinical outcomes.

Taken together, these studies highlight a growing body of evidence that aligns with the present findings, suggesting that DSD models supported by mHealth interventions can be effective strategies for improving the QoL of EPLHIV. The plausible reason for the increase in mean QoL after the SVM intervention could be attributed to the mode of implementation and the content of the messages for EPLHIV. Voice call messages were sent to EPLHIV three times weekly, with follow-ups for those who missed the calls. The availability of mobile phones for all participants ensured timely receipt of messages. This process helped ensure participants received the messages and allowed for follow-ups to check on their well-being. During clinical visits, provisions were made for participants to discuss their health with healthcare workers. All these processes likely contributed to the improvement in their QoL. Furthermore, evidence has shown that the use of mobile phones to aid in information sharing improves health outcomes, especially in ARV adherence for EPLHIV in Ethiopia (Tizie et al., 2023) and QoL in another study in South Africa (Mukund Bahadur & Murrayb, 2010).

Another reason for the increase in QoL could be the idea of respondents sharing delivered intervention short voice messages or discussing the contents of the messages with others, leading to them being encouraged to adopt healthier living practices which in turn, positively influenced their QoL. Beyond the act of message sharing, the actual content of the intervention might have played a significant role in shaping these outcomes since the SVM had specific contextual messages aimed at behaviour changes that could ultimately impact the outcome of interest. By providing reminders about treatment adherence, promoting positive health behaviors, offering psychosocial support, and reinforcing stigma-reduction messages, the intervention likely empowered participants with both knowledge and motivation suggesting that it was not only the medium of delivery but also the relevance and applicability of the content itself that contributed to the observed improvements in QoL.

In line with other studies (Webb, 2010; Erlen et al., 2001), the findings of this study also showed that DSD interventions helped improve the QoL for PLHIV. The findings of this study are in agreement with studies by Erlen et al. (2001) that used a DSD approach, relying on a life review intervention facilitated by two health workers to examine its effect on the QoL in the United States and reported an increase in QoL for the treatment group and a study by Webel (2010) that also reported an increase in the QoL of the intervention group using a peer-based DSD symptom management intervention. We can therefore deduce that the increase in QoL in this study could be due to the DSD the intervention implemented.

The DSD intervention in this study ensured active participation by all EPLHIV. Those with challenges were attended to and counselled through one-on-one sessions. Additionally, a specific day was set aside as a clinical day for PLHIV, during which all their issues were addressed. These factors very likely contributed to the effectiveness of the intervention and in improving the QoL for EPLHIV using this intervention.

The findings of this study therefore underscore the relevance of using such interventions to enhance the QoL among elderly people. Significantly, these interventions directly address some of the key challenges to healthcare access identified earlier, such as long travel distances to health facilities, transportation costs, and extended waiting times. By delivering psychosocial support and health information through mobile platforms, the intervention reduces the need for frequent facility visits, thereby saving time and financial resources while ensuring care continuity. In this way, the use of mHealth within a DSD model not only improves accessibility but also helps to mitigate barriers that traditionally undermine treatment adherence and overall well-being. This is also the first study in Ghana using mHealth and DSD to assess the QoL among EPLHIV.

5.5.1 Factors Associated with Improvement in the Quality of Life among Elderly Persons on ARVs in the GAR

Factors influencing the QoL among EPLHIV using both DSD and mhealth intervention after the implementation of the intervention include marital status, living arrangement, viral load and taking other medications to treat HIV.

Consistent with other studies, the findings of this study showed that EPLHIV who were divorced/separated had a decrease in QoL than those who were married (Algaralleh et al., 2020; Gesese et al., 2022; Okere N et al., 2021).In Tanzania, Okere et al., (2021) found that married women had a higher QoL. In addition, Gesese et al., (2022) reported that being separated or divorced is associated with poor QoL. The plausible reason could be that those who were divorced/separated may experience reduced social support and emotional toll of divorce or separation, which probably could be as a result of the partner leaving them because of their HIV condition, which is crucial for managing HIV. Consequently, these factors could lead to isolation and depression, thereby affecting their overall QoL, unlike married PLHIV, who may have support from their partners, which has the potential to improve their QoL.

In addition, EPLHIV who were not living with persons with HIV had a higher QoL than those living with someone. The plausible reason could be that living with someone with HIV could amplify the stigma and discrimination, which can have a negative impact on their QoL. In addition, households with multiple HIV-positive members could also face challenges regarding their well-being, such as economic and access to healthcare and other sources (Nigusso & Mavhandu-Mudzusi, 2021).

Furthermore, participants who were not taking additional medications reported a lower QoL compared to those who were on other medications (Panayi et al., 2024). A plausible explanation is that many EPLHIV have comorbid conditions such as hypertension, diabetes, or mental health disorders, and those receiving treatment for these conditions may experience better overall health management, which in turn contributes to improved QoL.

In addition, there are other instances where people take traditional medicines in addition to the ARVs to treat HIV. For instance, Kloos et al., (2013) reported that in Ethiopia, people use plant medicines in addition to the ARVs to treat HIV. They further indicated that primary phytochemical tests have identified plant species with anti-HIV and anti-mycobacterial that can help to improve the well-being of people living with HIV(Kloos et al., 2013). Such medications could, therefore, help to improve the well-being of PLHIV and impact on their QoL. In Ghana, Gyasi et al., (2013) reported that persons living with HIV use other traditional medications with ARVs to treat their conditions (Gyasi et al., 2013). The reliance on these medications aside, ARVs alone could probably help to improve the QoL among EPLHIV.

EPLHIV whose viral load results were pending experienced a lower QoL compared to those whose viral load was suppressed. This finding contrasts with Ahmed et al. (2021), who reported no significant association between viral load status and QoL, suggesting that other factors such as access to treatment and psychosocial support may mitigate the influence of viral load on well-being. In the present study, however, the lack of knowledge about one's viral load appeared to create uncertainty and anxiety, which may have affected adherence to ARVs and overall perception of health. This group may also have included individuals who were recently diagnosed and had not yet received their viral load results, further contributing to worry and reduced well-being. Although many respondents with pending results had lived with the condition for 1–4 years and were likely adhering to their medication regimen, the absence of confirmed results may have overshadowed the benefits of adherence. These findings underscore the importance of timely communication of viral load results to reduce uncertainty, strengthen confidence in treatment, and ultimately improve the QoL of PLHIV.

5.6 Effect of a psychosocial support intervention among elderly persons on ARVs in the GAR

The integration of PSSI into healthcare systems is increasingly recognized as an integral component for improving the QoL of individuals managing chronic conditions like HIV/AIDS. A key priority of the Global AIDS Strategy 2021–2026 is the incorporation of mental health and psychosocial support into HIV services (Remien et al., 2021; World Health Organization, 2020). Studies have demonstrated that employing client-centred approaches using DSD and the use of mHealth interventions to deliver psychosocial support has significantly improved the QoL for PLHIV(Bateganya et al., 2015b; Panayi et al., 2024).

The integration of DSD and mHealth technologies in delivering psychosocial support not only addresses the clinical aspects of HIV care but also the emotional and social dimensions that are crucial for improving QoL(Okonji et al., 2020a). As highlighted by the Global AIDS Strategy, prioritizing mental health and psychosocial support is key to achieving better health outcomes for PLHIV.

In this study, two interventions (DSD and SVM) were developed and implemented. The DSD intervention utilized a face-to-face approach to offer counselling and educational information based on client needs. At the same time, the (mHealth) intervention employed a non-interactive SVM to offer the same counselling and educational information. Findings from our study revealed that there was a statistically significant difference in the baseline and endline QoL for the SVM intervention [MDID =10.07; 95%CI= [8.3-11.8]; p<0.001] and DSD intervention [MDID =5.75; 95%CI= [3.8-7.7]; p<0.001]. This result suggests that the two interventions can improve the QoL among EPLHIV.

5.6 .1 Short Voice Messaging Intervention

For participants who received the SVM intervention, there was a positive impact on the QoL of EPLHIV compared to the control group, with a coefficient of 12.478 indicating an approximately 12.5-unit increase in QoL. These findings are consistent with other studies that highlight the role of psychosocial support in improving outcomes for people living with HIV. Previous research has shown that psychosocial interventions, including counseling and social support, can significantly enhance mental health, emotional well-being, and overall QoL for individuals affected by HIV(Okonji et al., 2020b). Similarly, Yasmin et al.., (2016) systematic review on the influence of voice messaging intervention on health outcomes demonstrated SVM is an effective approach to addressing unique challenges faced by EPLHIV, leading to better health outcomes(Yasmin et al., 2016). Findings from Murthy et al. 's (2020) study on the effects of a mHealth voice message service on maternal health knowledge and practices of low-income women in India revealed that personalized mobile phone-based voice messages could enhance essential maternal behaviours. Women who received voice messages showed improved adoption of both home-based and health facility practices compared to those in the control group, and this can positively influence maternal and child health outcomes(Murthy et al., 2020).

The effectiveness of using SVM for intervention delivery can be attributed to easy accessibility, confidentiality and convenience. Messages can be delivered directly to participants' mobile phones, making it possible to reach individuals regardless of their literacy levels or access to technology enabling all participants to receive support without the need for in-person sessions or complex digital platforms. Voice messages are a safer way to deliver health interventions, allowing participants to listen privately without drawing attention. This is especially important for EPLHIV, who may face stigma and prefer not to engage in face-to-face or public interventions. The confidentiality of receiving voice messages can make participants feel safer and more comfortable engaging with the intervention.

Voice message interventions can also be delivered consistently and frequently, as was the case in this study, ensuring regular reinforcement of key messages such as medication adherence, lifestyle advice, and coping strategies. This continuous engagement helps participants stay on track with their health goals, promoting sustained improvements in QoL.

5.6 .2 Differentiated Service Delivery Intervention

The findings of this study indicate that participants who received the DSD intervention experienced an improvement in QoL compared to those in the control group, with a coefficient of 7.952 showing a significant positive effect of receiving psychosocial support through a face-to-face approach. This suggests that tailored service delivery models can directly enhance the well-being of EPLHIV and aligns with broader evidence on the value of differentiated care. For example, Godfrey et al. (2022) emphasized the need for HIV programs in PEPFAR-supported countries to adopt DSD models that are responsive to the unique needs of ageing populations. Similarly, Okere et al. (2022), in Tanzania, found that accessibility factors within DSD models contributed more positively to emotional well-being than clinic-based care, highlighting the psychosocial benefits of differentiated approaches. Evidence from Nigeria also supports this trend, with Sanwo et al. (2021) demonstrating that DSD participants achieved higher retention and viral suppression rates compared to those receiving standard care. Taken together, these studies reinforce the present finding that DSD interventions not only improve clinical outcomes but also enhance the QoL of PLHIV by addressing both accessibility and psychosocial dimensions of care

The observed increase in QoL among the DSD participants therefore reflects the significance of personalized, direct interaction in healthcare, aligning with previous studies that emphasize the value of individualized care approaches, especially for vulnerable populations such as people living with HIV. Also, DSD models usually incorporate psychosocial support, as in the case of our study, which addresses the emotional, mental, and social challenges of living with HIV. Face-to-face counselling or peer support provided in DSD models helps reduce isolation, stigma, and anxiety, leading to better mental health outcomes and an enhanced overall sense of well-being.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSION, CONTRIBUTION AND RECOMMENDATIONS

6.1 Introduction

Human immunodeficiency virus remains a major global public health challenge, with the disease burden varying greatly across regions, countries, and populations. The development and introduction of ART have become crucial public health interventions for PLHIV, significantly increasing life expectancy. As a result, the global HIV population is experiencing a significant shift towards an ageing demographic due to the widespread access to ART services. Several factors contribute to the utilization of ART services, which could either be a barrier or enhance the use of ARVs. Antiretroviral treatment has profoundly impacted the lives of PLHIV, thereby improving their QoL

Despite health improvements and increased survival rates for HIV patients, the psychological, social, and other consequences affecting the QoL among EPLHIV remain complex. Psychosocial barriers such as stigma and social isolation significantly impede the QoL for EPLHIV, often leading to depression and reduced social support. PLHIV develop more non-HIV health conditions compared to those without the condition. This situation is particularly challenging for the elderly, as ageing is associated with a double burden of diseases.

Interventions, such as mobile service technology (mHealth) and DSD, have been used to implement PSSI to improve the QoL of EPLHIV, especially in developed countries. However, little is known about PSSI and QoL among elderly Ghanaians living with HIV. This underscores the need for intervention studies to assess the effectiveness of psychosocial support programmes in improving the QoL of EPLHIV.

This study sought to assess the effects of a psychosocial support intervention on the QoL among EPLHIV on antiretrovirals in the GAR. The study relied on the PRECEDE-PROCEDE model and the socio-ecological framework to understand and evaluate the impact of psychosocial interventions on the QoL of EPLHIV.

The findings of the study will contribute theoretically to research literature as it provides evidence on factors associated with QoL using specific psychosocial interventions since there is currently no study that has examined the impact of psychosocial support interventions on the QoL of EPLHIV in Ghana.

The findings of this study will give stakeholders a better understanding of the impact of psychosocial support intervention on the QoL of EPLHIV, thereby offering information to guide policy decisions. This will contribute to the ongoing efforts aimed at achieving Sustainable Development Goal 3 (SDG 3), which focuses on ensuring healthy lives and promoting well-being for all, with particular emphasis on combatting HIV and AIDS.

To fill the gap in the study, a sequential exploratory mixed-method approach was adopted, relying on pragmatism as a philosophical paradigm. Narrative methods and quasi-experimental designs were used for the qualitative and quantitative approaches, respectively.

The study was conducted in three health facilities offering ART services in Greater Accra, Ghana. Three phases relying on the PRECEDE-PROCEDE approach, namely the formative, intervention, and evaluation stages, were employed in the study. At the formative stage, a qualitative approach was employed to explore the psychosocial barriers and facilitators in HIV care as well as the feasibility and acceptability of using mobile technology for delivering PSSI to EPLHIV. The second stage involves the implementation of the interventions tailored towards EPLHIV, which were rolled out to offer counselling and educational messages to SVM and DSD through a face-to-face approach. Each intervention was implemented in one facility. The third stage involves the evaluation of the intervention using a quantitative approach to examine the effects of the psychosocial interventions on the QoL of

EPLHIV. The summary of the findings, the implication for theory and recommendations are discussed in this chapter.

6.2 Summary of Findings

The sample size for the baseline was 437, and this reduced to 409 at the end line, with 28 EPLHIV lost to follow. The study shows that about two-thirds of the EPLHIV were females at both baseline (66.1%) and endline (66.5%). More than one-third (38.2%) of the EPLHIV were married, two out of ten (22.0%) were divorced/separated, and less than one-tenth (9.2%) were never married at both the baseline and endline. Slightly more than one-third of the study participants had lived with HIV for more than 10 years, while the smallest proportion had lived with HIV for less than 1 year at baseline and endline. Regarding living arrangements, slightly less than two-thirds of the respondents were living with someone at baseline (65.2%), and this increased to 65.8% at the endline. About 35% of the EPLHIV had comorbidity disease at both baseline and endline. The results showed that more than half of the respondents had never consumed alcohol before at baseline (58.4%) and (57.75%) at the end of the study. At baseline, slightly more than half (51.3%) of respondents were depressed, and this reduced to (33.7%) at endline. The overall mean QoL increased from 89.1 at baseline to 94.2 at the end of the follow-up period.

The results show that physical, psychological, social, and environmental health domains impact the QoL of EPLHIV. The physical challenges include pain and lack of physical strength. Factors associated with psychological health include thinking a lot about the HIV condition and getting worried and scared as persons living with HIV. Disclosure and non-disclosure to friends immediate and non-immediate family members; thus, partners and children were associated with social health, while challenges in accessing health facilities due to the distance and cost of transportation to the facilities were associated with the physical environment.

The facilitators for accessing ARVs were task-sharing, general counselling in health facilities and the use of social support to improve comprehensive care and the psychosocial health of EPLHIV in Ghana. The psychosocial barriers in comprehensive care service utilization for EPLHIV include stigma, no tailored needs for EPLHIV, lack of comprehensive psychosocial assessment, lack of capacity building for healthcare providers, and lack of HIV education and awareness creation were identified as major barriers.

The findings indicated that few participants perceived the feasibility of using Mobile Technology for the intervention. In contrast, most of the participants do not perceive the use of mobile technology to be feasible in the delivery of psychosocial intervention for EPLHIV due to privacy and confidentiality, literacy level of participants, and language and disability (eyesight challenges). In addition, the use of support groups in delivering the psychosocial intervention to EPLHIV was mentioned by the participants as an alternative. This, therefore, led to the use of SVM and DSD for the intervention's implementation.

The results show that the two interventions improved the QoL of EPLHIV. For the SVM intervention, the mean QoL increased from 88.9 to 98.8, while the DSD intervention mean QoL increased from 88.7 to 94.6. For the SVM intervention, the results show that depression, adherence and age were significantly associated with QoL at baseline. However, at the end of the study, health facility, marital status, living with HIV patients and taking other medications besides ARVs to treat HIV were significantly associated with QoL after the intervention for the adjusted regression.

With regards to the DSD intervention, depression, sex, age, educational level, current living status, morbidity status, alcohol consumption status, involvement in physical activity, place of residence and the use of other medications in addition to ARVs to treat HIV were significantly related with QoL at the baseline. At the end of the intervention, health facility, marital status and viral load were significantly associated with QoL. The DID regression results show a statistically significant relationship between the impact of the intervention and the QoL for the two arms of the study.

It is worth noting that although the interventions significantly improved the QoL of EPLHIV, the mechanisms underlying these improvements remain difficult to to decipher. This observel improvement in QoL could be due to a single intervention model component such as reduced social isolation or increased adherence to ARVs or due to an interplay of the many factors of the multicomponent interventions used in the study. However, the study was not designed to examine causal mechanisms for QoL improvement as one of its objectives, the improvements in QoL can best be interpreted as the result of an interplay of several factors rather than the result of change in a single factor.

6.3 Theoretical Implications

The study drew on the socio-ecological model and PRECED PROCEDE model. The findings of the study are relevant to the application of these theories. In the socio-ecological theory, the findings of the study showed that different levels or factors influence the QoL, especially at the endline of the study. Personal factors such as marital status, viral load, taking other medications to treat HIV, physical pains, psychological disorders, stigma and discrimination, depression and anxiety were identified, while interpersonal factors include living arrangements and disclosure to family and non-family members. Organizational and community factors include psychosocial counselling provided at health facilities by health workers, which offers critical emotional support to enhance access to ARVs. Furthermore, capacity building for health and support groups within the community provides a sense of belonging and shared experiences, which can improve access to ARVs and QoL, while lack of mental health support at the community and organizational level reduces the ability of people to access ARVs.

The socio-ecological theory emphasizes the need for a holistic approach to improving access to ARVs and QoL. It suggests that interventions should extend beyond the individual to include organizational and community contexts that impact the QoL. By considering all relevant factors of the framework, this comprehensive perspective leads to more effective and sustainable improvements in ARV access within health facilities, ultimately enhancing the QoL.

6.4 Limitations of the Study

Although this is the first study conducted in Ghana that examined the effect of PSSI on the QoL of EPLHIV, the findings must be interpreted within the context of some limitations.

1. The study was conducted in three (3) districts out of the 26 in the Greater Accra Region. This limited the geographic scope of the study and may affect the generalizability of the findings to other districts within the region and to other parts of Ghana where different socio-cultural and health system contexts are in play
2. Another limitation of this study will be the possibility of social desirability bias in the self-reported data. Questionnaires and interviews were used to collect some of the outcome variables and some participants may have given socially acceptable responses rather than responses that reflect their experiences despite being assured of confidentiality. This may have led to possible underreporting of negative experiences or overstating of positive experiences during the data collection phase of the study.
3. Also, the study utilized a non-randomized design which can affect internal validity and limit the generalizability of findings. This lack of randomization therefore implies that causal claims raised in this study should be interpreted with caution and framed primarily as evidence of association instead of definitive causality.
4. There is an absence of follow-up assessments beyond the immediate post-intervention period. As a result, the findings are interpreted as reflecting short-term improvements in QoL among EPLHIV, rather than sustained effects since the study design did not allow for long term persistent measurements.
5. Finally, while the interventions demonstrated measurable improvements in QoL, the study did not conduct a cost-effective analysis so the financial feasibility of scaling up these interventions on a wider scale are not discussed.

However, notwithstanding these limitations, the findings of this study have important implications as far as the psychosocial needs of EPLHIV are concerned.

6.5 Conclusion

This study demonstrates that the QoL of elderly people living with HIV is shaped by a complex interplay of social, physical, and psychosocial environments and show that barriers to accessing ART not only exacerbate morbidity and mortality but also undermine viral suppression and increase the risk of transmission.

By using a triangulation of the SEM and PRECEDE–PROCEED models to analyze and design interventions the study highlights how individual, relational, and structural factors converge to influence health outcomes and shows the value of combining these models in designing and evaluating interventions.

The study also contributes new evidence that tailored PSSI such as the DSD and SVM models can significantly improve the QoL for EPLHIV. These interventions demonstrate both conceptual and practical value by addressing service gaps, refining existing theories, and providing adaptable strategies for low-resource settings. The study also underscores the importance of translating research into practice by equipping healthcare workers with skills to deliver client-centred, age-appropriate, and context-specific psychosocial support.

This study also advances knowledge and provides actionable pathways for policy and practice aimed at strengthening HIV care and enhancing well-being in sub-Saharan Africa and beyond. It equips service providers with enhanced skills in counselling and psychosocial education and offers scalable models for improving inclusive care. It also underscores the importance of integrating severe models to understand the psychosocial needs of people, given the complexity of their lived experiences, intersecting vulnerabilities, and context-specific stressors that shape individual well-being.

Taken together, the empirical findings, theoretical insights, and practical contributions of this study reinforce the urgent need for integrated, holistic approaches to HIV care.

1.6 Contribution to Knowledge

This study makes a significant contribution to the body of knowledge on HIV care for EPLHIV in the areas expounded

1. **Addressing psychosocial support gaps for EPLHIV**

The study began identified a key conceptual and empirical gap in psychosocial support for EPLHIV and then developed and tested two tailored interventions, a DSD model and tan SVM approach to fill this gap. This has moved HIV care research forward by now offering a framework for developing interventions that could respond to the unique psychosocial needs of EPLHIV in low-resource settings

2. **Extending global understanding of psychosocial interventions in LMICs**

The interventions in this study are grounded in low-resource and client-centred approaches. The study therefore provides new knowledge and has very strong potential for adaptation and replication across other low- and middle-income countries (LMICs) facing similar healthcare challenges.

3. **Triangulation of Models**

A key theoretical contribution of the study is the triangulation and analytic application of the SEM and PRECEDE–PROCEED models. This offered a novel methodological approach for analyzing and designing interventions in resource-constrained contexts.

4. **Knowledge translation into service delivery and capacity building**

   This study makes a practical contribution to capacity building by equipping service providers with improved skills in delivering care to EPLHIV through the client-centred DSD model. It exemplifies knowledge translation, showing how evidence-based psychosocial interventions can be integrated into service delivery to enhance counselling and psychosocial education practices

6.7 Recommendations

This study generated important findings on the QoL of EPLHIV and the effectiveness of PSSI such as the DSD and SVM models. The recommendations below are designed to translate these findings into actionable steps for policy, practice, and research. They are explicitly informed by the study's evidence on barriers to care, the impact of psychosocial interventions, and the theoretical insights drawn from SEM and PRECEDE–PROCEED.

1. Recommendations for Policy

Integrate psychosocial interventions into national HIV guidelines: The study showed that tailored psychosocial interventions significantly improved the QoL for EPLHIV. Based on this evidence, the Ghana Health Service, through the NACP, should review treatment and DSD guidelines and formally integrate the SVM model into the DSD package for EPLHIV. Doing so will ensure that age-specific psychosocial support becomes a core part of HIV service delivery across diverse socio-economic groups.

2. Recommendations for Practice

- ***Build healthcare worker capacity for tailored care***: Findings demonstrated that QoL improvements were linked to client-centred approaches. To sustain this impact, healthcare workers should be trained by the NACP to provide tailored psychosocial services for different population segments, with a focus on counselling, adherence support, and mental health care.
- ***Strengthen health education for EPLHIV*****:** The study highlighted knowledge gaps in treatment adherence and lifestyle practices. The Ministry of Health, in collaboration with NACP, GHS,

and stakeholders, should implement targeted health education initiatives to empower EPLHIV with information on HIV management, treatment adherence, and healthy living.

3. Recommendations for Research

- ***Employ stronger study designs*:** To confirm causality, future research should use randomized controlled trials designs to provide stronger evidence that quality-of-life gains are attributable to the interventions.
- ***Assess sustainability of outcomes***: The study showed immediate improvements in QoL, but long-term sustainability remains unknown. Future studies could include follow-up assessments at 3–6 months post-intervention to help determine whether gains persist or require maintenance strategies.
- ***Conduct cost-effectiveness analyses***: Since scalability is a critical concern in low-resource settings, future studies should include a cost-effective analysis on integrating PSSI into national HIV programs. Evidence of such financial feasibility will strengthen the policy relevance and adoption of the findings.

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APPENDIX

Appendix 1: Interview Guide for Key Informant Interview

Key Informant Interview Guide (Policy makers & Service Providers)

a. ***Name of Interviewer:*** ______________________
b. ***Notetaker (if applicable):*** ______________________________
Town/Community/District: ________________________
c. ***Date:***______________________
d. ***Time interview started:*** __________ ***Time ended:***______________
e. ***Participant ID:***___________
f. ***Demographic Data to be completed on a separate sheet (Age, Sex, Marital status, Number of children, Educational level, professional background, number of years they have been at the post, etc.)***
g. **Introductions:** ***Introduce the interviewer and the purpose of KII***

Let's go ahead and get started. My name is ____________________. I am from the University of Ghana School of Public Health. Today I would like to have a conversation with you. We are very interested in learning about the support that EPLHIV need in the area of psychological support and quality of life. We will only share the information we learn today in a general way and in a way that does not reveal the identity of any participant. With your permission, I would be recording our conversation. We want to hear what you have to say and want you to feel comfortable answering questions however you want to. There are no right or wrong answers.

The interview should last for about 40minutes

Do you have any questions before we begin?

Ice breaker

Ask participants to wish for something good for their region/district in the year 2023 and why?
Tell me about your job as a policymaker/service provider.

1. Quality of life (General health, Physical health, psychological health, social relationships and physical environment)

a. Please tell me what you think about the general health of EPLHIV.
Probe: *is their health generally good or bad, why? Are they satisfied with their health generally? What is accounting for this satisfaction/non-satisfaction? what is your thought about their current life? Why?*

b. Please tell me what you think about the physical health of EPLHIV

- ***Probe*** *for physical pain, any effect on doing daily activities, the need for medication to be able to go about physical/daily activities? Satisfaction with the ability to perform their daily activities, and work capacity? daily energy level? Is it enough? Satisfaction with their sleep? What accounts for this level of physical health?*

c. What is your knowledge about the psychological health/mental health of EPLHIV?

- ***Probe*** *for a meaningful life? level of concentration? Satisfaction with bodily appearance? experience negative feelings such as depression? How often? What accounts for this level of psychological health?*

d. Tell me about your knowledge of social relationships of EPLHIV

- **Probe** satisfaction with relationships with family, friends etc., satisfaction with sex life, what accounts for this level of social relationships?

e. What do you think about the physical environment of EPLHIV?

- ***Probe for a*** healthy physical environment? Availability of information needed for day-to-day life? Opportunity for leisure activities? satisfaction with access to health services, transport etc.

f. What health challenges do you think EPLHIV have generally? Do they have any challenges with their physical, psychological/mental health, social health and environment?

2. *Needed Support (General health, Physical health, psychological health/mental health, social relationships and physical environment)*

a. Please tell me about what forms/kind of support will enhance the general health of EPLHIV

- ***Probe for*** *information support, enhanced support, counselling & psychotherapies, educational intervention, mental health support?*

b. What specific kinds of support will enhance the physical health of EPLHIV?

c. What forms of support will be needed for the psychological health/mental health of EPLHIV?

- Probe for counselling & psychotherapies, mental health support?

d. What forms of support will enhance the social health and the environment of EPLHIV?

3. Intervention (medium, quality of life, mental health)

Psychosocial Interventions

a. Are you aware of any psychosocial interventions for EPLHIV?
  - If yes, kindly list and explain them

b. Have you been involved in any psychosocial intervention in Ghana?
  - If yes, kindly list and explain the process involved.
  - Where and which group received the intervention.
  - What were the challenges involved in implementing the intervention?

a. What kind of intervention do you think will help provide the needed support for EPLHIV (*general health, physical health, psychological health, social relationships and physical environment*)
  - ***Probe for*** intervention type, intervention component (eg counselling, educational intervention, group support), frequency and duration, mode of delivery, medium, persons involved etc

b. What do you think about delivering an intervention using mobile technology approach?
  - ***Probe for*** *intervention component, kind of message, frequency/mode, delivery, etc.*

c. What challenges do you anticipate with the delivery of the intervention?

d. Any other recommendation for an intervention that will improve upon the quality of life and mental health of EPLHIV?

THANK YOU FOR YOUR TIME!!!

Appendix 2: Interview Guide for Focus Group Discussion

Focus Group Discussion Guide [EPLHIV (≥50 years)]

a. ***Name of Focus group discussion facilitator:*** ______________________

b. ***Notetaker (if applicable):*** _______________________________

Town/Community/District: _________________________

c. ***Date:***________________________

d. ***Time discussion started:*** _________***Time ended:***________________

e. ***# of Women/Men Participating in Focus Group:***_____________

f. ***Demographic Data to be completed on a separate sheet (Age, Sex, Marital status, Number of children, Educational level, professional background, religious background, how long they have LHIV, etc.)***

g. **Introductions:** ***Introduce the moderator, note-taker and purpose of FGD***

Let's go ahead and get started. My name is ______________________ and this is my colleague _____________________. We are from the University of Ghana School of Public Health. ________________________________. Today we would like to have a conversation with you all. We are very interested in learning about the support you need in the area of psychological support and quality of life. We will only report the findings we learn today in a general way that does not reveal the identity of anyone in the group. With your permission, I would be recording our conversation to aid in the transcription and analysis of the information we receive for research purposes. It's important that the information shared in this group does not leave this group. So we ask everyone to not share who was here or what was said in the group with others outside the group when they leave here. There are no right or wrong answers. We want to hear what you have to say and want you to feel comfortable answering questions however you want to.

_________________ is taking notes to make sure that we don't miss what you say and any non-verbal actions. This will help us later when we go back and organize all the information that was shared today. This FGD should last for about 40mins.

Does anyone have any questions before we begin?

Ice breaker

Ask participants what one thing they want to work towards in the year 2023 and why this particular wish.

1. Quality of life (General health, Physical health, psychological health, social relationships and physical environment)

b. Please tell me what you think/feel about your health generally.

Probe: *is your health generally good or bad, why? Are you satisfied with your health generally? What is accounting for this satisfaction/non-satisfaction? what is your thought about your current life? Why?*

g. Please tell me what you feel/think about your physical health

- ***Probe*** *for any physical pain, any effect on doing daily activities, the need for medication to be able to go about physical/daily activities? Do you feel satisfied with your ability to perform your daily activities, and capacity for work? How is the daily energy level? Is it enough? Are you satisfied with your sleep? What accounts for this level of physical health?*

h. How do you feel about your psychological health/mental health?

- ***Probe****: do you enjoy your life, how? How meaningful is it for you? How is your level of concentration? Are you okay with your bodily appearance, why? How satisfied are you with yourself? Do you experience negative feelings such as depression? How often? What accounts for this level of psychological health?*

i. Tell me about your social relationships

- Probe satisfaction with relationships with family, friends etc., satisfaction with sex life, and satisfaction with emotional and financial support received from friends, what accounts for this level of social relationships?

j. What do you think about your environment?

- ***Probe for*** how safe you feel in your daily life. healthy physical environment? Enough money to meet needs? Availability of information needed for day-to-day life? Opportunity for leisure activities? Satisfaction with the condition of living space, satisfaction with access to health services, transport etc.

k. What health challenges do you have generally? Do you have any challenges with your physical, psychological/mental health, social health and your environment?

2. *Needed Support (General health, Physical health, psychological health/mental health, social relationships and physical environment)*

e. Tell me about what forms/kind of support you will need to enhance your general health

- ***Probe for*** *information support, enhanced support, counselling & psychotherapies, mental health support?*

f. What specific kinds of support will enhance your physical health?

g. What forms of support will you need for your psychological health?

- Probe for counselling & psychotherapies, mental health support?

h. What forms of support will enhance your social health and your environment?

3. Preferable Intervention (medium, quality of life, mental health)

Psychosocial Interventions

b. Are you aware of any psychosocial interventions for PLHIV and EPLHIV?
    a. If yes, kindly list and explain them
    b. Have you received any psychosocial interventions for EPLHIV?
c. Have you ever benefited from any psychosocial intervention in Ghana?
    a. If yes, kindly list and explain the process involved.
    b. Where and which group received the intervention.
    c. What were the challenges involved in implementing the intervention?

d. What kind of intervention do you think will help provide the needed support (indicated earlier) for all aspects of your health (*general health, physical health, psychological health, social relationships and physical environment)*
    - ***Probe for*** intervention type, intervention component (eg counselling, educational intervention, group support), mode of delivery, frequency and duration, medium, persons involved etc

c. What do you think about delivering an intervention using mobile technology approach?
    - ***Probe for** intervention component, kind of message, frequency/mode, delivery, etc.*
d. What challenges do you anticipate with the delivery of the intervention?

e. Any other recommendation for an intervention that will improve their quality of life and mental health?

THANK YOU FOR YOUR TIME!!!

Appendix 3: Questionnaire for Baseline and Endline Data Collection

QUESTIONNAIRE FOR BOTH BASELINE AND ENDLINE

INTRODUCTION AND CONSENT

Hello, I am a PhD student at the School of Public Health, University of Ghana, Legon – Accra. I am conducting a study on effects of psychosocial support intervention on quality of life among elderly persons living with HIV in the Greater Accra region of Ghana: A Quasi-experimental study.

I would be grateful if you could answer the questions below. Your participation in this study is essential but voluntary and you can withdraw at any point. Any information provided for this study would be treated with the utmost confidentiality and used only for academic purposes. Thank you.

Data collection date:

dd-mm-yyyy

Patient mobile phone number:

Patient Folder or ART Number:

Patient HIV E-tracker number:

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS (BASELINE ONLY)

A1. Sex of respondent

Male	1☐
Female	2☐

A2. Age of respondent in years on the last birthday.

A3. Marital status

Never married	1☐
Married	2☐
Cohabiting	3☐
Divorced/Separated	4☐
Widowed	5☐

A4. What is your highest level of education?

No education	1☐
Primary	2☐
JHS/MSLC	3☐
Secondary/Vocational/Technical School	4☐
Tertiary	5☐

A5. What is your religious affiliation?

None	1☐

Christian	2☐
Muslim	3☐
Traditionalist	4☐
Other religion (please specify): ___________________	5☐

A6. What is your occupational status?

Formal	1☐
Informal	2☐
Pensioner/ Retired	3☐
Not employed	4☐

A7. Are you the breadwinner or head of the household?

Yes	1☐
No	2☐

A8. What is your ethnic affiliation?

Akan	1☐
Ga/Adangme	2☐
Ewe	3☐
Guan	4☐
Mole-Dagbani	5☐
Other (please specify): _________________________	6☐

A9. Where do you currently live?

☐

A10. Geographic location of current residence.

Rural	1☐
Urban	2☐

A11. Do you currently live alone?

Yes	1☐
No	2☐

A12. Apart from you, is there anyone in your household living with HIV? (You can tick more than one)

Child living with HIV	1☐
Spouse or partner living with HIV	2☐
Other family member living with HIV	3☐
None	4☐

A13. Facility of care

Tema General Hospital	1☐
Achimota Hospital	2☐
La General Hospital	3☐

A14. Do you have health insurance?

Yes, not expired	1☐
Yes, expired	2☐
No	3☐

A15. Do you have any challenges in accessing health care?

No	1☐	**(If No skip to A16)**
Yes	2☐	

A15.1. If yes what are the specific challenges?

Distance to the facility 1☐
Cost of transportation 2☐
Long waiting hours 3☐
Other (please specify): ________________________ 4☐

A16. Do you get support from family and friends in your health care?

Yes 1☐
No 2☐

A17. How many children do you have?

A18. What is your current viral load result?

Virally suppressed 1☐
Unsuppressed 2☐
Viral load result pending 3☐
Viral load test not done 4☐

A19. Which type of phone are you using?

Android smartphone 1☐
Windows smartphone 2☐
Iphone 3☐
Non-smart phone (Yam phone) 4☐

SECTION B: HIV RELATED QUESTIONS

B1. How long have you been living with HIV/AIDS?

Less than a year 1☐
1-4 years 2☐
5-9 years 3☐
10 years and above 4☐
Don’t know 5☐

B2. How long have you been on ARVs?

Less than a year 1☐
1-4 years 2☐
5-9 years 3☐
10 years and above 4☐
Don’t know 5☐

B3. Mechanisms for contracting HIV. (Skip to B4 if other is not selected)

Sexual contact 1☐
Blood transfusion 2☐
Needle/Sharp object 3☐
Other 4☐
Unknown 5☐

B3.1. Kindly specify the other means by which you contracted HIV?

B4. Which Antiretroviral (ARV) regimen are you taking?

B5. Which line of ARV regimen are you on?

First line	1☐
Second line	2☐
Third line	3☐
Other line	4☐

B6. How many tablets of antiretrovirals (ARVs) do you take in a day?

B7. Apart from ARVs, are you taking any other medication to treat HIV?

Yes	1☐	
No	2☐	**(Please skip to B8)**

B7.1. If yes to B7, please specify the medication?

B8. Aside HIV, do you currently have any of the underlisted or any existing health condition(s)?
(Skip to B9 if any of the conditions have not been ticked)

Diabetes	1☐
Hypertension (High blood pressure)	2☐
Tuberculosis	3☐
Heart disease	4☐
Liver disease	5☐
Kidney disease	6☐
Cancer	7☐
Stroke	8☐
Asthma	9☐
Arthritis	10☐
Other conditions	11☐
None	12☐

B8.1. Please specify the other conditions that you were diagnosed of.

B8.2. How many tablets of other medications do you take in a day to treat these existing health conditions?

B9. Do you currently experience any of the following symptoms?

Weight loss	1☐
Fever	2☐
Rashes/Skin diseases	3☐
Chronic diarrhoea	4☐
Sore throat and mouth sores	5☐
Cough	6☐
Swollen lymph nodes	7☐
None	8☐

B10. Which people know of your HIV status? (Baseline & Endline)

Spouse	1☐
Children	2☐
Other family members	3☐
Friends	4☐
Peers	5☐
Other	6☐ **(Skip to B11 if other is not ticked)**
No one	7☐

B10.1. Please specify the other people who know about your HIV status.

B11. Are you a member of an HIV support group?

Yes	1☐
No	2☐

SECTION C: LIFESTYLE

C1. Have you ever consumed a drink that contains alcohol (such as beer, wine, spirits, etc)?

Yes	1☐
No	2☐ **(If No skip to C2)**

C1.1. Do you currently consume alcohol?

Yes	1☐
No	2☐

C2. Have you ever smoked tobacco or used smokeless tobacco?

Yes	1☐
No	2☐ **(If No skip to C3)**

C2.1. Are you currently smoking?

Yes	1☐
No	2☐

C3. Do you engage in any form of exercise like running, walking, swimming, playing football, for at least 30 minutes continuously?

Yes	1☐
No	2☐ **(If No skip to D1)**

C3.1. What is the frequency of the exercise?

At least three times a week	1☐
Once a week	2☐
Monthly	3☐
Once a while	4☐

SECTION D: MEASUREMENT OF QUALITY OF LIFE (BASELINE & ENDLINE)

This section collects information to measure the Quality of Life (QOL) of Elderly Persons Living with HIV/AIDS. All the QOL questions in this section was adopted from the World Health Organisation's (WHO) global study on aging and adult health. Please tick or circle only one of the responses.

SECTION D1: WHO QUALITY OF LIFE

D1.1 How would you rate your quality of life?

Very poor	Poor	Neither poor nor good	Good	Very good
1	2	3	4	5

D1.2 How satisfied are you with your health?

Very dissatisfied	Dissatisfied	Neither dissatisfied nor satisfied	Satisfied	Very satisfied
1	2	3	4	5

SECTION D2: PHYSICAL DOMAIN

No	Question	Not at all	A little	A moderate amount	Very much	An extreme amount
D2.1	To what extent do you feel that physical pain prevents you from doing what you need to do? (reversed)	1	2	3	4	5
D2.2	How much do you need any medical treatment to function in your daily life? (reversed)	1	2	3	4	5
		Not at all	**A little**	**Moderately**	**Mostly**	**Completely**
D2.3	Do you have enough energy for everyday life?	1	2	3	4	5
D2.4	How well are you able to get around?	1	2	3	4	5
		Very Dissatisfied	**Dissatisfied**	**Neither dissatisfied nor satisfied**	**Satisfied**	**Very satisfied**
D2.5	How satisfied are you with you sleep?	1	2	3	4	5
D2.6	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
D2.7	How satisfied are you with your capacity for work?	1	2	3	4	5

SECTION D3: PSYCHOLOGICAL DOMAIN

This sub-section has to do with statements concerning the psychological domain of the quality of life. Kindly circle or tick only one response.						
No	**Question**	**Not at all**	**A little**	**A moderate amount**	**Very much**	**An extreme amount**
D3.1	How much do you enjoy life?	1	2	3	4	5
D3.2	To what extent do you feel your life to be meaningful?	1	2	3	4	5
D3.3	How well are you able to concentrate?	1	2	3	4	5
		Not at all	**A little**	**Moderately**	**Mostly**	**Completely**

D3.4	Are you able to accept your bodily appearance?	1	2	3	4	5
		Very Dissatisfied	**Dissatisfied**	**Neither dissatisfied nor satisfied**	**Satisfied**	**Very satisfied**
D3.5	How satisfied are you with yourself?	1	2	3	4	5
		Never	**Seldom**	**Quite Often**	**Very Often**	**Always**
D3.6	How often do you have negative feelings such as blue mood, despair, anxiety, depression? (Reversed)	1	2	3	4	5

SECTION D4: SOCIAL DOMAIN

This sub-section has to do with statements concerning the social domain of the quality of life. Kindly circle or tick only one response.

No	Question	Very Dissatisfied	Dissatisfied	Neither dissatisfied nor satisfied	Satisfied	Very satisfied
D4.1	How satisfied are you with your personal relationships?	1	2	3	4	5
D4.2	How satisfied are you with your sex life?	1	2	3	4	5
D4.3	How satisfied are you with the support you get from your friends?	1	2	3	4	5

SECTION D5: ENVIRONMENTAL DOMAIN

This sub-section has to do with statements concerning the environmental domain of the quality of life. Kindly circle or tick only one response.

No	Question	Not at all	A little	A moderate amount	Very much	Extremely
D5.1	How safe do you feel in your daily life?	1	2	3	4	5
D5.2	How healthy is your physical environment?	1	2	3	4	5
		Not at all	**A little**	**Moderately**	**Mostly**	**Completely**
D5.3	Have you enough money to meet your needs?	1	2	3	4	5
D5.4	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
D5.5	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5
		Very Dissatisfied	**Dissatisfied**	**Neither dissatisfied nor satisfied**	**Satisfied**	**Very satisfied**
D5.6	How satisfied are you with the conditions of your living place?	1	2	3	4	5

D5.7	How satisfied are you with your access to health services?	1	2	3	4	5
D5.8	How satisfied are you with your transport?	1	2	3	4	5

SECTION E: DEPRESSION AND ADHERENCE (BASELINE & ENDLINE)

SECTION E1: DEPRESSION – PATIENT HEALTH QUESTIONNAIRE (PHQ-9)

Over the past two (2) weeks, how often have you been bothered by any of the following problems?

No	Question	Not at all	Several days	More than half the days	Nearly everyday
E1.1	Little interest or pleasure in doing things	0	1	2	3
E1.2	Feeling down, depressed, or hopeless.	0	1	2	3
E1.3	Trouble falling or staying asleep, or sleeping too much.	0	1	2	3
E1.4	Feeling tired or having little energy.	0	1	2	3
E1.5	Poor appetite or overeating.	0	1	2	3
E1.6	Feeling bad about yourself or that you are a failure or have let yourself or your family down.	0	1	2	3
E1.7	Trouble concentrating on things, such as reading the newspaper or watching television.	0	1	2	3
E1.8	Moving or speaking so slowly that other people could have noticed. Or the opposite being so fidgety or restless that you have been moving around a lot more than usual.	0	1	2	3
E1.9	Thoughts that you would be better off dead, or of hurting yourself.	0	1	2	3

SECTION E2: ADHERENCE – MARS -5 QUESTIONNAIRE (BASELINE & ENDLINE)

Over the past two (2) weeks, how often have you been bothered by any of the following problems?

No	Question	Always	Often	Sometimes	Rarely	Never
E2.1	I forgot to take them	1	2	3	4	5
E2.2	I alter the dose	1	2	3	4	5
E2.3	I stop taking them for a while	1	2	3	4	5
E2.4	I decide to miss out a dose	1	2	3	4	5
E2.5	I take less than instructed	1	2	3	4	5

SECTION F

These questions are about your involvement in the psychosocial intervention among elderly persons living with HIV. Please tell me how you felt and experience of the intervention.

DSD for the Elderly intervention *(Endline only)*

Have you in the last four months had any one-on-one interactions (counselling) with your health care provider at the TGH regarding your psychosocial health?

- ○ Yes
- ○ No

If yes how many times have you had these interactions within the period with your health care provider?

- ○ Once
- ○ Twice
- ○ Three times
- ○ Four times
- ○ More than 4 times

Would you say the interactions with your health care providers within the period has been helpful?

- ○ Yes
- ○ No

•How would you rate the delivery of the counselling sessions with your health care provider?

- ○ Excellent
- ○ Very good
- ○ Good
- ○ Bad
- ○ Worse

Which components of the counselling was beneficial?

- ○ Mental / Psychological health
- ○ Physical Health
- ○ Physical Environment
- ○ Social Health
- ○ Disclosure
- ○ Adherence and health seeking behaviour.
- ○ Nutrition and lifestyle

What are some of the benefits from interactions within the period with your health care provider?

- ○ Shorter waiting time at the facility
- ○ Comprehensive services targeting our needs rendered.
- ○ Additional Services being rendered at the same place.
- ○ More concern about my health now
- ○ Improvement in lifestyles
- ○ Improvement in health seeking behaviours.
- ○ Improvement in social connections
- ○ Improvement in physical activity
- ○ Reaching out more to my peers for support
- ○ Adhering to my medications
- ○ Seeing HIV more as a chronic sickness than a death sentence

What are some of the barriers and challenges you faced within the counselling period with your health care provider.

- ○ Spend more time at the facility.
- ○ Attitude of Health care providers

- ○ Counselling sessions not very interactive
- ○ Counselling did not target my needs.

How would you rate the quality of services provided by the health care workers after the deployment of this intervention?

- ○ Excellent
- ○ Very good
- ○ Good
- ○ Bad
- ○ Worse

Did you engage with your peers at the facility during health visits to discuss your personal issues and share ideas regarding your health condition?

- ○ Yes
- ○ No

Did you engage with your peers in the form of groups to discuss your personal issues and seek ideas from your peers regarding your condition during your clinic visits?

- ○ Yes
- ○ No

If yes how many times have you had these interactions within the period with your peers?

- ○ Once
- ○ Twice
- ○ Three times
- ○ Four times
- ○ More than 4 times

How convenient was the peer group meetings?

- ○ 1………...
- ○ 2…………
- ○ 3………….
- ○ 4…………

How worried were you about your privacy with your involvement in the discussions with your peers?

- ○ 1………...
- ○ 2…………
- ○ 3………….
- ○ 4…………

How satisfied were you with the group discussion?

- ○ 1………...
- ○ 2…………
- ○ 3………….
- ○ 4…………

Do feel your needs as EPLHIV are now being met following your interactions with your health service providers as well as your peers?

- ○ Yes
- ○ No

What do you think can be done to improve on this intervention?

- ○ …………………………………..
- ○ …………………………………..
- ○ ……………………………….
- ○

Do you think the intervention should be continued?

- ○ If yes state your reasons…………………………

Mobile Technology (Voice SMS) *(Endline only)*

In the last three months were you receiving any voice educational massages through a phone call from one particular number targeting your quality of Health?

- ○ Yes
- ○ No

If yes how often were the messages coming in ?

- ○ Once Daily
- ○ Twice a week
- ○ Three times a week
- ○ One a week
- ○ Not Defined

Were the messages constant and delivered at the same time of the day?

- ○ Yes
- ○ No

During the period did you miss a call from that number because you were busy or not by your phone at that time?

- ○ Yes
- ○ No

If yes did you get a return call to ensure you got the message for that day?

- ○ Yes
- ○ No

If the calls or messages were delivered 3 times a week? Did you receive all three messages weekly continuously for the three-month period?

- ○ Yes
- ○ No

If no, on how often did you miss these messages?

- ○ 1……….
- ○ 2………..
- ○ 3……….
- ○ 4…………..

Has this intervention impacted or benefited you?

○ Yes
○ No

Which components of the counselling was beneficial?

○ Mental / Psychological health
○ Physical Health
○ Physical Environment
○ Social Health
○ Disclosure
○ Adherence and health seeking behaviour.
○ Nutrition and lifestyle

Can you state a particular message or statement from any of the domains that were delivered which you enjoyed so much or remember?

○ ……………………………………………..
○ …………………………………………….
○

How has the intervention impacted or benefited you?

○ More concern about my health now
○ Improvement in lifestyles
○ Improvement in health seeking behaviours.
○ Improvement in social connections
○ Improvement in physical activity
○ Reaching out more to my peers and family members for support
○ Adhering to my medications
○ Disclosing my HIV status is more beneficial to me than I taught.
○ Seeing HIV more as a chronic sickness than a death sentence

Within the period did you deliberately reject any of the calls ?

○ Yes
○ No

What were the reasons for you rejecting the calls?

○ Longer messages
○ Non-Interactive
○ Message duration very short
○ Massages not very clear
○ Poor sound quality
○ Messages were boring.
○ Content not very educative
○ Time of message delivery not conducive

What do you think can be done to improve this?

○ Quality of the messages
○ ……………………….
○ ……………………………

Do you think the intervention should be continued?

o If yes state your reasons……………

Appendix 4: Short Voice Messaging Program Message Library

Introduction to Voice SMS	**First message to be sent**		
	Monday	Wednesday	Friday
DOMAIN	Week 1		
DISCLOSURE	What is Disclosure and concerns about Disclosure	What to disclose and how to disclose	Benefits of disclosure
	Week 2		
ADHERANCE	What is Adherence and How to adhere	Barriers to Adherence and effects of Incomplete or Non adherence to medications	Benefits of Adherence
	Week 3		
PHYSICAL HEALTH	What is Physical Health and how it effects the QoL	Improving our nutrition and lifestyle as part of our physical health	Regular Medical Check-ups, Managing comorbidities
	Week 4		
PSYCHOLOGICAL HEALTH	What is Psychological Health and how it effects Quality of life	Benefits of mental Health and stress management	Benefits of cognitive functioning and steps to improve it.
	Week 5		
SOCIAL HEALTH	What is Social Health and how it effects our Quality of life	How to engage in social connections and support systems	Benefits of social connections and support systems
	Week 6		
PHYSICAL ENVIRONMENT	What is Physical Environment and how does it impact the health of the elderly.		Creating a safe and healthy environment
	Week 7		

DISCLOSURE	What is Disclosure and concerns about Disclosure	What to disclose and how to disclose	Benefits of disclosure	
	Week 8			
ADHERANCE	What is Adherence and How to adhere	Barriers to Adherence and effects of Incomplete or Non adherence to medications	Benefits of Adherence	
	Week 9			
PHYSICAL HEALTH	What is Physical Health and how it effects the QoL	Improving our nutrition and lifestyle as part of our physical health	Regular Medical Check-ups, Managing comorbidities	
	Week 10			
PSYCHOLOGICAL HEALTH	What is Psychological Health and how it effects Quality of life	Benefits of mental Health and stress management	Benefits of cognitive functioning and steps to improve it.	
	Week 11			
SOCIAL HEALTH	What is Social Health and how it effects our Quality of life	How to engage in social connections and support systems	Benefits of social connections and support systems	
	Week 12			
PHYSICAL ENVIRONMENT	What is Physical Environment and how does it impact the health of the elderly.	Creating a safe and healthy environment	Final Message (Thank You)	

Appendix 5: Differentiated Services Delivery Approach Training Content

TRAINING CONTENT

Psychosocial Support Intervention on the Quality Of Life among Elderly People Living With HIV

1. **Disclosure**
    - ***Improved access to medical care and support***: Disclosing HIV status to healthcare providers allows for more personalized and effective care.
    - Enhanced emotional well-being: Sharing one's status with trusted individuals can provide emotional support, reduce feelings of isolation, and alleviate mental health issues.
    - ***Strengthened social support:*** Disclosing to family and friends can create a network of understanding and empathy, fostering a sense of belonging and reducing isolation.
    - ***Prevention of transmission***: Disclosing HIV status to intimate partners allows for informed decision-making, including practicing safe sex or exploring other prevention options.
    - ***Advocacy and reducing stigma:*** Disclosure can help raise awareness, challenge misconceptions, and fight against the stigma surrounding HIV.

Encourage elderly PLHIV to assess their personal readiness and safety before disclosing their HIV status. This involves considering factors such as:

Emotional preparedness: Are they emotionally ready to disclose and handle potential reactions from others?

- Legal protections: Are there laws or regulations in place that protect PLHIV from discrimination and ensure confidentiality?
- Support system: Do they have a reliable support system in place to lean on if needed?
- Social environment: What is the level of stigma and discrimination in their social circles or community?

Provide information and education:

- It is important to provide accurate information and education about HIV transmission, treatment, and the realities of living with HIV. Elderly PLHIV may have outdated or incomplete knowledge about the virus. Educating them about the advancements in treatment, prevention methods, and the reduced risk of transmission can help alleviate fears and misconceptions.

Encourage open communication with healthcare providers:

- Support elderly PLHIV in building a trusting relationship with their healthcare providers. Encourage them to openly discuss their concerns, seek advice, and ask questions related to disclosure. Healthcare professionals can provide guidance tailored to their specific needs and circumstances.

Discuss potential strategies for disclosure:

- Help elderly PLHIV explore different strategies for disclosure. This may involve considering whom to disclose to, when and where to disclose, and how to handle potential reactions. Encourage them to identify supportive individuals or groups, such as HIV support organizations or counseling services, that can assist them throughout the process.

Encourage gradual disclosure:

- Recognize that disclosure is a personal decision and may not happen all at once. Encourage elderly PLHIV to start with disclosing to trusted individuals before moving on to broader circles. Gradual disclosure allows for a sense of control and minimizes potential negative consequences.

Address concerns and provide ongoing support:

- Be prepared to address concerns and provide ongoing support to elderly PLHIV throughout the disclosure process. Encourage them to seek counseling or support groups where they can share experiences, gain guidance, and connect with others who have gone through similar situations.

Highlight legal protections.

2. Adherence

Adherence to antiretroviral therapy (ART) is crucial for managing HIV infection effectively. Here's why adherence is important for elderly PLHIV:

- ***Treatment Efficacy***: Consistent adherence to prescribed medications helps maintain viral suppression, which reduces the risk of HIV-related complications and disease progression. This is particularly important for elderly individuals, as they may be more vulnerable to the effects of uncontrolled HIV infection due to age-related immune system changes.
- ***Health Outcomes:*** Adherence to ART has been associated with improved health outcomes, reduced hospitalizations, and increased life expectancy among PLHIV. Older individuals with HIV may already be at increased risk for age-related comorbidities, so maintaining viral suppression through adherence becomes even more crucial.
- ***Drug Resistance Prevention:*** Incomplete adherence can lead to the development of drug-resistant strains of HIV, limiting future treatment options. This is especially concerning for elderly PLHIV, as they may have fewer alternative medication choices due to age-related health conditions or interactions with other medications they take for non-HIV-related issues.
- ***Quality of Life:*** Adherence to medications helps individuals maintain their overall well-being and quality of life by reducing symptoms, improving energy levels, and preventing opportunistic infections associated with uncontrolled HIV infection.
- To support adherence among elderly PLHIV, healthcare providers should provide clear instructions, offer reminders, address barriers to adherence (such as complex medication regimens or side effects), and regularly monitor treatment progress.
- In summary, adherence to medications and the decision to disclose HIV status are both significant for elderly PLHIV. Adherence ensures optimal treatment outcomes and overall health, while disclosure can provide access to support, personalized care, and improved well-being. These factors should be addressed sensitively, respecting the autonomy and privacy of everyone.

3. Physical Health/Life Style Modification

- ***Regular Medical Check-ups:*** Schedule regular visits to healthcare professionals experienced in HIV care to monitor the individual's overall health. These check-ups may include assessing viral load, CD4 count, and other relevant blood tests to evaluate the progression of the disease and determine appropriate treatment plans.
- ***Nutrition and Diet:*** Encourage a balanced and nutritious diet to support the individual's immune system and overall well-being. A well-rounded diet should include fruits, vegetables, whole grains, lean proteins, and healthy fats. Proper nutrition helps maintain strength, energy levels, and a healthy weight.
- ***Exercise and Physical Activity***: Engaging in regular physical activity is beneficial for maintaining cardiovascular health, muscle strength, flexibility, and overall well-being. Encourage elderly individuals to participate in appropriate exercises such as walking, swimming, or low-impact aerobics, based on their abilities and medical conditions. Exercise can also improve mood and mental well-being.
- ***Prevention and Management of Comorbidities:*** Older adults with HIV may be at higher risk of developing certain comorbidities, such as cardiovascular disease, diabetes, osteoporosis, or certain cancers. It is important to screen for and manage these conditions appropriately, working closely with healthcare providers.
- ***Medication Management***: Ensure that the individual is taking their medications as prescribed and understands any potential side effects. It may be helpful to use pill organizers or smartphone apps as reminders. If the person has difficulty managing their medications independently, consider involving a caregiver or a healthcare professional.
- ***Pain Management:*** Some elderly individuals living with HIV may experience chronic pain, which can impact their quality of life. It is crucial to assess and manage pain appropriately, taking into consideration any drug interactions or contraindications with their HIV medications.
- ***Fall Prevention:*** Falls can pose significant risks for the elderly, and those living with HIV may have additional challenges due to potential complications or side effects of medication. Assess the living environment for potential hazards, encourage the use of assistive devices, and promote activities that improve balance and strength to reduce the risk of falls.
- ***Adequate Sleep:*** Encourage good sleep hygiene practices to promote better physical health and overall well-being. Aim for a consistent sleep routine and create a comfortable sleep environment that is conducive to restful sleep.
- *Social Support*: Loneliness and isolation can negatively impact an individual's physical health. Encourage social engagement, maintain connections with friends and family, and consider support groups or community resources that can provide emotional support.

Smoking and Alcohol: Briefly introduce the topic of smoking and drinking among elderly people living with HIV (PLHIV) and State the importance of discussing the negative effects of smoking and drinking on this specific population.

- ✓ Weakened immune system.
- ✓ Increased risk of cardiovascular diseases.
- ✓ Worsening respiratory health.
- ✓ Interactions with HIV medications.
- ✓ Increased risk of comorbidities.
- ✓ Impact on mental health.

4. **Psychological Health**
    - ***Emotional Well-being:*** This involves recognizing and managing emotions effectively. It includes the ability to understand and express emotions, as well as to cope with and regulate emotional responses.
    - ***Cognitive Functioning:*** Cognitive health refers to the ability to think, reason, learn, and make decisions. It involves processes such as attention, memory, problem-solving, and critical thinking.
    - ***Self-esteem and Self-worth:*** This component relates to an individual's sense of self, self-acceptance, and self-confidence. A healthy level of self-esteem is important for overall psychological well-being.
    - ***Resilience***: Resilience is the capacity to bounce back and adapt in the face of adversity or challenging life circumstances. It involves coping skills, problem-solving abilities, and the ability to maintain a positive outlook.
    - ***Social Support:*** Strong social connections and supportive relationships with family, friends, and a community are vital for psychological health. Social support provides a sense of belonging, acceptance, and assistance during times of stress or hardship.
    - ***Coping Skills:*** Effective coping skills enable individuals to manage stress, deal with difficult emotions, and navigate life's challenges. Healthy coping mechanisms may include seeking support, engaging in relaxation techniques, practicing mindfulness, or engaging in hobbies.
    - ***Purpose and Meaning:*** Having a sense of purpose, meaning, and goals in life contributes to psychological health. It involves feeling a sense of fulfillment, having a direction, and engaging in activities that align with personal values and passions.
    - ***Psychological Flexibility:*** This refers to the ability to adapt to changing circumstances, tolerate uncertainty, and maintain an open-minded approach. Psychological flexibility involves being able to adjust one's thoughts, emotions, and behaviors as needed.
    - ***Work-Life Balance***: Maintaining a healthy balance between work, personal life, and leisure activities is essential for psychological well-being. It involves setting boundaries, managing time effectively, and prioritizing self-care.
    - ***Positive Mindset:*** Cultivating a positive mindset involves focusing on strengths, gratitude, optimism, and positive self-talk. It contributes to psychological well-being by promoting resilience and reducing the impact of negative thoughts.
    - ***Screening for minor mental health disorders among this population using the PHQ-***9

5. **Social Health**
    - ***Social Support***: Building and maintaining a strong support network is crucial for elderly people living with HIV. This can include family, friends, support groups, and healthcare providers who provide emotional, practical, and informational support. Social support helps reduce feelings of isolation, depression, and anxiety.
    - ***Stigma Reduction:*** Addressing and reducing stigma associated with HIV is vital for the social well-being of elderly individuals. Stigma can lead to social isolation, discrimination, and a negative impact on mental health. Education and awareness programs can help dispel myths and promote a more inclusive and accepting environment.
    - ***Community Engagement:*** Encouraging involvement in community activities and organizations can foster a sense of belonging and purpose. Participation in social,

recreational, and volunteer activities tailored to the needs and preferences of elderly individuals can enhance their social well-being and overall quality of life.

- ***Mental Health Support:*** Addressing mental health concerns is an essential aspect of social health management. Elderly people living with HIV may experience higher rates of depression, anxiety, and cognitive decline. Access to mental health services, counseling, and support groups can play a significant role in maintaining their social well-being.
- ***Caregiver Support:*** Providing support and resources for caregivers of elderly individuals living with HIV is crucial. Caregivers often face challenges such as emotional stress, burnout, and limited resources. Offering caregiver support programs, respite care, and access to education can help alleviate their burden and improve the overall social health of both the caregiver and the elderly person.
- ***Communication and Education:*** Effective communication and education about HIV, treatment options, and managing the condition are vital for the elderly population. Providing clear information, addressing concerns, and promoting open dialogue can empower individuals to actively participate in their own care and make informed decisions.

6. Physical Environment

- ***Adequate Lighting:*** Good lighting is essential for the elderly, especially those with visual impairments or cognitive decline. Sufficient lighting should be provided in all areas of the living space, including hallways, bedrooms, bathrooms, and common areas.
- ***Assistive Devices:*** Depending on the specific needs of the elderly individuals, providing assistive devices can greatly enhance their independence and quality of life. These may include mobility aids like walkers or wheelchairs, hearing aids, magnifying glasses for those with visual impairments, or any other devices that can assist with daily activities.
- ***Medication Management:*** HIV requires adherence to medication regimens, so it's important to ensure that the physical environment supports proper medication management. This may include providing pill organizers, easy-to-read labels, and a designated area for storing medications safely.
- ***Personal Hygiene Facilities:*** Maintaining personal hygiene is essential for individuals living with HIV. The physical environment should include accessible bathrooms with grab bars, non-slip mats, and adjustable showerheads to accommodate different needs. Adequate storage for toiletries and supplies should also be available.
- ***Nutrition Support:*** A well-balanced diet plays a crucial role in managing HIV and overall health. The physical environment should facilitate access to nutritious food, whether through a well-equipped kitchen or easy access to meal delivery services or community resources.
- ***Accessibility and Mobility***: Elderly individuals with HIV may have mobility challenges, so the physical environment should be designed to promote ease of movement. This may involve removing physical barriers, providing ramps or elevators for those with limited mobility, and ensuring pathways are clear and wide enough to accommodate assistive devices.
- ***Social Spaces and Recreation:*** Creating social spaces within the physical environment can foster a sense of community and reduce isolation among elderly individuals living

with HIV. This can include common areas, outdoor spaces, and facilities for recreational activities, such as exercise equipment or areas for hobbies and crafts.

- ***Safety Measures:*** Implementing safety measures is crucial to prevent accidents and injuries. This may involve installing smoke detectors, carbon monoxide detectors, fire extinguishers, and maintaining clear emergency exit routes. Adequate security measures should also be in place to ensure the safety and well-being of the residents.
- ***Privacy and Dignity:*** Lastly, it's important to create an environment that respects the privacy and dignity of elderly individuals living with HIV. This can be achieved by providing private spaces, ensuring confidentiality of personal information, and promoting autonomy and choice in decision-making.

7. Components of the DSD Model

- ***Client-centered approach*****:** service providers ensure that services are flexible and tailored to each person's preferences, health conditions, and circumstances. This personalized care improves both engagement and satisfaction.
    - ***Risk stratification:*** This is where clients are categorized based on factors such as their viral load, adherence to medication, or other health risks. This categorization allows for more focused care, as individuals with different risk profiles can receive varying levels of attention and support.
    - ***Service differentiation*** refers to customizing healthcare services based on the risk categories identified during the stratification process. This approach ensures that high-risk clients receive more comprehensive care while low-risk, stable clients can access less intensive services.
    - ***Streamlined services:*** focuses on simplifying and standardizing healthcare processes to make service delivery more efficient and user-friendly. This includes reducing unnecessary bureaucratic steps, minimizing wait times, and ensuring clients receive prompt and effective care.
    - ***Community Engagement:*** engaging communities in the design and delivery of healthcare services is essential to ensuring that services are responsive to the specific

needs and preferences of the population they serve. Community engagement fosters trust, improves service uptake, and enhances the cultural relevance of interventions

- ***Data-Driven Decision-Making:*** This allows healthcare providers to monitor outcomes, identify gaps in service, and make evidence-based adjustments to improve care. This approach involves collecting and analyzing data on key indicators such as viral suppression rates, adherence levels, and client satisfaction.

Appendix 6: Pre and Posttest Assessment/Questionnaire

Pre and Post-Test Questionnaire for Health Care Providers Training on Developing a Differentiated Service Delivery Intervention for Elderly Persons Living With HIV.

1. How do you approach counseling elderly clients living with HIV on appropriate strategies for disclosing their status?"

   a) Provide detailed strategies based on the client's emotional readiness, legal protections, and support systems.
   b) Offer basic information on disclosure but do not focus on personalized strategies.
   c) Usually refer clients to other professionals for counseling on disclosure.
   d) Do not address disclosure in my counseling sessions.

2. What key factors do you consider when advising elderly clients on disclosing their HIV status?

   a) Emotional preparedness

   b) Legal protections

   c) Support systems

   d) All of the above

   e) None of the above

3. How do you support elderly clients in maintaining adherence to their ART

   a) Provide clear instructions and regularly monitor their treatment progress and also offer reminders and help them address barriers like complex medication regimens or side effects.

   b) Focus on adherence only if the client brings it up.

   c) Do not actively engage in adherence counseling.

4. What strategies do you discuss with elderly clients to prevent drug resistance from incomplete ART adherence?

   a) Explain the risks of drug resistance and emphasize the importance of consistent adherence.

   b) Provide information but do not specifically address drug resistance.

   c) Refer clients to other professionals for more detailed adherence counseling.

d) Do not discuss drug resistance in relation to adherence.

5. When counseling elderly clients living with HIV, how do you address lifestyle modifications?

a) Provide detailed guidance on exercise, nutrition, and encourage regular check-ups.

b) Offer basic recommendations on lifestyle modifications but do not go into detail.

c) Focus primarily on medical care and refer clients to other professionals for lifestyle advice.

d) Do not discuss lifestyle modifications with my clients.

6. How do you approach the management of comorbidities and discuss the risks of smoking and alcohol consumption with elderly clients living with HIV?"

a) Regularly screen for comorbidities and discuss the risks of smoking and alcohol use.

b) Provide information about comorbidities but do not actively discuss smoking or alcohol risks.

c) Refer clients to specialists for comorbidity management and lifestyle counseling.

d) Do not typically address comorbidities, smoking, or alcohol use in my counseling sessions

7. How do you assess and address the psychological health needs of elderly clients living with HIV

a) Conduct regular assessments and offer guidance on managing emotional health, self-esteem, and resilience.

b) Provide general emotional support but do not conduct formal assessments of psychological health.

c) Refer clients to mental health professionals for psychological support.

d) Do not actively address psychological health in my consultations.

8. What strategies do you use to help elderly clients living with HIV develop coping skills and maintain social support systems?

a) Discuss coping skills but leave social support to be managed by the client independently.

b) Provide specific coping strategies and encourage building strong social support networks.

c) Refer clients to support groups or counselors for coping and social support advice.

d) Do not focus on coping strategies or social support in my sessions.

9. How do you assist elderly clients living with HIV in building and maintaining a strong social support network?"

a) Actively help clients connect with family, friends, and support groups for emotional and practical support.

b) Clients are referred to community organizations or social workers for support.

c) Do not address social support in my counseling sessions.

d) Provide general advice on building social support but do not actively assist with connections.

10. What steps do you take to address stigma and promote social inclusion for elderly clients living with HIV?

a) Clients are referred to advocacy or educational programs to address stigma.

b) Do not focus on stigma reduction in my practice.

c) Clients and their communities are educated about HIV to reduce stigma and encourage inclusion.

d) Focus on providing care but do not actively address stigma or social inclusion.

11. How do you ensure that the physical environment supports the needs of elderly clients living with HIV, particularly in areas such as medication management and mobility?"

a) Clients are helped to set up accessible spaces for medication management and recommend assistive devices for mobility.

b) Provide general advice on medication management but do not focus on mobility or environmental needs.

c) I do not address physical environment needs in my practice.

12. What strategies do you use to promote safety, privacy, and dignity in the living environments of elderly clients with HIV?"

a) Counselling do not typically address the physical environment during counselling of clients.

b) Counselling focuses mainly on health care but do not address safety or privacy concerns.

d) Clients are counselled on living spaces which are safe, accessible, and respect their privacy and dignity.

13. How do you ensure that the healthcare services you provide are tailored to meet the individual preferences and needs of elderly clients living with HIV?"

a) Services are provided based on each client's preferences and health conditions.

b) Provide standardized of care without adjusting for individual preferences.

d) Do not specifically tailor care plans to individual preferences.

14. How do you use risk stratification to categorize elderly clients living with HIV and provide them with appropriate levels of care?"

a) I assess health risks such as viral load and adherence to determine care levels.

b) I offer the same level of care to all clients regardless of risk.

c) I refer clients to other professionals for risk assessment.

d) I do not know risk stratification

15. How do you ensure that healthcare services for elderly clients living with HIV are streamlined and efficient?

a) I work to simplify processes and minimize wait times for clients.

b) I follow standard protocols without focusing on reducing service delays.

c) I refer clients to external services to avoid bureaucratic delays.

d) I do not focus on streamlining healthcare processes.

Appendix 7: World Health Organisation Quality of Life Bref tool

WHO/MSD/MER/02.2

English only

Distr.: General

WHOQOL-HIV BREF

MENTAL HEALTH: EVIDENCE AND RESEARCH DEPARTMENT OF MENTAL HEALTH AND SUBSTANCE DEPENDENCE WORLD HEALTH ORGANIZATION GENEVA

		Raw Score	Transformed Score	
Domain 1	(6-Q3) + (6-Q4) + Q14 + Q21 آ+آ+آ+آ			
Domain 2	Q6 + Q11 + Q15 + Q24 + (6-Q31) آ+آ+آ+آ+آ			
Domain 3	(6-Q5) + Q20 + Q22 + Q23 آ+آ +آ+ آ			
Domain 4	Q17 + Q25 + Q26 + Q27 آ+آ+آ+آ			

Domain 5	Q12 + Q13 + Q16 + Q18 + Q19 + Q28 + Q29 + Q30 ٱ+ٱ+ٱ+ٱ +ٱ +ٱ+ٱ+ٱ	
Domain 6	Q7 + (6–Q8) + (6-Q9) + (6-Q10) ٱ+ٱ+ ٱ+ٱ	

Further copies of this document may be obtained from

Department of Mental Health and Substance Dependence

World Health Organization

CH-1211 Geneva 27

Switzerland

ABOUT YOU

Before you begin we would like to ask you to answer a few general questions about yourself: by circling the correct answer or by filling in the space provided.

What is your **gender**?	Male / Female
How old are you?	____________ (age in years)
What is the highest **education** you received?	None at all / Primary / Secondary / Tertiary
What is your **marital status**?	Single / Married/ Living as married / Separated / Divorced / Widowed
How is your **health**?	Very Poor / Poor / Neither Poor nor Good / Good / Very Good
Do you consider yourself currently ill?	Yes / No

If there is something wrong with you, what do you think it is? ________________________

Please respond to the following questions if they are applicable to you:

What is your **HIV serostatus**?	Asymptomatic / Symptomatic / AIDS converted

In what year did you first **test positive** for HIV? ________________________

In what year do you think you were infected? ________________________

How do you believe you were **infected with HIV**? (circle one only):

Sex with a man / Sex with a woman / Injecting drugs / Blood products / Other (specify)__________________

Instructions

This assessment asks how you feel about your quality of life, health, or other areas of your life. **Please answer all the questions.** If you are unsure about which response to give to a question, **please choose the one** that appears most appropriate. This can often be your first response. Please keep in mind your standards, hopes, pleasures and concerns. We ask that you think about your life **in the last two weeks.** For example, thinking about the last two weeks, a question might ask:

		Not at all	A little	A moderate amount	Very much	Extremely
11 (F5.3)	How well are you able to concentrate?	1	2	3	4	5

You should circle the number that best fits how well are you able to concentrate over the last two weeks. So you would circle the number 4 if you were able to concentrate very much. You would circle number 1 if you were not able to concentrate at all in the last two weeks.

Please read each question, assess your feelings, and circle the number on the scale for each question that gives the best answer for you.

		Very poor	Poor	Neither poor nor good	Good	Very good
1(G1)	How would you rate your quality of life?	1	2	3	4	5

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied

2 (G4)	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about **how much** you have experienced certain things in the last two weeks.

		Not at all	A little	A moderate amount	Very much	An extreme amount
3 (F1.4)	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4 (F50.1)	How much are you bothered by any physical problems related to your HIV infection?	1	2	3	4	5
5 (F11.3)	How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
6 (F4.1)	How much do you enjoy life?	1	2	3	4	5
7 (F24.2)	To what extent do you feel your life to be meaningful?	1	2	3	4	5
8 (F52.2)	To what extent are you bothered by people blaming you for your HIV status	1	2	3	4	5
9 (F53.4)	How much do you fear the future?	1	2	3	4	5
10 (F54.1)	How much do you worry about death?	1	2	3	4	5

		Not at all	A little	A moderate amount	Very much	Extremely
11 (F5.3)	How well are you able to concentrate?	1	2	3	4	5
12 (F16.1)	How safe do you feel in your daily life?	1	2	3	4	5
13 (F22.1)	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about **how completely** you experience or were able to do certain things in the last two weeks.

		Not at all	A little	Moderately	Mostly	Completely
14 (F2.1)	Do you have enough energy for everyday life?	1	2	3	4	5
15 (F7.1)	Are you able to accept your bodily appearance?	1	2	3	4	5
16 (F18.1)	Have you enough money to meet your needs?	1	2	3	4	5
17 (F51.1)	To what extent do you feel accepted by the people you know?	1	2	3	4	5
18 (F20.1)	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5

19 (F21.1)	To what extent do you have the opportunity for leisure activities?	1	2	3	4	5

		Very poor	Poor	Neither poor nor good	Good	Very good
20 (F9.1)	How well are you able to get around?	1	2	3	4	5

The following questions ask you how **good or satisfied** you have felt about various aspects of your life over the last two weeks.

		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
21 (F3.3)	How satisfied are you with your sleep?	1	2	3	4	5
22 (F10.3)	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
23 (F12.4)	How satisfied are you with your capacity for work?	1	2	3	4	5
24 (F6.3)	How satisfied are you with yourself?	1	2	3	4	5
25 (F13.3)	How satisfied are you with your personal relationships?	1	2	3	4	5
26 (F15.3)	How satisfied are you with your sex life?	1	2	3	4	5
27 (F14.4)	How satisfied are you with the support you	1	2	3	4	5

	get from your friends?					
28 (F17.3)	How satisfied are you with the conditions of your living place?	1	2	3	4	5
29 (F19.3)	How satisfied are you with your access to health services?	1	2	3	4	5
30 (F23.3)	How satisfied are you with your transport?	1	2	3	4	5

The following question refers to **how often** you have felt or experienced certain things in the last two weeks.

		Never	Seldom	Quite often	Very often	Always
31 (F8.1)	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

Did someone help you to fill out this form? ______________________

How long did it take to fill this form out? ______________________

Do you have any comments about the assessment? ______________________

____

____

____

THANK YOU FOR YOUR HELP

Appendix 8: Informed Consent Form

CONSENT FORM

STUDY TITLE: Psychosocial Intervention Support for Improving the Health-Related Quality of Life for Elderly on Antiretroviral Therapy in the Greater Accra Region of Ghana: A Quasi-Experimental Study

PARTICIPANTS' STATEMENT

I acknowledge that I have read, or someone has read to me the purpose and contents of the Participants' Information Sheet in the language I best understand (English, Twi, Ga etc.), on the research study titled "*Psychosocial Intervention Support for Improving the Health-Related Quality of Life for Elderly on Antiretroviral Therapy in the Greater Accra Region of Ghana: A Quasi-Experimental Study*". I have had the opportunity to ask questions about it and any questions I have asked were answered to my satisfaction

I fully understand the contents and any potential implications as well as my right to change my mind (i.e. withdraw from the research) even after I have signed this form.

I voluntarily agree to be part of this research.

Name of Participant…………………………..

Participants' Signature ……………………..OR Thumb Print……………………………

Date:…………………………..

Contact Details………………………………….

INTERPRETERS' STATEMENT

I interpreted the purpose and contents of the Participants' Information Sheet on the research study titled "*Psychosocial Intervention Support for Improving the Health-Related Quality of Life for the Elderly on Antiretroviral Therapy In the Greater Accra Region of Ghana: A Quasi-Experimental Study"* to the afore named participant to the best of my ability in the language (English, Twi, Ga, Hausa, Dagbani etc.) to her proper understanding.

All questions and appropriate clarification enquired by the participant, were duly answered to his/her satisfaction.

Name of Interpreter…………………………….

Signature of Interpreter………………………. OR Thumb Print ……..............................

Date:…………

STATEMENT OF WITNESS

I was present when the purpose and contents of the Participant Information Sheet on the research study titled "*Psychosocial Intervention Support for Improving the Health-Related Quality of Life for the Elderly on Antiretroviral Therapy in The Greater Accra Region of Ghana: A Quasi-Experimental Study*" was read and explained satisfactorily to the participant in the language he/she understood.

I confirm that he/she was allowed to ask questions/seek clarifications and the same were duly answered to his/her satisfaction before voluntarily agreeing to be part of the research.

Name………………………

Signature………………………….. OR Thumb Print ……..............................

Date……………………………

INVESTIGATOR STATEMENT AND SIGNATURE

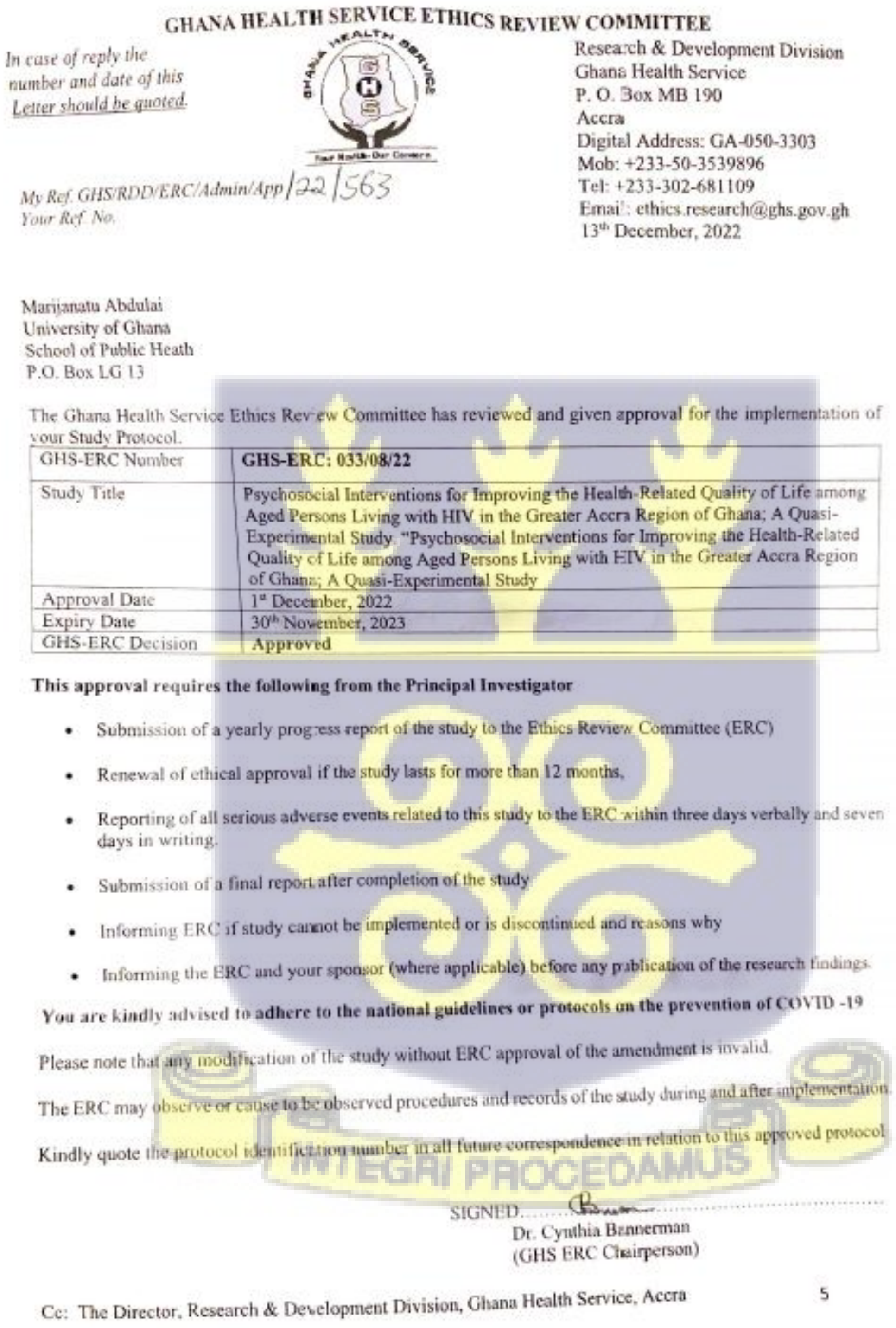
I certify that the participant has been given ample time to read and learn about the study titled; "*Psychosocial Intervention Support for Improving the Health-Related Quality of Life for the Elderly on Antiretroviral Therapy in The Greater Accra Region of Ghana: A Quasi-Experimental Study*". All questions and clarifications raised by the participant have been addressed.

Researcher's name……………………………………….

Signature ………………………………………………….

Date……………………………………………………………….

Appendix 9: Ethical Clearance



GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the
number and date of this
Letter should be quoted.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Digital Address: GA-050-3303
Mob: +233-50-3539896
Tel: +233-302-681109
Email: ethics.research@ghs.gov.gh

My Ref. GHS/RDD/ERC/Admin/App/22/563
Your Ref. No.

13th December, 2022

Marijanatu Abdulai
University of Ghana
School of Public Heath
P.O. Box LG 13

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	**GHS-ERC: 033/08/22**
Study Title	Psychosocial Interventions for Improving the Health-Related Quality of Life among Aged Persons Living with HIV in the Greater Accra Region of Ghana; A Quasi-Experimental Study. "Psychosocial Interventions for Improving the Health-Related Quality of Life among Aged Persons Living with HIV in the Greater Accra Region of Ghana; A Quasi-Experimental Study
Approval Date	1st December, 2022
Expiry Date	30th November, 2023
GHS-ERC Decision	**Approved**

This approval requires the following from the Principal Investigator

- Submission of a yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report after completion of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings.

You are kindly advised to adhere to the national guidelines or protocols on the prevention of COVID -19

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED...
Dr. Cynthia Bannerman
(GHS ERC Chairperson)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra

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