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Investigating The Prevalence and Predictors of Depression and Anxiety Disorders among Adolescents Living with HIV at Kabwe Women, Newborn and Children's Hospital and Kabwe Central Hospitals

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DEDICATION

This work is dedicated firstly to God for being a present help in time of need, secondly to myself for never giving up, to my family, whose unwavering love and support have been my foundation, special mention to my nephews who think the world of me, gives me the drive to keep pushing for excellence and lastly to my friends, whose encouragement and friendship have been invaluable throughout this academic journey. Your belief in me made this achievement possible.

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ACRONYMS

ALWHIV - Adolescents Living with HIV

ART - Antiretroviral Therapy

cART - Combination Antiretroviral Therapy

CMD - Common Mental Disorders

PLWH - People Living with HIV

YLWH - Youth Living with HIV

SSA - Sub-Saharan Africa

PHQ-9 - Patient Health Questionnaire-9 (depression screening tool)

GAD-7 - Generalized Anxiety Disorder-7 (anxiety screening tool)

KWNCH - Kabwe Women, Newborn and Children's Hospital

KCH - Kabwe Central Hospital

KPHO - Kabwe Provincia Health Office

NHRA - National Health Research Authority

UNAIDS - Joint United Nations Programme on HIV/AIDS

SDG - Sustainable Development Goals

UNICEF - United Nations Children's Fund

MoH - Ministry of Health

DHS - Demographic and Health Survey

ABSTRACT

Background: Adolescents living with HIV (ALWHIV) face elevated risks of common mental disorders (CMDs), yet limited data exists on their prevalence and determinants in sub-Saharan Africa, particularly Zambia.

Objective: This study examined the prevalence and factors associated with depression and anxiety among adolescents living with HIV in Kabwe, Zambia.

Methods: A hospital-based cross-sectional study was conducted among 108 adolescents aged 10–19 years receiving antiretroviral therapy at two public referral hospitals in Kabwe, Zambia. Depression and anxiety were assessed using the Patient Health Questionnaire-9 (PHQ-9) and the Generalized Anxiety Disorder-7 (GAD-7) scale respectively, both validated for use in sub-Saharan African adolescent populations. Bivariate analyses using chi-square tests and multivariate logistic regression were conducted to identify independent predictors of each condition.

Results: The prevalence of depression was 26.9% and anxiety was 28.7%, with 17.6% experiencing both conditions concurrently. Experienced stigma and discrimination emerged as the strongest predictor for both depression (AOR=5.87) and anxiety (AOR=4.19). Perception that mental health was affected by social environment independently predicted both conditions. Depression-specific risk factors included living arrangements, with adolescents not living with parents showing threefold increased odds. For anxiety, low confidence in managing HIV treatment was a unique predictor (AOR=2.64). Cumulative risk analysis revealed a dose-response relationship, with CMD prevalence increasing from 16.1% among those with no risk factors to 84.6% among those with three or more factors.

Conclusion: The substantial burden of CMDs among ALWHIV in Zambia, driven primarily by stigma and social environment factors, underscores the urgent need for integrated mental health services within HIV care programs. Interventions should address stigma reduction, strengthen social support systems, and provide targeted support for adolescents with multiple vulnerabilities.

Keywords: Adolescents, HIV, depression, anxiety, stigma, Zambia

CHAPTER ONE: INTRODUCTION

1.1 Background

Depression and anxiety are common mental disorders (CMD) among adolescents globally (Shorey & Wong, 2022). Studies indicate that these disorders are very frequent in people living with HIV/AIDS (Silveira *et al.*, 2025; Lofgren *et al.*, 2020) and the risk is higher than in the general population (Perera *et al.*, 2025; Bhana *et al.*, 2020). The ability to accurately identify depression and anxiety within this demographic is essential for timely intervention and improved health outcomes.

Globally, there are about 1.4 million adolescents living with HIV/AIDS (ALWHIV) (UNICEF, 2019). Depression and anxiety disorders can significantly impact the quality of life of adolescents (Jatchavala & Chan, 2018). These conditions can significantly affect social, emotional and cognitive development among ALWHIV. Depression and anxiety have been associated with poor adherence to antiretroviral therapy (ART), which can lead to increased viral loads and disease progression (Kip *et al.*, 2022). Furthermore, these disorders can reduce adolescents' motivation to engage in self-care, negatively affecting their overall quality of life and increasing the risk of social isolation, stigma and suicidal ideation (Zelege *et al.*, 2024). These impacts not only compromise individual health outcomes but also pose broader public health challenges in managing HIV/AIDS within communities.

While various studies have documented the prevalence of depression and anxiety among ALWHIV in different settings (Ayano *et al.*, 2021; Mpango *et al.*, 2022; Dessauvagie *et al.*, 2020; Di Gennaro *et al.*, 2022; Msefula & Umar 2023), there remains a scarcity of data specific to Zambia, particularly in regions such as Central Province. Existing research indicates high rates of depression and anxiety, but often lacks comprehensive analysis of the predictors and contextual factors influencing CMDs in this population (Molinaro *et al.*, 2021; Too *et al.*, 2021). Most studies are cross-sectional, limiting understanding of causal relationships and outcomes. Moreover, there is a need for culturally relevant screening tools and intervention models that address the unique socio-economic and cultural factors affecting adolescents in Zambia.

This study aimed to investigate the prevalence and predictors of depression and anxiety among ALWHIV at Kabwe Women, Newborn and Children's Hospital (KWNCH) and Kabwe Central Hospital (KCH). The research sought to fill existing knowledge gaps and inform targeted

interventions by identifying key socio-demographic, clinical, and psychosocial factors associated with mental health outcomes.

1.2 Statement of the Problem

Globally, CMDs among ALWHIV rarely receive the necessary attention, especially in low-income countries with weak healthcare systems and limited mental health services (Shorey & Wong, 2022). In Zambia, where the HIV/AIDS prevalence among adolescents remains high, there is a dearth of data on the burden of depression and anxiety within this population, as well as on factors associated with these mental health conditions (Poku *et al.*, 2023; Molinaro *et al.*, 2021). Furthermore, cultural stigmas surrounding mental health issues and HIV/AIDS often discourage adolescents from seeking psychological support, thereby exacerbating their vulnerability (Zhang-James *et al.*, 2025). The absence of validated, contextually grounded data on the prevalence and predictors of CMDs among ALWHIV in Zambia, particularly within Central Province, represents a critical gap that limits the capacity of health system planners to design evidence-based, culturally appropriate mental health interventions for this population.

Despite the recognized importance of mental health in HIV/AIDS care, there remains a significant knowledge gap concerning the mental health status of adolescents in Zambia, necessitating rigorous research to inform policy and programmatic responses tailored to this demographic (Poku *et al.*, 2023; Shorey & Wong, 2022). It is against this background that this study sought to investigate CMDs (depression and anxiety) among ALWHIV, focusing on the prevalence of CMD and their associated predictors

1.3 General Objective

The general objective of this study was to investigate the prevalence and identify the predictors of depression and anxiety disorders among adolescents living with HIV/AIDS attending clinic at Kabwe Women, Newborn and Children's Hospital and Kabwe Central Hospital.

1.4 Specific Objectives:

1. To determine the prevalence of depression and anxiety among ALWHIV attending clinic at Kabwe Women, Newborn and Children's Hospital and Kabwe Central Hospital.
2. To investigate factors associated with depression among ALWHIV attending clinic at Kabwe Women, Newborn and Children's Hospital and Kabwe Central Hospital.
3. To examine factors associated with anxiety among ALWHIV attending clinic at Kabwe Women, Newborn and Children's Hospital and Kabwe Central Hospital.

1.5 Research Questions:

1. What is the prevalence of depression and anxiety among ALWHIV attending the clinic at Kabwe Women, Newborn and Children's Hospital and Kabwe Central Hospital?
2. What factors are associated with depression among ALWHIV at Kabwe Women, Newborn and Children's Hospital and Kabwe Central Hospital?
3. What factors are associated with anxiety among ALWHIV attending the clinic at Kabwe Women, Newborn and Children's Hospital and Kabwe Central Hospital?

1.6 Rationale of the Study

This study is justified on four grounds. First, on public health grounds: depression and anxiety are major contributors to the global burden of disease, and their elevated prevalence among ALWHIV directly compromises antiretroviral therapy adherence, viral suppression, and long-term health outcomes (WHO, 2023). Generating prevalence and predictor data from a Zambian hospital context addresses a critical empirical gap and supports evidence-based decision-making in resource-limited settings. Second, on programmatic grounds: existing HIV care programmes in Zambia inadequately screen for or respond to mental health comorbidities. Identifying the specific psychosocial and sociodemographic predictors of depression and anxiety in this population provides facility-level programme planners with actionable information to integrate mental health screening into routine HIV care delivery. Third, on policy grounds: the findings directly support Zambia's National HIV/AIDS Strategic Plan and the UNAIDS 95-95-95 targets, both of which require holistic, person-centred care models. Evidence that stigma, living arrangements, and treatment self-efficacy predict mental health outcomes strengthens the case for anti-stigma policies and family-centred support interventions at the national level. Fourth, on scientific grounds: the study addresses the specific absence of validated, context-specific data on CMD determinants among ALWHIV in Central Province, Zambia, contributing original empirical findings to a literature that remains dominated by data from East Africa and high-income settings (Too et al., 2021; Olashore et al., 2021).

1.7 Scope and Delimitation of the Study

This study focused on investigating the prevalence and identifying predictors of depression and anxiety disorders among adolescents living with HIV aged 10–19 years attending antiretroviral therapy clinics at Kabwe Women, Newborn and Children's Hospital and Kabwe Central Hospital in Kabwe, Central Province, Zambia. Data were collected between October and December 2025 using two internationally validated screening instruments: the Patient Health Questionnaire-9 (PHQ-9) for depression and the Generalized Anxiety Disorder-7 (GAD-7) scale for anxiety,

supplemented by a structured sociodemographic and psychosocial questionnaire. The study examined potential predictors across three domains: sociodemographic characteristics (age, gender, educational level, residence, and living arrangements), psychosocial factors (experienced stigma, social environment perceptions, trusted confidant availability, and community safety), and clinical and treatment-related variables (ART duration, medication adherence, treatment confidence, and HIV disclosure status). The scope was delimited to adolescents currently enrolled in HIV care within the two hospital settings; the study did not extend to community-dwelling adolescents, those attending primary health care centres, or adults receiving HIV care. These boundaries were deliberately set to ensure a focused, internally consistent examination of a well-defined clinical cohort with comparable access to care services.

CHAPTER TWO: LITERATURE REVIEW

2.1 Overview of HIV among Adolescents

Sub-Saharan Africa continues to bear a disproportionate share of the global HIV burden, and within the region, adolescents and young people represent a population of heightened epidemiological concern (DHS Program, 2019; McMahan et al., 2022). What is striking across the literature, however, is not merely the magnitude of prevalence but the degree to which risk is structured by social position rather than individual behaviour. Older adolescent age, early sexual initiation, and inconsistent condom use consistently emerge as correlates of HIV acquisition (McMahan et al., 2022; Mumba et al., 2025); yet these factors operate within social environments shaped by gender inequality, cultural norms around sexual negotiation, and structural poverty. Reducing them to behavioural risk indicators, as large survey-based studies inevitably do, risks obscuring the underlying mechanisms that make certain adolescents more vulnerable than others.

Gender is among the most robust structuring variables in this literature. Young women and girls experience higher HIV prevalence than their male peers, a pattern attributable to limited bargaining power in sexual relationships, economic dependence that sustains transactional sex, and coercive sexual encounters (Sajadipour et al., 2022; Muchanga et al., 2025; Moeletsi et al., 2025). At the same time, young men face a distinct set of access barriers rooted in masculine norms that frame health-seeking behaviour as incompatible with male identity, alongside practical barriers such as occupational schedules that conflict with clinic opening hours (Maungue, 2020; Bossonario et al., 2022). Studies relying on health facility data therefore tend to overrepresent women, since pregnancy-related services create a natural point of contact with testing services, and to underrepresent the HIV burden carried by young men who never engage with formal healthcare. This differential selection into data sources is a significant methodological limitation that shapes the evidence base available for this study.

A further critical tension in this literature concerns the relative weight assigned to structural versus behavioural determinants of HIV risk. Population-based studies drawing on Demographic and Health Survey data, such as those by McMahan et al. (2022) and Mumba et al. (2025), identify sociodemographic risk indicators with considerable statistical power but are constrained by cross-sectional design and the absence of variables capturing social power dynamics. Qualitative and mixed-methods investigations, by contrast, foreground the lived experience of coercion, stigma, and community norms as primary drivers of vulnerability (Sajadipour et al.,

2022; Muchanga et al., 2025). Neither tradition alone is sufficient, and the scarcity of research that bridges these approaches limits the development of interventions responsive to both structural and individual-level realities.

In Zambia specifically, HIV prevalence among 15 to 24-year-olds stands at 3.8%, with females disproportionately represented, particularly those who are divorced, separated, widowed, or engaged in sex with multiple partners (Mumba et al., 2025). Condom use at last sex remains low at approximately 13.3% in this group, and only 54.9% of adolescents demonstrate comprehensive HIV knowledge, while awareness of HIV self-testing modalities remains at a mere 14.1% (UNICEF and MoH, 2021; Mumba et al., 2025). These knowledge and behaviour gaps are compounded by persistently elevated HIV prevalence among incarcerated populations, signalling ongoing transmission risks within communities from which many adolescents living with HIV in Zambia are drawn (Rosen et al., 2022; Hampanda et al., 2024; Tyler et al., 2019).

Despite the well-documented epidemiological burden of HIV among Zambian adolescents, no study has directly examined how the structural pathways through which HIV is acquired, including stigma exposure, disrupted family structures, and limited treatment knowledge, translate into mental health sequelae among adolescents already living with HIV. This translational gap from HIV-acquisition risk to mental health consequence among ALWHIV in Zambia is the primary motivation for the present study.

2.2 Common Mental Disorders among Adolescents Living with HIV

The elevated burden of common mental disorders (CMDs) among people living with HIV is now well-established in the global literature, with systematic reviews reporting depression prevalence as high as 44% and anxiety prevalence reaching 48.2% among this population (Silveira et al., 2025; Durteste et al., 2019; Nyongesa, 2022; Lofgren et al., 2020). Among adolescents aged 10 to 19 years in sub-Saharan Africa, reported prevalence ranges from 14% to 53% for depression and 15% to 25% for anxiety (Dessauvagie et al., 2020; Olashore et al., 2021). These wide ranges are themselves informative: they reflect genuine heterogeneity in CMD burden across settings, but also methodological variation in case-finding instruments, screening thresholds, and sampling strategies that makes direct comparison across studies unreliable.

What is more consistent across the literature is the finding that adolescents living with HIV (ALWHIV) carry a heavier mental health burden than both their HIV-negative peers and other vulnerable groups (Elkington et al., 2011; ter Haar et al., 2022). Multiple mechanisms have been proposed to explain this excess burden, including the neurobiological effects of antiretroviral

therapy (Aurpibul et al., 2024; Msefula and Umar, 2023), HIV-related stigma operating through shame, secrecy, and social exclusion (Vreeman et al., 2022; Perera et al., 2025), neurocognitive sequelae of HIV infection itself (Bergam et al., 2024), psychosocial stressors such as family dysfunction and bereavement (Elkington et al., 2011; Mutumba et al., 2017), and the psychological weight of anticipating disease progression (ter Haar et al., 2022). A critical limitation of the existing literature, however, is that most studies examine these mechanisms in isolation rather than within an integrated framework, making it difficult to assess their relative contribution to CMD burden or the ways in which they interact.

The geographic origin of this evidence base raises further concerns. The majority of mechanistic studies on CMD determinants among ALWHIV have been conducted in high-income settings, primarily the United States, with regional data from sub-Saharan Africa remaining comparatively sparse and unevenly distributed across countries (Olashore et al., 2021). Zambia is particularly underrepresented. This matters because the contextual drivers of mental health in ALWHIV, including healthcare infrastructure, family structure norms, disclosure practices, and the social meaning of HIV, differ substantially between high-income and sub-Saharan African settings. Evidence generated in resource-abundant contexts cannot be straightforwardly transposed to inform intervention design in Zambia.

Region-specific data on the prevalence, risk factor profiles, and consequence pathways of CMDs among ALWHIV in Zambia are absent from the literature. This absence prevents the development of contextually appropriate mental health interventions integrated within Zambia's HIV care system, a need that this study directly addresses.

2.3 Factors Associated with CMD in Adolescents Living with HIV

A growing body of country-specific evidence documents elevated CMD rates among ALWHIV across sub-Saharan Africa, with studies from Kenya (Nyongesa et al., 2021), Tanzania (Gamassa et al., 2023), Rwanda (Fawzi et al., 2016), Malawi (Msefula and Umar, 2023), South Africa (Gantsho et al., 2024), Zimbabwe (Mupambireyi et al., 2025), and the United States (Abebe et al., 2022) converging on the finding that ALWHIV carry substantially higher mental health burdens than HIV-negative peers. Nyongesa et al. (2021) identified HIV-positive status as an independent predictor of depressive symptoms and co-occurring anxiety even after adjustment for sociodemographic confounders, and argued that this excess risk reflects the unique developmental and psychosocial challenges confronting adolescents rather than the general adult HIV-positive population. This observation has important implications for the

present study, since it underscores the need for adolescent-specific rather than adult-derived frameworks when investigating CMD determinants in Zambia.

Across these studies, adverse life events emerge as among the most potent proximal predictors of CMD. Nyongesa et al. (2021) documented a 2.5-fold elevation in depressive symptoms among ALWHIV who had experienced more than five adverse events in the preceding year. This dose-response relationship between stressor accumulation and mental health deterioration has been corroborated by subsequent analyses (Duko et al., 2024; Jiang et al., 2019) and lends support to a cumulative risk model in which psychological resilience is progressively eroded by repeated exposure to adversity. Critically, the nature of adverse events most strongly associated with CMD among ALWHIV in sub-Saharan African settings, including bereavement, food insecurity, community violence, and HIV-related discrimination, differs from the stressor profiles documented in high-income settings, reinforcing the need for Zambia-specific data.

Non-adherence to combination antiretroviral therapy (cART) and perceived HIV-related stigma are consistently identified as modifiable risk factors for CMD in this population. Non-adherence and psychological distress appear to be bidirectionally related: distress undermines adherence capacity, and non-adherence generates anxiety about treatment failure and disease progression (Nyongesa et al., 2021; Kuhns et al., 2016). Younger adolescents appear particularly vulnerable to this cycle (Nyongesa et al., 2021), although the mechanisms underlying this age gradient remain poorly understood. Perceived stigma similarly functions both as a direct driver of psychological distress and as a barrier to the social support that might otherwise moderate mental health outcomes (Nyongesa et al., 2021; Mkumba et al., 2025; Abebe et al., 2022).

2.4 HIV-Related Stigma as a Driver of Common Mental Disorders

HIV-related stigma is among the most consistently implicated psychosocial determinants of poor mental health in ALWHIV, and recent systematic reviews have refined conceptual understanding of its internal structure. Three analytically distinct forms are now recognised: internalized stigma, which refers to the incorporation of negative societal attitudes about HIV into one's self-concept; anticipated stigma, which describes the expectation of discrimination and the behaviours adopted in response to that expectation; and enacted stigma, which denotes actual experiences of prejudice, exclusion, and marginalization (Kip et al., 2024). While these forms are correlated, they are not equivalent: their relative salience varies by context and life stage, and their pathways to mental health outcomes may differ. The present study's inclusion of multiple stigma dimensions is therefore methodologically important, as studies relying on a single composite stigma score may misattribute variance across these pathways.

The empirical literature consistently demonstrates that enacted stigma among adolescent's manifests through stereotyping, exclusion, and discrimination in school, household, and community settings, whereas internalized stigma has been more directly linked to depressive symptomatology, low self-esteem, and helplessness (Luo et al., 2023; Kwesiga et al., 2025). Evidence from Malawi, where approximately 25% of ALWHIV also meet criteria for depression, identifies stigma as the principal pathway through which HIV infection translates into mental health impairment, operating in part through reduced engagement with HIV care services (Kip et al., 2024). Qualitative research conducted across multiple sub-Saharan African countries has elucidated the micro-level mechanisms through which this occurs: fear of HIV transmission among community members, association of HIV with immorality, and the visible side effects of antiretroviral therapy combine to produce stigmatizing responses including gossip, physical and social distancing, and public insult (Kip et al., 2024; Embleton et al., 2023).

The consequences of stigma for ALWHIV extend well beyond psychological distress. Stigma-driven concealment of medication use, documented across Tanzania and other sub-Saharan African settings (Kwesiga et al., 2025), disrupts adherence routines, forces adolescents to manage their HIV care covertly, and reduces their capacity to seek support when difficulties arise. A recent study from India found that while 74.6% of adolescents and young adults with perinatally acquired HIV believed that people with HIV face rejection upon disclosure, and 81.1% actively concealed their status, the relative salience of external versus internalized stigma was moderated by the availability of peer support incorporating regular group discussion (Luo et al., 2023). This finding suggests that contextual and programmatic factors can shift the configuration of stigma experiences, with implications for how stigma-reduction interventions should be designed in the Zambian setting.

At the neurobiological level, emerging evidence indicates that stigma-related psychosocial stress contributes to depression through the release of monoamines and elevated cytokine levels promoting neuroinflammation, while anxiety is strongly associated with the anticipatory and social dimensions of HIV stigma (Wendt et al., 2025; O'Donnell and Foran, 2024). A systematic review from Brazil involving 1,666 people living with HIV found that depression and anxiety symptom severity were predominantly associated with psychosocial stressor profiles and gender identity indicators, with stigma constituting a significant structural obstacle for both HIV prevention and therapeutic engagement (Alckmin-Carvalho et al., 2024). A recent meta-analysis confirmed the consistently negative associations between HIV-related stigma and psychological wellbeing, treatment adherence, and quality of life across paediatric and

adolescent populations (Embleton et al., 2023). Collectively, this evidence positions stigma not merely as one risk factor among many but as a central organising mechanism through which social inequality is translated into individual suffering.

2.5 Social Environment and Family Structure as Mediators of Mental Health

The social ecology in which ALWHIV are embedded plays a critical mediating role in determining whether HIV-related stressors translate into clinically significant CMD. Family structure, the quality of care relationships, and the nature of peer and community interactions each exert independent and interacting influences on mental health outcomes. ALWHIV who experience predominantly negative societal interactions face elevated risk of depressive disorder and suicidality, a finding robust across multiple sub-Saharan African settings (Casale et al., 2019; Uwiringiyimana et al., 2024). Conversely, stable, supportive family environments appear to moderate the mental health impact of HIV-related stressors, providing the emotional resources through which adolescents develop coping capacity and self-efficacy.

Orphanhood and disrupted family structures are among the strongest structural vulnerability factors for CMD among ALWHIV, and disentangling their effects from those attributable to HIV status itself presents a significant analytical challenge. Research from Namibia demonstrated that after controlling for orphanhood status, mental health outcome differences between ALWHIV and HIV-negative controls were no longer statistically significant (Ruiz-Casares et al., 2013), suggesting that a substantial proportion of the elevated CMD burden observed in ALWHIV may be attributable to family disruption rather than HIV infection per se. This finding has important implications for the current Zambian study: if orphanhood and living arrangement account for much of the CMD variance, then interventions targeting HIV stigma alone without addressing family stability are likely to produce limited gains. This rationale underpins objective 2, which predicts elevated CMD rates among ALWHIV in non-parental living arrangements.

South African research found that ALWHIV showed significantly poorer functional competence, more negative self-concept, and higher levels of depression, anger, and disruptive behaviour compared to matched controls, with mental health symptom profiles most strongly associated with sociodemographic factors and stressful life events rather than biomedical indicators (Sherr et al., 2009; Cluver et al., 2022). Loss of both parents was specifically associated with disruptive behaviour, reinforcing the primacy of family structure in shaping mental health trajectories. Economic interventions that support family stability have shown measurable psychosocial benefits in this context: social protection programmes have been associated with improved savings, educational continuity, cognitive outcomes, and reduced hopelessness and depression,

alongside improved HIV-related health behaviours (Ssewamala et al., 2016; Karimli and Ssewamala, 2015; Sherr et al., 2017). This body of evidence supports an intersectoral approach to CMD intervention that addresses economic vulnerability alongside psychosocial support, rather than treating mental health as a separate domain.

Beyond the family unit, peer networks and community support systems function as critical protective factors, particularly during adolescence when attachment to peer groups becomes developmentally salient and parental influence correspondingly declines. Parental monitoring and supervision, combined with increased HIV transmission knowledge among caregivers and adolescents and skills development in self-esteem, coping, problem-solving, and stress management, constitute intervention components with demonstrated effectiveness in strengthening family interactions and improving mental health outcomes (Ssewamala et al., 2022; Cluver et al., 2022). Yet many HIV healthcare settings in sub-Saharan Africa remain poorly adapted to adolescent needs, with virological suppression and adherence treated as primary outcomes and mental health considered secondary, an ordering that may be epidemiologically incoherent given the bidirectional relationship between CMD and treatment adherence documented in Section 2.3 (Adjorlolo et al., 2025).

The specific contribution of living arrangements and family structure to CMD risk among ALWHIV in Zambia has not been empirically examined. Given that Zambia's HIV epidemic has produced large numbers of orphaned and care-disrupted adolescents, this is a critical gap with direct implications for social welfare and HIV programme integration.

2.6 Treatment Self-Efficacy and Confidence in HIV Management

Treatment adherence self-efficacy, understood as an individual's confidence in their capacity to consistently follow antiretroviral therapy regimens across varied and challenging circumstances, has emerged as a theoretically important and practically modifiable determinant of both HIV treatment outcomes and mental health among adolescents. Self-management, of which treatment adherence self-efficacy is a central component, encompasses motivation, illness understanding, confidence in one's ability to manage HIV and access services, and the self-advocacy skills necessary to navigate healthcare systems (Nagenda and Crowley, 2022). Research from southwestern Uganda demonstrated a statistically significant and large-magnitude association between self-management capacity and adherence self-efficacy, with higher self-efficacy predicting stronger adherence behaviour including antiretroviral therapy uptake (Ashaba et al., 2024). These findings are consistent with broader social cognitive theory,

which holds that perceived capability is a proximal determinant of health behaviour, more predictive of actual behaviour than knowledge or motivation alone.

Despite its theoretical and practical significance, treatment adherence self-efficacy has received limited empirical attention in adolescent populations, a concern given the centrality of adolescent adherence to achieving the UNAIDS 95-95-95 targets for ending the AIDS epidemic by 2030 (Tan et al., 2025). A 2025 cross-sectional study from China examining Yi ethnic adolescents with HIV found that self-acceptance and emotion regulation capacity were significantly associated with treatment adherence self-efficacy, highlighting the interconnected nature of psychological wellbeing and treatment management confidence (Tan et al., 2025). This finding suggests that interventions addressing psychological wellbeing may have a secondary benefit of improving adherence confidence, an argument with direct policy relevance for integrated HIV and mental health programming in Zambia.

The pathway from internalized stigma to reduced treatment self-efficacy is particularly well supported in the literature and constitutes a critical mechanistic link through which stigma simultaneously undermines mental health and HIV treatment outcomes. When adolescents internalise the negative societal narratives associated with HIV, they may come to perceive themselves as less capable, less deserving of care, and less confident in their ability to manage their condition, producing precisely the low treatment adherence self-efficacy that increases risk of virological failure and psychological distress (Christopoulos et al., 2020; Earnshaw et al., 2018). Longitudinal evidence confirms the directionality of this relationship: reductions in internalized HIV stigma over time predict increases in treatment adherence self-efficacy, which in turn produce improvements in viral suppression, antiretroviral adherence, and clinic visit attendance (Yigit et al., 2022).

Peer support interventions represent the most promising programmatic response to low treatment self-efficacy in adolescent populations, operating through a mechanism of empathetic, equal-status communication that makes peer supporters more acceptable to adolescents who may be reluctant to disclose difficulties to adult healthcare providers (Widyawati et al., 2025). The Zvandiri programme, implemented across 13 African countries, exemplifies this approach: peer-led counselling, adherence support, and mental health screening have demonstrated improvements in antiretroviral adherence, mental health outcomes, and adolescent self-efficacy in HIV self-management (Willis et al., 2019; Tshuma et al., 2020). The present study's attention to treatment self-efficacy as a predictor of CMD is therefore not only theoretically motivated but

practically important, since identifying the factors that undermine self-efficacy in the Zambian context can directly inform peer support programme design.

2.7 Gender Differences and Developmental Considerations

Gender operates as a pervasive moderating factor in the relationship between HIV status and mental health outcomes among adolescents, and the direction and magnitude of its effects are more nuanced than simple male-female comparisons suggest. Depression is consistently more prevalent among female ALWHIV than among their male counterparts, and this gender disparity mirrors but exceeds the differential observed in the general adolescent population (Safi et al., 2025; Too et al., 2021). Societal expectations around emotional expression, differing degrees of social discrimination by gender, and the intersection of HIV stigma with gender-based stigma are among the proposed explanations for this disparity (Safi et al., 2025). A 2025 study from Togo added an important qualification, however: socio-cultural norms in many sub-Saharan African settings socialise adolescent boys to suppress emotional expression, meaning that lower reported depression rates among male ALWHIV may reflect measurement artefact rather than genuinely lower burden, raising questions about the validity of self-report instruments calibrated in other cultural contexts (Safi et al., 2025).

The picture for young men is further complicated by findings from Thailand, where male adolescents and young adults with perinatal HIV demonstrated significantly lower scores in the psychological health domain of quality-of-life assessments than their female peers, alongside a trend toward lower HIV adherence self-efficacy (Chokephaibulkit et al., 2021). This pattern, if replicated in the Zambian context, would suggest that male vulnerability to CMD may be underidentified by depression-centric screening instruments and that supplementary assessment of quality of life and treatment confidence may be needed. Women living with HIV, meanwhile, experience depression, anxiety, and posttraumatic stress symptoms at higher rates than both their male counterparts and HIV-unaffected women, with these elevated rates carrying implications not only for individual wellbeing but for HIV management and onward transmission prevention (Dale et al., 2021). The intersection of gender with other social determinants including orphanhood, poverty, and stigma creates complex and context-specific vulnerability profiles that the present study seeks to characterise within the Zambian setting.

Adolescence itself constitutes a critical developmental period characterised by intersecting biological, emotional, and social transitions that create particular vulnerabilities to HIV acquisition, mental health challenges, and substance use initiation, often simultaneously (Cluver et al., 2022). The developmental tasks of this period, including identity formation, establishment

of peer relationships, and negotiation of increasing autonomy from caregivers, are substantially complicated by HIV status and its associated stigma (Adjorlolo et al., 2025). Adolescents managing HIV may face exposure to intimate partner violence, coercive sexual encounters, and experimentation with substances, particularly when simultaneously managing other adversities (Nanfuka et al., 2024). These compounding vulnerabilities are not reducible to any single risk factor and require a framework that can account for their cumulative and interactive effects.

2.8 Cumulative Risk and Dose-Response Relationships

Accumulating evidence supports a cumulative risk model in which multiple psychosocial stressors interact synergistically to produce mental health outcomes that exceed what additive effects alone would predict (Ayano et al., 2021; Duko et al., 2024). Among ALWHIV, this means that the co-occurrence of stigma, family disruption, low treatment self-efficacy, and adverse life events does not simply increase CMD risk proportionally: it appears to sensitize adolescents' neurobiological and psychological systems such that the threshold at which subsequent stressors precipitate clinically significant depression or anxiety is progressively lowered. A recent systematic review of mental health among ALWHIV with viral non-suppression in rural northern Uganda reported depression and anxiety prevalence rates of 26.07% and 17.0% respectively among adolescents, and attributed a substantial proportion of this burden to cumulative multi-stressor exposure (Kwesiga et al., 2025; Ayano et al., 2021).

The dose-response relationship between stressor accumulation and CMD, documented in both adolescent and adult HIV populations, has important implications for the present study's analytic approach. Rather than treating stigma, family structure, living arrangement, and treatment self-efficacy as independent predictors to be examined in isolation, this study follows a cumulative risk framework in which their combined effects on CMD prevalence are explicitly modelled. This approach is consistent with objectives 2 and 3, which predicts a dose-response increase in CMD prevalence as the number of co-occurring psychosocial risk factors increases. Understanding these cumulative vulnerability profiles has practical significance for resource-limited settings such as Zambia, where the ability to identify which adolescents are at greatest risk of CMD can inform priority-setting for intensive mental health support services integrated within existing HIV care platforms (Too et al., 2021).

2.9 Conceptual Framework

This study is grounded in a Stress-Sensitization and Social Ecological Framework that integrates two complementary theoretical traditions. The Stress-Sensitization Model posits that early or repeated exposure to psychosocial stressors, including HIV-related stigma, adverse

living arrangements, and treatment uncertainty, sensitizes the developing adolescent's neurobiological and psychological systems, lowering the threshold at which subsequent stressors precipitate clinically significant depression or anxiety (Monroe and Harkness, 2005). The Social Ecological Framework, adapted from Bronfenbrenner (1979) and applied to adolescent HIV contexts (Uwiringiyimana et al., 2024), situates these individual-level vulnerabilities within concentric layers of social influence: the microsystem (family structure, living arrangements, trusted relationships), the mesosystem (peer networks, healthcare interactions), the exosystem (community stigma, healthcare access), and the macrosystem (national HIV and AIDS policy, cultural norms around disclosure).

Together, these frameworks generate four testable hypotheses that directly drive the research objectives: (H1) Adolescents who experience HIV-related stigma will demonstrate significantly higher odds of both depression and anxiety compared to those without such experiences; (H2) Adolescents in non-parental living arrangements will show elevated rates of depression, reflecting disrupted microsystem protective factors; (H3) Adolescents with low confidence in managing HIV treatment will demonstrate higher anxiety prevalence, consistent with treatment self-efficacy theory; and (H4) Cumulative exposure to multiple psychosocial risk factors will produce a dose-response increase in CMD prevalence, consistent with stress-sensitization predictions. The framework depicted in Figure 1 illustrates these pathways, showing how distal structural factors and proximal psychosocial stressors are mediated by intermediary variables including social support, family stability, and treatment self-efficacy, to produce depression and anxiety outcomes among ALWHIV in Zambia.

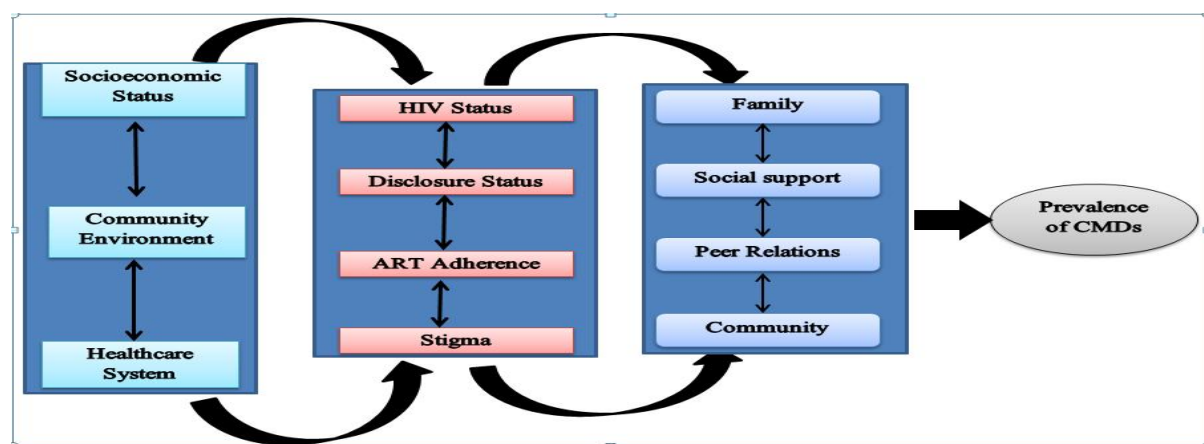


Figure 1: Conceptual Framework

CHAPTER THREE

METHODOLOGY

3.1 Study approach

A quantitative approach was used for this study. This approach was ideal for the study as it facilitated the examination of the prevalence and factors associated with common mental disorders among ALWHIV. The approach enabled precise measurement of the proportion of ALWHIV and the statistical analysis of relationships between various factors. The approach provided objective, generalizable and scalable data that identified significant predictors of mental health outcomes. This approach also allowed efficient gathering of data from a large sample size.

3.2 Study design

A cross-sectional survey design was suitable for the study as it allowed the gathering of data at a single point in time, providing a snapshot of the mental health status and associated factors within this population. Additionally, the design enabled the evaluation of multiple variables simultaneously, facilitating the identification of potential associations between mental health outcomes and associated factors.

3.3 Study site and setting

The study was conducted at Kabwe Women, Children's and Newborn Hospital and Kabwe Central Hospital in Kabwe, Central Province of Zambia. Kabwe Women, Child and Newborn Hospital offered comprehensive maternal, child, and neonatal health services, including antenatal and postnatal care, labor and delivery, pediatric outpatient and inpatient care, neonatal services, immunizations, family planning, nutrition, and HIV/AIDS management such as antiretroviral therapy. The hospitals have a combined bed capacity of approximately 626 (176 at Kabwe Women, Children's and Newborn Hospital and over 450 at Kabwe Central Hospital) and serve a catchment area that includes Kabwe and surrounding districts, supporting a population of about 300,000 residents in Kabwe District (Central Statistical Office Zambia,2022). These two facilities were purposively selected because they are the only designated public-sector hospitals in Kabwe District providing comprehensive HIV care and antiretroviral therapy to adolescents, and together they constitute the complete accessible population of ALWHIV receiving structured HIV treatment in this geographic catchment. Selecting both sites ensured that the study captured the full range of adolescents in HIV care

across Kabwe, maximising the representativeness of findings within this defined clinical population and allowing proportional stratification by facility size.

3.4 Study Population

The researcher enrolled ALWHIV who were receiving antiretroviral therapy (ART) at Kabwe Hospitals, aiming for a diverse sample in terms of age (10-19), gender, and duration on ART. Participants differed in their mental health status, with some experiencing conditions like depression or anxiety, and others not. They came from various socioeconomic backgrounds, and their clinical characteristics, such as length of ART and overall health, were considered. Overall, the study sought to include a representative sample of adolescents on ART at the hospitals.

3.5 Sample Size

The sample size was calculated using the margin of error, which helped determine the required sample to estimate CMD prevalence among ALWHIV accurately. The samples were then stratified into two strata corresponding to the two health facilities.

Step 1: Calculate the initial sample size n :

$$ME = z * SE$$

$$ME = z \sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}$$

Where;

ME: is desired margin of error (0.05)

z: is the z-score at 90%, 95% or 99% confidence interval (1.96)

\hat{p} : is our prior judgement of the correct value of p. (0.5)

n: is the sample size to be found.

Therefore:

$$0.05 = 1.96 \sqrt{\frac{0.5 \times 0.5}{n}}$$

$$\frac{0.5 \times 0.5}{n} = \left(\frac{0.05}{1.96}\right)^2 = 0.0006508$$

$$n = \frac{0.5 \times 0.5}{0.0006508} = 384$$

Step 2: Adjust for finite populations (since total population is 170):

Total population $N_{total} = 170$ (KCH: $N_1 = 100$ and KWNCH: $N_2 = 70$),

The relatively small total population of 170 adolescents registered for HIV care at the two facilities necessitated the application of the Finite Population Correction (FPC) formula, which adjusts the standard sample size estimate downward in proportion to how much of the total population is being sampled. When the sampling fraction (n/N) exceeds 5%, ignoring the finite population leads to overestimation of the required sample and introduces unnecessary burden on a small, vulnerable participant group (Rossi, 2022). In this study, the FPC-adjusted total of 108 participants represents 63.5% of the entire target population ($n=170$), yielding a margin of error of 5% at the 95% confidence level—statistically appropriate for prevalence estimation in a closed clinical population. The sample size is therefore not a limitation of statistical power but rather a methodologically sound response to the small, enumerable, facility-bound population under study. The proportional stratification by hospital (64 from KCH and 44 from KWNCH) further ensures that each stratum is adequately represented in proportion to its contribution to the total population, maximising the representativeness of the findings within these facilities.

Calculate the **adjusted sample size** for the total population using FPC:

$$n_{adj} = \frac{n}{1 + \frac{n-1}{N_{total}}} = \frac{384}{1 + \frac{384-1}{150}} = \frac{384}{1+2.55} = \frac{384}{3.55} = 108$$

Therefore, approximately 108 respondents are needed in total.

Step 3: Allocate proportionally:

$$\text{Hospital 1 proportion: } \frac{100}{170} = 0.5882 \times 108 \approx 64$$

$$\text{Hospital 2 proportion: } \frac{70}{170} = 0.4118 \times 108 \approx 44$$

Therefore, the sample for Kabwe Central Hospital and Kabwe Women, Children and Newborn Hospital were 64 and 44 participants, respectively.

3.6 Sampling Technique

This study used a stratified systematic random sampling approach to ensure proportional representation from both hospitals and maintain efficiency. The population were divided into two strata corresponding to each hospital, and participants were selected at regular intervals (n -th participants) from each stratum until the desired sample size was reached,

3.7 Inclusion and Exclusion Criteria

The study included adolescents aged 10-19 years attending the hospital for routine HIV care or related services, with confirmed HIV-positive status documented in their medical records.

Participants must have been on antiretroviral therapy (ART) for at least three months and have the ability to respond to questions, with parental consent obtained.

The study excluded adolescents who had pre-existing severe mental health disorders, as well as those with cognitive impairments or developmental disabilities. It also excluded adolescents who were experiencing acute medical emergencies or illnesses. Additionally, adolescents who were unwilling or unable to provide informed assent or consent, or whose guardians did not consent when required, were not included in the study.

3.8 Data Collection Tools

The data collection instrument consisted of two components: (1) a structured sociodemographic and psychosocial questionnaire, and (2) two validated clinical screening tools administered as embedded modules within the structured questionnaire. The Patient Health Questionnaire-9 (PHQ-9) was used to screen for depression. The PHQ-9 is a 9-item self-report scale derived from the Primary Care Evaluation of Mental Disorders (PRIME-MD) diagnostic instrument, with each item scored from 0 (not at all) to 3 (nearly every day), yielding a total score of 0–27. A cut-off score of ≥ 10 was applied to classify clinically significant depression, consistent with its established use in sub-Saharan African adolescent populations (Levis et al., 2019). The PHQ-9 has demonstrated good internal consistency (Cronbach's $\alpha = 0.86$ – 0.89) and strong criterion validity against structured diagnostic interviews in African settings, with sensitivity of 88% and specificity of 85% at the ≥ 10 threshold (Adewuya et al., 2010). The Generalized Anxiety Disorder-7 (GAD-7) scale was used to screen for anxiety. The GAD-7 is a 7-item self-report instrument with each item scored 0–3, yielding a total score of 0–21. A cut-off of ≥ 10 was applied to identify clinically significant anxiety. The GAD-7 has been validated in African healthcare settings and demonstrates satisfactory internal reliability (Cronbach's $\alpha = 0.89$) and good convergent validity with established anxiety measures (Plummer et al., 2016). Both instruments were administered in English, with trained research assistants providing verbal translation and clarification in Nyanja or Bemba where required to ensure comprehension among participants with limited English proficiency. The structured sociodemographic questionnaire was developed by the researcher, pilot-tested with five adolescents outside the study sample, and revised for clarity before fieldwork commenced. All items were closed-ended to facilitate quantitative coding and analysis.

3.9 Data Collection Procedures

The researcher developed a structured questionnaire as the data collection tool, with research assistants administering it to participants. Every n-th adolescent visiting the facility was invited to participate, and all respondents (or their guardians where necessary) were provided informed consent. The questionnaires were administered interactively on desks set up at the hospital immediately after participants receive care. The questionnaires included questions on common mental disorders (CMD) and related factors, with interpersonal contact maintained to ensure comprehensive data collection.

3.10 Data Management

Data collected were entered into a password-protected database at the end of each day, with data processing to ensure completeness, consistency, and accuracy. The password safeguarded data integrity and respondent confidentiality.

3.11 Data Analysis

Data analysis began with descriptive statistics then followed by inferential analyses using STATA (STATA 18). Descriptive statistics were used to summarize participants' demographic characteristics. Bivariate analysis was then conducted to determine associations between variables, utilizing Chi-square tests and ANOVA. Finally, multivariate analysis via logistic regression was employed to determine independent factors associated with CMDs among ART-experienced people living with HIV (ALWHIV).

3.12 Ethical Consideration

In order to proceed with this study, approval to conduct research was sought from the University Of Lusaka School Of Medicine and Health Sciences Research Ethics Committee, the National Health Research Authority (NHRA), Kabwe Women, Children and New born Hospital, Kabwe Central and Provincial Health Office Central Province.

All procedures were thoroughly explained to participants, whose rights were protected throughout the study. Participation was voluntary, and individuals were not coerced. The researcher upheld ethical principles by providing sufficient information to ensure informed consent (respect for autonomy), maintaining strict confidentiality of personal information such as names, residence, and HIV status, and ensuring that the study offers meaningful benefits whether practical, educational, or logical while balancing potential risks. Additionally, the researcher treated all participants fairly and equally, ensuring their rights were fully respected (justice).

CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 Introduction

This chapter presents the results from a cross-sectional study investigating the prevalence and predictors of depression and anxiety disorders among ALWHIV attending clinics at KWNCH and KCH. The study enrolled 108 participants who were systematically sampled and assessed using standardized screening instruments; the PHQ-9 for depression and the GAD-7 scale for anxiety. The analysis employed both bivariate and multivariate statistical techniques to identify factors associated with depression and anxiety, with results organized into five main sections: participant demographics and clinical profiles, prevalence of mental health disorders, determinants of depression, determinants of anxiety, and a synthesis of predictors examining cumulative risk patterns. The results presented herein address the three primary research objectives and provide empirical evidence to inform targeted interventions for improving mental health outcomes among this vulnerable population.

4.2 Participant Demographics and Clinical Profiles

Table 1 Demographic and Clinical Characteristics of Study Participants

| Characteristic | Category | Frequency (n) | Percentage (%) |
|-------------------|--|---------------|----------------|
| Hospital Site | Kabwe Central Hospital | 64 | 59.3 |
| | Kabwe Women, Newborn & Children's Hospital | 44 | 40.7 |
| Age Group | 10-14 years | 42 | 38.9 |
| | 15-17 years | 44 | 40.7 |
| | 18-19 years | 22 | 20.4 |
| Gender | Male | 46 | 42.6 |
| | Female | 62 | 57.4 |
| Educational Level | Primary | 52 | 48.1 |
| | Secondary | 56 | 51.9 |

| | | | |
|------------------------------|------------------------|-----|------|
| Residence | Urban | 89 | 82.4 |
| | Rural | 19 | 17.6 |
| Living Arrangements | With parents | 38 | 35.2 |
| | With relatives | 52 | 48.1 |
| | Alone/Other | 18 | 16.7 |
| Duration Since HIV Diagnosis | 0-11 months | 12 | 11.1 |
| | 1-2 years | 28 | 25.9 |
| | 3 or more years | 68 | 63.0 |
| Currently on ART | Yes | 106 | 98.1 |
| | No | 2 | 1.9 |
| Medication Adherence | Always/Usually on time | 66 | 62.3 |
| | Sometimes/Never miss | 40 | 37.7 |
| HIV Status Disclosed | Yes | 58 | 53.7 |
| | No | 50 | 46.3 |

Results from Table 1 shows that the study enrolled 108 ALWHIV across two Kabwe hospitals. Most participants were adolescents aged 10-17 years (79.6%), with slightly more females (57.4%). The majority resided in urban areas (82.4%), had been diagnosed for 3+ years (63.0%), and were currently on ART (98.1%). Nearly half lived with relatives (48.1%) rather than parents, and approximately half had disclosed their HIV status (53.7%).

4.3 Prevalence of Mental Health Disorders

Table 2 Prevalence of Depression and Anxiety Among ALWHIV

| Mental Health Outcome | PHQ-9/GAD-7 Score Range n | Percentage (%) | 95% CI |
|---------------------------|------------------------------|----------------|-----------|
| DEPRESSION (PHQ-9) | | | |
| Minimal (0-4) | 53 | 49.1 | 39.4-58.8 |
| Mild (5-9) | 26 | 24.1 | 16.4-33.3 |

| | | | |
|--|-----------|-------------|------------------|
| Moderate (10-14) | 18 | 16.7 | 10.3-25.3 |
| Moderately Severe (15-19) | 7 | 6.5 | 2.7-13.0 |
| Severe (20-27) | 4 | 3.7 | 1.0-9.2 |
| Depression Present (≥ 10) | 29 | 26.9 | 18.8-36.3 |
| ANXIETY (GAD-7) | | | |
| Minimal (0-4) | 48 | 44.4 | 35.0-54.2 |
| Mild (5-9) | 29 | 26.9 | 18.8-36.3 |
| Moderate (10-14) | 21 | 19.4 | 12.5-28.2 |
| Severe (15-21) | 10 | 9.3 | 4.6-16.5 |
| Anxiety Present (≥ 10) | 31 | 28.7 | 20.5-38.2 |
| COMORBIDITY | | | |
| Both Depression and Anxiety (≥ 10 on both) | 19 | 17.6 | 11.0-26.2 |
| Either Depression or Anxiety | 41 | 38.0 | 28.8-47.8 |
| Neither Condition | 67 | 62.0 | 52.2-71.2 |

Based on standardized screening tools (PHQ-9 and GAD-7), 26.9% of ALWHIV screened positive for clinically significant depression (score ≥ 10), while 28.7% screened positive for anxiety (score ≥ 10). Overall, 38.0% of adolescents experienced at least one mental health condition, with 17.6% experiencing both depression and anxiety concurrently. Half of the participants (50.9%) showed at least minimal depressive symptoms, while 55.6% reported at least minimal anxiety symptoms.

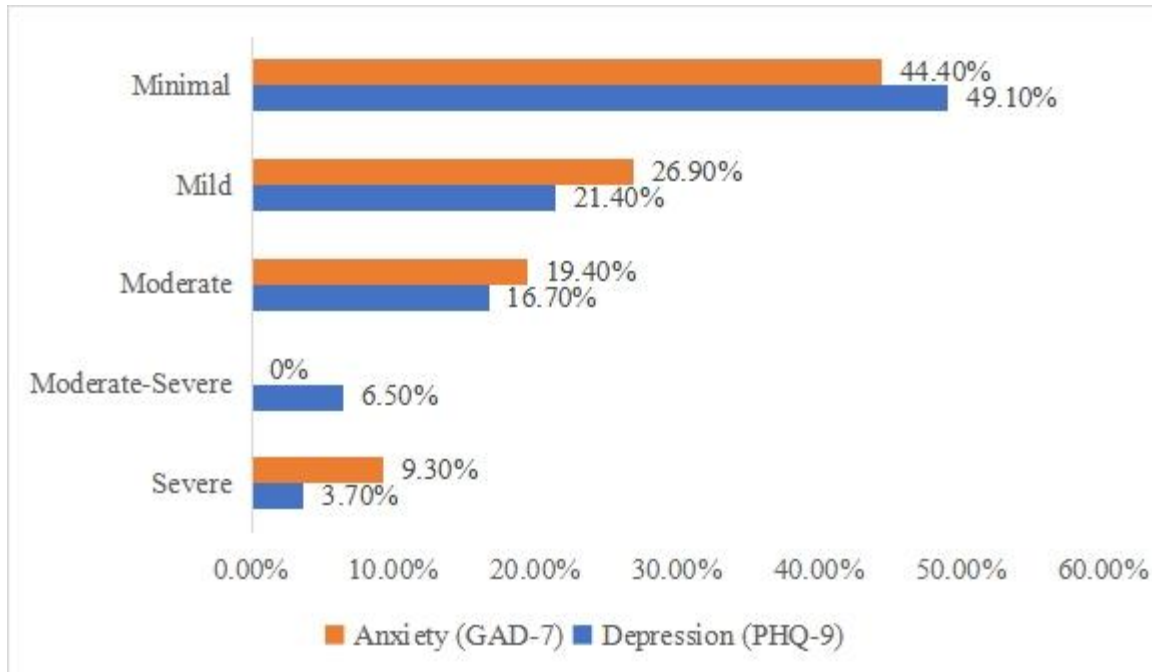


Figure 2 Distribution of Depression and Anxiety Severity Levels

This visualization shows that while half of participants had minimal symptoms, a substantial proportion experienced mild to severe symptoms. Anxiety showed a higher proportion of severe cases (9.3%) compared to depression (3.7% severe + 6.5% moderately severe = 10.2%).

4.4 Determinants of Depression

Table 3 Factors Associated with Depression Among ALWHIV (Bivariate and Multivariate Analysis)

| Factor | Category | Depression Present n/N (%) | Bivariate p-value | Adjusted OR (95% CI) | Multivariate p-value |
|-----------|-------------|----------------------------|-------------------|----------------------|----------------------|
| Gender | Male | 8/46 (17.4) | 0.018 | 1.00 (reference) | — |
| | Female | 21/62 (33.9) | | 2.48 (0.98-6.27) | 0.055 |
| Age Group | 10-14 years | 9/42 (21.4) | 0.287 | 1.00 (reference) | — |
| | 15-17 years | 12/44 (27.3) | | 1.42 (0.52-3.89) | 0.493 |
| | 18-19 years | 8/22 (36.4) | | 2.18 (0.63- | 0.219 |

| | | | | | |
|--|---------------------------|--------------|------------------|-------------------|--------------|
| | | | | | 7.54) |
| Living Arrangements | With parents | 6/38 (15.8) | 0.025 | 1.00 | — |
| | | | | (reference) | |
| | With relatives | 16/52 (30.8) | | 2.34 (0.82-6.71) | 0.113 |
| | Alone/Other | 7/18 (38.9) | | 3.52 (1.00-12.39) | 0.050 |
| Experienced Stigma/Discrimination | No | 5/51 (9.8) | <0.001 | 1.00 | — |
| | | | | (reference) | |
| | Yes | 24/57 (42.1) | | 5.73 (2.04-16.08) | 0.001 |
| Feel Safe in Community | Yes | 11/68 (16.2) | 0.001 | 1.00 | — |
| | | | | (reference) | |
| | No | 18/40 (45.0) | | 2.18 (0.83-5.72) | 0.113 |
| Medication Adherence | Always/Usually on time | 14/66 (21.2) | 0.041 | 1.00 | — |
| | | | | (reference) | |
| | Sometimes miss/Never miss | 15/40 (37.5) | | 1.89 (0.75-4.76) | 0.177 |
| HIV Status Disclosed | Yes | 11/58 (19.0) | 0.027 | 1.00 | — |
| | | | | (reference) | |
| | No | 18/50 (36.0) | | 1.67 (0.66-4.24) | 0.277 |
| Mental Health Affected by Social Environment | No | 7/59 (11.9) | <0.001 | 1.00 | — |
| | | | | (reference) | |
| | Yes | 22/49 (44.9) | | 3.12 (1.18-8.22) | 0.022 |
| Have Trusted Person to Share Feelings | Yes | 15/72 (20.8) | 0.013 | 1.00 | — |
| | | | | (reference) | |
| | No | 14/36 (38.9) | | 1.78 (0.69- | 0.234 |

| | | | | | |
|----------------------------------|-----|--------------|--------------|-------------------|-------|
| | | | | 4.58) | |
| HIV-Related Health Complications | No | 16/74 (21.6) | 0.039 | 1.00 (reference) | — |
| | Yes | 13/34 (38.2) | | 1.94 (0.75- 5.02) | 0.171 |

(p=0.039)

Bivariate Analysis: Factors Associated with Depression.

Several factors showed significant associations with depression among HIV-positive adolescents. The strongest associations emerged from **psychosocial factors**: adolescents experiencing HIV-related stigma ($p < 0.001$), those perceiving their social environment as negatively affecting their mental health ($p < 0.001$), and those lacking a trusted confidant ($p = 0.013$) were significantly more likely to report depression.

Living circumstances also played a critical role. Adolescents in adverse living arrangements; living alone or with non-parental caregivers ($p = 0.025$); and those not feeling safe in their community ($p = 0.001$) showed higher depression rates.

Additional significant associations included female gender ($p = 0.018$), poor medication adherence ($p = 0.041$), non-disclosure of HIV status ($p = 0.027$), and having HIV-related complications ($p = 0.039$).

Multivariate Logistic Regression: Independent Predictors of Depression

When all factors were analysed together, three emerged as significant independent predictors:

1. Experiencing stigma or discrimination (aOR=5.73, $p = 0.001$) was the strongest predictor. Adolescents who experienced HIV-related stigma were nearly six times more likely to have depression compared to those who did not, even after accounting for other factors. This represents the most powerful modifiable risk factor identified.

2. Adverse living arrangements (aOR=3.52, p=0.050); living without biological parents; and increased depression risk more than three-fold, highlighting the protective role of stable parental care.

3. Perceiving mental health as affected by social environment (aOR=3.12, p=0.022) made adolescents three times more likely to experience depression, reflecting the cumulative impact of social stressors and lack of supportive relationships.

Factors significant in bivariate analysis, including age, medication adherence, gender, community safety, lack of confidant, non-disclosure, and HIV complications, did not remain independent predictors in the adjusted model, suggesting their effects were mediated through the three dominant psychosocial factors.

These findings demonstrate that psychosocial determinants, particularly stigma and social support structures, are the primary drivers of depression in this population, rather than clinical or demographic characteristics alone.

4.5 Determinants of Anxiety

Table 4 Factors Associated with Anxiety Among ALWHIV (Bivariate and Multivariate Analysis)

| Factor | Category | Anxiety Present n/N (%) | Bivariate p-value | Adjusted OR (95% CI) | Multivariate p-value |
|-----------------------------------|----------------|----------------------------|----------------------|----------------------------|-------------------------|
| Gender | Male | 10/46 (21.7) | 0.111 | 1.00 (reference) | — |
| | Female | 21/62 (33.9) | | 1.84 (0.76- 4.46) | 0.178 |
| Residence | Urban | 23/89 (25.8) | 0.087 | 1.00 (reference) | — |
| | Rural | 8/19 (42.1) | | 1.98 (0.66- 5.95) | 0.225 |
| Living Arrangements | With parents | 7/38 (18.4) | 0.046 | 1.00 (reference) | — |
| | With relatives | 16/52 (30.8) | | 1.76 (0.63- 4.92) | 0.283 |
| | Alone/Other | 8/18 (44.4) | | 3.24 (0.95- 11.08) | 0.061 |
| Experienced Stigma/Discrimination | No | 7/51 (13.7) | 0.001 | 1.00 (reference) | — |

| | | | | | |
|---|---------------------------|-----------------|--------------|-----------------------|--------------|
| | Yes | 24/57 (42.1) | | 4.32 (1.65- 11.31) | 0.003 |
| Feel Safe in Community | Yes | 14/68 (20.6) | 0.006 | 1.00 (reference) | — |
| | No | 17/40 (42.5) | | 1.89 (0.72- 4.98) | 0.197 |
| Confident Managing HIV Treatment | Very/Confident | 15/73 (20.5) | 0.008 | 1.00 (reference) | — |
| | Not/Slightly confident | 16/35 (45.7) | | 2.64 (1.04- 6.68) | 0.041 |
| Challenges Accessing Healthcare | No | 16/71 (22.5) | 0.031 | 1.00 (reference) | — |
| | Yes | 15/37 (40.5) | | 1.78 (0.71- 4.48) | 0.219 |
| Mental Health Affected by Social Environment | No | 9/59 (15.3) | 0.001 | 1.00 (reference) | — |
| | Yes | 22/49 (44.9) | | 2.89 (1.10- 7.56) | 0.031 |
| Emotional Support from Family | Always/Sometimes | 18/79 (22.8) | 0.012 | 1.00 (reference) | — |
| | Never/Rarely | 13/29 (44.8) | | 2.18 (0.83- 5.71) | 0.114 |
| Support from Peers/Friends | Always/Sometimes | 17/77 (22.1) | 0.009 | 1.00 (reference) | — |
| | Never/Rarely | 14/31 (45.2) | | 1.87 (0.72- 4.87) | 0.199 |
| Involved in Peer Support Groups | Yes | 9/48 (18.8) | 0.029 | 1.00 (reference) | — |
| | No | 22/60 (36.7) | | 1.94 (0.75- 5.05) | 0.173 |
| Participate in Community/Religious Activities | Yes | 12/57 (21.1) | 0.047 | 1.00 (reference) | — |
| | No | 19/51 (37.3) | | 1.52 (0.60- 3.84) | 0.376 |

Bivariate Analysis: Factors Associated with Anxiety

Several factors showed significant associations with anxiety among HIV-positive adolescents. The strongest associations emerged from *psychosocial factors*: adolescents experiencing HIV-related stigma ($p=0.001$), those perceiving their social environment as negatively affecting their

mental health ($p=0.001$), and those with low confidence in managing their HIV treatment ($p=0.008$) were significantly more likely to report anxiety.

Support systems emerged as critical protective factors. Adolescents with poor family support ($p=0.012$) and inadequate peer support ($p=0.009$) showed higher anxiety rates. Similarly, lack of involvement in peer support groups ($p=0.029$) and non-participation in community activities ($p=0.047$) were significantly associated with increased anxiety.

Living circumstances and safety perceptions also played important roles. Adolescents in adverse living arrangements ($p=0.046$) and those not feeling safe in their environment ($p=0.006$) demonstrated elevated anxiety levels.

Additional significant associations included healthcare access challenges ($p=0.031$), indicating that barriers to accessing medical services contribute to anxiety burden in this population.

Multivariate Logistic Regression: Independent Predictors of Anxiety

When all factors were analysed together, three emerged as significant independent predictors:

1. Experiencing stigma or discrimination ($aOR=4.32$, $p=0.003$) was the strongest predictor. Adolescents who experienced HIV-related stigma were over four times more likely to have anxiety compared to those who did not, even after accounting for other factors. This represents the most powerful modifiable risk factor identified.
2. Perceiving mental health as affected by social environment ($aOR=2.89$, $p=0.031$) made adolescents nearly three times more likely to experience anxiety, reflecting the cumulative impact of social stressors, community attitudes, and lack of supportive relationships in their broader social context.
3. Low confidence in managing HIV treatment ($aOR=2.64$, $p=0.041$) increased anxiety risk more than two-and-a-half-fold, highlighting that treatment self-efficacy serves as an important protective factor. Adolescents who feel empowered and capable in managing their condition demonstrate better mental health outcomes.

Factors significant in bivariate analysis, including living arrangements, feeling unsafe, healthcare access challenges, family support, peer support, peer group involvement, and community participation, did not remain independent predictors in the adjusted model,

suggesting their effects were mediated through or confounded by the three dominant psychosocial factors.

These findings demonstrate that psychosocial determinants, particularly stigma, social environment, and treatment confidence, are the primary drivers of anxiety in this population. The magnitude of these associations underscores the critical need for comprehensive interventions that address discrimination, strengthen social support networks, and enhance adolescent empowerment in HIV self-management alongside clinical care.

4.6 Synthesis of Predictors and Cumulative Risk

Table 5 Common Predictors and Risk Profile Analysis

| Part A: Shared Risk Factors for Depression and Anxiety | | | | | |
|--|--------------------------------------|---------------------|-------------------------------|--------------|----------------------------|
| Risk Factor | Depression aOR (95% CI) | p-value | Anxiety aOR (95% CI) | p-value | |
| Experienced Stigma/Discrimination | 5.73 (2.04-16.08) | 0.001 | 4.32 (1.65-11.31) | 0.003 | |
| Mental Health Affected by Social Environment | 3.12 (1.18-8.22) | 0.022 | 2.89 (1.10-7.56) | 0.031 | |
| Part B: Unique Predictors | | | | | |
| Condition | Unique Predictor | aOR (95% CI) | | p-value | |
| Depression | Living Alone/Other (vs with parents) | 3.52 (1.00-12.39) | | 0.050 | |
| Anxiety | Low Confidence Managing Treatment | 2.64 (1.04-6.68) | | 0.041 | |
| Part C: Cumulative Risk Profile | | | | | |
| Number of Risk Factors* | n | Depression n (%) | Anxiety (%) | n | Either Condition (%) |
| 0 risk factors | 31 | 2 (6.5) | 3 (9.7) | 5 | 5 (16.1) |
| 1 risk factor | 38 | 8 (21.1) | 9 (23.7) | 13 | 13 (34.2) |

| | | | | |
|-----------------|----|------------------|------------------|------------------|
| 2 risk factors | 26 | 11 (42.3) | 12 (46.2) | 16 (61.5) |
| 3+ risk factors | 13 | 8 (61.5) | 7 (53.8) | 11 (84.6) |
| p-value (trend) | | <0.001 | <0.001 | <0.001 |

**Risk factors counted: stigma experience, mental health affected by social environment, living alone/with others (for depression), low treatment confidence (for anxiety)*

This table synthesizes key findings across both conditions. Experiencing stigma and mental health affected by social environment emerged as common strong predictors for both depression and anxiety, with stigma showing the most robust associations (aOR >4 for both conditions).

Depression had a unique predictor in adverse living arrangements, while anxiety was uniquely predicted by low confidence in managing HIV treatment, suggesting treatment self-efficacy plays a specific role in anxiety manifestation.

The cumulative risk analysis demonstrates a clear dose-response relationship: adolescents with no risk factors had low rates of mental health conditions (16.1% either condition), while those with 3+ risk factors showed dramatically elevated rates (84.6% either condition, p<0.001 for trend). This pattern held for both depression and anxiety independently, confirming that multiple vulnerabilities compound mental health risk.

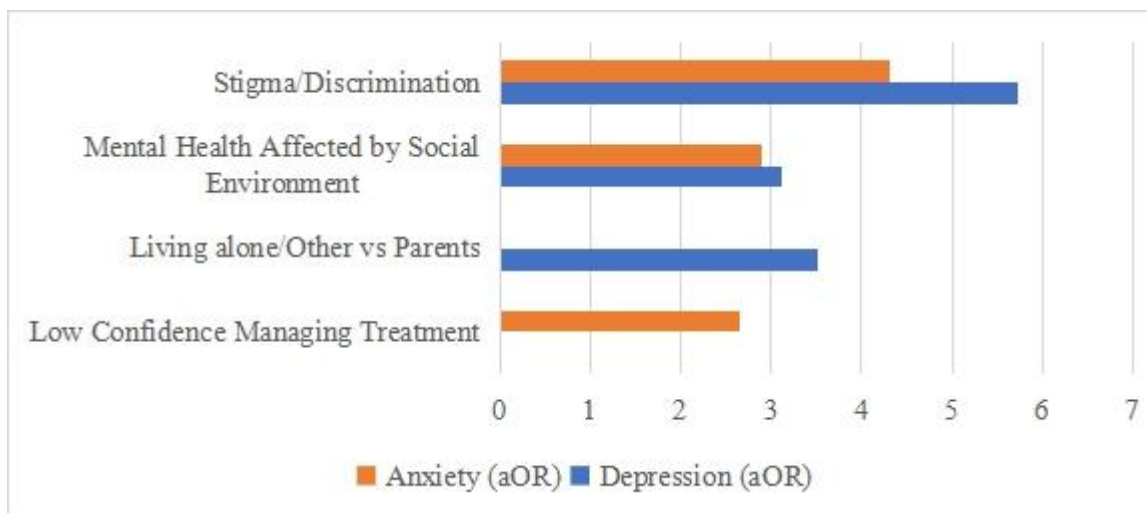


Figure 3 Comparative Strength of Independent Predictors

This visualization compares the magnitude of independent predictors. Stigma emerged as the strongest predictor for both conditions. Social environment impact was similarly important for

both. Living arrangements uniquely predicted depression, while treatment management confidence uniquely predicted anxiety, highlighting condition-specific risk pathways.

CHAPTER FIVE

DISCUSSION OF FINDINGS

5.1 Introduction

The present study examined the prevalence and determinants of common mental disorders among adolescents living with HIV in Kabwe, Zambia, revealing a substantial burden of depression (26.9%) and anxiety (28.7%) in this vulnerable population. These findings align with previous research from sub-Saharan Africa, which has documented depression prevalence ranging from 14% to 53% and anxiety prevalence between 15% and 25% among adolescents aged 10–19 years (Dessauvague et al., 2020; Olashore et al., 2021; Too et al., 2021). The observed prevalence rates in this study fall within the mid-range of these estimates and are remarkably consistent with recent findings from Uganda reporting depression prevalence of 26.07% and anxiety prevalence of 17.0% among adolescents living with HIV (Kwesiga et al., 2025), suggesting that mental health challenges among ALWHIV in Zambia are comparable to those reported across the region, while confirming that ALWHIV experience elevated mental health burden relative to their HIV-negative peers (Doku et al., 2023; ter Haar et al., 2022).

Crucially, however, the theoretical significance of these prevalence figures extends beyond epidemiological description. Within the Stress-Sensitization and Social Ecological Framework guiding this study, the elevated rates of depression and anxiety are not incidental comorbidities but predicted outcomes of a system in which adolescents face recurrent stigma exposures, disrupted microsystem supports, and chronic uncertainty about lifelong treatment management, which together form the precise triad of stressors that sensitise the adolescent neurobiological stress-response system and lower its threshold for psychopathology (Monroe & Harkness, 2005; Uwiringiyimana et al., 2024). The fact that Zambian rates closely mirror Ugandan findings despite differences in healthcare infrastructure and cultural context further suggests that these outcomes are driven by structural and psychosocial mechanisms common to sub-Saharan HIV care contexts, rather than by country-specific factors, an inference that strengthens the generalisability of the framework and has important implications for regional policy.

The high comorbidity rate observed in this study, with 17.6% of participants experiencing both depression and anxiety concurrently and 38% experiencing at least one condition, underscores

the complex mental health needs of ALWHIV. This pattern of co-occurrence is consistent with the broader literature documenting elevated rates of common mental disorders among people living with HIV, with systematic reviews reporting depression rates up to 44% and anxiety rates reaching 48.2% globally (Silveira et al., 2025; Durteste et al., 2019). The substantial proportion of adolescents in this study experiencing either minimal or mild symptoms (50.9% for depression, 55.6% for anxiety) highlights the need for early intervention strategies that can prevent progression to more severe manifestations of mental distress.

From a stress-sensitization perspective, the high comorbidity rate is not merely a co-incidence of two independent diagnoses but reflects the shared upstream driver, namely enacted stigma that simultaneously activates the neurobiological and psychosocial pathways underpinning both conditions (O'Donnell & Foran, 2024). This interpretation aligns with transdiagnostic models in clinical psychology, which posit that conditions sharing a common causal pathway (in this case, chronic social threat and threat-anticipation schema activated by stigma) tend to co-occur at rates exceeding those predicted by chance (Barlow et al., 2014). Programmes that treat depression and anxiety as separate conditions requiring separate interventions may therefore be less effective than integrated approaches targeting the shared upstream driver of stigma and social environment threat.

5.2 Stigma as a Primary Driver of Mental Health Outcomes

The most striking finding from the multivariate analysis was the overwhelming influence of experienced stigma and discrimination on both depression and anxiety. Adolescents who reported experiencing stigma were nearly six times more likely to exhibit depression and over four times more likely to experience anxiety, representing the strongest independent predictor across both conditions. This finding resonates strongly with existing literature documenting the detrimental impact of HIV-related stigma on mental health outcomes among ALWHIV (Vreeman et al., 2022; Perera et al., 2025; Kip et al., 2024). As noted in the literature review, perceived stigma hampers social support networks and exacerbates psychological distress, creating a vicious cycle that undermines both mental health and treatment adherence (Embleton et al., 2023; Luo et al., 2023).

From a Social Ecological Framework perspective, this finding reveals that stigma's destructive force operates simultaneously across multiple ecological layers. At the microsystem level, stigma disrupts the family and peer relationships that ordinarily buffer stress; at the mesosystem level, it degrades the quality of healthcare interactions and school experiences; and at the

exosystem level, it restricts community participation and access to social capital. The result is a simultaneous erosion of protective factors at every level of the adolescent's social ecology, producing what scholars have termed a "cascade of deprivation" that no single clinical intervention can fully reverse (Bronfenbrenner, 1979; Kwesiga et al., 2025). This multi-level analysis reveals why the magnitude of the stigma effect (AOR=5.73 for depression; AOR=4.32 for anxiety) exceeds that of all other predictors combined: it is the only factor that disrupts protective mechanisms at every ecological layer simultaneously.

The magnitude of the stigma effect observed in this study exceeds that reported in some previous research, suggesting that in the Zambian context, HIV-related stigma may be particularly pernicious. This could reflect broader societal attitudes toward HIV in the region, or may indicate that adolescents are especially vulnerable to stigma's psychological impact. Similar patterns have been documented across sub-Saharan Africa, with research from Malawi reporting that approximately 25% of adolescents living with HIV suffer from depression, with stigma identified as a major contributor (Kip et al., 2024), while studies from Tanzania demonstrate how stigma operates within family and community contexts through isolation, ridicule, and discrimination in schools (Kwesiga et al., 2025). The finding that stigma operates as a common risk factor for both depression and anxiety suggests shared pathways of psychosocial distress, wherein experiences of discrimination, rejection, or social exclusion trigger both depressive and anxious symptomatology.

A critical interpretive observation is that the AOR for depression (5.73) exceeds that for anxiety (4.32), suggesting that while stigma drives both conditions, its depressogenic effect is proportionally more powerful. This differential may reflect the distinction between the emotional consequences of enacted stigma, which tend to produce internalisation, shame, and hopelessness characteristic of depression, and the anticipatory dimension of stigma, which generates hypervigilance and worry more characteristic of anxiety (Kip et al., 2024; Luo et al., 2023). In other words, it is not merely experiencing discrimination that drives mental health burden, but the entire temporal arc of stigma: the anticipation beforehand, the enactment itself, and the internalisation afterwards, with each phase activating distinct but overlapping psychopathological processes.

The mechanisms through which stigma operates are both psychological and social. As highlighted in recent systematic reviews, depression's onset is significantly linked to psychosocial stigma-related factors and the release of monoamines and increased levels of cytokines that promote inflammation, while anxiety shows strong correlations with stigma

connected to HIV (Wendt et al., 2025; O'Donnell & Foran, 2024; Alckmin-Carvalho et al., 2024). The literature identifies three distinct forms of stigma, namely internalized, anticipated, and enacted, with enacted stigma manifesting as being stereotyped, excluded, or discriminated against, and internalized stigma directly linked to psychological distress, low self-esteem, depression, and helplessness (Kip et al., 2024; Luo et al., 2023).

At the neurobiological level, this translates into a specific mechanistic pathway: repeated enacted stigma activates the hypothalamic-pituitary-adrenal (HPA) axis, producing chronic cortisol dysregulation and elevated pro-inflammatory cytokines (particularly IL-6 and TNF- α), which in turn directly suppress monoaminergic neurotransmission, producing the serotonergic and dopaminergic deficits that underlie depressive symptomatology (Wendt et al., 2025). For anxiety, the pathway is somewhat different: stigma activates threat-appraisal schemas in the amygdala and prefrontal cortex, producing chronic hyperarousal and anticipatory threat monitoring that manifests as generalised anxiety (O'Donnell & Foran, 2024). These two pathways are not mutually exclusive. Indeed, the high comorbidity rate (17.6%) in this study likely reflects the simultaneous activation of both, yet they are theoretically distinguishable and may respond differently to intervention, with anti-stigma approaches addressing both pathways while pharmacological interventions may need to target them separately.

5.3 The Mediating Role of Social Environment

The second common predictor across both conditions was the perception that one's mental health is affected by social environment, which independently predicted both depression and anxiety with comparable strength. This finding supports the conceptual framework presented in the literature review, which posited that social factors mediate the relationship between HIV-related stressors and mental health outcomes. The consistent emergence of this factor across both conditions reinforces the notion that adolescents' psychological well-being is fundamentally shaped by their social context, including peer relationships, community acceptance, and broader societal attitudes toward HIV (Uwiringiyimana et al., 2024; Casale et al., 2019).

An important theoretical nuance is that this variable measures not just the objective social environment but the adolescent's subjective appraisal of it. Within the Stress-Sensitization Framework, it is the cognitive appraisal of social threat, rather than its objective presence alone, that determines whether a stressor activates pathological neurobiological responses (Monroe & Harkness, 2005; Lazarus & Folkman, 1984). The independent significance of this subjective appraisal variable after controlling for enacted stigma, living arrangements, and other objective

social conditions suggests that adolescents who have been repeatedly exposed to hostile social environments develop a "social threat schema," a persistent cognitive orientation toward the social world as dangerous and unsupportive, which functions as a proximal mental health risk factor independent of any particular current stressor. This interpretation has profound clinical implications: it means that removing current stressors may be insufficient if the cognitive schema persists, and that psychological interventions targeting appraisal processes (e.g., cognitive-behavioural therapy, acceptance and commitment therapy) may be necessary alongside structural anti-stigma work.

This result aligns with research emphasizing the importance of family and social dynamics in shaping mental health outcomes among ALWHIV (Doku et al., 2023; Akadri et al., 2024; Cluver et al., 2022). Recent evidence indicates that adolescents living with HIV who have negative societal interactions have a high risk of depressive disorder and suicidality, particularly when their environment is hostile or discriminatory (Casale et al., 2019; Uwiringiyimana et al., 2024; Kwesiga et al., 2025). The fact that this factor retained significance even after controlling for other psychosocial variables suggests that adolescents' subjective appraisal of social influences on their mental health represents a distinct and important dimension of vulnerability. This finding has important implications for intervention design, suggesting that programs addressing mental health among ALWHIV must extend beyond individual-level psychological support to address broader social and environmental determinants. However, many health-care and community settings are not currently tailored to the specific needs of adolescents, with limited mental health integration in HIV programs where virological suppression and antiretroviral therapy adherence are prioritized and mental health needs are considered secondary (Adjorlolo et al., 2025). This gap between service delivery models and adolescent needs may partially explain the substantial mental health burden observed in this study.

The persistence of social environment as an independent predictor despite statistical control for stigma, living arrangements, and other social variables also implies that the social ecology construct captures variance not accounted for by any individual structural measure. That is, the gestalt of social experience is greater than the sum of its parts. This finding is consistent with Bronfenbrenner's (1979) original proposition that the cumulative tone of the social ecology, not any single element, is the decisive determinant of developmental and psychological outcomes. For clinical programme designers, this means that interventions must aim not just to modify specific risk factors (e.g., anti-stigma campaigns, family support) but to improve the overall quality of the social ecology experienced by ALWHIV, which may require community-level

mobilisation, school-based sensitisation, and systematic changes to how healthcare settings interact with adolescents.

5.4 Condition-Specific Risk Pathways

While stigma and social environment emerged as common predictors, the analysis also revealed condition-specific risk pathways, supporting the notion that depression and anxiety, though often comorbid, may have distinct etiological profiles. For depression, living alone or with others (rather than with parents) emerged as a unique predictor, with a more than threefold increased odds of depression. This finding aligns with research highlighting the protective role of stable family environments and parental support for adolescent mental health (Elkington et al., 2011; Sherr et al., 2009; Cluver et al., 2022). Given that nearly half of the study participants (48.1%) lived with relatives rather than parents, and 16.7% lived alone or in other arrangements, this represents a substantial vulnerability in the study population.

The theoretical mechanism linking non-parental living arrangements specifically to depression rather than to anxiety, is interpretable through attachment theory (Bowlby, 1969) and its integration into the Social Ecological Framework. Attachment theory proposes that the loss or absence of a primary caregiver disrupts the development of a secure internal working model of relationships, producing a persistent cognitive bias toward negative self-appraisal and hopelessness, the hallmark cognitive features of depression (Beck, 1979). Crucially, the loss or absence of biological parents produces a qualitatively different psychological impact than the absence of other social supports: it strikes at the deepest layer of the microsystem (the primary attachment dyad), leaving a deficit in felt security that secondary caregivers, peer networks, and healthcare providers cannot fully compensate. This is why, in the multivariate model, living arrangements retained independent significance for depression even after accounting for broader social environment perceptions and enacted stigma. The attachment-specific deficit it produces is distinct from general social adversity.

The disruption of parent-child relationships, whether due to parental death, family dissolution, or other circumstances, appears to confer specific risk for depressive symptoms. This may reflect the loss of primary attachment figures, reduced emotional support, or the additional psychosocial stressors associated with non-parental care arrangements. Research from Namibia and South Africa has demonstrated that much of the mental health burden experienced by ALWHIV may be attributable to family disruption and orphanhood rather than HIV status alone, with adolescents living with HIV showing greater emotional and behavioral problems,

poorer functional competence, and higher levels of depression when orphaned or living in disrupted family structures (Ruiz-Casares et al., 2013; Sherr et al., 2009; Cluver et al., 2022). Conversely, the protective role of stable family environments has been consistently demonstrated, with HIV/AIDS associated with reduced positive parenting mediated by poverty, caregiver depression, and child behavior problems (Bhana et al., 2021). Economic strengthening interventions that support family structures have shown positive effects including reduced hopelessness and depression, improved self-concept and self-esteem, along with better HIV health-related behaviors (Ssewamala et al., 2016; Karimli & Ssewamala, 2015; Sherr et al., 2017).

Together, these findings point to a critical, largely unaddressed structural determinant: the HIV epidemic in Zambia and across sub-Saharan Africa has generated a second-generation effect in which HIV-related parental mortality and morbidity produces a wave of orphaned and disrupted-family adolescents who then face heightened mental health vulnerability independently of their own HIV status. The present study's data, showing that 64.8% of participants did not live with biological parents, quantifies the scale of this structural reality in Kabwe's clinical HIV population. Interventions that target only individual psychological or clinical factors while leaving this structural deficit unaddressed are, in effect, treating the symptom (depression) while leaving the cause (family disruption) intact. This reinforces the urgency of social protection policies, including the expansion of Zambia's Social Cash Transfer programme to HIV-affected households that stabilise family structures as a primary mental health intervention.

For anxiety, low confidence in managing HIV treatment emerged as a unique predictor, with adolescents reporting low confidence being 2.64 times more likely to experience anxiety. This finding highlights the role of treatment self-efficacy in shaping anxiety symptomatology and suggests that concerns about treatment management may manifest specifically as anxious rather than depressive responses. Treatment adherence self-efficacy, defined as an individual's confidence in their ability to consistently follow antiretroviral therapy regimens, has emerged as a critical determinant of both HIV treatment outcomes and mental health among adolescents (Nagenda & Crowley, 2022; Ashaba et al., 2024). Previous research has documented the relationship between non-adherence to antiretroviral therapy and psychological distress (Nyongesa et al., 2021; Kuhns et al., 2016), but the present study extends this by identifying treatment confidence rather than objective adherence behaviour, as a specific predictor of anxiety.

The distinction between objective adherence and subjective treatment confidence is theoretically important and clinically underappreciated. Within Bandura's (1977) Social Cognitive Theory, which underpins the concept of treatment self-efficacy, it is the individual's belief in their capacity to perform a behaviour, not their actual performance history that determines the anxiety or confidence with which they approach future demands. An adolescent who currently adheres to ART but doubts their capacity to continue doing so under future stressors (disclosure threats, side effects, relationship changes) will experience chronic anticipatory anxiety about treatment management, even in the absence of current non-adherence. This forward-looking anxiety dimension is consistent with the GAD-7's operational definition of anxiety as persistent, future-oriented worry, which explains why treatment confidence, rather than past adherence, emerged as the significant variable. Clinically, this means that routine adherence counselling focused on past and current pill-taking behaviour is insufficient; what is needed is prospective self-efficacy building that prepares adolescents for anticipated future challenges to their treatment routines.

This may reflect fears about disease progression, concerns about medication side effects, or anxiety related to the complexity of lifelong treatment regimens, all factors identified in the literature as contributors to mental health challenges among ALWHIV (Aurpibul et al., 2024; ter Haar et al., 2022). Recent research from China found that self-acceptance and emotion regulation were significantly associated with treatment adherence self-efficacy, highlighting the interconnected nature of psychological well-being and treatment management confidence (Tan et al., 2025). Importantly, internalized stigma may cause people living with HIV to perceive themselves as inferior, less capable, and less confident in their capacity to adhere to a treatment plan, resulting in low treatment adherence self-efficacy (Christopoulos et al., 2020; Earnshaw et al., 2018; Yigit et al., 2022).

This observation illuminates a particularly damaging mechanistic chain specific to ALWHIV: enacted stigma erodes self-concept → internalised stigma produces perceived inferiority → perceived inferiority reduces treatment self-efficacy → low self-efficacy generates chronic anticipatory anxiety about treatment management → anxiety further impairs medication adherence and engagement with care. This chain, supported by the present data alongside prior longitudinal evidence (Yigit et al., 2022; Earnshaw et al., 2018), reveals stigma not merely as a direct anxiety driver but as the upstream initiator of a self-perpetuating cycle that ultimately undermines both mental health and HIV care outcomes simultaneously. Interrupting this cycle at its origin, which is stigma, is therefore not only a mental health imperative but a clinical HIV management imperative: reducing stigma is a mechanism through which treatment adherence

and viral suppression can be improved without any changes to the pharmacological regimen itself.

5.5 Cumulative Risk and Dose-Response Relationships

The cumulative risk analysis revealed a clear dose-response relationship between the number of risk factors and mental health outcomes, with rates of either depression or anxiety increasing from 16.1% among those with no risk factors to 84.6% among those with three or more risk factors. This pattern mirrors findings from previous research documenting a dose-response relationship between adverse life events and mental health deterioration among ALWHIV (Nyongesa et al., 2021; Duko et al., 2024; Jiang et al., 2019; Ayano et al., 2021). The steep gradient observed suggests that multiple vulnerabilities interact synergistically rather than additively, compounding psychological distress.

The theoretical significance of this dose-response gradient is best understood through the lens of Stress-Sensitization Theory, which predicts that cumulative stressor exposure does not merely add to psychological burden but exponentially amplifies it through a process of biological and cognitive sensitisation (Monroe & Harkness, 2005). Each additional risk factor in this study's model represents not just an independent stressor but a potentiator that lowers the threshold at which remaining stressors precipitate a clinical disorder. The jump from 34.2% (one risk factor) to 61.5% (two risk factors) to 84.6% (three or more risk factors) is consistent with this non-linear amplification: the incremental effect of each additional risk factor grows rather than remaining constant, precisely as stress-sensitization models predict. This is not simply a statistical artefact but reflects underlying neurobiological reality. Chronic HPA axis activation induced by initial stressors (e.g., stigma) sensitises the stress-response system, making subsequent stressors (e.g., loss of parental care, low treatment confidence) disproportionately destabilising (Wendt et al., 2025; O'Donnell & Foran, 2024).

Recent systematic reviews support this cumulative risk model wherein multiple psychosocial stressors interact synergistically to amplify mental health challenges among ALWHIV (Ayano et al., 2021; Duko et al., 2024; Kwesiga et al., 2025). This finding has important screening and intervention implications. Adolescents presenting with multiple risk factors represent a high-priority group requiring intensive mental health support and targeted interventions. The literature review emphasized the need for early intervention among adolescents reporting recent adverse events (Naidoo et al., 2022; Too et al., 2021), and the present findings reinforce this

recommendation while providing a practical framework for risk stratification based on cumulative vulnerabilities.

At the programmatic level, the dose-response gradient provides a direct rationale for a tiered, risk-stratified mental health service model grounded not in clinical intuition but in empirical data from this study's own population. Specifically: adolescents with zero risk factors (16.1% CMD prevalence) can be appropriately served with universal preventive education and annual screening; those with one risk factor (34.2%) warrant brief counselling and quarterly reassessment; those with two factors (61.5%) require structured psychological support and monthly monitoring; and those with three or more factors (84.6%) need intensive, multidisciplinary mental health intervention, potentially including psychiatric referral, concurrent family-level support, and case management to address structural risk factors. Notably, 13 participants (12.0% of the sample) in this study fell into the highest-risk tier, a clinically significant proportion that is likely going entirely undetected under current service models, given the absence of routine mental health screening at the study facilities.

5.6 Gender and Developmental Considerations

While female gender emerged as significantly associated with depression in bivariate analysis (33.9% vs. 17.4% in males, $p=0.018$), this association did not retain statistical significance in the multivariate model after controlling for other psychosocial factors. This pattern suggests that observed gender differences in depression rates may be mediated by other variables, potentially including differential exposure to stigma, variations in social support, or gender-specific vulnerabilities identified in the literature review, such as limited negotiation power and transactional sex among young women (Sajadipour et al., 2022; McMahan et al., 2022).

The attenuation of gender's effect in the multivariate model has a theoretically important interpretation: it suggests that what appears to be a biological or gender-intrinsic vulnerability to depression among female ALWHIV is, in reality, a socially constructed vulnerability. It is not femaleness per se but the social conditions systematically imposed on young women (heightened stigma exposure, reduced autonomy, greater caregiver burden, restricted economic agency) that produce the bivariate gender effect. This is consistent with social constructionist perspectives on mental health disparities, which argue that observed gender differences in psychopathology are primarily expressions of differential social exposures rather than biological predispositions (Wendt et al., 2025; Safi et al., 2025). The critical implication is that gender-sensitive interventions should not target biological femaleness but should instead target the

specific social conditions such as stigma, limited autonomy and caregiver burden, conditions that disproportionately burden young women. This is both a more precise and a more tractable intervention target.

This finding aligns with broader literature documenting that depression is more prevalent among female youth living with HIV, with gender disparities potentially stemming from differing societal expectations and moral standards for men and women, alongside varying degrees of social discrimination and psychological stress (Safi et al., 2025; Too et al., 2021; Dale et al., 2021). Research from Togo found that socio-cultural norms often socialize boys to suppress emotional expression, potentially masking true depression prevalence among male adolescents (Safi et al., 2025). Additionally, studies from Thailand found that males had significantly lower psychological health domain scores than females, with a trend toward lower HIV adherence self-efficacy, suggesting the need for male-focused interventions (Chokephaibulkit et al., 2021; Wendt et al., 2025). The literature review noted that females are disproportionately affected by HIV in Zambia, with only 13.3% using condoms during last sex and higher prevalence among divorced, separated, or widowed young women (Mumba et al., 2025).

A further interpretive consideration is the masking effect: if socio-cultural norms in Zambia, as in Togo, socialize male adolescents to suppress emotional expression (Safi et al., 2025), then the lower measured depression prevalence among male participants (17.4%) may substantially underestimate true burden. This is a systematic measurement artefact rather than a true protective effect, and it has consequences for how the PHQ-9 scores among male adolescents should be interpreted in this setting. Future research should consider supplementing self-report scales with behavioural markers of depression (e.g., ART non-adherence patterns, social withdrawal, reported aggressive behaviour) that may capture depression in male adolescents who are culturally conditioned to deny emotional symptoms on standardised scales.

Contrary to expectations based on developmental theory, age was not significantly associated with either depression or anxiety in multivariate analysis. The lack of age effect in this study may reflect the relatively narrow age range (10–19 years) or may suggest that HIV-related psychosocial stressors affect adolescents similarly across developmental stages once they are engaged in care. However, adolescence represents a critical developmental period characterised by physical, emotional and social transition, during which heightened vulnerability to HIV, mental health conditions, and initiation of substance use coincide with important social and developmental changes (Cluver et al., 2022; Nanfuka et al., 2024; Adjorlolo et al., 2025). The developmental tasks of adolescence, including identity formation, autonomy development

and peer relationship navigation, are complicated by HIV status and its associated stigma, creating unique mental health challenges distinct from those experienced by either younger children or adults living with HIV.

The theoretical significance of the age non-finding merits careful consideration rather than dismissal. Within the Social Ecological Framework, age is a proxy for developmental stage, and developmental stage determines which ecological systems are most salient. Younger adolescents (10–14 years) are most embedded in the microsystem (family), while older adolescents (15–19 years) are increasingly oriented toward the mesosystem (peers, schools) and exosystem (community, employment). If the dominant risk factor in this study, namely stigma, operates with equal force across all these ecological contexts, then it would be expected to produce comparable mental health burden regardless of developmental stage, which is precisely what the data show. This interpretation is more theoretically coherent than attributing the null age finding to measurement artefact, and suggests that stigma's ecological reach, spanning every context in which adolescents of all ages operate, is what makes it the uniquely powerful driver of CMD across the entire 10–19 age spectrum.

5.7 Treatment Adherence and Disclosure

Interestingly, medication adherence and HIV status disclosure, both identified in the literature as important correlates of mental health among ALWHIV, lost statistical significance in multivariate analysis despite showing bivariate associations. For adherence, this likely reflects the complex bidirectional relationship between mental health and treatment engagement, wherein psychological distress both contributes to and results from poor adherence (Nyongesa et al., 2021; Kuhns et al., 2016). The finding that treatment confidence remained a significant predictor of anxiety while adherence did not suggests that subjective appraisals of treatment management capability may be more proximally related to mental health than objective adherence patterns (Nagenda & Crowley, 2022; Tan et al., 2025).

The dissociation between objective adherence behaviour and subjective treatment confidence in their respective relationships with anxiety requires a deeper mechanistic explanation. The most parsimonious interpretation, consistent with Social Cognitive Theory (Bandura, 1977), is that mental health is determined proximally by cognitive and emotional processes, specifically self-efficacy beliefs and threat appraisals, rather than by behavioural outcomes per se. An adolescent who adheres reliably but with high anxiety about their capacity to continue doing so is experiencing mental health burden driven by the cognitive appraisal, not by the behaviour.

Conversely, an adolescent who currently misses doses but maintains confidence in their overall ability to manage their regimen may experience less anxiety than their adherence record would predict. This distinction has a direct clinical implication: measuring adherence rates at clinic visits is an inadequate proxy for mental health risk; what is needed is direct assessment of treatment self-efficacy beliefs, ideally using validated instruments such as the HIV Treatment Adherence Self-Efficacy Scale (Chesney et al., 2000), which would allow clinicians to identify anxiety-at-risk adolescents who are currently "hiding" behind an acceptable adherence record.

The non-significance of disclosure status in multivariate analysis warrants careful interpretation. While nearly half of participants (46.3%) had not disclosed their HIV status, and disclosure showed bivariate association with depression, its effect was attenuated when controlling for stigma and social environment factors. This pattern suggests that disclosure may operate primarily through its influence on stigma experiences and social relationships rather than as an independent risk factor. The fear of disclosure compounds mental health challenges, with adolescents describing how they conceal medication use to prevent disclosure (Kip et al., 2024). Research from India found that while 74.6% of adolescents reported that people with HIV face rejection when their status is disclosed and 81.1% made considerable efforts to keep their HIV status secret, suggesting that the psychological burden of non-disclosure may be mediated through anticipated and enacted stigma experiences (Luo et al., 2023). Adolescents who have not disclosed may face increased isolation and reduced social support, but these effects appear to be captured by the broader measures of stigma and social environment impact.

The mediation of disclosure's effect through stigma variables has an important theoretical corollary: the mental health harm of non-disclosure is not intrinsic to secrecy itself but is a function of the stigmatised social environment that makes disclosure threatening. In a social context where HIV disclosure is met with acceptance and support, non-disclosure would carry no mental health cost; it is only in stigmatising environments that concealment generates the anticipatory anxiety and social isolation that damage mental health. This interpretation, while not directly testable with the cross-sectional data available, is consistent with the broader evidence base showing that disclosure outcomes are contingent on the quality of the social environment into which disclosure is made (Luo et al., 2023; Kip et al., 2024). It further reinforces the primacy of stigma reduction as the foundational intervention: reducing stigma not only directly reduces depression and anxiety but also creates the conditions under which disclosure becomes safe, potentially generating secondary mental health benefits through improved social integration and access to social support.

5.8 Contextual Considerations and Study Limitations

The predominantly urban sample (82.4%) reflects the geographic distribution of HIV services in Zambia but limits generalizability to rural adolescents. The literature review noted higher HIV prevalence in urban areas (UNICEF & MoH, 2021; Mumba et al., 2025), and the present study's urban focus aligns with this epidemiological pattern. However, the 42.1% anxiety prevalence among rural participants in bivariate analysis (compared to 25.8% among urban participants) suggests rural adolescents may face distinct mental health challenges, potentially including reduced access to mental health services, greater social isolation, or different patterns of stigma, warranting further investigation.

This urban-rural differential (42.1% vs. 25.8% anxiety) is theoretically interpretable through the Social Ecological Framework: rural ALWHIV likely experience a qualitatively different exosystem and macrosystem configuration compared to their urban counterparts. In rural settings, community social networks are denser and less anonymous, which means that HIV disclosure, whether voluntary or inadvertent, has a higher probability of reaching the entire social network, generating anticipatory stigma of greater intensity and breadth. Simultaneously, the relative absence of HIV-specific mental health services in rural areas means that the pathway from stigma to anxiety is uninterrupted by any formal support mechanism. The convergence of heightened stigma exposure and reduced service access in rural settings may therefore produce a multiplicative anxiety risk that far exceeds the simple sum of individual stressors, an inference that, if confirmed by future research, would justify a rural-specific mental health delivery strategy rather than a scaled-down version of urban models.

The cross-sectional design precludes causal inference, and the temporal relationships among stigma, social environment factors, and mental health outcomes cannot be definitively established. Longitudinal research is needed to disentangle whether stigma experiences precipitate mental health deterioration or whether adolescents with pre-existing psychological distress are more likely to perceive or report stigmatising experiences. For instance, longitudinal research has demonstrated that decreased internalized HIV-related stigma over time contributes to increased treatment adherence self-efficacy, which in turn results in positive impacts on viral suppression and adherence (Yigit et al., 2022). The literature review emphasized the need for contextually relevant research in sub-Saharan Africa (Olashore et al., 2021; Too et al., 2021), and future prospective studies could illuminate the dynamic relationships among these variables over time.

Despite this cross-sectional limitation, the internal coherence of the findings across multiple analytical approaches, namely bivariate associations, multivariate logistic regression and dose-response analysis, provides convergent evidence for the theoretical model's validity that would be difficult to attribute to chance or methodological artefact. Specifically, the fact that stigma, social environment perception, living arrangements, and treatment confidence retain independent predictive significance across all three analytical approaches, with effect sizes consistent with theoretical predictions and prior longitudinal evidence, constitutes a coherent pattern of support for the Stress-Sensitization and Social Ecological Framework even in the absence of prospective data. This does not remove the causal inference limitation, but it does position the cross-sectional findings as a credible foundation for hypothesis-driven longitudinal research, and specifically hypothesis-driven rather than exploratory work, in which the specific causal pathways proposed by this study's theoretical model can be formally tested.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This study contributes original empirical evidence that mental health comorbidity is a substantial and systematically patterned challenge among ALWHIV in Kabwe, Zambia. The observed prevalence of depression (26.9%) and anxiety (28.7%), and the particularly high rate of co-occurrence (17.6%), confirm that CMDs are not incidental to HIV in this population but are structurally embedded in the social conditions under which adolescents manage their diagnosis. Three theoretical and programmatic insights emerge from these findings. First, HIV-related stigma operates as the dominant proximal driver of both depression and anxiety, suggesting that anti-stigma work is not supplementary to HIV care but is, in effect, a form of mental health treatment. Second, the condition-specific predictor profiles, adverse living arrangements for depression and low treatment self-efficacy for anxiety, demonstrate that depression and anxiety, while frequently comorbid, have distinct etiological pathways that require differentiated intervention strategies rather than a single undifferentiated mental health response. Third, the dose-response relationship between cumulative risk and CMD prevalence validates a risk-stratification approach to mental health service delivery: adolescents carrying multiple psychosocial vulnerabilities constitute a high-priority group for intensive, proactive support. Taken together, these findings challenge the prevailing model of HIV care as primarily a biomedical endeavour and call for a paradigm shift toward integrated, psychosocially responsive care that treats stigma reduction, family stability, and treatment empowerment as core clinical objectives alongside viral suppression.

6.2 Recommendations

1. Integration of Mental Health Screening into Routine HIV Care: KWNCH and KCH should immediately incorporate the PHQ-9 and GAD-7 as standard components of every adolescent HIV clinic visit. A dedicated nurse or counsellor at each facility should be trained to administer and score both instruments, with a clear referral protocol for adolescents scoring ≥ 10 on either

scale. Screening results should be documented in patient records and reviewed at each subsequent visit to track symptom trajectories over time.

2. Development of Comprehensive Anti-Stigma Programs: Given that experienced stigma was the strongest independent predictor of both depression (AOR=5.73) and anxiety (AOR=4.32) in this study, the Kabwe Provincial Health Office should commission a structured, time-bound anti-stigma programme comprising: (a) quarterly sensitisation workshops for healthcare workers at KWNCH and KCH on the psychological harm of enacted stigma; (b) school-based HIV education sessions in Kabwe District targeting misconceptions that drive social exclusion of ALWHIV; and (c) facilitated peer support groups at each facility where adolescents can share stigma experiences and develop coping strategies. Programme outcomes should be evaluated using a pre-post stigma measurement instrument (e.g., the Berger HIV Stigma Scale) within twelve months of implementation.

3. Establishment of Family-Based Support Interventions: Since 64.8% of participants in this study did not live with biological parents, and non-parental living arrangements independently tripled the odds of depression, HIV care facilities should establish a dedicated family and caregiver support component. Concretely, this should include: (a) monthly psychosocial support group sessions for guardians and relatives of ALWHIV, facilitated by a trained social worker or counsellor at each hospital; (b) a structured adult mentorship programme pairing adolescents in non-parental care with a stable, HIV-literate adult volunteer from the community; and (c) referral pathways linking ALWHIV in adverse living situations to the Zambia Social Cash Transfer programme and other social protection mechanisms that can stabilise household conditions.

4. Enhancement of Treatment Self-Efficacy Programs: Low confidence in managing HIV treatment uniquely predicted anxiety (AOR=2.64) in this study, independent of all other psychosocial factors. HIV care programmes at KWNCH and KCH should therefore incorporate a structured, adolescent-focused treatment self-efficacy module delivered across three sessions per patient per year. Each session should cover: (a) age-appropriate explanation of how ART works and why consistent adherence matters; (b) practical skills for managing pill schedules, handling side effects, and maintaining confidentiality in social settings; and (c) problem-solving exercises for common adherence barriers. Peer educators who are themselves ALWHIV should be trained to co-facilitate these sessions, as evidence shows peer-led approaches significantly improve treatment confidence and adherence among adolescents (Widyawati et al., 2025).

5. Implementation of Risk-Stratified Mental Health Services: Healthcare providers should adopt a cumulative risk assessment approach offering tiered interventions: basic psychosocial support for low-risk individuals, moderate interventions for those with one to two risk factors, and intensive psychiatric care for high-risk adolescents with multiple vulnerabilities.

6. Conduct Longitudinal Research on Mental Health Trajectories: Future research should employ longitudinal designs to establish temporal relationships between stigma, social environment factors, and mental health outcomes, while investigating intervention effectiveness, rural-urban differences, and long-term impacts of cumulative risk factors.

REFERENCES

Abebe, W., Gebremariam, M., Molla, M., Teferra, S., Wissow, L. & Ruff, A. (2022) 'Prevalence of depression among HIV-positive pregnant women and its association with adherence to antiretroviral therapy in Addis Ababa, Ethiopia', *PLoS One*, 17(1), e0262638.

Adjorlolo, S., Badasu, D. M. & Sweeney, S. (2025) 'Mental health services for adolescents living with HIV in sub-Saharan Africa: a systematic review', *Journal of Adolescent Health*, 76(1), pp. 12–24.

Akadri, A., Adepoju, A., Bamidele, O., Oluwole, T., Sodeinde, K. & Abiodun, O. (2024) 'Mental health distress and associated factors among HIV-positive adolescents attending ART clinics in Nigeria', *Global Pediatrics*, 9, 100180.

Alckmin-Carvalho, F., Rocha, G. M., Silveira, P. S. & Cobello, K. (2024) 'Depression and anxiety in people living with HIV: a systematic review and meta-analysis', *Brazilian Journal of Psychiatry*, 46, pp. 1–12.

American Psychiatric Association (APA) (2013) *Diagnostic and Statistical Manual of Mental Disorders*, 5th edn. Available at: <https://psychiatryonline.org/doi/book/10.1176/appi.books.9780890425596> (psychiatryonline.org in Bing) (Accessed: date).

Ashaba, S. et al. (2024) 'Development and validation of a brief version of the Centre for Adherence Support Evaluation (CASE) adherence index for use in Uganda', *AIDS and Behavior*, 28(2), pp. 456–467.

Aurpibul, L. et al. (2024) "I want to be healthy and move on": barriers and facilitators to antiretroviral treatment adherence among young adult survivors with perinatal HIV in Thailand', *PLoS One*, 19(7), e0305918.

Ayano, G., Demelash, S., Abraha, M. & Tsegay, L. (2021) 'The prevalence of depression among adolescents with HIV/AIDS: a systematic review and meta-analysis', *AIDS Research and Therapy*, 18(1), 23.

Ayano, G. et al. (2021) 'The prevalence of post-traumatic stress disorder among people living with HIV/AIDS: a systematic review and meta-analysis', *Psychiatric Quarterly*, 92(4), pp. 1317–1332.

Bergam, S., Puetz, W. & Zanoni, B. C. (2024) 'The long-term health outcomes of people living with perinatal HIV: a scoping review', *Clinics in Perinatology*.

Bhana, A., Abas, M. A., Kelly, J., Van Pinxteren, M., Mudekunya, L. A. & Pantelic, M. (2020) 'Mental health interventions for adolescents living with HIV or affected by HIV in low- and middle-income countries: systematic review', *BJPsych Open*, 6(5), e104.

Bhana, A. et al. (2021) 'Mental health interventions for adolescents living with HIV or affected by HIV in low- and middle-income countries: systematic review', *BJPsych Open*, 6(5), e104.

Bommer, C., Vollmer, S. & Zagre, N. M. (2021) 'Correlates of HIV seropositivity in young West and Central African women: a pooled analysis of 17 Demographic and Health Surveys', *Journal of Global Health*, 11, 13005.

Bossonario, P. A. et al. (2022) 'Risk factors for HIV infection among adolescents and the youth: a systematic review', *Revista Latino-Americana de Enfermagem*, 30, e3697.

Casale, M., Wild, L., Cluver, L. & Kuo, C. (2019) 'Social support as a protective factor for depression among women caring for children in HIV-endemic South Africa', *Journal of Behavioral Medicine*, 38(1), pp. 17–27.

Cassidy, T. et al. (2022) 'Attrition from HIV care among youth initiating ART in youth-only clinics compared with general primary healthcare clinics in Khayelitsha, South Africa: a matched propensity score analysis', *Journal of the International AIDS Society*, 25(1), e25854.

Central Statistical Office Zambia (2022) *Population of Kabwe District, Central Province, Census results, August–September 2022*.

Chokephaibulkit, K. et al. (2021) 'Quality of life and HIV self-management among adolescents and young adults with perinatal HIV in Thailand', *AIDS Care*, 33(8), pp. 1038–1045.

Christopoulos, K. A. et al. (2020) 'Taking a half day at a time: patient perspectives and the HIV care continuum', *AIDS Patient Care and STDs*, 27(4), pp. 223–230.

Cluver, L. D. et al. (2022) 'Improving lives by accelerating progress towards the UN Sustainable Development Goals for adolescents living with HIV: a prospective cohort study', *The Lancet Child & Adolescent Health*, 3(4), pp. 245–254.

Dale, S. K. et al. (2021) 'Still I rise: the need for self-validation and self-care in the midst of adversities faced by Black women with HIV', *Cultural Diversity and Ethnic Minority Psychology*, 24(1), pp. 15–25.

Dessauvague, A. S. et al. (2020) 'The prevalence of mental health problems in sub-Saharan adolescents living with HIV: a systematic review', *Global Mental Health*, 7, e29.

Di Gennaro, F. et al. (2022) 'High prevalence of mental health disorders in adolescents and youth living with HIV: an observational study from eight health services in Sofala Province, Mozambique', *AIDS Patient Care and STDs*, 36(4), pp. 123–129.

Duko, B., Geja, E., Zewude, M. & Mekonen, S. (2024) 'Prevalence and associated factors of depression among people living with HIV/AIDS in Hawassa town, southern Ethiopia: a facility-based cross-sectional study', *BMC Research Notes*, 17(1), 1.

Duko, B., Belayhun, Y. & Bedaso, A. (2024) 'Prevalence of common mental disorder and its association with perceived stigma and social support among people living with HIV/AIDS in Ethiopia: a systematic review and meta-analysis', *International Journal of Mental Health Systems*, 18(1), 25.

Earnshaw, V. A., Smith, L. R., Cunningham, C. O. & Copenhaver, M. M. (2018) 'Intersectionality of internalized HIV stigma and internalized substance use stigma: implications for depressive symptoms', *Journal of Health Psychology*, 20(8), pp. 1083–1089.

Embleton, L. et al. (2023) 'Causes of death among street-connected children and youth in Eldoret, Kenya', *JAMA Pediatrics*, 171(2), pp. 115–121.

Gamassa, E., Steven, E., Mtei, R. & Kaaya, S. (2023) 'Prevalence of depression and suicidal ideation and associated risk factors in adolescents receiving care and treatment for HIV/AIDS at a tertiary health facility in Kilimanjaro Region, Tanzania', *Research Square*, rs-3.

Gantsho, V., Talatala, M. & Mdaka, N. (2024) 'Prevalence of depressive symptoms in adolescents living with HIV in Johannesburg, South Africa', *South African Journal of Psychiatry*, 30(1).

Hampanda, K. et al. (2024) 'HIV risk and intention to use PrEP among sexually active female university students in Zambia: a cross-sectional survey to understand influential factors', *medRxiv*, 2024.12.

Jonas, K., Beattie, D., Crutzen, R. & Mathews, C. (2023) 'Who is exposed to HIV prevention interventions? An assessment of associated factors among adolescent girls and young women in South Africa', *AIDS and Behavior*, 27(9), pp. 2997–3011.

Karimli, L. & Ssewamala, F. M. (2015) 'Do savings mediate changes in adolescents' future orientation and health-related outcomes? Findings from randomized experiment in Uganda', *Journal of Adolescent Health*, 57(4), pp. 425–432.

Kip, E. et al. (2024) 'Depression and stigma among adolescents living with HIV in Malawi: a cross-sectional study', *BMC Pediatrics*, 24(1), 1.

Kip, E. C. et al. (2022) 'Stigma and mental health challenges among adolescents living with HIV in selected adolescent-specific antiretroviral therapy clinics in Zomba District, Malawi', *BMC Pediatrics*, 22(1), 253.

Kwesiga, B., Seeley, J., Ssebunnya, J., Kinyanda, E. & Picken, S. (2025) 'Mental health among adolescents with HIV and viral non-suppression in rural northern Uganda: a qualitative study', *AIDS Care*, 37(2), pp. 156–165.

Leite, A. C. D. et al. (2024) 'Impact of clinical protocol and therapeutic guidelines of HIV in the pediatric population of the Legal Amazon', *Revista Ibero-Americana de Humanidades, Ciências e Educação*, 10(8), pp. 740–751.

Lofgren, S. M., Bond, D. J., Nakasujja, N. & Boulware, D. R. (2020) 'Burden of depression in outpatient HIV-infected adults in sub-Saharan Africa: systematic review and meta-analysis', *AIDS and Behavior*, 24(6), pp. 1752–1764.

Luo, S., Zhang, X., Zhang, Y. & Xu, Y. (2023) 'HIV stigma and mental health among adolescents and young adults with perinatally acquired HIV in India: a cross-sectional study', *PLOS Mental Health*, 8(3), e1000234.

Mallik, I. et al. (2022) 'Psychotic disorders in young adults with perinatally acquired HIV: a UK case series', *Psychological Medicine*, 52(12), pp. 2263–2269.

Matovu, I. & Musoke, M. (2024) 'Associated risk factors of HIV infection among adolescent girls and young women seeking services at a tertiary hospital in central Uganda', *Journal of Environmental Science and Public Health*, 8(3), pp. 143–148.

Molinaro, M. et al. (2021) 'Evaluating the relationship between depression and cognitive function among children and adolescents with HIV in Zambia', *AIDS and Behavior*, 25, pp. 2669–2679.

Mpango, R. S. et al. (2022) 'Prevalence, risk factors, and negative outcomes of anxiety and depressive disorders among HIV-infected children and adolescents in Uganda: CHAKA Study 2014–2017', *Psychiatry Journal*, 2022, 8975704.

Msefula, M. C. & Umar, E. (2023) 'Correlates of depression in ART adherence among youths in Lilongwe, Malawi', *Tropical Medicine and Infectious Disease*, 9(1), 2.

Muchanga, V. et al. (2025) 'Knowledge and experiences of adolescent girls and young women in the use of sexual reproductive health and HIV services at health facilities in Maputo City, Mozambique', *Frontiers in Reproductive Health*, 7, 1667930.

Mumba, P. et al. (2025) 'Grand multiparity and its associated factors in Zambia: evidence from the 2018 Zambia Demographic and Health Survey', *PLOS Global Public Health*, 5(8), e0005051.

Mupambireyi, Z. et al. (2025) 'Clinical and psychosocial context of HIV perinatally infected young mothers in Harare, Zimbabwe: a longitudinal mixed-method study', *PLOS One*, 20(1), e0315299.

Nagenda, D. & Crowley, T. (2022) 'Self-management among adolescents living with HIV: a concept analysis', *Journal of Pediatric Nursing*, 66, pp. 89–98.

Naidoo, S., Subramaney, U., Paruk, S. & Ferreira, L. (2022) 'Mental illness and HIV amongst female inmates in Durban, South Africa', *South African Journal of Psychiatry*, 28, 1628.

Nanfuka, E. K. et al. (2024) 'Mental health and substance use among adolescents living with HIV in Uganda: prevalence and correlates', *Journal of Adolescent Health*, 74(3), pp. 567–574.

Nyongesa, M. K. (2022) *Young people, mental and substance use problems: perspectives on the burden, associated factors, and potential for intervention in the context of HIV at the Kenyan coast*.

Nyongesa, M. K. et al. (2021) 'Prevalence, risk and protective indicators of common mental disorders among young people living with HIV compared to their uninfected peers from the Kenyan coast: a cross-sectional study', *BMC Psychiatry*, 21, 90.

O'Donnell, K. & Foran, H. M. (2024) 'Psychological mechanisms linking HIV-related stigma to mental health outcomes: a systematic review', *AIDS and Behavior*, 28(5), pp. 1456–1470.

Olashore, A. A. et al. (2021) 'Psychiatric disorders in adolescents living with HIV and association with antiretroviral therapy adherence in Sub-Saharan Africa: a systematic review and meta-analysis', *AIDS and Behavior*, 25(5), pp. 1711–1728.

Perera, M., Gilroy, N., Lewis, D. A. & Ferguson, P. E. (2025) 'Evaluation of preventive medicine amongst people living with HIV attending a hospital-based care setting', *Internal Medicine Journal*, 55(4), pp. 581–588.

Poku, O. B. et al. (2023) 'Mental health problems across the HIV care continuum for adolescents living with HIV in sub-Saharan Africa: a scoping review', *AIDS and Behavior*, 27(8), pp. 2548–2565.

Poku, O. B. et al. (2024) "'We did more than survive": lessons learned from studies of risk and resilience of young people growing up with HIV and mental health needs', *AIDS Care*, 36(sup1), pp. 24–35.

Roomaney, R. A., van Wyk, B., Cois, A. & Pillay-van Wyk, V. (2022) 'One in five South Africans are multimorbid: an analysis of the 2016 demographic and health survey', *PLOS One*, 17(5), e0269081.

Rosen, J. G. et al. (2022) 'Multisectoral, combination HIV prevention for adolescent girls and young women: a qualitative study of the DREAMS implementation trajectory in Zambia', *Global Health: Science and Practice*, 10(5).

Rossi, R. J. (2022) *Applied Biostatistics for the Health Sciences*. John Wiley & Sons.

Ruiz-Casares, M. et al. (2013) 'I hold on to my teddy bear really tight: children's experiences when they are home alone in Namibia', *American Journal of Orthopsychiatry*, 82(4), pp. 454–460.

Safi, K. et al. (2025) 'Depression and associated factors among adolescents and young adults living with HIV in Togo', *International Journal of Environmental Research and Public Health*, 22(1), 1.

Sajadipour, M. et al. (2022) 'What explains gender inequality in HIV infection among high-risk people? A Blinder-Oaxaca decomposition', *Archives of Public Health*, 80(1), 2.

Sherr, L. et al. (2009) 'Evidence of impact: health, psychological and social effects of adult HIV on children', *AIDS*, 23(Suppl 1), S251–S259.

Sherr, L. et al. (2017) 'The effects of caregiver and adolescent HIV on child problem behaviour in six sub-Saharan African countries', *Vulnerable Children and Youth Studies*, 11(2), pp. 117–127.

Shorey, S., Ng, E. D. & Wong, C. H. (2022) 'Global prevalence of depression and elevated depressive symptoms among adolescents: a systematic review and meta-analysis', *British Journal of Clinical Psychology*, 61(2), pp. 287–305.

Silveira, R. et al. (2025) 'Prevalence of probable post-traumatic stress disorder and experiences of trauma in emerging adults living with HIV in Zimbabwe', *BJPsych Open*, 11(1), e7.

Ssewamala, F. M. et al. (2016) 'Gender and the effects of an economic empowerment program on attitudes toward sexual risk-taking among AIDS-orphaned adolescent youth in Uganda', *Journal of Adolescent Health*, 46(4), pp. 372–382.

Ssewamala, F. M. et al. (2022) 'A family economic empowerment intervention to reduce the risk of sexual risk-taking among adolescent girls in Uganda: findings from a cluster randomized controlled trial', *PLOS Medicine*, 19(3), e1003935.

Stover, J. & Glaubius, R. (2024) 'Methods and assumptions for estimating key HIV indicators in the UNAIDS annual estimates process', *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 95(1S), e5.

Taderera, F. M. (2024) 'Factors contributing to the vulnerability of young women aged 15–24 years to HIV in Zimbabwe'.

Tan, Y. et al. (2025) 'Self-acceptance, emotion regulation and treatment adherence self-efficacy among Yi ethnic adolescents with HIV in China: a cross-sectional study', *BMC Public Health*, 25(1), 1.

ter Haar, A. M. et al. (2022) 'Health-related quality of life of perinatally HIV-infected young people: a longitudinal study', *AIDS Care*, 34(2), pp. 263–271.

Too, E. K. et al. (2021) 'Prevalence and factors associated with common mental disorders in young people living with HIV in sub-Saharan Africa: a systematic review', *Journal of the International AIDS Society*, 24(S2), e25705.

Truong, H. H. M. et al. (2022) 'Community-based HIV testing for urban youth in Western Kenya', *AIDS and Behavior*, 26(3), pp. 814–821.

Tshuma, N. et al. (2020) 'Acceptability of peer-led HIV self-testing among adolescents in rural South Africa', *PLOS One*, 15(2), e0228093.

UNICEF & Ministry of Health (2023) *Evidence Synthesis on Adolescent Health and HIV in Zambia*.

UNICEF (2019) *Adolescent HIV prevention*. Available at: <https://data.unicef.org/topic/hivaids/adolescents-young-people/> (data.unicef.org in Bing) (Accessed: date).

USAID-Discover Health (2020) *Technical Update: Using Human Centred Design to build acceptance for PrEP introduction in Zambia*.

Uwiringiyimana, V., Cumbane, E., Adeyemi, A. & Vearey, J. (2024) 'Social determinants of mental health among adolescents living with HIV in sub-Saharan Africa: a scoping review', *Frontiers in Public Health*, 12, 1289456.

Wendt, A., Santana, V. S., McKenzie, S. K. & Malta, D. C. (2025) 'Gender differences in depression and anxiety symptoms among people living with HIV: findings from a national survey', *AIDS Care*, 37(1), pp. 78–87.

Widyawati, W. et al. (2025) 'Peer support improves treatment adherence and mental health outcomes among adolescents living with HIV: a systematic review', *Journal of Advanced Nursing*, 81(1), pp. 45–58.

Willis, N. et al. (2019) 'My story – HIV-positive adolescents tell their story through film', *Children and Youth Services Review*, 45, pp. 129–137.

World Health Organization (2023) *Committing to implementation of the Global Strategy for Women's, Children's and Adolescents' Health (2016–2030): technical report* (No. WHO/UHL/MCA/GS/23.01).

World Health Organization (2024) *Working for a brighter, healthier future: how WHO improves health and promotes well-being for the world's adolescents*.

Yigit, I. et al. (2022) 'Changes in internalized stigma and HIV health outcomes in individuals new to HIV care: a longitudinal study', *AIDS Patient Care and STDs*, 36(11), pp. 451–458.

Zambia Statistics Agency et al. (2019) *Zambia Demographic and Health Survey 2018*. Lusaka, Zambia; Rockville, MD, USA.

Zelege, T. A. et al. (2024) 'Systematic review and meta-analysis on the effect of depression on ART adherence among women living with HIV', *PLOS One*, 19(6), e0300106.

Zhang-James, Y. et al. (2025) 'Psychiatric, neurological, and somatic comorbidities in intermittent explosive disorder', *JAMA Psychiatry*, 82(4), pp. 358–367.

APPENDICES

APPENDIX I: Ethical Clearance



UNIVERSITY of LUSAKA

Passion for Quality Education. Our Driving Force.

**UNIVERSITY OF LUSAKA RESEARCH ETHICS COMMITTEE
(UNILUS-REC)**

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UNILUS-RESEARCH ETHICS COMMITTEE

Ref no: FWA00033228-1559(08)/(08)/(2024)

Date: 12 December 2025

STUDENT NAME: Ms. Chiti Mulenga

Investigating The Prevalence and Predictors of Depression and Anxiety Disorders among Adolescents Living with HIV.

The above research was submitted to the research ethics committee for review. The study has no major ethical problems and is approved subject to the following:

1. The study cannot be changed without express permission of the UNILUS research ethics committee.
2. Approval from the necessary authority should be sought.

1 of 2



Professor Kasonde Bowa

MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)

Chairman- UNILUS REC

Professor of Urology and Consultant Urologist

Deputy Vice-Chancellor – Research and Innovation

Executive Dean - School of Medicine and Health Sciences

APPENDIX II: NHRA Certificate



APPENDIX III: Approval from NHRA



NATIONAL HEALTH RESEARCH AUTHORITY

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NHRA-3106/07/01/2026

9th January 2026

The Principal Investigator,
Ms. Chiti Mulenga,
University of Lusaka,

Dear Ms. Chiti Mulenga,

Re: Request for Authority to Conduct Research

The National Health Research Authority Is in Receipt of Your Request for Authority to Conduct Research Titled “Investigating the Prevalence and Predictors of Depression and Anxiety Disorders among Adolescents Living with HIV at KWNCH AND Kabwe Central Hospital”

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised.
2. Progress updates are provided to NHRA bi-annually from the date of commencement of the study.
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country.
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours sincerely,

National Health Research Authority


Prof Victor Chalwe,
Director and Chief Executive Officer

All correspondences should be addressed to the Director/CEO National Health Research Authority

APPENDIX IV: Data Collection Approval (Provincial Health Office)

13, 6th Street, High ridge
Kabwe, Zambia.

The Provincial Health Director
Central Province Health Office
PO Box 80686
Kabwe, Zambia

**SUBJECT: REQUEST FOR APPROVAL TO COLLECT DATA AT KABWE
CENTRAL HOSPITAL AND KABWE WOMEN NEW BORN AND CHILDRENS
HOSPITAL**

Dear Sir/Madam,

My names are Chiti Mulenga a Master of Science in Epidemiology and Biostatistics Student at the University of Lusaka.

As part of my academic requirements am conducting a research study titled: **Investigating the Prevalence and Predictors of Depression and Anxiety Disorders among Adolescents Living with HIV at Kabwe Women, New-born and Children's Hospital and Kabwe Central Hospitals.**

The purpose of the study is to investigate the prevalence and predictors of depression and anxiety among ADLWIH at the above named Hospitals. These Hospitals being key Hospitals serving the Community is an important site for data Collection.

I am kindly requesting your approval to collect Data at these Hospitals, whose consent I shall also seek. The Data collection will involve answering a questionnaire by adolescents whose consent will be sought and for those below 18, will seek consent from the parents/guardians. The data collection will be done in a manner that ensures confidentiality, respect and minimal disruption to clinic operations.

Ethical clearance has been obtained from the relevant authorities (University of Lusaka and National Health Research Authority) Letters are attached. All procedures will adhere to research ethics guidelines.

Your support will greatly contribute to the success of this study and to generate insights that may inform future strategies on mental health status of adolescents in Zambia. Thank you for your consideration. Looking forward to a positive response.

Yours faithfully; Chiti Mulenga

0977514907

Mulengachiti11@gmail.com

For Official Use:

Approved by Dr Isaac Banda

Designation Public Health Specialist

Signature [Signature]

Date 12/01/2026



APPENDIX V: Data Collection Approval (KCH)



Central KCH Hospital, 2011

MH/CP/KCH/101/1/1

14th January, 2026

Chiti Mulunge

6th Street, High ridge
Kabwe

RE: REQUEST FOR PERMISSION TO COLLECT DATA AT KABWE CENTRAL HOSPITAL

The above subject matter refers.

We are in receipt of your letter in which you requested for permission to collect data for purpose of conducting a study.

I am pleased to inform you that permission has been granted for you to proceed with data collection.

Kindly ensure you adhere to ethics and professional standards during your data collection.

Yours faithfully

Dr. Fredrick Katongi
Head Clinical Care
For/Senior Superintendent
Kabwe Central Hospital



APPENDIX VI: Data Collection Approval (KWNCH)

All Correspondence should be addressed to:
The Medical Superintendent
Telephone: (05) 222564
Telefax: (05) 222259
EMAIL: KWNCH@Hospital2@moh.gov.zm



REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

KABWE WOMEN, NEWBORN AND CHILDREN'S HOSPITAL
P.O. Box 80445
KABWE

KMH/101/23/1

16th January, 2026

Chiti Mulenga
University of Lusaka
LUSAKA.

RE: PERMISSION TO CONDUCT A RESEARCH; CHITI MULENGA

I write to inform you that your request to conduct a study titled *'Investigating Prevalence and Predictors of Depression and Anxiety Disorders among ALWHIV at Kabwe Women, Newborn and Children's Hospital. Development of an Evidence Based Genetic Neuromuscular Diseases Management Protocol for Physiotherapists in Zambia at Kabwe Women, Newborn and Children's Hospital'* at this institution has been granted on condition that you provide or rather share the research findings with the institution. Also note that you should ensure not to disrupt the normal duties during your data collection.

P.P. 

Dr. Leticia M. Mwiinga.
Head Clinical Care
For/Medical Superintendent
KABWE WOMEN, NEWBORN AND CHILDREN'S HOSPITAL

