The burden of poor mental health on parenting in mothers living with HIV in Zimbabwe

A thesis presented for the degree of

DOCTOR OF PHILOSOPHY

Rudo M.S. Chingono

[redacted]

Institute of Global Health,

UCL

Declaration

I, Rudo Chingono confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in this thesis.

Acknowledgements

This PhD is dedicated to the women worldwide who have knowingly or unknowingly lived through depression, anxiety, and other mental health conditions – may you find the strength and willpower to face each new day.

Enormous thanks to my first and second supervisors, Professor Lorraine Sherr and Professor Frances Cowan, who have been very generous with their time and wisdom for close to six years. Thank you for patiently guiding me to this huge milestone and for not giving up on me even when I felt I could not go on. A special thanks to Dr Victoria Simms, who unceasingly stood by me through this journey and held my hand through my struggles with statistical analysis. Thank you for teaching me it's okay not to send a perfect draft and constantly pushing me to keep writing.

To my mentor, Professor Katharina Kranzer: words fail me. I met you towards the fourth year of my PhD journey, and you have pushed me day in, day out, to "just get it done". Thank you for believing in me and investing in my academic and career advancement. My heartfelt gratitude also goes out to Professor Rashida Ferrand and Dr Justin Dixon for supporting me alongside Katharina.

I want to thank Dr Zivai Mupambireyi, the CeSHHAR research team, the rest of the research consortium (World Education and Mavambo Orphan Care), and the study participants, without whom implementing the CHIDO trial would not have been possible.

Most importantly, I would like to thank my close friends and family. To my siblings, Eddy, Tariro and the late Farai, thank you for believing in me and for the moral support. To my mother, Albertina Chingono, I am forever grateful for the prayers and constant encouragement you gave me. To my husband, Jameson Mupfukudzwa, my pillar from day one, thank you for standing by me, supporting me, pampering me, and staying up with me during my late nights. To my daughter, Juanita, you may not have known it, but your smile kept me going on gloomy days. To my late father, Alfred Chingono: Dad, I finally made it. Were it not for you, I would not have embarked on this journey.

You set the bar, and Lord knows I wish you were alive to see me surpass it. This one is for you, Shumba!

Abstract

Background

Mothers living with HIV are at increased risk of comorbidities, including mental health conditions. Mental health condition rates may be high yet often undiagnosed and untreated. This study aimed to assess the prevalence and factors associated with mental health conditions in mothers living with HIV and their association with parenting behaviour.

Methods

Firstly, the 8-item Shona Symptom Questionnaire (SSQ-8), which identifies the risk of common mental disorders (CMD), was validated in a sample of 264 primary care clinic attendees compared to a gold standard, using a receiver operating characteristic curve to identify the optimal cut point of 6. The next phase used data from 485 mothers living with HIV, participating in a cluster-randomised controlled trial evaluating parenting and income interventions, to explore the prevalence of and risk factors for CMD, defined as a 3-category ordinal variable (no CMD, CMD at one timepoint, CMD at both timepoints). I also investigated the association of CMD with parenting stress, parenting sense of competence and discipline. Lastly, a comprehensive parenting intervention was evaluated using mixed methods and guided by the MRC guidance to evaluate complex interventions.

Results

The SSQ-8 was found to have good validity when compared to the clinical assessments conducted by psychologists using the gold standard, Structured Clinical Interview for DSM-V (SCID). In the sample living with HIV, the optimal cut-off was ≥6 with an area under the curve of 89% (95% CI: 83%–93%). A quarter (N=127, 25.7%) of the 495 mothers in our sample experienced repeat CMD symptoms and a further 33.5% experienced CMD symptoms at one timepoint, with no difference by trial arm. Associated risk factors for CMD included food insecurity (aOR=2.23 (1.32, 3.78) p=0.003); domestic violence (aOR=3.12 (95% CI: 1.71, 5.70) p<0.001); mobility

problems (aOR=2.71 (1.55, 4.72) p<0.001); increased pain and discomfort (aOR=1.61 (0.19, 2.43) p=0.015), low resilience (aOR=0.61 (0.42, 0.89) p=<0.010) and low postpartum bonding (aOR=3.13 (1.78, 5.52) p<0.001). CMD was associated with increased parenting stress. Mean parenting stress (total score) standard deviation scores (SD) were higher among mothers with repeat CMD symptoms (97.1, SD 15.0) compared to those with CMD symptoms at one timepoint (84.8, SD 14.8) and those without CMD symptoms (78.0, SD 12.8). Children of parents with repeat CMD were almost three times as likely to have been spanked >20 times as opposed to children with no CMD symptoms (14.2% vs 5.0%). A multivariate model found no association between repeat CMD symptoms and harsh discipline after adjusting for parenting stress. The process evaluation provided evidence that complex parenting interventions are feasible, but there is a need to foresee and address potential contextual and individual barriers to uptake. A major learning point was that future interventions targeting mothers living with HIV should consider lessons learnt from the CHIDO intervention and seek to comprehensively address risk factors not only affecting their parenting outcomes but their mental health.

Conclusion

The SSQ-8 has been shown to be valid for the use of screening common mental disorders in a population with high HIV prevalence. There is a high burden of mental health conditions in mothers living with HIV. These mothers have been shown to be at risk of experiencing depressive symptoms at different trajectories of their parenting journey, with several risk factors identified. Therefore, there is a need for interventions aimed at improving parenting and child outcomes and also to target addressing the risk factors associated with poor maternal mental health.

Impact statement

This PhD validates a short screening tool for common mental disorders (the SSQ-8), demonstrating that it is as sensitive and specific as the original SSQ-14, and can be used by lay workers, programmers, and researchers with little training. This will benefit clinical use, public health and research, as it will lead to more rapid diagnosis of mental health conditions, reducing the mental health gap in resource-limited settings where high-level trained staff are insufficient.

The results of this thesis have already had an impact on healthcare in Zimbabwe. The finding that intimate partner violence was a strong predictor of depressive symptoms and parenting stress influenced the decision to add intimate partner violence to an occupational health screening programme for health workers in Zimbabwe (1). Over 2,000 health workers have been screened for intimate partner violence and referred as appropriate, benefitting themselves and their families and providing indirect benefits to the patients in their care.

The results from this study will inform programmers, researchers, and policymakers on the importance of multicomponent interventions to address the complexity and comorbidity of maternal mental health conditions, HIV, and the associated risk factors faced by mothers in similar contexts. The process evaluation of the CHIDO intervention conducted as part of this thesis has been shared with the stakeholders in a dissemination meeting. As a result, the NGO implementing partners have made changes to their programmes, benefiting families and the intervention has been adopted and scaled up in Zimbabwe.

This study highlighted the burden of maternal mental health conditions by investigating the prevalence of repeat common mental disorder symptoms and the prevalence of parenting stress symptoms. The longitudinal follow-up of depressive symptoms in this research project adds useful insight to the literature on the burden of maternal mental health in low- and middle-income countries. In my postdoctoral research, informed by the evidence in this PhD thesis, I intend to formulate and evaluate interventions aimed at reducing poor maternal mental health in young mothers. This will have an impact on mothers and their children in Zimbabwe. If the intervention proves to be effective,

it can be used as a model regionally and in other low- and middle-income settings to improve the mental health of women, reduce parenting stress, and facilitate child development.

Dissemination and awards

Peer reviewed publications

Published

1) Mebrahtu H, Sherr L, Simms V, Weiss HA, **Chingono R** et al (2020). The impact of common mental disorders among caregivers living with HIV on child cognitive development in Zimbabwe. AIDS Care 32(S2):198-205 https://doi.org/10.1080/09540121.2020.1739216
2) Mebrahtu H, Simms V, Mupambireyi Z, Rehman AM, **Chingono R** et al (2019). Effects of parenting classes and economic strengthening for caregivers on the cognition of HIV-exposed infants: a pragmatic cluster randomised controlled trial in rural Zimbabwe. BMJ Global Health 4(5):e001651 https://doi.org/10.1080/09540121.2020.1739216
3) **Chingono R**, Mebrahtu H, Mupambireyi Z, Simms V, Weiss HA et al (2018). Evaluating the effectiveness of a multi-component intervention on early childhood development in paediatric HIV care and treatment programmes: a randomised controlled trial. BMC Pediatrics 18(1):222 https://doi.org/10.1186/s12887-018-1201-0
4) Mebrahtu H, Simms V, **Chingono R**, Mupambireyi Z, Weiss HA et al (2018). Postpartum maternal mental health is associated with the cognitive development of HIV-exposed infants in Zimbabwe: a cross-sectional study. AIDS Care 39(S2):74-82. https://doi.org/10.1080/09540121.2018.1468015

Under submission

1) **Chingono R**, Chibanda D, Chabata S, Maringwa G, Simms V, et al. (2022). Validation of the 8-item Shona Symptom Questionnaire for common mental disorders in a population with high HIV prevalence in Zimbabwe. Community Mental Health Journal

Under preparation for submission

1) **Chingono R**, Simms V, Mebrahtu H, Mupambireyi Z, Cowan F.M, Sherr L (2023). The burden of poor mental health on parenting in mothers living with HIV in Zimbabwe.
2) **Chingono R**, Simms V, Mupambireyi Z, Mebrahtu H, Gwasira I-A, et al (2023). Implementation and uptake of a multi-component parenting intervention targeting caregivers of HIV-exposed infants in Zimbabwe: process evaluation of the CHIDO intervention.

Conference presentations

1) **Chingono R**. Burden of and risk factors for maternal mental health and the impact on parenting by mothers living with HIV in rural Zimbabwe. AIDS 2022, the 24th International AIDS Conference. Montreal: 2022 (poster presentation)
2) **Chingono R**. The impact of depression in HIV positive mothers on child development in Zimbabwe. AIDS 2018, the 22nd International AIDS Conference. Amsterdam: 2018 (poster presentation)
3) **Chingono R**. Postnatal depression of women with HIV in Zimbabwe. AIDS 2018, the 22nd International AIDS Conference. Amsterdam: 2018 (poster presentation)
4) **Chingono R**. Validation of the 8-item Shona Symptom Questionnaire as a measure of common mental disorders in a population with high HIV prevalence in Zimbabwe. AIDS Impact 13th International Conference. Cape Town: 2017 (oral presentation)

Local dissemination

1) Mupambireyi Z, **Chingono R.** Effects of parenting classes and economic strengthening for caregivers on the cognition of HIV-exposed infants: dissemination of the results from the CHIDO trial. Local stakeholders meeting. Harare: 2018 (oral presentation)

Awards

Academic awards

1) Patrice Engle Dissertation Grant for Global Early Child Development (2017)
2) HIV Research Trust Scholarship (2018)
3) USAID OVC PhD Grant through University College London (UCL) (2016)

Conference awards

1) AIDS 2022, the 24th International AIDS Conference, Montreal – Full attendance bursary
2) AIDS Impact 13th International Conference, Cape Town – Honorary bursary

Table of contents

List of tables

List of Figures

Glossary of acronyms and other abbreviations

ACASI	audio computer-assisted self-interviewing
AIDS	acquired immune deficiency syndrome
aMD	Adjusted mean difference
aOR	Adjusted odds ratio
ART	antiretroviral therapy
AUC	area under the curve
BRS	Brief Resilience Scale
CBT	community-based trainer
CeSHHAR	Center for Sexual Health HIV/AIDS Research
CHIDO	Child Health Intervention for Development Outcomes
CHW	community health worker
CMD	common mental disorder
CTSPC	Conflict Tactics Scale for Parent and Child
CRT	Cluster-randomised trial
DSM	Diagnostic and Statistical Manual
ECS	early childhood stimulation
HIC	high-income countries
HITS	Hurt, Insulted, Threatened with Harm and Screamed scale
HIV	human immunodeficiency virus
HREC	Human Research Ethics Committee
ISALS	Internal Savings and Lending Scheme
LMICs	low- and middle-income countries
LSHTM	London School of Hygiene and Tropical Medicine
LSTM	Liverpool School of Tropical Medicine
MINI	Mini International Neuropsychiatric Interview
MSSI	Maternal Social Support Index
MRC	Medical Research Council
MRCZ	Medical Research Council of Zimbabwe
NPV	negative predictive value

OR	odds ratio
PCC	population, context, concept
PLWH	people living with HIV
PMTCT	prevention of mother to child transmission
PPV	positive predictive value
PSOC scale	Parenting Sense of Competence scale
PSI-SF	Parenting Stress Index – Short Form
PTSD	post-traumatic stress disorder
RCZ	Research Council of Zimbabwe
ROC	receiver operating characteristic
RCT	Randomised controlled trial
SCID	Structured Clinical Interview for DSM-IV
SD	standard deviation
SDGs	Sustainable Development Goals
SSQ	Shona Symptom Questionnaire
UCL	University College London
USAID	United States Agency for International Development
WHO	World Health Organization

1 Chapter 1: Introduction

1.1 Thesis outline

This PhD was nested within a cluster randomised controlled trial (CHIDO trial) aimed at improving early childhood development through a parenting intervention offered to mothers living with HIV. The PhD primarily used data collected as part of the trial. The first chapter gives a brief overview of the CHIDO trial and introduces key concepts important to the PhD thesis: namely common mental disorders, parenting stress and parenting. The chapter ends by giving a rationale for the PhD thesis and listing the three objectives: i) to assess the burden of and risk factors for symptoms of common mental health disorder (CMD) in mothers living with HIV (objective 1); ii) to explore how maternal mental health affects parenting; and iii) to evaluate the process of implementation of a multicomponent parenting intervention in the CHIDO trial. Chapter 2 reviews the literature on the burden of maternal mental health in low-income settings and how it relates to parenting. Chapter 3 describes the methods used to investigate objectives 1-3. Chapter 4 details the validation of the abbreviated 8-item Shona Symptom Questionnaire (SSQ-8) against the 14-item Shona Symptom Questionnaire (SSQ-14), justifying the use of the SSQ-8 as an outcome and exposure measurement for Chapter 5 (Objective 1 and 2). Chapter 5 estimates the prevalence of symptoms of CMD among mothers enrolled in the CHIDO and the risk factors associated with these symptoms of CMD. Also, in Chapter 5, associations between CMD and parental stress and discipline are investigated. Chapter 6 describes the mixed methods process evaluation of the CHIDO trial, which sought to understand the maternal and contextual factors which influenced the trial outcome. Of note, the CHIDO intervention did not address maternal mental health, so this was not explicitly explored within the process evaluation. However, references to poor maternal mental health were made in passing. This is highlighted as a limitation of the process evaluation. The results of all chapters are discussed in chapter 7.

1.2 Chapter overview

Chapter 1 introduces and defines key concepts and outlines the scope of this thesis. It is divided into three sections:

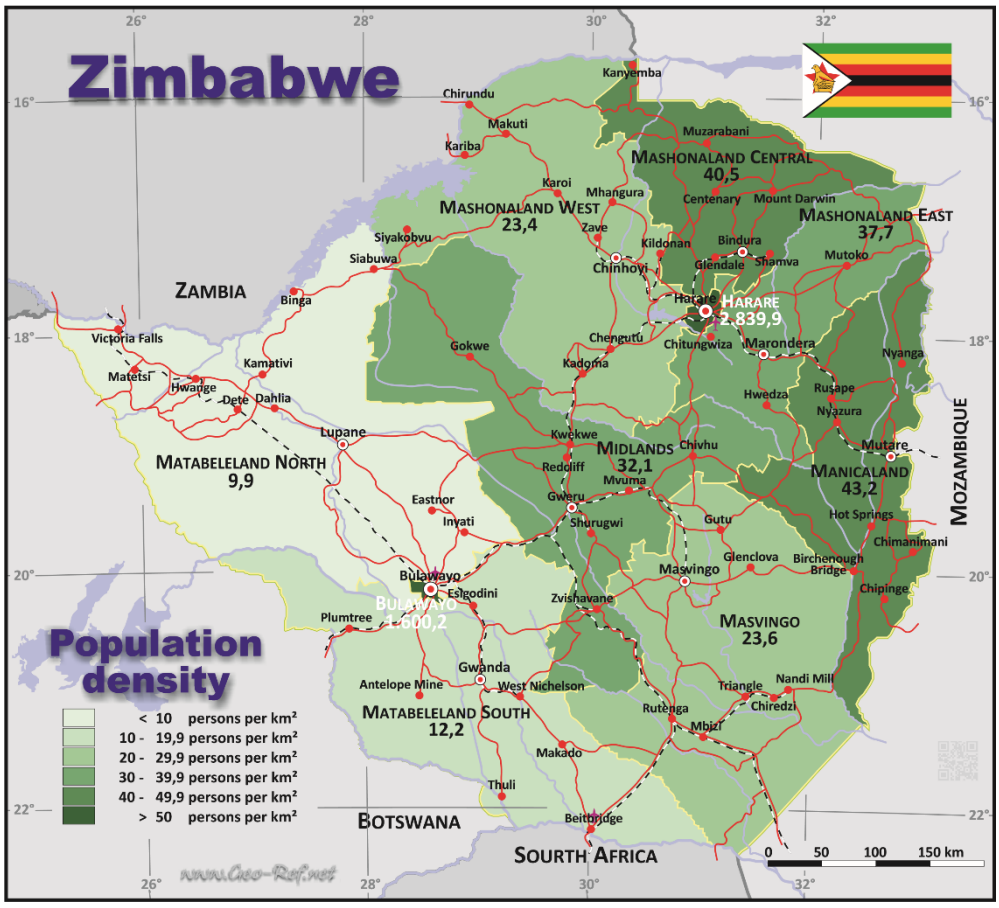
i) Section one introduces the research background of this PhD. The PhD was nested within a large cluster-randomised trial of an intervention to support early childhood development conducted in rural Zimbabwe. This section describes that trial and the broader context in which the PhD was conducted. Here I also introduce my role and contributions to the trial.
ii) Section two defines the key concepts (maternal mental health conditions, common mental disorders) and parenting stress) and gives an overview of the importance of maternal mental well-being. (Chapter 2 then provides a detailed literature review of these key concepts).
iii) Section three presents the rationale, aims, and questions of the research.

1.3 Overview of the CHIDO Trial

The CHIDO (Child Health Intervention for Development Outcomes) trial was a cluster randomised controlled trial conducted between March 2016 and January 2018, in 30 primary care clinic catchment areas providing maternal and paediatric antiretroviral therapy (ART) in two rural districts (Goromonzi and Mudzi), in Mashonaland East Province in Zimbabwe (Figure 1 1). In this setting prevalence of HIV is high, and many people experience extreme poverty. Both HIV and poverty have been shown to adversely affect the quality of maternal health and childcare (2). The trial tested the hypothesis that providing early childhood stimulation, strengthening economic strengthening opportunities, and providing ART adherence support, would result in improved child development outcomes after one year. The theory of change proposed that these effects would lead to a reduced need for second and third-line ART among mothers, reduced opportunistic infections and AIDS diagnoses, and increased child survival (3). The theory of change and a description of the trial protocol has been published (3). The mental health of the mothers on this trial is particularly interesting

to this thesis. Here I provide a brief background of the trial, the methods used and the critical trial results published in 2019 (4).

Figure 1-1: Map of Zimbabwe



Source: Geo-Ref.net (http://www.geo-ref.net/en/zwe.htm)

1.3.1 The CHIDO trial design and methods

1.3.1.1 CHIDO trial population, recruitment and enrolment

The trial population comprised mother-child dyads where the child was aged 0-24 months and was HIV positive or HIV exposed. The dyad could include biological mothers or other primary carers. Thirty listed clinics were selected to participate, each with a minimum of 30 eligible mother-child dyads identified in the HIV-exposed infant register. These 30 clinics were randomly allocated to two arms in a 1:1 ratio stratified by district. Women attending clinics in the control arm received the usual care the

Zimbabwe Ministry of Health and Child Care provided for women living with HIV and their infants. Women attending clinics in the intervention arm received the CHIDO intervention above the usual care (Figure 1-2). Each site enrolled either one or two groups of 12 mother-child dyads. The mother-child dyads enrolled were those living in the catchment areas of designated healthcare facilities and available to attend meetings in the community once every two weeks for the 18 months of the trial.

1.3.1.2 The CHIDO intervention components

The CHIDO intervention comprised three key components:

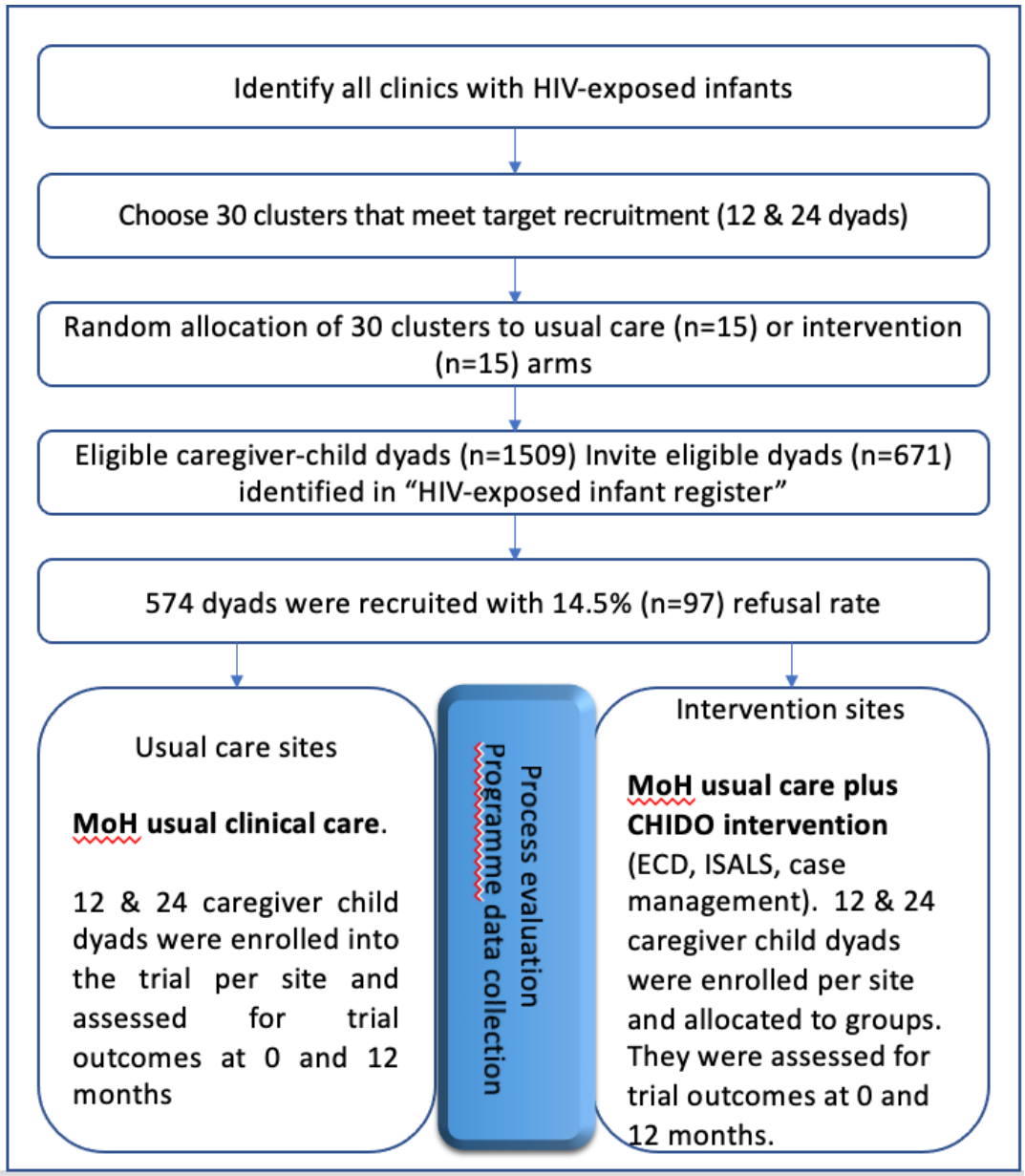
(i) First, an 18-session **early childhood stimulation (ECS)** parenting programme was conducted over nine months by trained and supported ECS facilitators and a local nurse. Each session was held for over 1.5 hours. The goal of the ECS component was to improve the parental promotion of cognitive stimulation, nutritional status of children and positive discipline.

(ii) Nine **internal savings and lending scheme (ISALS) sessions**, conducted by community-based trainers (CBTs) immediately after nine of the 18 ECS sessions, for 30 minutes. The main aim was to increase household income to enable mothers to meet costs such as transport to a health facility, clinic user fees, medication and food.

(iii) **Home visits** are conducted by community health workers (CHWs) once per month (or more frequently in the case of non-attendance at group sessions or other problems) to support the learning and skills development taking place in the ECS sessions (2). The main aim of this component was to support the mothers with engagement with and retention in HIV care and management, as well as to ensure that ECS messages were being followed at home.

The content and the number of sessions of the ECS programme were based on formative work and piloting.

Figure 1-2: The CHIDO cluster-randomised trial design



1.3.1.3 Summary of the CHIDO trial outcomes and findings

Data were collected at two timepoints, baseline and 12-month follow-up. The primary outcomes were infants' cognitive development and retention in HIV care of both mother and infant. The trial's secondary outcomes included viral load of infants living with HIV (proportion with viral load >1000 copies/ml) and of their biological mothers, food security, and mental health assessed as those at risk of postnatal depression and common mental disorders at 12 months.

From the 30 clusters, 574 mother-child dyads were recruited, with 89.5% retained at follow-up. Among the mother-child dyads in the intervention arm, 91 of 281 (32.4%) were recorded as having received the complete intervention package as per protocol; overall, 161 of 281 (57.3%) attended ≥14 ECS sessions. More details on the process evaluation results are provided in chapter 6. The CHIDO intervention had no impact on any primary and secondary outcomes. Also, while there was a high prevalence of mothers with symptoms of CMD at baseline, there was no evidence of effect modification of the primary outcome by maternal mental health status (measured by 8-item Shona Symptom Questionnaire and Edinburgh Postnatal Depression Scale). There was weak evidence that the proportion of mothers with parental stress was reduced in the intervention arm (adjusted OR (aOR)=0.69; 95% confidence interval (95%CI) 0.45-1.05; p=0.08) and evidence that parental distress was reduced (intervention arm 17.4% vs standard of care 29.1% scoring above the cut-off; aOR=0.56; 95% CI 0.35-0.89; p=0.01).

1.3.2 My role in the CHIDO trial

The CHIDO trial was part of a research consortium funded by USAID-PEPFAR under the Orphans and Vulnerable Children Special Initiative. The trial intervention was implemented by Mavambo Orphan Care, overseen by World Education Inc. (Bantwana). The trial was evaluated by a team of researchers from University College London (UCL), Liverpool School of Tropical Medicine (LSTM), London School of Hygiene and Tropical Medicine (LSHTM) and the Centre for Sexual Health HIV/AIDS Research (CeSHHAR) Zimbabwe. I was the Research Project Coordinator for the CHIDO trial, leading the CeSHHAR Zimbabwe team,

I was responsible for coordinating the day-to-day research activities throughout the trial. I contributed to the protocol development and obtained all regulatory approval; I led the teams in mapping and identifying potential study sites, conducted the stakeholder meetings and community entry and oversaw the recruitment and enrolment of the mother-child dyads. I took a leading role in designing the data collection tools for baseline and 12-month follow-up, and more specifically, I developed the process evaluation qualitative data collection tools. I supervised the qualitative

data collection and did several in-depth interviews myself. I routinely reviewed the qualitative interviews with the research assistants and provided feedback on improving the interviews and/or topic guides. I documented and regularly fed back to the implementing partners on findings arising during data collection, which informed the adaptation of the intervention.

I performed all the qualitative analyses of the process evaluations. In addition, I sourced the dataset for the 8-item Shona Symptom Questionnaire (SSQ-8) validation, which was used in the trial as a common mental disorder (CMD) screening tool (see Chapter 4). With help from the trial statistician, I conducted validation of the SSQ-8 against the SSQ-14. Using the quantitative baseline and 12-month questionnaires, I analysed the burden of poor maternal mental health (see Chapter 5) and the associated risk factors.

Over the course of my PhD, I contributed to the writing of papers and reports based on the trial. I was the first author of the CHIDO trial protocol paper (2) and the validation of the SSQ-8 (unpublished). I have co-authored papers related to the trial (3,4), including the main trial results paper (5). I have also presented the preliminary findings of the trial at international conferences.

1.4 Research background

1.4.1 Importance of the psychological well-being of mothers living with HIV

Mental health is an integral part of health, defined by the World Health Organization (WHO) as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (6). The WHO goes on to define mental health as “a state of well-being in which an individual realises his or her own abilities, can cope with the normal stresses of life, can work productively, and is able to make a contribution to his or her community” (6). Maternal mental health is referred to as mothers’ feelings of well-being and their ability to cope and be resilient in their day-to-day lives, despite the life stressors they encounter (7). A range of terminology has been used for the mental health issues, such as ‘poor mental health’, ‘mental health

problems', mental health disorders and mental health conditions, including 'mental ill health' used by the WHO. In addition, there are more specific terms such as 'intellectual disability', 'personality disorder', 'substance dependence' and 'maladjustment to adverse life events' (8). Some of these terms are used interchangeably, and for the sake of avoiding any stigmatising terminology in this thesis, I will use the term 'poor (maternal) mental health conditions', which describes the inability to adapt to and cope with normal life stressors (7).

Mental health conditions are among the top ten causes of disability globally, with depressive and anxiety disorders being leading contributors to this burden. Women are disproportionally affected by chronic illness (9). Minority groups, including women living in poverty and those living with chronic conditions such as HIV, have a heightened burden of poor maternal mental health, which goes undetected and untreated (10). In the context of poor maternal mental health conditions, women encounter common mental disorders (CMD), perinatal depression and postnatal depression, among other conditions. The neglect of maternal mental health in low- and middle-income countries is concerning as the high burden of poor maternal mental health negatively impacts the everyday functioning of women, children and the family as a whole (11–14). Depression has been shown to be a risk factor for poor growth and development in young children (15), as mothers suffering from depression may struggle to have affectionate contact behaviour with their infants, are less responsive to the cues of their infants, and are withdrawn (14). The association between maternal depression and a range of adverse child development outcomes has been documented in many individual studies and systematic reviews and will be detailed in Chapter 2 (16–19). Maternal depression is also associated with substantial adverse effects on the mother and the whole family (20). Mental health conditions are also associated with an increased risk of suicide (21–23) and marital discord (24–26).

Despite the mounting evidence of the impact of poor mental health conditions on women and children in LMICs, there has been little integration of mental health screening, prevention and treatment into routine maternal and child health programmes and little recognition of the importance of promoting mental health and

well-being to prevent the adverse effects of poor mental health conditions on health, economic and social outcomes.

1.5 Mental health and HIV

The high burden of mental health conditions is more common in people living with HIV (PLWH) than in the general population. A meta-analysis of studies published in 2001, conducted in western countries, found the prevalence of major depressive disorder to be nearly twice as high among people living with HIV compared to those not living with HIV (27). A systematic review conducted in 2009 on the mental health of adults living in Africa found evidence that there were high levels of psychiatric morbidity among men and women living with HIV. Approximately half of PLWH met the criteria for one or more mental health diagnoses (28). Depression in mothers living with HIV has been well documented and varies widely across populations (4,29–31). Comorbidity of mental health conditions with other health problems is high and has been shown to exacerbate major modifiable risk factors for chronic disease: it worsens prognosis, increases the prevalence of preventable complications and can lead to poor management of the condition (9,31,32). These findings suggest that depression-prone individuals living with HIV are more likely to have lapses in adherence to treatment, making viral suppression and better clinical outcomes difficult to attain (31).

The UNAIDS 90-90-90 initiative (33) is an ambitious set of treatment targets with the aim of virtually eliminating the AIDS epidemic. The aim was that by the end of 2020, 90% of all PLWH would know their status, 90% of those diagnosed would receive antiretroviral therapy (ART), and lastly, 90% on ART would have viral suppression (34). A systematic review conducted in 2015, of 111 studies among 42,366 PLWH, found that the odds of achieving good ART adherence was 0.58 among those with depressive symptoms compared to those without (pooled OR=0.58, 95% CI: 0.55 to 0.62) (35). The high burden of poor mental health conditions impairs treatment adherence, creating barriers to attainment of the 90-90-90 targets.

1.6 Defining maternal mental health conditions

Common mental disorders can be classified as mild to moderate depression, anxiety disorders (such as generalised anxiety disorder) and post-traumatic stress disorder (PTSD) (36). CMD are characterised by symptoms such as sadness and irritability mood, sleep disturbances, fatigue, loss of appetite, lack of concentration, and suicidal ideation (37). Diagnosis of mental health conditions is ideally conducted by a qualified clinician, who references a diagnostic criterion such as the World Health Organization's international classification of diseases (38), or a comprehensive diagnostic interview, such as the Structured Clinical Interview for DSM-V (SCID) (39). Definitive diagnosis is made by a clinically trained professional, but we can also use other methods to screen for risk using validated screening instruments (40). Women are also at risk of CMD during their perinatal period (perinatal CMD), which is defined as depression that occurs during pregnancy or within 12 months of birth. It has been shown that perinatal CMD has been associated with maternal, foetal and neonatal morbidity and mortality (41). While postpartum depression generally lasts up to a maximum of 12 months, episodes of common mental disorders can recur – following a relapsing and remitting course – or persist (10). Of particular interest to this thesis is the burden of repeat poor mental health conditions in mothers over time, at different points of their parenting trajectory.

Parenting stress is one of the mental health challenges that mothers are at risk of experiencing. It is defined as the negative psychological reaction parents might experience because of the pressures of and their inability to cope with the requirements of their parental role (42,43). Recent literature has shown an association between depressive and anxiety symptoms and parenting stress (43–45). Like other mental health challenges, parenting stress is associated with adverse effects on parents, the parent–child interaction and marital interactions (46,47). In this thesis, when referring to poor maternal mental health the emphasis will mainly be on (repeat) common mental disorders and parenting stress.

1.7 Screening for the prevalence of maternal mental health conditions

Globally, a high proportion of people who need mental health services are unable to access them (48). Identifying people with mental health conditions using appropriately validated tools is the first step towards providing care. Mental health conditions are identified through semi-structured diagnostic assessments and screening tools conducted by qualified mental health professionals (49). Screening tools are commonly used to detect possible mental health morbidity where diagnostic services are unavailable, and this is typical of resource-limited settings that have limited numbers of mental health professionals (50). Screening tools are typically used by non-specialist workers, such as lay healthcare workers and researchers, to screen people for mental health conditions and to assess the need for clinical care (51). Screening tools can also be used for training primary healthcare workers to improve their ability to detect mental health problems (52).

Validity is an essential characteristic of any screening tool, as it is the extent to which a tool measures what it claims to measure (52). Using validated tools increases the probability of correct identification and classification of individuals at risk of mental health conditions. The process of screening tool validation entails comparing the results of a screening tool with a gold standard in the same group of individuals (53). The Structured Clinical Interview for Diagnostic and Statistical Manual for DSM-IV Axis I Disorders (SCID) (54) and the Mini International Neuropsychiatric Interview (MINI) (55) are some commonly used gold standard assessments. Although a high burden of poor mental health conditions is prevalent in all regions worldwide, clinical presentations differ between settings (56). Optimal cut-off scores (the score at which one is classified as at risk of the condition being tested for) may differ due to cross-cultural somatisation of symptoms leading to the possible misidentification or low detection of mental health conditions. Tools developed and shown to be valid for use in one context, thus, need to be validated when applied in different contexts (52). This enables researchers to better compare their findings across populations and to understand how mental health conditions differ by geographic location, culture, and the composition of the patient population (51). Studies have shown that the majority of well-performing screening tools have been locally adapted and validated (52).

Numerous tools, with varying degrees of accuracy, acceptability and evidence, have been developed to detect poor mental health conditions (57). Several screening tools exist for common mental disorders, perinatal depression, and parenting stress.

Table 1-1, below gives a list of some of the various tools used, identified pragmatically, with particular focus on tools used to detect CMD, depressive disorders and major depressive disorders, perinatal depression, and parenting stress. In this thesis, I have used the shortened version of the 14-item Shona Symptom Questionnaire (SSQ-14) – that is, the eight-item Shona Symptom Questionnaire (SSQ-8) – to screen for CMD and repeat CMD, a locally designed and validated tool for use in Zimbabwe. A shorter tool was chosen as the CHIDO trial questionnaire was long, and there was a need to use short, precise, and efficient tools in measuring the various variables. For parenting stress, I use the Parenting Stress Index 36-item Short Form (PSI-SF) developed by Abidin in the United States and validated in several settings including a more recent validation that used confirmatory factor analysis in a sample of 240 predominantly Black and Latino caregivers of children with behavioural difficulties (58). Further details of these screening tools will be discussed in chapters 3–5.

Table 1-1: Tools/tests used to detect poor mental health conditions

Screening Tool	Abbreviation	Primary Focus	Items	Validated in PLWH (Yes/No), Location (reference)
12-item General Health Questionnaire	GHQ-12	CMD, distress	12	Yes, Spain (59)
20-item Self-Reporting Questionnaire	SRQ-20	CMD, depressive disorders	20	Yes, Uganda (60)

Screening Tool	Abbreviation	Primary Focus	Items	Validated in PLWH (Yes/No), Location (reference)
*14-item Shona Symptom Questionnaire	SSQ-14	CMD	14	Yes, Zimbabwe (51)
Major Depression Inventory	MDI	Depressive disorders	10	Yes, Kenya (61)
9-item Patient Health Questionnaire	PHQ-9	Depressive disorders	9	Yes, Zimbabwe (62)
Beck Depression Inventory	BDI	Depressive disorders, major depressive disorders	21	Yes, Jamaica (63)
Zung Self-Rating Depression Scale – short	ZSDS	Major depressive disorders	10	Yes, USA (64)
Hospital Anxiety and Depression Scale – Depression	HADS-D	Depressive disorders, major depressive disorders, anxiety disorders	7	Yes, South Africa (65)
Center for Epidemiologic Studies	CES-D	Major depressive disorders	20	Yes, Vietnam (66)
*Edinburgh Postnatal Depression Scale	EPDS	Perinatal depression (postnatal depression, antenatal depression), common mental disorders	10	Yes, Zimbabwe (67)

Screening Tool	Abbreviation	Primary Focus	Items	Validated in PLWH (Yes/No), Location (reference)
Postpartum Depression Screening Scale	PDSS	Postnatal depression	35	No
*Parenting Stress Index – Short Form	PSI-SF	Parenting stress	36	No
Parental Stress Scale	PSS	Parenting stress	18	No
Perceived Stress Scale	PSS	Stress	10	Yes, China (68)

**Assessment tools that were used in the CHIDO trial.*

1.8 Overview of the burden of poor maternal mental health in LMICs

It has been established that there is global gap between the need for and provision of services to prevent, diagnose and treat mental, neurological and substance use disorders (69). The burden of mental health conditions is higher in LMICs than it is in high-income countries (HICs). To highlight the disparity between LMICs and HICs: there are 0.9–14.7 mental health workers per 100,000 population in LMICs as compared to 62.2 per 100,000 in HICs (70). In LMICs there is a huge diagnostic and treatment gap, with an estimated 85% of people identified as having mental disorders receiving no treatment (71–75). In a meta-analysis conducted in 2012 of the prevalence of perinatal CMD in low- and lower-middle-income countries, antenatal data were available from nine countries and postnatal data from 17 countries in Africa and Asia (76). The weighted mean prevalence of any CMD was 15.6% (95% CI: 15.4 to 15.9) antenatally and 19.8% (95% CI: 19.5 to 20) postnatally. More recently, another meta-analysis, of 28 studies conducted in Africa showed that one on average in four pregnant women had depression. The pooled prevalence of antenatal depression was

26.3% (95% CI: 22.2 to 30.4) (77). Despite the high poor maternal mental health, mental health conditions continue to be infrequently diagnosed and treated in LMICs. This can be attributed to several factors, including stigma and lack of awareness at the community level, poverty and difficult geographical access at the environmental level, and insufficient investment in the mental health infrastructure (78).

1.9 Overview of the burden of poor maternal mental health and HIV in Zimbabwe

Zimbabwe is a lower middle-income country, that had an estimated population of 14.8 million people in 2020 (79), the majority of whom live in rural areas; 52% are female. It is one of the countries with the highest HIV burden in Southern Africa, with an estimated “1 300 000 (1 200 000 - 1 400 000) people living with HIV; 25 000 (18 000 - 35 000) new HIV infections annually, and 22 000 (18 000 - 26 000) AIDS-related deaths” according to the UNAIDS 2020 epidemic estimates (80). Most people living with HIV (PLWH) in the country are between the ages of 15 and 49 years, with most of the new HIV infections and AIDS-related deaths occurring among women 15+ years (80).

The country has faced prolonged periods of economic recession over the past 20 years, leaving many people unemployed and poorly remunerated, with an estimated 70.5% living in poverty (81,82). Food insecurity is high, with 5.5 million people (38% of the population) estimated to have faced food insecurity in 2019 (83). The country has registered notable progress on several key health indicators over the last decade, with significant achievements in maternal and child health indicators. There has been a decline in HIV incidence, and this can be attributed to the role played by foreign funders (such as the USAID/PEPFAR) in supporting national HIV programs. However, the quality of healthcare provided is deteriorating, with the health system affected by a shortage of medicines and equipment, a shortage of trained and motivated personnel, and the cost of healthcare, which continues to increase beyond the means of citizens, especially those in rural areas (81).

There is evidence of a high burden of poor maternal mental health in Zimbabwe, although no national prevalence studies have been conducted. A study conducted in

2018 among 375 pregnant women in Harare's high-density areas found that 23.5% of pregnant women who visited the clinic were at risk of antenatal depression, regardless of their HIV status (84). HIV increases the risk of common mental disorders. A cross-sectional study conducted in Harare in 2014 among primary care attendees found that probable CMD was higher among women living with HIV than those not living with HIV (67.9% and 51.4%; p=0.02) (85). The prevalence of postpartum depression in mothers living with HIV was 39.4% in another study conducted in four primary health clinics in Harare in 2016 (86). This high prevalence of depression in mothers living with HIV has implications for a wide range of HIV prevention and care initiatives, such as the prevention of mother-to-child transmission. Zimbabwe continues to have a large treatment gap for mental health, with very few psychiatrists serving a population of over 14.8 million people, with an estimated 1.3 million living with HIV (87).

1.10 Thesis rationale

Maternal mental health is vital in reducing global disease burden and in healthy child development. Poverty and living with chronic conditions such as HIV exacerbate the burden of poor mental health conditions and impede parenting capacity. Various factors, including the direct and indirect effects of HIV, socio-economic factors, and cultural factors influence depression and stress in mothers living with HIV. Mothers living with HIV face physical and psychological challenges that may affect their parenting capacity and style. There is growing literature on the burden of mental health conditions in mothers living with HIV in resource-limited settings and its impact on parenting (88–90). However, in Zimbabwe, evidence of the burden of poor maternal mental health is still limited, especially outside the capital city, and even more so, its impact on parenting and child development. Similarly, interventions to detect and treat the high burden of poor maternal mental health are still scarce. Thus, there is a need to describe the pattern and distribution of mental health conditions, how they impact parenting capacity, and better understand how parenting interventions can help improve maternal mental health in mothers living with HIV in Zimbabwe.

1.11 Thesis aims and objectives.

Depression and stress in mothers living with HIV are influenced by a wide range of factors, including the direct and indirect effects of HIV, socio-economic factors, and cultural factors. This thesis aimed to investigate the burden of poor maternal mental health conditions and the burden of parenting stress among mothers living with HIV in Zimbabwe, who had children below the age of two years. My thesis focused on understanding the association between depressive symptoms, parenting stress, and parenting. As part of the thesis, I conducted a process evaluation of the CHIDO intervention to understand its implementation, mechanisms, and context. Specifically, I was interested in understanding why the intervention did not have an impact not only on the main trial outcomes but also on mental health. The overall objectives of this thesis were as follows:

- Objective 1: To assess the prevalence of maternal mental health challenges and explore the associations and risk factors for poor maternal mental health in mothers living with HIV in Zimbabwe.
- Objective 2: To explore how maternal mental health affects the parenting and livelihoods of mothers living with HIV.
- Objective 3: To evaluate the process of implementation of a multi-component parenting intervention evaluated in the CHIDO trial.

Chapter-specific objectives will be highlighted at the beginning of each chapter.

1.12 Thesis hypotheses

The overall hypotheses made in this thesis are as follows:

- Mothers living with HIV are vulnerable to mental health conditions (common mental disorders) and parenting stress, which negatively impact their parenting capacity.
- Successful implementation of a complex parenting intervention targeting mothers living with HIV may reduce poor maternal mental health indirectly, but

its impact will depend on how well it is implemented, i.e intervention fidelity, dose, appropriateness to context, and mechanisms of impact.

2 Chapter 2: A literature review of the burden of poor maternal mental and the impact of interventions in improving maternal mental health

2.1 Chapter overview

This chapter gives a detailed review of the existing literature on the burden of poor maternal mental health (common mental disorders, perinatal depression), and parenting stress in the context of parenting in resource-limited settings. I use scoping review steps to highlight the risk factors of poor maternal mental health conditions that are identified in several studies. I then give a conceptual framework highlighting the intersection of the multiple risk factors on mental health and parenting in mothers living with HIV.

2.2 Background

There is an increasing global burden of disease attributable to mental health conditions, which are now among the top ten leading causes of disability globally (48,91). Over the recent decades, the field of mental health has gained recognition on the global health agenda (92) and it has also been included as part of the Sustainable Development Goals (SDGs) (93). Poor mental health can decrease the quality of life and increase the risk of communicable and non-communicable diseases, with high comorbidity found among anxiety disorders and between anxiety disorders and other mental health conditions (94). A systematic review of 289 publications showed that depression and anxiety were the leading global expression of mental health conditions (95); this study showed that depression, followed by anxiety, were identified among the most common among the cohort groups. Depression was reported to have increased by 18.4% between 2005 and 2015 in the global population (8). Depression

and anxiety are highly prevalent mental health conditions, with estimates indicating that they affect up to 322 million and 264 million people globally (8).

Despite this heightened awareness of global mental health challenges, and close to 15 years after the WHO's declaration that "there is no health without mental health" (96), the mental health agenda has still not yet been adequately incorporated into primary healthcare systems by most LMICs (17). This is probably due to a lack of mental health skilled and trained primary care providers, a lack of locally relevant screening tools, financial restraints, and the overwhelming burden of other diseases such as HIV that cause significant barriers to better mental healthcare in these countries. According to the Global Health Observatory, in 2016, Zimbabwe had 0.95 psychiatrists, 0.57 psychologists and 34.9 nurses working in the mental health sector per million population. Similarly, WHO showed that Zimbabwe has limited health facilities, with only 0.25 mental health hospitals, 0.25 mental health units in general hospitals, 0.57 mental health outpatient facilities, 0.06 mental health day treatment facilities and 0.51 community residential facilities per million population. This limited number of mental health resources and facilities echoes the challenges faced in other LMICs with accumulating evidence of poor maternal mental health.

The burden of poor maternal mental health varies considerably, with prevalence estimates for antenatal and postnatal depression ranging from 4.6% to 49% in low- and middle-income countries (90). Untreated maternal mental health conditions, such as depression and anxiety, have increasingly been shown to have consequences not only for the mothers but also for their children, their partners and the family system at large (19,97,98). Research has shown that by shifting from treating mental health conditions to implementing early prevention interventions, management of maternal mental health outcomes becomes achievable (99). Prevention efforts seek to reduce risk factors such as poverty, illness, abuse and neglect and enhance protective factors such as resilience, stress management and resilience to help people withstand environmental stressors (100). A growing body of initiatives aimed at fostering research into and programmes for maternal mental health conditions, including prevention and treatment, have been developed over the past 20 years, including an HIV group support psychotherapy intervention conducted in Uganda that helped

reduce depression symptoms and increased levels of functioning in patients living with HIV (101).

Several previous systematic reviews have been conducted on mental health conditions in mothers living with HIV in LMICs (see Table 2-5), and a limited number of studies have addressed parenting stress in mothers living with HIV. To avoid duplication, the objectives framing this literature review are to map (i) existing evidence from the literature regarding depression and parenting stress in mothers living with HIV in LMICs, (ii) the various contributory factors that lead to depression and stress in mothers living with HIV in LMICs, and (iii) to create a conceptual framework of the risk factors linking maternal mental health, parenting and child development. The aim is to identify gaps in the body of knowledge that could inform the implementation, evaluation and scale-up of future interventions. The review seeks to answer the following questions:

i) What evidence exists regarding the burden of mental health challenges, specifically depression and parenting stress, in mothers living with HIV in LMICs?
ii) What evidence exists regarding the risk factors for and the consequences of maternal mental health conditions experienced by mothers living with HIV in LMICs?

2.3 Methods used during the literature review

The steps taken in conducting this review were based mainly on and adapted from the principles applied when conducting a scoping review. Scoping reviews have been defined as a form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts and types of evidence and identifying research gaps (102). A scoping review is useful where the body of literature is complex and addresses diverse but intersecting research questions which cannot be amendable to a more thorough systematic review of evidence. Scoping reviews also allow for the identification and synthesis of existing systematic reviews and identification of research gaps" (103). This is best suited to achieving the study

objectives of mapping the available evidence on the burden and risk factors associated with mental health conditions among mothers living with HIV in LMICs. I synthesised evidence from multiple systematic reviews and other publications addressing this topic to identify key concepts and gaps. I adopted the six steps of the scoping review process, namely; i) defining clear review objectives and questions, ii) applying the population, concept and context (PCC) framework, iii) conducting systematic searches, iv) screening results for eligibility, v) extracting and charting relevant data from included studies, and vi) writing up the evidence to answer the question (104,105). Scoping review step three involves developing a protocol, and although a formal protocol was not drawn up, a detailed discussion about the methods and stages of the review was conducted and the review process confirmed the other steps outlined above.

2.3.1 Data sources and search strategy

Qualitative, quantitative, and mixed-methods studies containing descriptive data on the prevalence of maternal mental health conditions (common mental disorders, depression), parenting stress, and their risk factors were included in the review. Empirical and peer-reviewed literature was sourced through searches of electronic databases from three search engines: Pubmed, Cochrane Library, and Embase. Additional searches included the screening of citations in the reference lists of articles relevant to the topic.

2.3.2 Eligibility criteria

Table 2-1 below describes the eligibility criteria detailing the population, context, and concept (PCC) framework. The literature included in this review comprises:

i) literature relating to maternal mental health conditions and the associated risk factors among mothers living with HIV in LMICs,
ii) literature reporting on the incidence and/or prevalence of common mental disorders, (perinatal) depression in LMICs and parenting stress globally,
iii) studies with descriptive data on the above-mentioned maternal mental health conditions

iv) Any literature that meets one of the criteria i) – iii) and is also published in English between 2005 and 2020 will be included.

Table 2-1: Population Concept Context (PCC) framework

P – Population	Priority will be given to studies including mothers and/or parents living with HIV, 16 years and older. For subtopics that have minimal literature in LMICs, such as parenting stress, the review will also include studies with parents or mothers regardless of their HIV status, sex, or location.
C – Concepts	Studies relating to maternal mental health conditions, specifically on: i) common mental disorders, (perinatal) depression – referred to as a mental disorder characterised by low mood, diminished self-worth, pessimistic thoughts, poor concentration, and biological symptoms [e.g. poor appetite and sleep difficulties] and increased withdrawal from social activities' ii) parenting stress – referred to as the negative psychological reaction parents might experience because of the pressures of and their inability to cope with the requirements of their parental role (42,43) iii) risk factors – referred to the factors leading to or associated with the identified problem
C – Context	Low- and middle-income countries (LMICs) including all countries classified as such by the World Bank

Sources of evidence	Empirical and grey literature containing evidence of maternal mental health conditions and their causal factors in mothers living with HIV living in LMICs.
Language	Only studies published in English will be included.
Publication's date range	Publications from 2005 to 2020 will be included in this review.

2.3.3 Literature search

I used the following four key search terms: 1) "mental health" or "mental disorders" or "maternal mental disorder" or "depression" or "common mental disorders" or "stress" or "parenting stress" or "anxiety", 2) "HIV" or "AIDS" or "HIV-positive" or "people living with HIV" or "mothers living with HIV", 3) "interventions" or "programmes", and 4) "developing countries" or "resource-limited" or "resource-constrained" or "low- and middle-income" or "LMIC" or "third world" or "low-income countries".

2.3.4 Charting of data and synthesis

To determine the eligibility of articles identified by the search, I reviewed the article titles with another researcher. If eligibility was not clear from a title alone, the full abstract was read. If, upon reading the abstract, article eligibility remained unclear, then the article will be included, with those that were eligible, for full-text review. A final listing of included papers was generated. A data extraction sheet was compiled, and I extracted data from the papers that comprehensively addressed the research questions and populated the tables in the data extraction sheet. The data extracted from the literature and included in the tables covered eleven categories. These included the authors, year of publication, country of study, main objective of the study, main study design or methodology, study setting, study population/sample size, intervention type, concepts, how outcomes were measured and key findings (106). The principles of thematic analysis were applied to extract common themes and synthesise the findings.

2.4 Results

This review was conducted in three parts. The first section of the review focused on the evidence and reviews highlighting the global burden of maternal mental health conditions. Having filtered for reviews, year range, language, and availability of full abstracts total of 2464 articles were retrieved from these searches and scanned for relevance based on their titles. After reviewing their titles, 84 articles were identified and scanned for further examination, and their abstracts were scanned for relevance. Studies were excluded if they did not focus on or include prevalence data on women within child-rearing age. A total of 18 reviews were then read in-depth, and the most relevant have been included in Table 2-2.

For the second section of the review, I examined the burden of maternal mental health conditions in PLWH in LMICs. 29 articles (including those identified through reference lists) were retrieved from these searches and scanned for relevance on the basis of their titles. 14 articles were saved for further examination and for those that appeared relevant (n=12) the entire article was read in-depth. Lastly, the third section of the review highlighted the multiple intersecting risk factors that affect the mental health and parenting of mothers living with HIV. I developed a conceptual framework highlighting the intersection of these risk factors and briefly cited examples of interventions that have tried to address these risk factors.

2.4.1 The prevalence of poor mental health

Mental health conditions have become a global health concern. They contribute to the global burden of disability with depression contributing 7.5% and anxiety contributing 3.4% of all years lived with disability in 2015 (8). Determining the current global prevalence of mental health conditions has remained a challenge due to the use of varying assessment tools, depending on whether cut-off points for those tools have been validated, and the varying cultural contexts (107). The WHO's global health estimates showed that in 2015, 4.4% of the world's population (over 300 million people) were estimated to suffer from depression, with depression contributing to about 800 000 deaths per year (8). Studies have pointed to the magnitude of the

problem with mental health ranging from 5% to 10% in the general population and from 13% to 78% in people living with HIV (90).

Research evidence on the burden of mental health conditions is growing (see Table 2-2). In a systematic review of the mental health of PLWH in China, most studies reported a prevalence of depressive symptoms of greater than 60% and a prevalence of anxiety symptoms of greater than 40%. The prevalence was greater among women than men (108). In five LMICs (Ethiopia, India, Nepal, South Africa, and Uganda), the prevalence of maternal depression varied across settings ranging from 5% in Ethiopia to 35% in South Africa (90). In a more recent systematic review conducted, in 2018, in sub-Saharan Africa, the prevalence of major depression diagnosed using a diagnostic interview among those with HIV was 30.0% compared with 18.1% in HIV-negative controls (109). Table 2-3 below shows a table of the estimated burden of major depression in PLWH in sub-Saharan Africa, published in the same review. The table only included the top 20 countries, inclusive of Zimbabwe, with a high prevalence of major depression (12.1%), with a regional pooled estimate of 12.4% prevalence in the PLWH. In a cross-sectional study conducted in a primary healthcare facility with a high HIV prevalence in Zimbabwe, 40.7% (83/204) had symptoms of post-traumatic stress disorder, and of these, 69.5% (95% CI 58.5–78.7, $p<0.001$) had comorbid common mental disorders (110).

Table 2-2: Systematic reviews highlighting global prevalence of maternal mental health conditions

Authors, year	Location, period, population	Type of review	Topic	Mental health outcomes	Prevalence	Key Findings
1. Collins, 2006 (111)	Developing countries, 1990-2005, PLWH	Systematic	Mental health and HIV care and treatment programs	Mental health conditions	Depression ranged from 0 to 63.3% among PLWH. Depression among asymptomatic PLWH in the four developing country sites averaged 6.0%	Increased psychological distress (especially depression) among people with HIV infection is common. Accurate rates of mental illness can only be ascertained with proper tools. Gaps remain between the acknowledgment of psychosocial factors as critical to the lives of people with HIV and the application of adequate resources to provide quality mental healthcare.
2. Brandt, 2009 (28)	Africa, 1994-2008, PLWH	Systematic	Mental health of people living with HIV	Depression	Approximately half of the PLWH sampled had some form of psychiatric disorder, with figures ranging from 44% to 58%. Depressive symptoms ranged from over 30% and as high as 64%.	There are high levels of psychiatric morbidity among PLWH in Africa, with depression being the most common.

Authors, year	Location, period, population	Type of review	Topic	Mental health outcomes	Prevalence	Key Findings
						Being female, experiencing poor health, receiving poor-quality health services, and a lack of material and emotional support from family and friends were associated with greater psychiatric morbidity.
3. Breuer, 2011 (112)	Sub-Saharan Africa, To Nov 2008	Systematic	HIV/AIDS and mental health	Mental health, Depression Anxiety	Prevalence of mental illness in PLWH ranged from about 5% to approximately 83%	Prevalence varied in part due to the range of assessment tools used as well as to the populations being studied. Depression occurred more frequently in PLWH. Common mental disorders such as depression tend to increase disease progression in PLWH.
4. Sherr, 2011 (113)	Global, 1950-2009	Systematic	HIV and depression	Depression	Prevalence ranged from 0%-80% according to the tool and cut-off point used.	Depression is commonly associated with HIV and AIDS. Psychological interventions can improve mental in PLWH. The review showed that 15 (68.2%) of psychological

Authors, year	Location, period, population	Type of review	Topic	Mental health outcomes	Prevalence	Key Findings
						interventions with random allocation to groups and a control group (n¼22) showed a significantly effective impact while six (27.3%) were not effective.
5. Steel, 2014 (114)	Global, 1980-2013, adults	Systematic and meta-analysis	Prevalence of CMD	CMD	(17.6%, 95% confidence interval:16.3-18.9%) were identified as meeting criteria for a common mental disorder during the 12-months preceding assessment 29.2% (25.9-32.6%) of respondents were identified as having experienced CMD at some time during their lifetimes.	Females had a higher aggregated prevalence of depression and anxiety whilst men had higher rates of substance use disorders. One-year prevalence rates were also low among sub-Saharan-Africa
6. Duko, 2020 (115)	Ethiopia, 2014-2017, Women with postnatal depression	Systematic and meta-analysis	Epidemiology of postnatal depression	Postnatal depression	The pooled estimated prevalence of postnatal depression in Ethiopia was 20.1% (95% CI 12.7-30.2). Pooled estimated prevalence of postnatal depression assessed	There was a high prevalence of postnatal depression. Being young (15-24 years), unplanned pregnancy, marital problems, death of an infant were risk factors associated with postnatal depression.

Authors, year	Location, period, population	Type of review	Topic	Mental health outcomes	Prevalence	Key Findings
					in the community setting was [16.6% (95% CI 8.90-28.99)] which was lower than that assessed in institutions [23.2% (95% CI 14.50-28.5)].	
7. Lofgren, 2020 (109)	Sub-Saharan Africa, 2008-2018, adult PLWH	Systematic and meta-analysis	Burden of depression in outpatient HIV infected adults	Depression (MINI, other diagnostic interviews and depression screening tools)	The prevalence of major depression in people living with HIV in Sub-Saharan Africa to be 17%, the prevalence of depressive symptoms to be 26%, and the prevalence of psychological distress to be 33%.	The absolute prevalence of depressive symptoms was similar between those participants on ART and those not on ART. Depression appeared to affect women more than men, with women having one-third higher prevalence of both major depression and depressive symptoms compared to men.

*PLWH (people living with HIV), CMD (common mental disorders), ART (antiretroviral therapy)

Table 2-3: Estimated burden of major depression disorder (MDD) in those with HIV in sub-Saharan Africa using data from a systematic review and UNAIDS 2008-2018 (8)

Country	Estimated prevalence	Mean estimate of MDD (000s)	Confidence interval (000s)	DALYs (000s)
East and Southern Africa				
Angola	12.1%	34	21-49	15
Botswana	12.2%	44	28-65	19
Ethiopia	12.5%	69	45-98	30
Kenya	12.6%	177	130-232	77
Lesotho	12.0%	36	22-52	16
Malawi	12.6%	116	72-169	50
Mozambique	12.1%	239	142-361	104
Rwanda	12.4%	26	18-36	11
South Africa	12.0%	825	699-961	360
Tanzania	12.7%	165	112-229	72
Uganda	12.5%	150	130-172	65
Zambia	12.1%	133	80-196	58
Zimbabwe	12.1%	143	89-210	62
Regional subtotal	12.4%	2,243	2045-2521	972
Western and Central Africa				
Cameroon	7.3%	34	22-49	15
Cote d'Ivoire	24.5%	113	71-160	49
Dem Rep Congo	24.5%	83	60-110	36
Ghana	24.5%	69	52-88	30
Guinea	24.5%	27	20-35	12
Mali	24.5%	29	21-39	13
Nigeria	27.8%	804	527-1095	348
Regional subtotal	24.7%	1383	1019-1754	599
Sub-Saharan Africa total	15.3%	3626	3152-4189	1572

This table was extracted from the WHO (2017) Depression and other common mental health disorders: global health estimates (8). Country burden calculated from prevalence data identified

from systematic reviews. Other countries burden were calculated using regional mean for major depression and 99.7% confidence interval (i.e. 3 standard deviation). Note: only the 20 countries with the highest prevalence of depression are listed.

Although mental health issues are considered a global threat and concern, the mental health field is struggling to overcome various barriers to improve uptake and engagement in the mental health prevention and care (48). Across LMICs it is reported that an estimated 85% of people identified as having mental health conditions receive no treatment. In LMICs, national-level and population-based studies on maternal mental health conditions are lacking, and most health facilities do not screen for maternal mental health problems, despite the evidence of the substantial prevalence of maternal mental health issues such as depressive symptoms (116).

2.4.2 Data collected over time (longitudinal) on maternal mental health conditions

Maternal mental health conditions can be experienced over a long period of time. As part of this review, I was interested in understanding the long-term trajectory of depression in women, however, there were few longitudinal studies in low and middle-income countries. Table 2-4 summarises studies in Africa that were conducted over time and included maternal mental health indicators. Most recently there are longitudinal studies that have been conducted in South Africa that show the burden of depression in women. Spies, et. al., (117) conducted a study tracking the longitudinal course of depression and trauma in women. They assessed the number of women who had depressive symptoms at baseline, emergent, and persistent cases over 12 months of follow-up. This study showed that HIV status, and early life stressors including social hardship, neglect, violence and sexual abuse were associated with persistent depressive symptoms (117). A study conducted by Rochat, et. al., (118) examined the psychological morbidity and associated risk factors in mothers in South Africa over a five-year period. This study found that psychological morbidity was more common in mothers living with HIV than HIV negative mothers. The study showed that mothers living with HIV were more likely to remain vulnerable to depression over time (118). Another study conducted in South Africa followed up mothers from pregnancy to five years post-delivery and assessed the patterns of alcohol abuse, depression and intimate partner violence (119). 56% of the mothers reported experiencing

depression for at least one timepoint, and these women had a higher likelihood of drinking alcohol compared to those who were not depressed before pregnancy and at six months after delivery. The focus of this study was more on the longitudinal assessment of alcohol use rather than perinatal depression (119). Verkuijl et. al., conducted a longitudinal study, in South Africa, which investigated the association between postnatal depression at six months after birth was associated with the psychological difficulties of children at the age of 10 years (120). Cross-sectional assessments of depression were conducted at two timepoints (at six months after birth, and 10 years later). 24% (453/1866) were at risk of postnatal depression, whilst 74% (747/1012) were at risk 10 years later. Children whose mothers had postnatal depression at six months were more than twice likely to have significant psychological difficulties 10 years later compared to those whose mothers did not have postnatal depression (adjusted odds ratio 2·26, 95% CI 1·23–4·16) (120).

Studies done in other African countries include one conducted in Ghana which examined the trajectories of antenatal and postpartum generalized anxiety symptoms in West-African women and associated risk factors with mother and child characteristics over a period of four years. This study showed that 11.4% had elevated anxiety scores before and around childbirth and this decreased over time and 5.4% had increasing anxiety over time. The latter was associated with economic, marital, and social stress and poor child health indicators (121). This study showed the importance of repeated screening over time as only screening women before childbirth would be less beneficial to informing future interventions aiming to address risk factors of mental health conditions in mothers. A study conducted in Kenya assessed the longitudinal relationship between food insecurity and depressive symptoms (assessed over 12 months) among a cohort of perinatal women (n=371) with mixed HIV status. At baseline, 58% of the pregnant women were at risk of depression. Severely food insecure women were close to six times more likely to be at risk of depression, 5.90 greater odds (OR 5.90 (95% CI: 2.32, 15.02, $p<0.001$)) (122). Evidence from these studies has shown that mental health conditions can exist over a long period of time, therefore relying on screening at one timepoint during pregnancy or postpartum is insufficient. There is a need for increased longitudinal studies on maternal mental

health conditions and their associated risk factors. Having such studies would help provide an understanding of the contextual factors associated with longitudinal experiences mental health conditions and provide opportunities to inform future interventions. A study conducted in Italy, between 2004 and 2007, followed women from their first trimester of pregnancy up to one year postpartum with the aim to provide estimates of the prevalence, incidence, recurrence, and new onset of perinatal depression (123). At baseline the Structured Clinical Interview for DSM-IV Disorders (SCID-I) was used to diagnose perinatal depression. For subsequent assessments, the EPDS was used and SCID was performed on those that exceeded cutoff. Results from the study showed a prevalence of depression of 12.4% in pregnancy and 9.6% depression in the postpartum period. Thirty-two (7.3%) women had their first episode in the perinatal period: 1.6% had a new onset of depression during pregnancy, and 5.7% in the postpartum period. The study suggested that casting a multi-professional network around women in need of support may potentially be useful for reducing the effects of perinatal depression on the mother and the newborn child (123). Although this study offered medical interventions that might not be easily accessible in the Zimbabwe setting, the provision of psychological counselling in a comprehensive manner proved to be valuable in improving the mental health of these women. Similarly, interventions that fully address the context specific risk factors would potentially help improve mental health outcomes.

Table 2-4: Studies conducted over time (longitudinal) with maternal mental health indicators

Authors, year	Location, period, population, follow-up	Topic	Mental health outcomes (tools)	Prevalence	Key Findings
1. Spies, 2018 (117)	South Africa, 2016, women with or without HIV, 12 months	Incidence and persistence of depression among women living with and without HIV.	Depression (CES-D), PTSD	19% (28/148) had depression at baseline, and 7% (10/148) had persistent depression. A higher proportion (11% vs 3%) of those living with HIV had persistent depression. 10% (15/148) reported to have PTSD and 4% (4/148) had persistent PTSD. Persistent PTSD was higher in those living without HIV (5% vs 2%).	PTSD was associated with depression. Childhood trauma and traumatic life events at baseline predicted depression at follow-up only for women living with HIV and those without HIV. Risk factors include long-lasting social hardship, neglect, violence, and sexual abuse. Difficult life circumstances are associated with the high rates of depression at baseline, which reduce but persist for a significant number 12 months later.
2. Roch at, 2018 (118)	South Africa, 2016, mothers of primary school children, 7-11 years	Psychological morbidity and parenting stress in mothers of primary school children by timing of	PHQ-9, GAD-7, PSI-SF	Clinical depression and anxiety were co-morbid in some mothers. Out of these 246 women 112 met criteria for either depression or anxiety and 6% (16/112) of these met the criteria for both. MLWH had higher rates of depression during pregnancy (8.5%) and post-delivery (6.6%)	Psychological morbidity was more common in MLWH than negative mothers. HIV was strongly associated with odds of clinical depression and parenting stress, varying by timing of infection. In all three groups, rates of clinical parenting stress were higher than of depression or anxiety.

Authors, year	Location, period, population, follow-up	Topic	Mental health outcomes (tools)	Prevalence	Key Findings
		acquisition of HIV		versus HIV negative mothers (4.2%). This was similar with parenting stress 12.2% and 19.0 (during pregnancy and post-delivery) in MLWH, versus 6.8% in those without HIV. In the MLWH group, parenting stress was double that of the HIV-negative group. Being diagnosed with HIV in pregnancy doubled the odds of depression (and 1.8 times the odds of clinical parenting stress.	
3.Davis, 2017 (119)	South Africa,2009-2016, township mothers. 5 years	Patterns of alcohol abuse, depression, and intimate partner violence among township mothers	Depression (EPDS)	Alcohol use was 25.8% prior to pregnancy and 24.7% five years after giving birth. 56% of mothers reported experiencing depression at one timepoint. At six months post-birth, depressed mothers were more than twice as likely to drink any alcohol compared to non-depressed mothers (χ2 (1, n =	Depression was found to be extremely common among South African mothers. Mothers with depression had a higher likelihood of drinking alcohol compared to mothers who were not depressed only at baseline and 6-months post-birth. MLWH were more likely to drink alcohol compared to mothers without HIV prior to pregnancy discovery and at 5-years post-birth. Following this

Authors, year	Location, period, population, follow-up	Topic	Mental health outcomes (tools)	Prevalence	Key Findings
				487) = 9.67, p < 0.001; OR = 2.63). Depressed mothers were also more than twice as likely to have problematic drinking compared to non-depressed mothers at six-months post-birth (χ2 (1, n = 487) = 7.13, p = 0.01; OR = 2.51). However, there were no significant differences at later timepoints.	cohort of mothers over five years after an initial pregnancy show patterns of persistent alcohol use is and the considerable discontinuity in use and abuse over time.
4.Verkuijl, 2014 (120)	South Africa, mothers-child dyads from antenatal clinics, 6 months-10 years	Postnatal depressive symptoms and child psychological development at 10 years	Postnatal depression (Pitt depression inventory) at 6 months, depression (CES-D) at 10 years	1866 mothers completed the Pitt depression inventory 6 months after the birth of their child; of these, 453 (24%) had symptoms of postnatal depression. At the 10-year assessment, 747/1012 (74%) mothers were judged to have depression. After adjusting for socioeconomic status and maternal depression at 10 years, children whose mothers had postnatal depression at 6 months were	Maternal postnatal depression 6 months after birth has a sustained negative association with child psychological outcomes 10 years later. Maternal depression and adverse child outcome are much more typical in situations of adversity. The finding of an association between maternal postnatal depression and adverse child psychological outcomes at age 10 years is pertinent because it shows the importance of delivering

Authors, year	Location, period, population, follow-up	Topic	Mental health outcomes (tools)	Prevalence	Key Findings
				more than twice as likely to have significant psychological difficulties 10 years later compared with children whose mothers did not have postnatal depression at 6 months (adjusted odds ratio 2·26, 95% CI 1·23–4·16).	effective treatment to the mother, not only to improve her health but also to prevent psychological difficulties for her offspring.
5.Barthel, 2016	Ghana and Cote d'Ivoire, 2010-2014, women, 5 years	Longitudinal course of antenatal and postpartum generalised anxiety symptoms and associated factors in West African women	Anxiety (GAD-7)	Four distinct trajectories of anxiety were identified. The majority of women (79.8%) had consistent low anxiety symptoms, while 11.4% had elevated anxiety scores before and around childbirth that decreased gradually. 5.4% of women showed increasing anxiety symptoms over time. The decreasing anxiety group is marked by high anxiety scores during the last trimester of pregnancy and after birth with a decreasing trend. The increasing anxiety group included women	The presence of different trajectories underline the importance of monitoring anxiety symptoms in pregnant women and in mothers with infants/toddlers. Risk factors identified to increased anxiety over time include changes to their lives caused by motherhood, relationship quality and increased economic hardships due to restricted working capacities and lower income. Partner support was found to be protective.

Authors, year	Location, period, population, follow-up	Topic	Mental health outcomes (tools)	Prevalence	Key Findings
				who showed low anxiety scores 3 months before and after birth, slightly elevated anxiety scores 12 months after birth and increased scores 24 months after birth.	
6. Tuthill 2021 (122)	Kenya, 2014,pregnant women, 21 months postpartum	Food insecruity, HIV and depressive symptoms among perinatal women	Depression (CES-D)	Women with severe food insecurity had 5.18 greater odds (95% CI: 2.45, 10.95, p<0.001) of screening positive for probable depression and were predicted to score 4.42 points higher on the CES-D (SE: 0.95, p<0.001) than food-secure women. After adjusting for education, wealth, number of dependents, maternal age, social support, and HIV status, experiencing severe food insecurity was associated with greater odds of depressive symptoms (adjusted odds ratio [AOR]: 5.90, CI: 2.32, 15.02, p<0.001) and higher CES-D scores (beta: 4.58, SE: 1.04,	The study found that negative psychosocial impacts of food insecurity persist throughout pregnancy and the postpartum period. Interestingly, when including data across the entire perinatal period, HIV no longer had a main effect on depression. By using a longitudinal design that extends from pregnancy through 21 months postpartum with a large sample size and considers modifiable factors of influence including social support, this study helps demonstrate that the relationship between food insecurity and depressive symptoms persists.

Authors, year	Location, period, population, follow-up	Topic	Mental health outcomes (tools)	Prevalence	Key Findings
				p<0.001) compared to being food secure.	
7.Banti, 2011 (123)	Italy, 2004 – 2007, pregnant women, 3 years	Prevalence, incidence, recurrence, and new onset of depression.	Perinatal depression (SCID-I and EPDS)	The period prevalence of postnatal depression was 12.4% in pregnancy and 9.6% in the postpartum period. The cumulative incidence was 2.2% and 6.8%, respectively. Thirty-two (7.3%) women had their first episode in the perinatal period: 1.6% had a new onset of depression during pregnancy, 5.7% in the postpartum period.	Of the women who met the criteria at study entry, 5.1% had a diagnosis of recurrent depression. Recurrence rates were 2-fold in the postpartum period compared with the pregnancy period. The prevalence decreased over time and this was attributed to the treatment (psychological counselling and drug treatment if necessary). Low socioeconomic status, and multiparity were associated with higher odds of having a major or minor depressive episode in the perinatal period. Conclusion was that casting a multiprofessional network around women in need of support may be potentially useful for diminishing the effects of this disorder on the mother and newborn child.

2.4.3 Mental health conditions in mothers living with HIV

Psychiatric conditions are common in PLWH, with depression being the most reported (30). Women living with HIV have significantly higher odds of depressive symptoms than HIV negative women (30). Table 2-5 provides a list of examples of reviews that show the pooled prevalence of the burden of mental health conditions in PLWH. People living with HIV are vulnerable to depression, anxiety and suicidal behaviour with women at greater risk than men (108). A systematic review of 24 studies conducted between 1994-2008 and including people in Africa reported the prevalence of depression to be nearly double in PLWH than in those that are uninfected (124). In another systematic review conducted between 1996-20016 and primarily focusing on sub-Saharan Africa, the prevalence estimates of depressive symptoms ranged from 14% to 32% in PLWH on ART, and 9% to 31% in groups where some participants were not on ART(125). Similarly, another review conducted in sub-Saharan Africa, on outpatient adults living with HIV, found that the weighted prevalence of depression was 16.8% (95%CI, 15.9%-17.7%) using a diagnostic interview, 25.5% (95%CI, 24.9%-26.0%) using a depression screening tool, and the prevalence of general psychological distress was 33.1% (95%CI, 31.9%-34.4%) (109). A cross-sectional study conducted in Ethiopia showed a prevalence of 32.7% for CMD in PLWH. In a cross-sectional study, conducted in Zimbabwe, on the prevalence and correlates of CMD in a population with high HIV prevalence, the prevalence of CMD and depression were higher among PLWH (67.9% and 68.5%) than among HIV-uninfected individuals (51.4% and 47.2%) (85). These reviews highlight the high prevalence of depressive symptoms in the African setting among PLWH.

Table 2-5: Systematic reviews on maternal mental health conditions in PLWH

Authors, review type	Location, period, population	Content/ Topic	Mental health outcomes	Prevalence	Key Findings
1. Catalan, 2011 (126), systematic	Global, to 2009, PLWH with suicidal ideation	HIV and mental health	Suicidality	Autopsy studies reveal 9.4% of deceased PLWH had committed suicide; 2.4% PLWH study participants commit suicide; approximately 20% of PLHW studied had deliberately harmed themselves; 26.9% reported suicidal ideation; 22.2% had a suicide plan; 19.7% had suicidal ideation	There is high prevalence of suicidality, and this was elevated in PLWH compared to those that are HIV negative. There is need to monitor and track all aspects of suicidality as part of routine clinical care. There is a gap in both provision and evaluation of interventions addressing suicidality.
2. Parsons, 2012 (127), literature	LMICs, 1970-2010, Women	Postnatal depression and child development	Postnatal depression	In Africa prevalence ranged from 7.1% (in Uganda) to 33% (in Zimbabwe). The substantial variance in estimates seen across studies means that it is difficult to assess the extent of the disease burden.	The available evidence suggests that rates of PND are substantial, and in many regions, are higher than those reported for high-income countries. An association between postnatal depression and

Authors, review type	Location, period, population	Content/ Topic	Mental health outcomes	Prevalence	Key Findings
					adverse child developmental outcomes was identified.
3. Kapetanovic, 2014 (29), comprehensive	Global, not stated, pregnant/ postpartum women living with HIV	Mental health of HIV positive women during pregnancy and postpartum period	Perinatal depression	30.8 % of perinatal depression over 10 years and 53% positive antenatal depression screens over two years	The qualitative data noted substance abuse and IPV as risk factors to perinatal depression.
4. Uthman, 2014 (35), Systematic with meta-analysis	LMICs, 1993-2013, PLWH on ART	Depression and ART adherence	Depression	The overall pooled rate of depressive symptoms amongst PLWH was 39.1%.	The odds were 0.42 lower among those with depressive symptoms compared to those without - a pooled OR of 0.58 (95% CI 0.55 to 0.62, n=112)
5. Niu, 2016 (108), systematic	China, 1998-2014, PLWH	Mental health of PLWH	Depression, anxiety, substance and alcohol abuse	The median prevalence of depressive symptoms among people living with HIV was 60.6%, with a range of 16% to 100%. The prevalence of anxiety symptoms ranged from 11.1% to 97.5%, and the median prevalence was 43.1%.	The review showed that there are conflicting results regarding health and treatment related correlates of mental health. Two studies showed an association between high somatic symptoms and depression and anxiety. Others showed that being on ART for a

Authors, review type	Location, period, population	Content/ Topic	Mental health outcomes	Prevalence	Key Findings
				Women (36.6%–94.5%) were more likely to report depression than men (37.9%–71.8%).	shorter period was associated with depression and anxiety.
6. Zhu,2019 (30), systematic with meta-analysis	Global, 1980-2013, pregnant and postpartum women	Perinatal depression among women living with HIV	Antenatal and postnatal depression	Antenatal depression 36% (95% CI: 27%, 45%) in PLWH and 26% (95% CI: 20%, 32%) in HIV negative. Postnatal depression: 21% (95% CI: 14, 27%) in PLWH and 16% (95% CI: 10, 22%) in HIV negative	There is a significantly increased risk of antenatal and postnatal depressive symptoms in women with HIV infection, and the findings emphasize the need for the optimal management of comorbid HIV and depression.
7. Atuhaire, 2020 (128), systematic	Africa, 1995-2020, postpartum women	Magnitude of postpartum depression	Postpartum depression	Postpartum depression ranged between 6.1% to 44% based on 9 countries.	The review showed that there are several screening tools used, across studies including the EPDS tool with very few studies showing the tools have been validated for use.

LMICs (low- and middle-income countries), IPV (intimate partner violence), PLWH (people living with HIV), CMD (common mental disorders), EPDS (Edinburgh Postnatal Depression Scale).

2.4.4 Mental health conditions in women during the perinatal period

Mental health conditions are more prevalent in women than in men. A systematic review conducted in Africa showed the weighted prevalence of major depression to be 12.9% (145/1121) in men versus 17.7% (450/2547) in women, with a relative difference of 36.6%, and an absolute difference of 4.8% (95%CI, 2.3%-7.2%; p<0.001). This high prevalence of mental health conditions in women can partly attribute to mental health conditions occurring during pregnancy and the postpartum period, representing periods of vulnerability for women. Pregnant women are at risk of perinatal (antenatal or postpartum) depression (129) and this is more common among those living with HIV compared to those in the general population (130). Depression and anxiety, the most common mental health conditions, affect one in every seven women during the perinatal period and are closely related to preterm delivery, reduced mother-infant bonding, and delays in the cognitive and emotional development of the infant (94). A literature review of the global prevalence of postpartum depression showed that the prevalence varies from 1.9% to 82.1% in developing countries and from 5.2% to 74.0% in developed countries when using self-reported questionnaires (107).

In a systematic review and meta-analysis, conducted globally, on perinatal depression among women living with HIV there was a high prevalence of perinatal depressive symptoms, and this was higher in women living with HIV compared to those who were HIV uninfected (30). Until recently, few studies have investigated the experience of perinatal depression within an African context. In a study undertaken in Ethiopia, participants described problematic “distress states” occurring in the postnatal period, but they did not consider these to be an illness (131). A systematic review of the mean prevalence of antenatal depressive symptoms based on 13 studies found a weighted prevalence of 36% (95% CI: 27, 45%) in the group of PLWH and 26% (95% CI: 20, 32%) in the HIV negative group. The odds of having antenatal depressive symptoms were higher in the mothers living with HIV than those who were HIV uninfected (odds ratio (OR) = 1.42; 95% CI: 1.12, 1.80). In the same review, the prevalence of postnatal depression symptom prevalence in the ten included studies was 21% (95% CI: 14, 27%) in the mothers living with HIV and 16% (95% CI: 10, 22%) in those that were

uninfected (30). Similarly, another systematic review of 22 studies conducted in Africa found that the weighted mean prevalence of antenatal and postnatal depression in women living with HIV was 23.4% and 22.5%, respectively (132). In a cross sectional study on antenatal depression in women living with HIV in rural South Africa, a prevalence of 47% (49/109) was shown (133). A recent systematic review and meta-analysis on the effects of poor social support on PLWH (n=3287) found a pooled prevalence of depression of 38.9% (95%: CI: 32.0, 45.8); (I2 =94:44%, p ≤ 0:001) (134).

Most studies of maternal mental health in Zimbabwe are restricted to assessing prevalence using screening tools due to the limited availability of qualified personnel to conduct clinical assessments. In an early study conducted in 2005 by Stranix-Chibanda, 19.4% (n=62/320) of pregnant women living with HIV versus 16.5% (35/212) of pregnant HIV-uninfected women seeking antenatal care in Zimbabwe, screened positive for psychological morbidity using the Shona Symptom Questionnaire (135). A more recent cross-sectional study conducted in six primary healthcare facilities in 2018, showed a psychiatric morbidity prevalence of 29.1% (n=99/340) of psychiatric morbidity in women in their postnatal period (136). Another cross-sectional study conducted in four primary health clinics showed a prevalence of 39.4% (95% CI 32.5%–46.3%) for depression symptoms using the Edinburgh Postnatal Depression scale (EPDS) (73) which has been validated for use in Zimbabwe (67). The prevalence of antenatal depression, in two primary health clinics in Harare, showed a prevalence of 23.5% (95% CI: 19.3–28.1) using a diagnostic tool (the Structured Clinical Interview for DSM-IV) (84). Overall, the burden of major depressive disorders, be it depression, common mental disorders during the perinatal period is high among women living with HIV in Harare. Most studies have been conducted in primary healthcare clinics in Harare, and few studies have been conducted to show the prevalence among women seeking services at rural-based primary healthcare facilities.

2.4.5 The burden of parenting stress among mothers living with HIV

Parents experience stress and anxiety about being unable to meet their parental obligations in taking care of their children's needs. Parenting stress is defined as the distress one experiences when one perceives oneself to have failed to cope with the demands of being a parent (137,138). It is the stress that parents experience not only because of child-rearing, but also due to their emotional distress, social and environmental circumstances, responsibilities and everyday life stresses (139). Nearly all research syntheses of the determinants of parenting stress compare the stress levels of parents of children with and without developmental disabilities (140,141) or chronic medical conditions (142,143).

Evidence of parenting stress among mothers living with HIV in LMICs is limited. For this indicator the literature search was not limited to LMICs. Of the 46 studies identified that looked at parenting stress, only two studies identified found a high prevalence of parenting stress in people living with HIV. A clinical trial that examined the psychosocial stressors experienced by fathers of children diagnosed with HIV/AIDS showed that they experienced significantly more parenting stress than those whose children were HIV-negative on the Parenting Stress Index total score (mean 234.6 (SD 43.0) vs 215.0 (SD31.5)) (144). A study conducted in a paediatric HIV unit at a hospital in South Africa found very high levels of parenting stress at baseline which reduced significantly ($p<0.001$) over the one-year study period they remained clinically significant (145). Consistent with studies done elsewhere, a study conducted in South Africa among mothers living with HIV, found a high prevalence of parenting stress but it went on to show that both parenting stress and parent-child dysfunction were positively associated with higher maternal depression ($\beta=0.15$, $p<0.01$ and $\beta=0.09$, $p<0.05$; respectively) and parenting stress was higher in mothers with lower socioeconomic status ($\beta=-0.73$; $p<0.01$) (146). Overall, the evidence shows that the prevalence of parenting stress in mothers living with HIV is high this is likely because they experience a range of stressors that go above and beyond the normal stress of parenting. Very few studies have investigated the comorbidity of parenting stress and depressive disorders, and even fewer in LMICs where HIV prevalence is high. Considering the multiple risk factors mothers living with HIV in sub-Saharan Africa

experience, (namely poverty, food insecurity, HIV, stigma and discrimination, lack of social support, and domestic violence), they are likely to have parenting stress related to the concern around their capability to provide for their children.

2.4.6 Risk factors for mental health conditions in people living with HIV

Mothers living with HIV face multiple risk factors associated with elevated depressive symptoms and parenting stress, including the challenges associated with chronic illness (113), stigma and discrimination (147), poverty (148), and low parenting sense of competence (149). Most studies identified PLWH did not assess the associated risk factors by sex, and thus the risk factors reported largely apply to PLWH in general. Where studies reported on risk factors specifically among women living with HIV, this will be explicitly mentioned.

Physical ill-health in PLWH was also shown to be associated with poor mental health conditions. A cross-sectional study conducted in China showed that recentness of HIV diagnoses ($P = 0.046$) was associated with elevated odds of anxiety while higher age ($P = 0.004$), sleep disturbance ($P < 0.001$), and the number of ART regimen switches ($P = 0.046$) were associated with risk of depression (150). Studies in sub-Saharan Africa have shown that depression has been associated with suboptimal HIV treatment outcomes leading to increased disease progression, including late ART initiation and poor adherence, lack of viral load suppression, and more rapid decline in CD4 cell count (130). A systematic review conducted in 2018 in sub-Saharan Africa compared the prevalence of depressive symptoms by ART status and found that depression was associated with non-adherence to ART as those , not on ART had a 28.8% (846/2942) vs 26.5% (3475/13097) prevalence of depressive symptoms. The relative difference was 8.7%, and the weighted absolute difference was 2.3% (95%CI, 0.5-4.1%; p=0.011) more depression for those not on ART (109). A study conducted in 2013 in China showed that patients who did not adhere to their treatment were more likely to be the ones who also report having depressive symptoms in comparison to the ones adhering to treatment (151). These studies have shown that depression in PLWH is problematic as it has been shown to lead to non-adherence to ART consequently increasing disease progression.

Poverty has been shown to be a risk factor for mental health conditions. In a systematic review conducted in LMICs in 2009, positive associations between a range of poverty indicators and CMD were reported (Odds ratios (OR) with 95%CI > 1, or $p < 0.05$). Variables such as education, food insecurity, housing, social class, socio-economic status and financial stress exhibit a relatively consistent and strong association with CMD (152). In a qualitative study in Zimbabwe that targeted adults living with HIV who had CMD symptoms. Participants expressed that the major challenges that they experienced daily included poverty, stigma and marital problems and these were major risk factors reported to lead to CMD symptoms. Poverty was seen as a major barrier to people's ability to meet people's ability to meet their basic needs such as having access to food and paying school fees for their children all of which would lead them to "think too much": *kufungisisa* (153). Similarly, poverty-related factors were seen to be associated with probable major depressive disorders in a cross-sectional study conducted in 14 districts in Uganda (154). Among the female respondents, having no formal education, having no employment and being of poorer socio-economic status were risk factors independently associated with probable major depressive disorders (154).

Social support is a key element in maternal mental well-being and where it is lacking there is a high risk of experiencing poor maternal mental health conditions. In a cross-sectional study conducted in Ethiopia among PLWH (n=294), CMD was associated with social relational factors such as being widowed (AOR = 1.99, (95% CI 1.51, 5.28)), having poor social support (AOR = 2.44, (95% CI 1.33, 4.51)), and HIV-related perceived stigma [AOR = 1.97, (95% CI 1.63, 2.89)] (155). Consistent with that, a systematic review and meta-analysis conducted among PLWH in Ethiopia revealed a higher chance of depression among patients with poor social support than those who had strong social support (OR: 2.31, 95% CI: 1.69, 2.93) (134). A scoping review of health-related stigma outcomes for high-burden diseases in LMICs showed that stigma is associated with poor health outcomes, including reduced help and treatment-seeking behaviours (156). Among PLWH, internalised and experienced HIV-related stigma was associated with an increased prevalence of mental health conditions such as depression and anxiety (156).

Women who received no help or who lived in stressful households that lack affectionate and trusting relationships have been reported to have higher depressive symptoms than women with good social support structures in place (76). Depression and stress can exist where there are difficulties within an intimate partner relationship. A high frequency of intimate partner violence during the perinatal stage has been shown to be associated with poor maternal mental health conditions. In a study conducted in China where 11.07% (90/813) of the participants reported having experienced intimate partner violence, postnatal depressive symptoms were associated with intimate partner violence (OR= 3.78; 95% CI 1.39–10.26) (157). In Africa, intimate partner relationship challenges such as having a partner who rejected paternity, who was unsupportive and uninvolved, violent, may explain the existence of high depressive and stress symptoms in communities. In a systematic review of the literature published up to 2010 by Fisher, et. al., women, from six studies, who experienced physical abuse during pregnancy or in the previous year had a higher prevalence of depression than women who had not had these experiences (76). Similarly, a study conducted in informal settlements in Kenya showed that psychological intimate partner violence was associated with approximately 2.5 times the odds of meeting the criteria for major depressive disorders (OR = 2.6, $p<0.01$) and suicidality (OR = 2.4, $p<0.05$) (158). In Zimbabwe, a study conducted in six postnatal clinics in the capital city found that one in five women (21.4% (95% CI 18.6–24.2)) met the diagnostic criteria for symptoms of postnatal depression. There was a high rate of reports of intimate partner violence (65.4%) including varying types of violence. Emotional violence was strongly associated with depressive symptoms and individual forms of severe physical violence were also associated with depressive symptoms (159). These findings correspond with the evidence from other studies in Zimbabwe that have highlighted intimate partner violence as a risk factor for depressive symptomology (73,84).

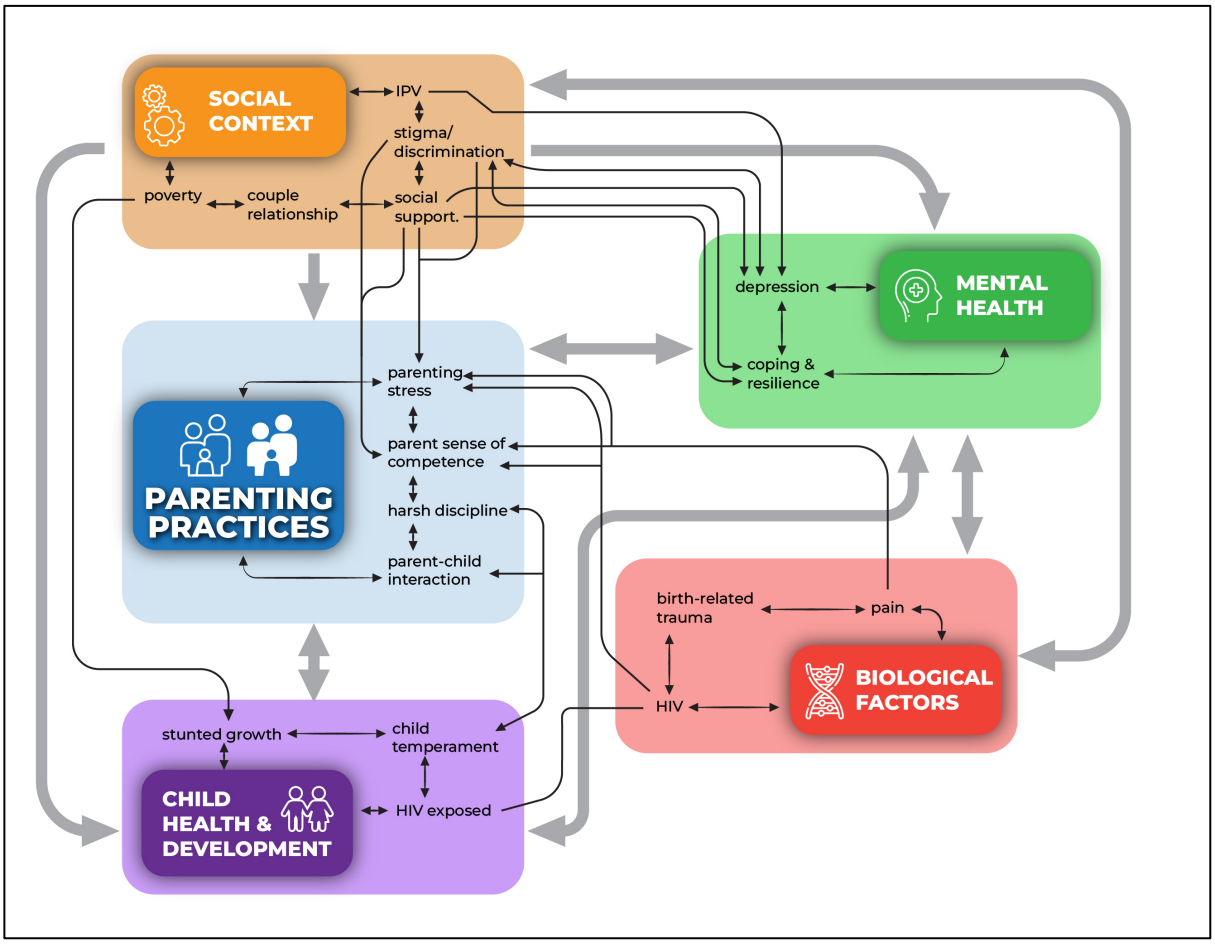
In summary, depression occurs across all income levels, but the context within which the depression occurs differs. There is increased exposure to known risk factors for depression and stress in mothers living with HIV in LMICs including poverty; food insecurity; intimate partner violence; humanitarian disasters; child maltreatment; and high prevalence of diseases such as tuberculosis, malaria, and HIV. Above and

beyond these there are barriers and challenges that threaten access to mental healthcare for women in LMICs, including shortages of psychologists and psychiatrists (160), and poor mental health literacy (161). It is, therefore, important that knowledge of context and mechanisms is important for informing the choice of interventions to be administered in LMICs settings.

2.4.6.1 A synthesis of the intersection of multiple risk factors associated with mental health and parenting in mothers living with HIV

The literature review identified several mental health and parenting risk factors that mothers living with HIV in resource limited settings are exposed to. Figure 2-1 provides a pictorial conceptualization of how the various risk factors intersect. These risk factors can be classified as (maternal) biological factors, social contextual factors, child health and development factors. An explanation of the framework is provided below.

Figure 2-1: Intersecting risk factors associated with mental health conditions and parenting



Maternal biological factors (HIV, pain and mobility problems, birth trauma) are risk factors associated with poor mental health and also affect one's parenting capacity. Living with HIV, pain and mobility problems affect health-related quality of life and can lead to depression, and equally lead to low parenting sense of competence, poor parent-child interaction and high parenting stress. A mother with low resilience is likely to be more vulnerable to depression, and poor parenting outcomes. Social contextual factors play a pivotal role in parenting, maternal mental health, and child development outcomes. Poverty can lead to increased depression, it can compromise a mother's coping strategies, and it can lead to stunted growth in children if it is characterised by food insecurity. In addition, mothers living in poverty are likely to have high parenting stress, a low sense of competence, and poor parent-child interaction if they feel overwhelmed by their challenges to fend for themselves and their children. Social

factors affect one's mental health (coping mechanisms/resilience and depression) and parenting capacity. Intimate partner violence, for example, increases depression, lowers one's resilience, and can increase stress in mothers. Consequently, this can lead to poor parent-child interaction (harsh discipline and poor bonding). Single parenting as a risk factor can lead to increased depression as the mother has limited immediate support, is vulnerable to poverty, and may have a low parenting sense of competence and high parenting stress. Lack of family and community social support, in mothers living with HIV, is a risk factor that can affect mental health coping mechanisms. HIV-related stigma and discrimination can result in a lack of support which increases the risk of depression, parenting stress and a low sense of competence. Child health and development factors can be an outcome as well as an exposure to maternal mental health and parenting. HIV-exposed infants are at risk of malnutrition and stunted growth, delayed milestones, and poor child temperament. These factors can increase the risk of depressive symptoms, and parenting stress, reduce parenting sense of competence, and compromise parent-child interaction.

Interventions seeking to address maternal neonatal child health need to take a holistic approach in addressing the above-mentioned factors. The framework highlights risk factors such as poor physical health, poverty, and low social support are associated with and can compromise mental well-being and parenting capacity. Intimate partner violence is another risk factor that can result in poor maternal mental health. Evidence of interventions that addressed all or most of these risk factors is limited. The literature highlighted interventions that addressed maternal mental health and social cultural factors. A cluster randomised trial conducted in India offered a participatory group intervention to women aiming to improve neonatal survival and maternal depression (162). There was no difference between arms in depressive symptoms overall, using years 2 and 3 combined as defined in the analytical plan. However, a difference was noted in year 3, when 55% of all pregnant women in the intervention clusters had joined a group and 6% of mothers in the intervention clusters compared with the 11% in the control clusters had moderate or severe depression symptoms. The intervention was believed to have improved maternal depressive symptoms by enhancing social support and the problem-solving skills of the mothers (162). A family-centred home-based intervention was offered in Rwanda to families affected by caregiver HIV, in an

RCT(N=81). Trained counsellors delivered six modules that created a platform for family discussions on how HIV affects the family while providing strategies for healthy communication. Mixed-methods analysis of the trial data showed that this home-based intervention significantly reduced intimate partner violence in the intervention arm (β = −0.56 p = .01) at three months (163).

Economic strengthening interventions have the potential to improve the maternal mental well-being of women and reduce depression and stress in both the general population (164,165) and in mothers living with HIV (166). In a randomised controlled trial (RCT) conducted in Uganda (N=346), caregivers of HIV-orphaned children who received a matched-savings economic strengthening intervention had significantly lower levels of parenting stress compared to those in the control group (β =−4.9, 95% CI =−8.5, −1.4, p<0.01) (167). The Shamba Maisha RCT conducted in Kenya and targeting PLWH (n=140) offered a microfinance component together with education in sustainable farming practices and financial management. The results from the intervention arm demonstrated increased CD4 count (165 cells/mm^3, p<0.001) and improvement in food security (3.6 scale points higher, p<0.001), thereby demonstrating that key risk factors for maternal mental health conditions were addressed (168). A study conducted in rural Uganda with 192 PLWH tried to raise evidence to counter the notion that offering micro financial loans to PLWH was not a viable option. Findings showed that participants' health was not a major barrier to conducting business; of the 86 who received the loans, over 80% indicate that they were able to increase the size of their business since baseline, with the majority (79%) using the loan as working capital. In another community-based intervention aimed at improving family capacity to care for children implemented in Kenya (n=400), women took part in a group lending programme. Between baseline and 1-year follow-up depression and loneliness reduced (p < 0.001) but there was a reduction in group and community trust by 7.7% and 11% respectively (169). The evidence shows the feasibility of economic strengthening interventions in addressing socio-economic risk factors associated with mental health and parenting in mothers living with HIV, but there is a need for strategies to prevent or counter anticipated barriers that could result in negative outcomes such as reduced trust within communities.

Interventions to alleviate compromised developmental outcomes in HIV-exposed children have shown an impact on maternal mental health. A CRT in rural Uganda (n=319) assessed the effectiveness of a manualised, parenting intervention where parents living with HIV took part in group parenting sessions and received home visits. Mothers who received the intervention reported lower levels of depressive symptoms (effect size −0.39, 95% CI −0.62 to −0.16) (170). These studies have therefore shown that mental health and parenting can be enhanced where interventions address multiple risk factors.

2.5 Discussion

This review was guided by the principles taken when conducting a scoping review. It has highlighted the burden of maternal mental health conditions, and that despite this burden there is still a huge treatment gap for mental health conditions especially in LMICs (71–73). Untreated mental health problems have negative public health consequences, especially in people living with HIV, including disengagement in care, delayed HIV diagnosis, and suboptimal ART adherence and virological suppression (116). WHO recommends the use of psychological interventions as first-line treatment for depression in LMICs (116). Addressing the treatment gap requires innovative programmes that can be integrated sustainably into existing primary care programmes that are scalable at different levels (171). Although few LMICs have sufficient mental health professionals to meet their populations mental health needs (71), interventions are increasing being implemented.

Mothers living with HIV, with mental health comorbidities, face significant and complex challenges that affect their health and parenting capacity. Women with perinatal depression have increased risks of self-harm ideation, cardiovascular diseases and gestational diabetes, and depression can even induce non-adherence to ART. In addition, having mental health difficulties usually accompanies adverse child development outcomes (30,172,173) and interferes with the relationship mothers have with their children as their symptoms can restrict their consistency and availability when parenting. Their children are at increased risk of attachment difficulties, social,

emotional, behavioural and educational problems (174). The combination of HIV and depression in the perinatal period is especially important because the negative impact of maternal depression on children is amplified by socio-economic adversity and lack of support (171,175).

It can be argued that the plight of parents affected with HIV may be viewed as similar to the experiences of parents with children with developmental disabilities and chronic experiencing elevated levels of psychological distress (144). The feelings of stress and anxiety are also present in mothers living with HIV who struggle with fulfilling their maternal, psychological and medical demands (149). Mothers living with HIV tend to 'silence' their own needs and attend to the needs of their children and others first and that combined with the fear of their child being exposed to HIV leads to the increased burden on the mothers 'thinking too much' (145). Implementing the expected parenting skills including family routines, mother-child interaction and parental monitoring may thus be difficult for mothers living with HIV resulting in increased distress and parenting stress.

This review is not a systematic review which can be identified as a limitation. The strategy was chosen as there are several systematic reviews that have already been conducted on maternal mental health conditions in women living with HIV, including reviews on studies in LMICs. This review has identified the key systematic reviews that high burden of maternal mental health conditions in mothers living with HIV and has shown the multiple intersecting risk factors that need to be considered when formulating mental health and parenting interventions. This review identified that literature on longitudinal studies of mental health conditions in mothers living with HIV is limited. Most of the studies have largely centred on pregnancy and the first few months post-partum. Studies conducted in Africa are mostly from South Africa (118,119) and some are conducted over a period of a 12 months trajectory (117). Very few follow up maternal mental health beyond 12 months postpartum. The evidence of higher prevalence of depression beyond the perinatal stage suggests that there is a need to monitor maternal mental health beyond the first year after childbirth. Several risk factors, other than childbirth, associated with depression, stress and mental health conditions have been identified throughout this review. Longitudinal studies can be

beneficial as they provide a long-term trajectory and a deeper understanding of the risk factors and lived experiences of maternal mental health conditions. This can be used to guide the development of future interventions.

2.6 Conclusion and recommendations

In summary, this literature review has shown that the maternal mental health burden is a global public health concern that has gained recognition due to the increased prevalence of mental health burdens. There is growing evidence of the high prevalence of maternal mental health conditions among mothers living with HIV and their links with multiple risk factors including poverty, intimate partner violence and a lack of social support. This review has also shown that there are still some gaps in the research addressing this area. In sub-Saharan Africa, few studies have taken a longitudinal approach and looked at the prevalence of repeated depressive symptoms and to the best of my knowledge none have looked at the prevalence of parenting stress in mothers living with HIV. Most longitudinal studies that were identified were either conducted over 12 months follow-up. Those that assessed mothers over a longer period such as five years were not directly assessing mental health indicators as their primary outcome. This review has also shown that no studies, in Africa, have looked at the comorbidity of depressive symptoms and parenting stress and examined the effects of these conditions on parenting, child outcomes and HIV treatment outcomes.

There is a need for screening protocols designed not only to identify not only women in the perinatal phase who are living with HIV and struggling with depression but also those who might be at risk for depression, with the goal of closely monitoring their clinical outcomes and psychosocial needs and providing appropriate referrals and interventions. Future interventions need to take a holistic approach in offering services that address the multiple intersecting risk factors of poor maternal mental health and parenting.

3 Chapter 3: Research design and methodology

3.1 Background

This chapter provides an overview of the methods used in data collection and analysis to answer the study's objectives, listed below (Table 3-1). The methods and analysis for each results chapter (chapters 4, 5 and 6) are quite different and use different methodologies. I have therefore chosen to fully describe the methods for each study in the relevant chapters. I briefly describe the different study designs, settings and populations, data collection methods and analyses performed, and the various ethical considerations.

Table 3-1: Recap of study objectives

Objective 1	To assess the prevalence of maternal mental health challenges and explore the associations and risk factors for poor maternal mental health in mothers living with HIV in the CHIDO trial.
Objective 2	To explore how maternal mental health affects the parenting and livelihoods of mothers living with HIV in the CHIDO trial.
Objective 3	To evaluate the process of implementation of the multi-component parenting intervention evaluated in the CHIDO trial.

3.2 Research design

This thesis used three datasets from 2 different studies. Dataset one is data from a study validating the use of the SSQ-14 in a population with a high HIV prevalence (62). This dataset was used to validate the SSQ-8 (Chapter 4), the shorter CMD screening tool used in the CHIDO CRT (addressing objective 1). The second dataset is the biobehavioral quantitative survey conducted during the CHIDO trial and was used to determine the prevalence of and risk factors associated with poor maternal mental health (objectives 1 & 2). The process evaluation of the CHIDO intervention (Chapter 6) used a mixed method design, although qualitative methods (in-depth interviews, focus group discussions and observations) were dominant. Intervention registers

were part of the quantitative data that was collected. An overview of the studies is shown in Figure 3-1.

Figure 3-1: Overview of datasets used in this thesis

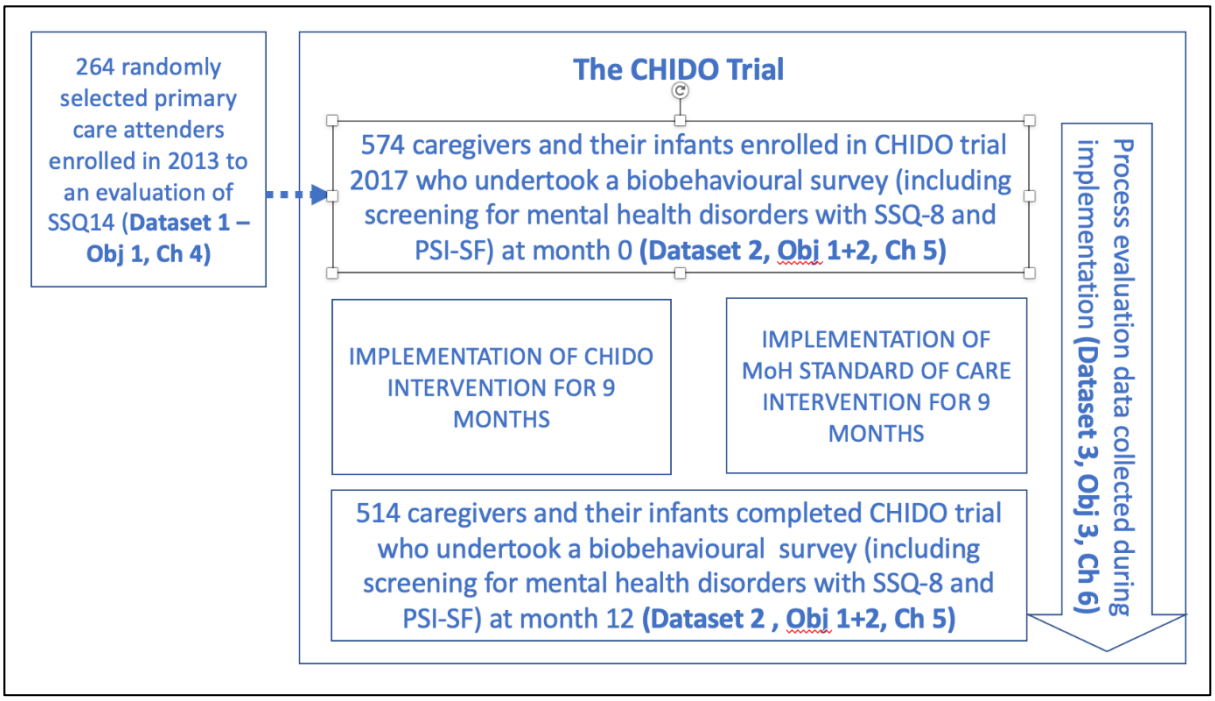


Figure 3-1 gives an overview of the different datasets used in this thesis. Dataset 1 is data from the validation of the SSQ-14 (addressing objective 1), dataset 2 is a biobehavioural survey conducted during the CHIDO CRT (addressing objectives 1 & 2), and dataset 3 is the CHIDO CRT trial process evaluation data (addressing objective 3).

3.3 Overview of methods for the validation of the SSQ-8 in a population with a high burden of HIV

3.3.1 Research design

For the validation of the SSQ-8 (the subject of Chapter 4), I used data collected for the validation of SSQ-14 in 2013 by Chibanda et al. Chibanda et al. compared the performance characteristic of SSQ-14 to a psychiatrist-administered interview (guided by the Structured Clinical Interview for Diagnostic and Statistical Manual for DSM-IV Axis I Disorders (SCID)). As all items in SSQ-8 are contained within SSQ-14, I was

able to use robust scale validation analysis to compare the performance of SSQ-8 both against SCID and against SSQ14.

3.3.2 Setting and population

Participants were enrolled from Mbare polyclinic in Harare. Mbare is one of the oldest and most deprived high-density suburbs in Harare, with over 200,000 people in its catchment area at the time of the study (62). Participants were 264 randomly selected primary care attendees with a high prevalence of HIV.

3.3.3 Data collection

Research assistants administered the SSQ-14 and a short socio-demographic questionnaire to primary care attendees consenting to the validation study (Chapter 4). Four psychiatrists administered the SCID. Psychiatrists were blind to the SSQ-14 score of screened participants. All data were collected on paper questionnaires and entered into a database using a predesigned data entry program containing automated range checks. Data cleaning was carried out at the end of each day. Data were transferred to STATA version 13.0 for analysis. The cleaned and verified anonymous dataset was made available for analysis for this thesis.

3.3.4 Data analysis:

Analyses were conducted using Stata 13.0. The SSQ-8 scores of the study participants were compared against the SCID to determine performance characteristics for screening positive for i) depression and anxiety (CMD) and ii) depression alone, respectively. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were estimated for different cut points, and receiver operating characteristic (ROC) curves were drawn. In addition, a comparison was made of how well the SSQ-8 performed against SCID compared with the SSQ-14. Internal reliability was assessed using Cronbach's alpha.

3.3.5 Research Ethics

The original study by Chibanda et al. (62) conducted to validate the SSQ-14 obtained ethical approval from the Medical Research Council of Zimbabwe and the Research Council of Zimbabwe (MRCZ/A/1732), and the Human Research Ethics Committee of the Faculty of Health Sciences, University of Cape Town (HREC 090/2014) and the London School of Hygiene and Tropical Medicine (8457). Permission to use the dataset to validate SSQ-8 was obtained from the principal investigator. Participants who participated in the study agreed to have their data anonymised and used for future research purposes, so no further consent was sought from the study participants. No participant-identifiable information was shared when the dataset was shared.

3.4 Overview of the methods used for the descriptive analysis of mental health symptoms in mothers living with HIV

3.4.1 Research design

The burden and risk factors for repeat common mental disorders (CMD) symptoms were determined by analysing the trial cohort data from the baseline and 12-month biobehavioural surveys (see Figure 3-1). Using descriptive analyses, the aim was to identify mothers with repeat CMD symptoms and determine the prevalence and risk factors for repeat CMD symptoms and other associated factors.

3.4.2 Setting and population

The CHIDO trial was conducted in two rural districts (Goromonzi and Mudzi) in Mashonaland East Province in 2016–2018. The CHIDO trial is described in detail in Chapter 1. Goromonzi District has a population of 223,879 (194) and a land area of 2,459 sq. km. It is located about 20 km northeast of Harare, the capital city. Livelihood in the area mainly relies on cash crop production. Households are also engaged in the production of garden vegetables, petty trading and casual labour (195). Mudzi District had an estimated population of 1,366,522 people in 2017; 88.8% of the population is rural (196). Mothers living with HIV in these rural areas are likely to live in poverty,

experience food insecurity and have poor access to health services. Therefore, all health facilities in these two rural districts were eligible for potential inclusion in the trial. Briefly, 30 facilities and their surrounding catchment areas were included in the trial. All mothers of infants (aged 0-24 months) identified through the HIV-exposed infant registers held at the facilities were invited to participate.

3.4.3 Data collection

Data from quantitative questionnaires collected from 495 primary mothers of HIV-exposed infants who took part in the CHIDO trial conducted at two timepoints a median of 12 months apart (see questionnaire - Appendix 1) were used in this analysis.

The CHIDO trial used a combination of interviewer-administered questionnaires using a tablet (electronic data capturing) and audio computer-assisted self-interviewing (ACASI) for sensitive questions such as HIV retention in care. Key variables collected include risk of common mental disorders (measured using the SSQ-8), parenting stress (measured using the Parenting Stress Index – Short Form), mothers' sense of parenting abilities (measured using part of the Parenting Sense of Competence scale), postpartum bonding (assessed using part of the Postpartum Bonding Questionnaire) and signs of a disturbed mother–infant relationship and discipline (measured using part of the Conflict Tactics Scale for Parent and Child). Other data collected include social interaction and intimate partner relationship quality, measured using the Maternal Social Support Index, the Relationship Assessment Scale (RAS) and the Hurt, Insulted, Threatened with Harm and Screamed (HITS) scale.

3.4.4 Data analysis

For the analysis to look at the prevalence of and factors associated with repeat CMD, I used data collected from mothers at enrolment into the trial rather than endline variables except in cases where the variable was only measured at follow-up (the Relationship Assessment Scale, Brief Resilience Scale, HITS scale, and items from the Conflict Tactics Scale for Parent and Child).

CMD was defined as ‘no CMD’ (mothers who screened negative for CMD at both timepoints, ‘single CMD’ (mothers who screened positive at baseline and negative at follow-up, or negative at baseline and positive at follow-up) or ‘repeat CMD’ (screened positive at both timepoints).

The prevalence of single and repeat CMD and 95% CI were calculated. I used univariate multilevel ordinal logistic regression to test for the association of CMD with risk factors such as socio-demographic characteristics, economic stability, social support, relationship quality and HIV indicators with a random effect for the trial cluster. Variables associated with repeat CMD in the univariate analysis at $p<0.2$ were carried forward into a multi-level ordinal logistic regression model, with a random effect for cluster. The trial arm was included as an *a priori* variable. The variables were removed sequentially if they were not associated with the outcome in the multivariate analysis.

Following this, I used multivariable ordinal logistic regression to investigate three research questions:

1. The association of CMD with parenting stress
2. The association of CMD with parenting sense of competence
3. The association of CMD with harsh discipline, adjusting for parenting stress

Parenting stress and parenting sense of competence were fitted as continuous variables and modelled using linear regression. In each case, the association between the exposure (CMD) and the outcome was investigated with multivariate linear regression, adjusting for relevant variables associated with both the exposure and the outcome. Harsh discipline was fitted as a binary variable and modelled using logistic regression. Effect modification by the trial arm was investigated, and a likelihood ratio test was used to compare the models.

3.4.5 Ethics approvals

The CHIDO trial had full ethical approval from the Medical Research Council of Zimbabwe and the Research Council of Zimbabwe (MRCZ/A/1943), University College London (6789/002) and the London School of Hygiene and Tropical Medicine (9912). In addition, all the participants who were enrolled in the different aspects of the

study received information about the trial and agreed to participate by providing written consent for themselves and their children.

3.5 Overview of the process evaluation of the CHIDO trial

3.5.1 Methodological approaches to process evaluation

Process evaluations seek to understand the effects (or not) of interventions, potential generalisability and optimisation in routine practice (176). Process evaluation is not about the statistical significance or no significance of an intervention attributed to effect size and statistical power (177). Instead, they are designed to evaluate the fidelity and intensity of intervention implementation and provide explanatory evidence around trial outcomes, mainly how and why the intervention works or does not work in the trial context. A range of evaluation frameworks have been published, with some established for evaluating public health programmes more broadly (e.g. RE-AIM) and those that have generic frameworks that can be used across a range of contexts, settings and sectors (e.g. Realist Evaluation (178,179)). A recent scoping review by Fynn et al. (2020) identified 71 evaluation frameworks within the academic and grey literature intended for public health, health promotion, behaviour change or generic programmes (180).

The various frameworks try to delineate key intervention components by systematically examining what the intervention comprises and how it is delivered to target participants (181). Therefore, it is necessary to consider the individual elements within each framework to understand the content and focus of the frameworks and the contexts in which they may be applied. Key components of process evaluation included in most frameworks include; describing contextual factors of programmes, identifying and describing causal mechanisms or theories of change, reach and implementation (180). Of the 71 frameworks listed by Fynn et al., six encompassed the key aspects of a process evaluation. Table 3-2 lists examples and brief explanations of the key components of the six frameworks (180). For the process evaluation of the CHIDO trial, I used the MRC guidance on process evaluation of complex interventions (182).

Table 3-2: Process evaluation frameworks

Framework	What they allow
1. MRC guidance: Process Evaluation of complex interventions (182)	Provides detailed guidance on process evaluation of complex public health programmes and a review of relevant theories and frameworks which informed its development. The focus is on the context, implementation and mechanisms as the key features of the evaluation.
2. Concepts in Process Evaluation	It identifies 11 components of process evaluation: 1. recruitment, 2. maintenance of participants, 3. context, 4. resources available to the program and the participants, 5. implementation, 6. reach of materials into (or receipt by) the target group, 7. barriers to implementing the program, 8. exposure, 9. initial use, 10—continued use of program-specified activities, and 11—contamination of treatment and control groups.
3. Framework for Program Evaluation in Public Health (183)	A comprehensive and systematic approach identifies six steps for tailoring an evaluation: describe the program, describe complete and acceptable program delivery, develop a potential list of questions, determine methods, consider program resources, context and characteristics, and finalise the process evaluation plan. It gives a set of standards for assessing the quality of evaluation activities (utility, feasibility, propriety, and accuracy).
4. Process Evaluation of Cluster-Randomised Trials	The framework presents a range of approaches to understanding trial delivery, intervention implementation and responses of targeted participants. It proposes a set of candidate elements for designers of process evaluations to consider. Its features apply to other study designs for evaluating complex interventions.
5. Planning, implementing	The model illustrates the three phases of planning, implementation, and evaluation. The context-contingent nature of health promotion programs; turbulence in the community context and players; multiple stakeholders, goals and strategies; and uncertainty of outcomes all contribute to the complexity of

Framework	What they allow
and evaluation model (184)	interventions. Bringing together insights from developmental evaluation and complexity theory can help to address some evaluation challenges. The proposed model emphasises recognising and responding to changing contexts and emerging outcomes, providing rapid feedback, and facilitating reflexive practice. This will enable the evaluator to understand better the influence of context and other implementation factors in a complex setting.
6. Systematic Evaluation of Multiple Components	A six-step approach to process evaluation: (1) Brainstorm the process necessary for full implementation & potential barriers and facilitators to implementation, (2) Application of process evaluation concepts to ensure inclusion of important implementation processes, (3) Measurement of proximal outcomes, (4) Identification of relevant data sources, (5) Selection of methods and timing of data collection of process measures, (6) Development of instruments.

Evaluation frameworks usually consist of procedures and protocols that ensure systematisation and consistency in how evaluations are undertaken. Variations in frameworks may be in their methods focusing on the type of data collection and analysis of the information. These methods provide insights into the fidelity of implementation and the causal mechanisms or pathways, interactions, and contexts driving different facets of an intervention (182,185). The methods may be quantitative, qualitative or both, and attempt to describe, explain, predict, or inform actions. The choice of methods follows from the evaluation questions being asked, the underpinning theory, and the mode of enquiry. This process evaluation acted as a case study of complex interventions. It provided a holistic and in-depth understanding of the relationship between an intervention and the contemporary context in which it was implemented (186,187). Case study design can capture the case's complexity, fill gaps in the knowledge and shed insight on how the intervention worked (or not) (187). The phenomenon of interest is the implementation of the CHIDO multicomponent intervention for mother-child dyads that are HIV-exposed and unexposed in rural districts in Zimbabwe. The use of the case study approach is justified in the sections below.

3.5.2 Setting and Population

The process evaluation data were collected from implementers and participants participating in the CHIDO trial. This includes the 495 mother participants who participated in both biohavioural surveys and answered questions asking their assessment of the various intervention components. In addition, 17 mother participants were purposively sampled based on the level of attendance and participation in the intervention and the age of the mother and her child to participate in in-depth interviews (see Table 3-3). The intervention facilitators provided data in the form of observational checklists, with 19 purposively sampled for in-depth interviews based on their role in the trial and the performance of the groups they were facilitating (see Table 3-4).

Table 3-3: Summary of mothers in the qualitative interviews

Total mothers interviewed (N)		17
District	District 1	10
	District 2	7
Age ranges	17-20	2
	21-30	4
	31-40	6
	41-50	5
Age of child at enrolment	0-5 months	4
	6-11 months	5
	12-17 months	3
	18-24 months	5
Marital status	Married	10
	Single/Divorced/Widowed	7
Education	Primary level and below	7
	O' Level	9
	A' Level	1
	Diploma, degree	0
Intervention participation level	Active	10
	Dropout	7

Table 3-4: Intervention staff who took part in qualitative interviews

Total facilitators interviewed (N)		19
District	District 1	11
	District 2	6
	Not applicable (implementing staff)	2
Role in the intervention	Early childhood stimulation facilitator	5
	Community based trainer	4
	Nurses	4
	Community Health Worker	4
	Mavambo implementing staff	2
Performance of group	Active	6
	Average	4
	Poor (high dropout/low enforcement)	5
	Not applicable (implementing staff)	2

3.5.3 Data Collection

This thesis is based on a CHIDO cluster randomised control trial case study. Case study methodology supports a range of data collection methods, both qualitative and quantitative, to gain an in-depth understanding of phenomena in the context (187). However, to ensure an understanding of the complexity of the relationship between the CHIDO trial multicomponent parenting intervention, the context in which it was delivered, and to allow for the use of multiple data sources, this was considered the best approach.

The process evaluation (Chapter 6) was guided by the MRC Process Evaluation Guidelines (see Figure 6-1 - in chapter 6). It sheds light on some of the CHIIDO trial findings which have been previously published (5). Data collection for the evaluation was mixed methods, although it was dominantly qualitative. The quantitative data comprised intervention registers and user feedback (from the biobehavioural survey)

at 12 months. The process evaluation assessed the intervention's recruitment, fidelity and dose and established which characteristics were associated with adoption, delivery, and effectiveness. The qualitative methods such as interviews, focus groups and observation offered a detailed description of the setting, delivery of the intervention in each site and arm, and perceptions of the intervention recipients and service providers (187). Observational checklists were filled in by the implementer supervisors (Mavambo) and the research team (CeSHHAR) using paper forms and entered into an Access database. In-depth interviews were conducted at three-month intervals throughout the trial, with participants and study implementers sampling different individuals. No follow-up interviews were conducted. In-depth interviews were audio-recorded, transcribed and translated into English.

3.5.4 Data analysis

The case study was viewed as a single case study with embedded units. This is mainly because the trial was conducted in multiple communities; within each community, a group of women lived under similar circumstances within the same province. Therefore, a case-based analysis was used for this process evaluation. Focus was on the various components under assessment instead of the differences across sites. For the quantitative data, a descriptive analysis summarising attendance over time for each of the different intervention components (parenting classes, ISALS meetings and home visits) was conducted. The proportion of participants who reported that each intervention component was valuable was reported, and an overall score was calculated. In addition, a group unity score was calculated from the responses of each group member as to her level of comfort and safety at parenting classes.

Thematic analysis was conducted on the qualitative process evaluation data. This method involves searching for repeated themes and patterns from a data set (188,189). This approach was selected for its flexible nature, as it can be applied across frameworks, including case studies. With the mixed method approach used in this process evaluation, the thematic analysis allowed themes to emanate from connecting different data elements, reframing and organising the data into classification labels that holistically describe the data (189). It allowed me to explore

and understand the experiences, thoughts or behaviours of the CHIDO trial participants as reported by participants in interviews and FGDs. An initial step of familiarisation with the data involved transcribing and translating the audio-recorded in-depth discussion and reviewing the notes on participant observation. All transcripts were uploaded to QSR NVivo 12. Four transcripts were randomly selected to familiarise ourselves with the data and develop the initial codes. The initial coding framework was created, with the researcher then reviewing all the other transcripts line by line, identifying tree nodes linked together under parent nodes representing a common theme. Themes were deductively identified, with findings concentrating on interrogating the hypothesis made in the CHIDO trial theory of change. The hypothesis was that the multicomponent intervention would improve child development, economic emancipation, and health outcomes. Emerging theoretical constructs were identified and iteratively built upon from the common themes across the interviews and analysis of the complete CHIDO trial data set.

3.5.5 Ethics approval

Ethics approval for the process evaluation of the CHIDO trial was as outlined in section 3.4.

4 Chapter 4: Validation of the eight-item Shona Symptom Questionnaire for common mental disorders in a population with high HIV prevalence in Zimbabwe

4.1 Chapter overview

In this chapter I describe the validation of the eight-item Shona Symptom Questionnaire (SSQ-8) which was derived from the SSQ-14 originally developed and validated by Patel et al. in 1994 (190). In 2013, Chibanda et al. validated the SSQ-14 for use in a population with a high prevalence of HIV (62), as the original study by Patel was conducted in a population with low HIV prevalence. Chibanda, et al. validated the 14-item Shona Symptom Questionnaire (SSQ-14) as a screening tool predictive of symptomatic common mental disorders (CMD) against the Structured Clinical Interview for Diagnostic and Statistical Manual for DSM-IV Axis I Disorders (SCID) assessment, which was administered by four trained psychiatrists and used as the reference standard. An abbreviated version of the SSQ-14, the SSQ-8, including only eight of the original SSQ-14 questions and excluding those that referred to the overlapping HIV and depression psychosomatic symptoms, was also found to be valid (Patel, unpublished data). The SSQ-8 was used in the CHIDO trial to identify individuals living with HIV who have symptoms of CMD.

4.2 Background

Mental health conditions such as major depressive disorder, generalised anxiety disorder and common mental disorders are more common among persons with acute or chronic medical problems such as HIV (191,192). Despite this, there is a lack of epidemiological data about the prevalence of these mental health conditions among populations with high HIV prevalence (193), specifically mothers living with HIV (194,195). This can be attributed partly to the lack of locally validated psychometric instruments, and failure to establish clinically significant cut points for psychiatric symptom checklists in these populations (193). A challenge is that commonly used

depression screening tools have questions that, in some cases overlap with psychosomatic symptoms encountered by people living with HIV (192). This overlap of symptoms includes loss of appetite, fatigue and insomnia. In the era where treatment was poor or delayed, using screening tools that excluded these overlapping symptoms would have helped to improve the identification of people living with HIV who were at risk of depressive symptoms (192).

Locally validated screening tools are a critical step towards the identification of people living with symptomatic CMD and other mental health problems. For screening to be valid, these tools have to be culturally appropriate and usable. The way in which these tools are interpreted is mediated by cultural factors such as cultural values, beliefs, experiences, communication patterns and socioeconomic conditions. Language is another cultural factor one considers, and depictions of words vary with the context. Cultural validity is recognised as an important characteristic considered in the development and use of a screening or assessment tool. It can be defined as the effectiveness with which assessments address the socio-cultural influences to which participants think and respond to them (196). For screening tools to be used across cultures and languages, they need to go through a rigorous translation process in order to ensure equivalence between the original tool and the newly developed version (197). Adaption includes the adaption of individual items, instructions as well as response options. The process of cross-cultural validation involves the translation process, which can be broken down into five steps, namely i) translation of the tool, ii) back translation by qualified people, iii) committee review of those translations and back-translations, iv) pretesting for equivalence using adequate techniques such as differential item function and v) re-examination of the weighting of the scores (198).

The Shona Symptom Questionnaire (SSQ-14) is an example of one tool that has been was developed in Zimbabwe in 1994 using these exemplary cross-cultural methods. The steps taken in the cultural validation of this tool for use in the Zimbabwean Shona culture setting are detailed in the publication by Patel (199). It was intended to be a user-friendly screening tool for CMD applicable for use in primary healthcare clinics and was validated against the gold standard of the Structured Clinical Interview for Diagnostic and Statistical Manual for DSM-IV Axis I Disorders (SCID) (190). At the

time of the validation of the original SSQ-14 by Patel, the target population did not have a high HIV prevalence. Using the cut point of ≥8/14 identified by Patel, findings were inconsistent across studies with a high HIV prevalence (135,200,201). Chibanda et al. (2013) then went on to validate the SSQ-14 for use in a population with high HIV prevalence (62). In the validation of the SSQ-14 by Chibanda et al., a cut point of ≥9/14 was identified with an 84% sensitivity, 73% specificity, 82% positive predictive value (PPV) and 75% negative predictive value (NPV) for symptomatic CMD against the SCID (62).

In the study presented here, I sought to validate the SSQ-8 for use in the screening of CMD symptoms among a high-HIV-prevalence population. The objective of this study was to conduct a secondary analysis of the data collected for the SSQ-14 revalidation study to determine the cut point for the SSQ-8 and to validate its use in identifying people living with symptomatic CMD among clinic attendees in Zimbabwe. Access to the original dataset was provided by Professor Dixon Chibanda, who performed the re-validation of the 14-item Shona Symptom Questionnaire.

4.3 Summary of the validation of the SSQ-14 by Chibanda et al. (62)

4.3.1 Methods of the study

4.3.1.1 Study design and location

A cross-sectional study was conducted at the largest primary care clinic in Harare, Mbare, an area of high population density. The catchment population is >200,000 people, with an average of 140 patients seen at the clinic each day. This clinic is mostly staffed by nurses and lay health workers. In addition, adults accessing the outpatient clinic for acute care who were residents in Mbare were eligible for the study.

4.3.1.2 Study procedures and tools

While adults were in the clinic waiting room, they were allocated a number based on their position in the queue. Computer-generated random numbers were used to select a random sample. Clients who met the eligibility criteria and provided written informed

consent were enrolled. The SSQ-14 is a case-finding tool that measures psychological distress through somatic and psychological experiences reported by individuals (202). It was developed using most of the items common in tools used to assess depression worldwide, such as sleep disturbance, suicidal thoughts and mental distress, as expressed in local idioms (190). Participants are asked if they have experienced any symptoms over the past week, yes or no, and each item scores one point (62,190). Research assistants administered the SSQ-14 and recorded the answers on a paper-based questionnaire.

The DSM-IV SCID is a 30–60-minute assessment used to determine major mental health conditions and administered by a trained mental health professional. Diagnosis is based on the following 5 DSM-IV criteria being met: A) five or more symptoms present for more than two weeks; B) symptoms did not meet criteria for a mixed episode; C) symptoms caused significant impairment in social, occupational functioning; D) symptoms were not due to the direct effects of a substance; and E) symptoms were not better accounted for by bereavement (39). In this study, the SCID was administered by four psychiatrists. The clinicians were trained over two weeks by Professor Chibanda (a psychiatrist and the PI of the study) on how to use the diagnostic criteria. They were trained to identify major mental health conditions using diagnostic evaluations based on the SCID and cultural knowledge of a wide range of mental and substance use disorders and how to manage clinically severe cases (62). The SCID assessment was done after the SSQ-14 screening tool had been administered, with the assessors blinded to the SSQ-14 scores. The SCID assessment was recorded on a paper-based structured assessment tool. Participants who met the criteria for major depression were first assessed by a medical officer and when necessary, they were referred to a tertiary psychiatric facility.

4.3.1.3 Sample size

The sample size calculation for the revalidation study was based on the precision of the estimated sensitivity and specificity of the SSQ-14 compared to the reference standard for depression (the SCID) and assumed a prevalence of CMD symptoms of 28%. If a total of 75 participants had scored positive for depression using the SCID

and 75 had scored negative on the SCID, it would have provided the +/- 9% precision around the 91% sensitivity (95% CI: 82%–96%) and +/- 11% precision around 80% specificity. The actual prevalence of CMD was 59.8%. The authors increased the sample size to 264, from 150 to allow for stratification by HIV status, assuming an HIV prevalence of 60% in the clinic population.

4.3.1.4 Ethics

Ethical approval was obtained from the Medical Research Council of Zimbabwe (MRCZ/A/1732), the Human Research Ethics Committee of the Faculty of Health Sciences, the University of Cape Town (HREC 090/2014) and the London School of Hygiene and Tropical Medicine (8457). All participants provided signed consent forms and were given information on the study's aims, which included this secondary data analysis.

4.3.2 Results of the original study

In total, 264 participants were enrolled in the study, of whom 208 (78.8%) were women, 157 (59.5%) were married, and 199 (75.4%) had completed secondary education or higher. Of the 237 (89.8%) participants who had ever had an HIV test, 165 (69.6%) were living with HIV. Clinic records were used to verify these results (203).

Table 4-1 shows the results of the characteristics of the study population obtained from the SSQ-14 (62).

Table 4-1: Characteristics of study participants from the SSQ-14

Characteristics	All participants (N=264)	
Gender		
Male	56	21.2%
Female	208	78.8%
Age group		
19–29	58	22.8%
30–39	91	35.8%
40–49	72	28.4%
50–63	33	13.0%
Marital status		
Married/partnered	157	59.5%
Divorced/widowed	52	19.7%
Single	55	20.8%
Education		
Primary or lower	65	24.6%
Secondary or higher	199	75.4%
Current employment status		
Unemployed	112	42.4%
Permanent full-time/part-time	26	9.9%
Casual/self-employed	126	47.7%
Main income source		
Own business/salary	149	56.4%
Partner/family	98	37.1%
No income	17	6.4%
Has a chronic illness	**120**	**45.5%**
Negative life event in the last six months	**237**	**89.8%**
Ever had an HIV test	**237**	**89.8%**
Living with HIV, if status known (N=237)	**165**	**69.6%**
Has common mental disorder using the SCID	**158**	**59.8%**

*These results are obtained from the SSQ-14 validation paper (62).

4.4 Secondary analysis

4.4.1 Methods

The SSQ-8 comprises the eight items shown in

Table 4-2. The six excluded questions included two health-related questions (aching stomach and having nightmares) that are common somatic symptoms of HIV and/or antiretroviral therapy (204,205).

Table 4-2: Eight-item Shona Symptom Questions (SSQ-8)

There were times in which I was thinking deeply or thinking about many things
I sometimes failed to sleep or lost sleep
There were moments when I felt life was so tough that I cried or wanted to cry
I felt run-down (tired)
At times I felt like committing suicide
I was generally unhappy with things that I would be doing each day
My work was lagging behind
I felt I had problems in deciding what to do

I conducted an analysis using Stata 13. I assessed the SSQ-8 against the SCID to compare performance characteristics for screening positive for i) depression and/or anxiety (CMD) and ii) depression alone. For each association, I estimated the sensitivity (proportion of true positives), specificity (proportion of false positives), positive predictive value (PPV) and negative predictive value (NPV) for different cut points and the ROC curve. A ROC curve is a graphical representation widely used when evaluating the discriminatory performance of a continuous variable that represents a diagnostic test, a marker and a classifier (206,207). I calculated it to find the optimal cut point for correctly assigning participants as having or not having symptoms of being at risk of CMD. I calculated a ROC curve separately for participants living with HIV and those without HIV because the SSQ-8 was subsequently used with women living with HIV only (see Chapter 5). Also, there is evidence that the prevalence of CMD differs by HIV status (4,32,208). I also performed a stratified analysis by educational attainment to investigate whether the performance of the SSQ-8 differed by education level.

To assess the consistency of the results across each item in the SSQ-8, I measured internal reliability using Cronbach's alpha, which is calculated by correlating the score for each scale item with the total score for each observation and then comparing that to the variance for all individual item scores.

4.4.1.1 Sample size

A sample size of 264 was available for this secondary analysis, and according to the SCID assessments the prevalence of CMD was 59.8%, with 158 screening positive for CMD and 106 negatives. Therefore, assuming that the sensitivity and specificity of the SSQ-8 were equal to those of the SSQ-14 (84% and 73% respectively), the precision of these estimates using the available sample size would be fair: sensitivity 84% (95% CI: 78%–89%), specificity 73% (95% CI: 63%–81%).

4.5 Results of the validation of the SSQ-8

4.5.1 Prevalence of depression and/or anxiety using the SCID

A total of 158 (59.8%; 95% CI: 54%–66%) participants met the SCID criteria for depression and/or anxiety. Of these, 52 (19.7%) participants had depression alone, 97 (36.7%) mixed depression and anxiety, and nine (3.4%) anxiety alone.

4.5.2 SSQ-8 distribution and internal consistency

The distribution of SSQ-8 scores for the whole sample is shown in Figure 4-1. The distribution is left-skewed, and the most common score was seven (33.3%). All participants reported at least one symptom. Internal consistency of the SSQ-8 was fair (Cronbach's alpha = 0.68).

The cut point that correctly classified the highest proportion of participants was a cut point of ≥6, where 80.7% of participants were correctly classified against the gold standard of the SCID (

Table 4-3). A ROC curve was drawn to identify the most likely optimal cut point for the SSQ-8. A cut point of ≥6 was the most distant point on the curve Figure 4-2. The area under the curve (AUC), which quantifies the overall ability of the test to discriminate between those individuals with the outcome and those without the outcome, was 88% (95% CI: 83%–92%).

Figure 4-1: Distribution of SSQ-8 scores

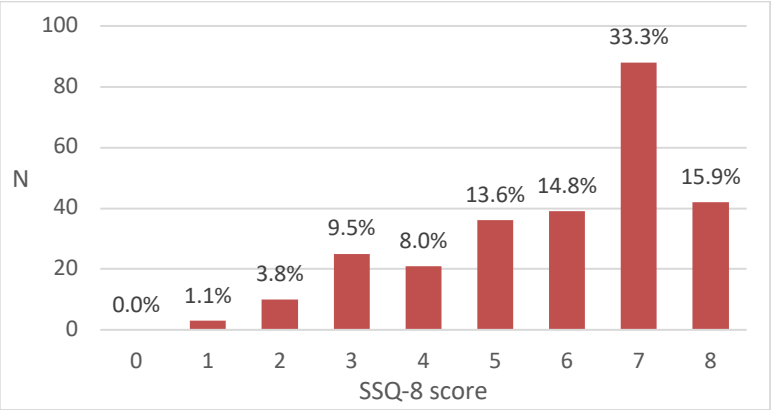


Figure 4-1 shows the distribution of scores of the SSQ-8, with the highest possible score being 8 and the lowest possible score being 0.

Table 4-3: Classification of SSQ-8 scores

SSQ-8 cut point	Sensitivity	Specificity	Proportion correctly categorised
0	100%	0	59.8%
1	100%	0	59.8%
2	100%	2.8%	61.0%
3	100%	12.3%	64.8%
4	97.5%	32.1%	71.2%
5	95.6%	49.1%	76.9%
6	87.3%	70.8%	80.7%
7	74.7%	88.7%	80.3%
8	26.0%	99.1%	55.3%

4.5.3 Performance of the SSQ-8 against the SCID diagnosis of any CMD (depression and/or anxiety)

Using the cut point of ≥6 established from the ROC curves Figure 4-2, a total of 169 (64.0%; 95% CI: 58%–70%) participants screened positive for CMD. Using this cut point for the SSQ-8, sensitivity and specificity were 87% (95% CI: 81%–92%) and 70%

(95% CI: 61%–79%) respectively. The PPV was 82% (95% CI: 75%–88%) and NPV was 79% (95% CI: 69%–87%).

Figure 4-2: ROC plot for the whole sample

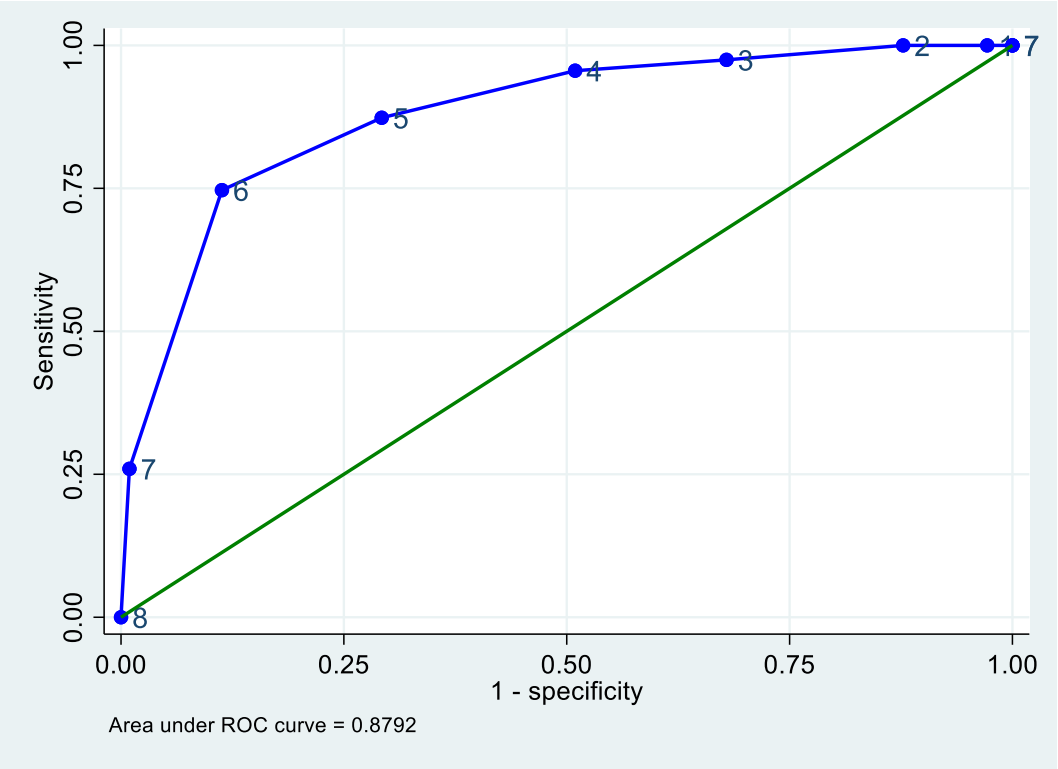
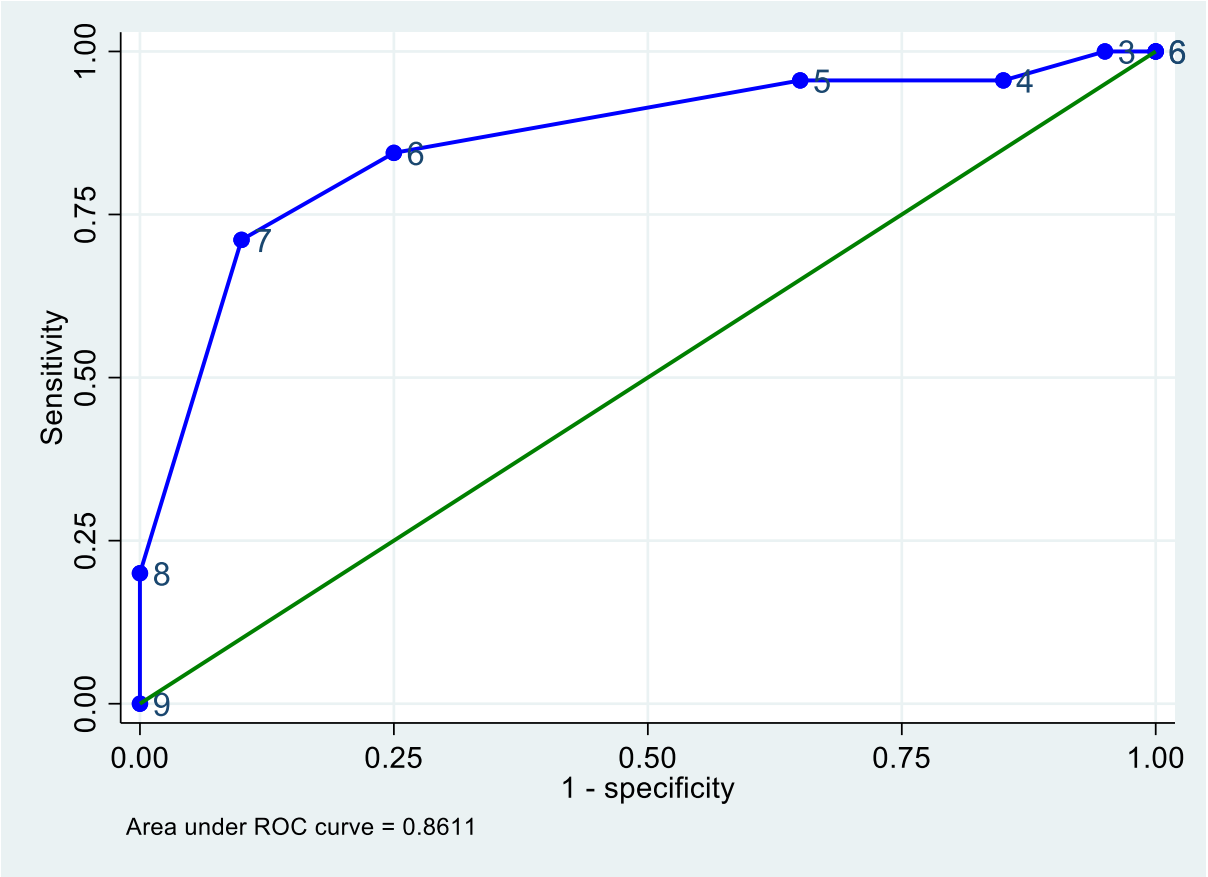


Figure 4-2 shows the ROC plot for the whole sample. The green straight diagonal line is the line of no discrimination, showing that on that line the probability of getting a correct result is 50:50. The curved line is the ROC curve, which indicates increasingly better performance moving to the upper left corner, which represents perfect performance. In the whole population, a cut point of 6 performs better.

4.5.4 Performance of the SSQ-8 by education level

I examined SSQ-8 by education level, splitting it into two categories, namely primary school level or less (n=65) and secondary school level or higher (n=199).

Figure 4-3: ROC curve for participants with primary or less education (N=65)



I examined SSQ-8 by education level, splitting it into two categories, namely primary school level or less (n=65) and secondary school level or higher (n=199).

I examined SSQ-8 by education level, splitting it into two categories, namely primary school level or less (n=65) and secondary school level or higher (n=199). Figure 4-3 shows the ROC plot for participants with primary education or less, where a cut point of 6 suggests optimal performance of the scale.

Figure 4-4: ROC curve for participants with secondary or more education (N=199)

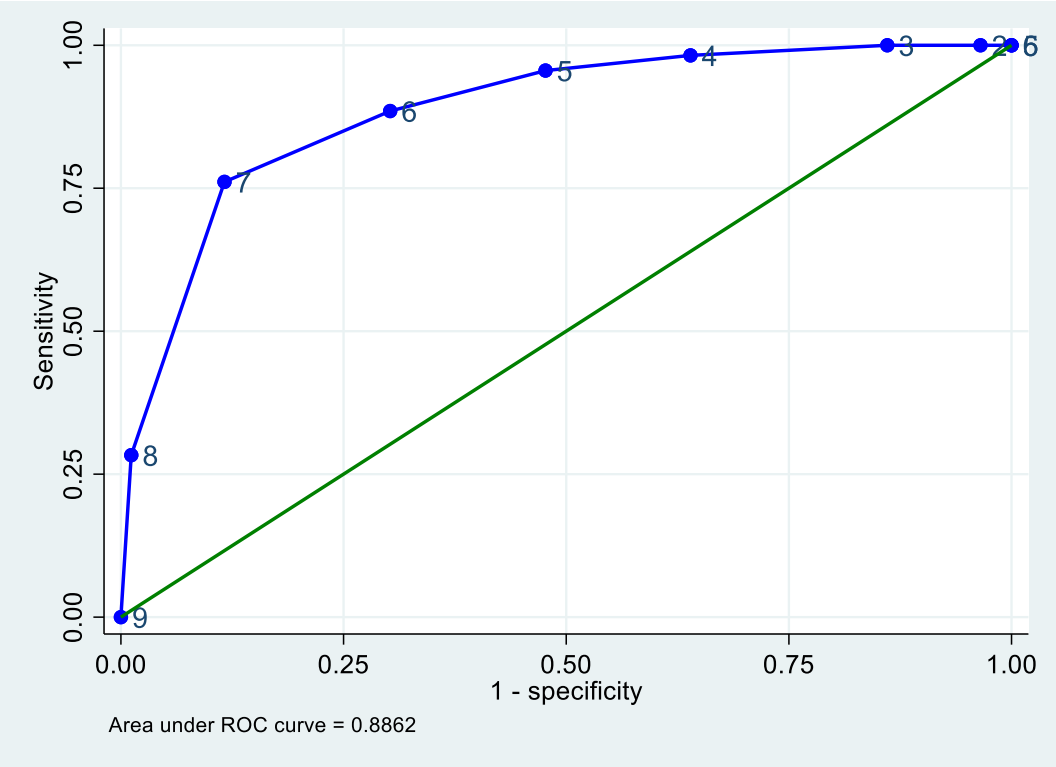


Figure 4-4 shows the ROC plot for participants with secondary education or more, where a cut point of 6 had an optimal performance.

Table 4-4: Optimal cut off point by educational status

Education level	N	Optimal cut point	CMD prevalence at cut point	PPV at cut point (95%CI)	NPV at cut point (95%CI)	Sensitivity at cut point (95%CI)	Specificity at cut point (95%CI)
Primary or less	65	6	66.2% (53.4-77.4)	88.4% (74.9-96.1)	68.2% (45.1-86.1)	84.4% (70.5-93.5)	75.0% (50.1-91.3)
Secondary or higher	199	6	63.3% (56.2-70.0)	79.4% (71.2-86.1)	82.2% (71.5-90.2)	88.5% (81.1-93.7)	69.8% (58.9-79.2)

In both education groups the optimal cut point was the same (≥6), and the prevalence of CMD was similar (66.2% vs 63.3%). The group with secondary education or above had higher sensitivity, lower PPV and higher NPV than the group with primary education or less, but the 95% confidence intervals overlapped for all these parameters. There was no evidence that the SSQ-8 performed less well among participants with less education.

Table 4-5: CMD detection by education level

Education level	N	True positive	False negative	False positive	True negative
Primary or less	65	38 (58.5%)	7 (10.8%)	5 (7.7%)	15 (23.1%)
Secondary or higher	199	100 (50.3%)	13 (6.5%)	26 (13.1%)	60 (30.2%)

As shown in Table 4-5, there was little difference between the proportion of participants that were correctly classified (true positive plus true negative) by education level; 81.6% among those with primary education or less compared to

80.5% among those with secondary education or higher. This was additional evidence that education level did not affect the performance of the SSQ-8.

4.5.5 Performance of the SSQ-8 by HIV status

Among the 165 participants who were HIV-positive, the optimal cut-off remained at ≥6 (Figure 4-5). The AUC was 89% (95% CI: 83%–93%). The prevalence of symptomatic CMD with this cut-off was 72% among people with HIV. Sensitivity was 91% (95% CI: 84%–96%), specificity was 71% (95% CI: 56%–83%), the PPV was 87% (95% CI: 80%–93%) and NPV was 78% (95% CI: 64%–89%).

Among the 72 HIV-negative participants, the optimal cut-off on the ROC curve was ≥6 (Figure 4-6) with an AUC of 86% (95% CI: 76%–93%). Using this cut-off identified 53% of the HIV-negative participants as being at risk of CMD. Sensitivity at this cut point was 83% (95% CI; 65%–94%), and specificity was 69% (95% CI; 53%–82%), while the PPV was 66% (95% CI; 40%–80%) and NPV was 85% (95% CI; 69%–95%).

Figure 4-5: ROC plot for the living with HIV

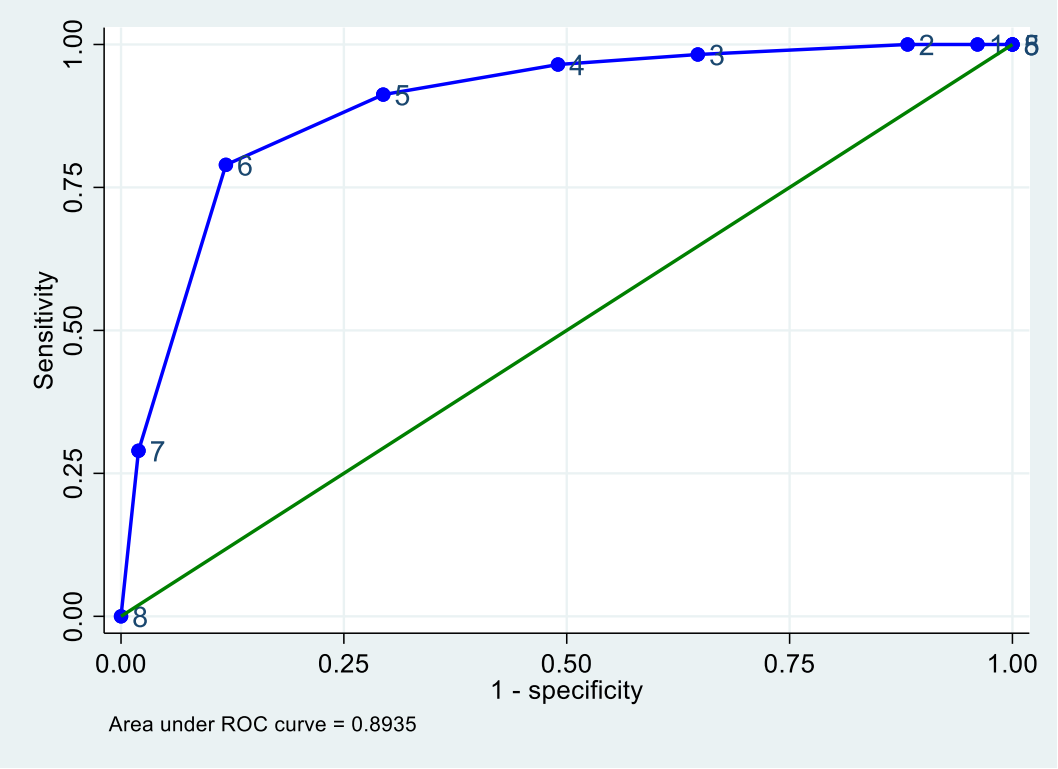


Figure 4-5 shows the ROC plot for the sample living with HIV. The green line is the line of no discrimination, showing that on that line, the probability of getting a correct result is 50:50. The curved line is the ROC curve, which indicates increasingly better performance moving to the upper left corner, which represents perfect performance. In the sample living with HIV, a cut point of 6 also has a better performance.

Figure 4-6: ROC curve for the HIV-negative sample

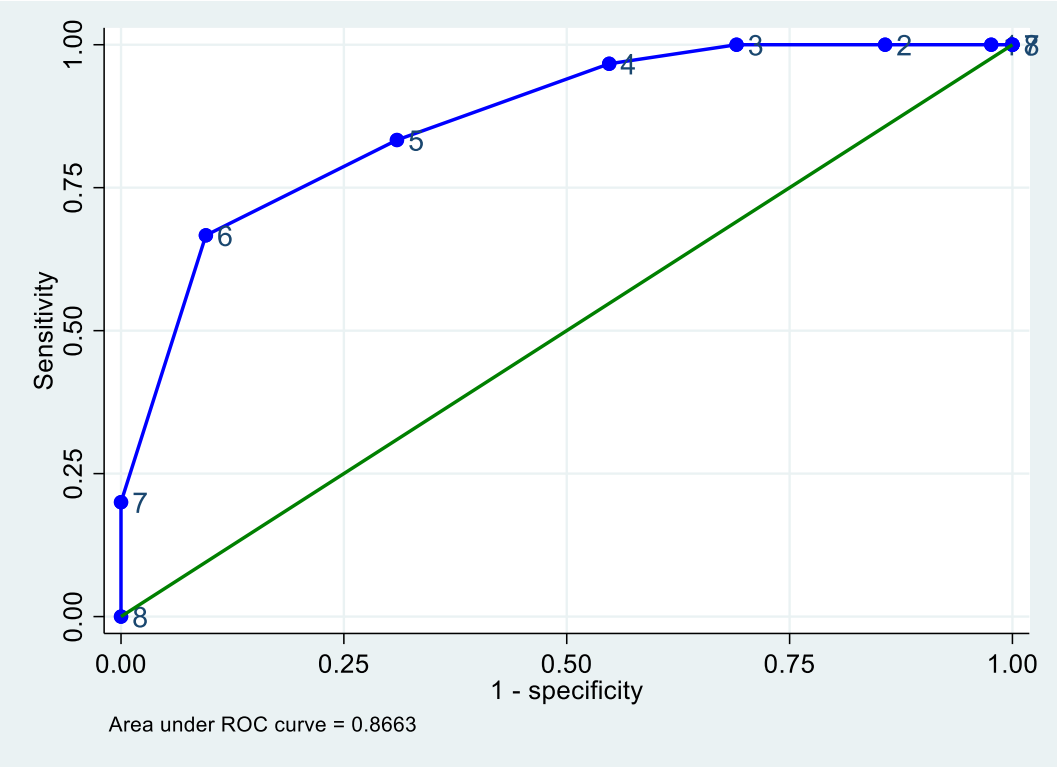


Figure 4-6 shows the ROC plot for the HIV-negative sample. In the HIV-negative sample, a cut point of 6 also has a better performance.

4.5.6 Comparison of the SSQ-8 and SSQ-14

Table 4-6: Comparison of the performance of SSQ-8 vs SSQ-14

	SSQ-14: cut point ≥9 (62)			**SSQ-8: cut point ≥6**		
ROC curve	0.86 (95% CI: 0.81–0.90)			0.88 (95% CI: 0.83–0.92)		
Cronbach's alpha	0.74			0.68		
	All (N=264)	HIV +ve (N=165)	HIV -ve (N=72)	All (N=264)	HIV +ve (N=165)	HIV -ve (N=72)
Sensitivity	84% (78–89)	88% (80–93)	77% (58–90)	87% (81–92)	91% (84–96)	83% (65–94)
Specificity	73% (63–81)	76% (63–87)	67% (50–80)	70% (61–79)	71% (56–83)	69% (53–82)
PPV	82% (75–88)	89% (82–94)	62% (45–76)	82% (75–87)	87% (80–93)	66% (49–80)
NPV	75% (66–83)	74% (60–85)	80% (63–92)	79% (69–87)	78% (64–89)	85% (69–95)

The performance of the SSQ-8 suggested that it had similar validity to the SSQ-14 (see Table 4-6). The optimal cut-off for the SSQ-8 was ≥6, with that of the SSQ-14 being ≥9. Regarding the timing of the administration of the tools, the SSQ-8 takes three minutes, including scoring, with the SSQ-14 taking 5 minutes. Table 4-6 compares the results of both tools and demonstrates the similarities and differences. The SSQ-8 had fair internal consistency, which was slightly lower than that of the SSQ-14, with overlapping confidence intervals. For both those living with HIV and those without HIV, sensitivity and specificity were similar, and the confidence intervals overlapped. The PPV for both was identical (82%), with the two versions being very similar for people living with HIV and the negative population. The prevalence of symptomatic CMD identified by the SSQ-8 was slightly higher than that of the SSQ-14 in both those living with HIV and HIV-negative participants (prevalence SSQ-8: living

with HIV 72%, HIV-negative 53%; prevalence SSQ-14: living with HIV 68%, HIV-negative 51%).

4.6 Discussion

Mental health conditions such as CMD are poorly recognised in LMICs, despite their high prevalence, in part because of the poor availability of user-friendly, culturally appropriate, validated screening tools for CMD and other mental health attributes (71). This study was conducted to validate a shorter and more user-friendly CMD screening tool that can be used by lay health workers.

This study validated the performance of the SSQ-8, comparing it to the gold standard SCID diagnosis of depression and/or anxiety in a population with high HIV prevalence. I found that the SSQ-8 had a fair internal consistency and good performance characteristics for symptomatic CMD detection. To ensure that the SSQ-8 correctly identifies all those who are likely to have CMD, priority should be given to the sensitivity of the test, as the sensitivity reflects how well the test detects disease in all who truly have the condition (209). With similarity in the performance of the two tools (SSQ-8 and SSQ-14), this evaluation suggests that the SSQ-8 is a sufficiently sensitive tool and one which is less time-consuming to administer and can be adapted for screening CMD.

The prevalence of HIV is high in sub-Saharan Africa despite the increase in the decentralised and scaled-up provision of antiretroviral therapy. In this study, the prevalence of symptomatic CMD identified by the SSQ-8 was higher in PLWH than among HIV-negative participants. This finding is supported by research that has shown that mental health conditions such as depression are common comorbidities in PLWH (72,130,210). Of the six questions from the SSQ-14 excluded in the SSQ-8, one is a somatic symptom (stomach aches), and one is a perceptual symptom (nightmares) that are typically associated with chronic medical conditions, particularly with antiretroviral therapy (192). The evidence of this study did not support the conclusion that removing these two symptoms improved the scale by reducing the

number of false positive classifications in the SSQ-8 as compared with the SSQ-14. The PPV remained the same in SSQ-8 as in SSQ-14.

With limited capacity in terms of professional mental health assessors, LMICs have filled the mental health gap by training lay health workers in the screening and identification of individuals at risk for various mental health conditions. A strength of this study is that it was conducted in a large urban clinic, representing real-life use. This study validated a tool for use at the grassroots level that is short and has acceptable psychometric characteristics that are precise in its identification of individuals at risk of CMD. It is also useful for inclusion in research instruments used to assess a lot of indicators within a limited time frame.

The study was carried out in only one urban community, but the prevalence of symptomatic CMD may differ in diverse settings; for example, the prevalence may be different in rural areas. The SSQ was developed specifically for a Shona-speaking population and has not been validated in languages besides Shona and English, and thus it might not be culturally sensitive enough to capture the CMD in other cultural settings. Further validations in more diverse populations and different languages would help to strengthen the generalisability of the tool.

This study showed that the SSQ-8 had acceptable psychometric characteristics to screen for CMD symptoms. Still, there is a need for future studies to assess the effectiveness and utility of the SSQ-8 as a screening measure that can be integrated into routine practice. The high prevalence of symptomatic CMD, as identified by the SSQ-8, indicates an urgent need to develop a national or regional healthcare policy for promoting increased screening, diagnosis, and treatment of CMD. Integrating mental healthcare services into primary healthcare and community-/home-based care should be the focus of future health policies in Zimbabwe. All lay health workers in the health system need to be empowered to improve their capacity for the proactive identification of poor mental health among their clients. However, when considering introducing mental health screening as part of routine care, it is essential to note that a screening tool alone may have little to no impact on detecting, treating, and improving mental health outcomes for people with depression (211). In resource-

limited settings like Zimbabwe, where healthcare workers are limited and overstretched due to workload, the practicality of them using screening tools to detect symptoms of mental health conditions is very unlikely. Clinicians are aware that screening tools may not necessarily identify those with the proper diagnosis; they are rather inclined to direct their limited time on those with a known condition (211). Whilst this seems like its undermining the importance of mental health conditions, practical ways of screening and identifying those with mental health conditions, such as the use of lay health workers, can be adopted, and this need to be integrated as part of the routine care pathway. However, the practicality of addressing mental health conditions goes beyond just screening. As shown in Chapter 2, several socioeconomic risk factors and life events may hinder effective psychotherapy interventions. There is a need to prioritise comprehensive mental health treatment interventions that screen for individuals at risk and provide the appropriate resources. These interventions should address the current mental health risk factors, strengthen community support, and build resilience and coping strategies in mothers living with HIV. A cross-sectional study conducted in Kenya assessing the prevalence, risk and protective indicators of CMD among young people (both living with HIV and HIV negative) identified the need to prioritise routine screening of CMDs as part of routine care but also noted that this, coupled with community level programmes strengthening social capital may help improve mental health outcomes (212).

The original study methods were sound; validation was conducted against the gold standard and a large sample. Therefore, this study maximises secondary analysis utilising an existing dataset (213,214). In addition, using the same dataset allows for a direct comparison of the performance of the SSQ-8 with the SSQ-14 using data collected independently of this study, thereby reducing various types of bias, such as the influence of the diagnostic process and independent classification errors.

A limitation of this study is that the SSQ-8 data had been pre-collected, so I had no control over the sample size, the sample selection and any data that might have been inaccurate or misclassified. In order to validate that an instrument does in fact measure specific constructs, one would need to test it for confirmatory factor analysis. This study did not examine the construct validity of SSQ-8, and none of the previous

validation studies of SSQ-14 investigated this. When the SSQ-14 was created by Patel et al they used stepwise logistic regression and discriminant analysis to determine the items that were predictive of case membership (199). Future research should include confirmatory factor analysis of the SSQ-8 and SSQ-14 to determine the construct validity of both tools. With only 65 mothers categorised as “primary school or less”, I had limited power to identify differences due to education levels. As with other studies (215), I was limited to using the variables recorded and included in the SSQ-14 dataset. Extracting the SSQ-8 from the SSQ-14 is not the same as when the scale is administered as a stand-alone 8-item scale. The responses to the SSQ-8 items may be affected by the preceding SSQ-14 questions, and so may provide a more favourable assessment of the performance of the shorter scale than would be found if it was used as a stand-alone scale. In addition, the dataset was limited to a population with high HIV prevalence. Thus the validation of the SSQ-8 was not explicitly designed for the same purpose, as its focus was primarily on mothers living with HIV with children.

4.7 Conclusion

In a setting where lay healthcare workers have many responsibilities to fulfil during their community work, it will be helpful to use shortened screening tools to detect symptoms of mental health conditions. The SSQ-8 performed as well as the SSQ-14 in identifying common mental disorders in this population, thus making the SSQ-8 a validated screening test with good psychometric properties for identifying research participants at risk of CMD. The SSQ-8 was appropriate for use in the CHIDO trial as it is a valid tool and a shorter screening tool that is appropriate when collecting data for trials and interventions. In addition, it is a screening tool that future interventions could use.

5 Chapter 5: The burden of poor maternal mental health and associated risk factors in postpartum women living with HIV

5.1 Background

Good mental health is an integral part of global health status. It is increasingly seen as central to achieving the Sustainable Development Goals (SDGs), where it has been included under SDG 3 (216). Mental health challenges contribute significantly to the global burden of disease, particularly depression and anxiety, burdening individuals, families and society (217). The burden of HIV and mental health conditions has been described in Chapter 2, and in this chapter, I will give a brief overview of how those living with HIV are at risk of long-term mental health conditions if untreated.

PLWH have an increased risk of chronic complications and comorbidities, such as non-communicable diseases and mental health conditions (218). In addition to social adversity and stigma, they encounter various symptoms such as pain, fatigue and insomnia that may contribute to the increased risk of mental health distress (219,220). When treating people living with HIV, healthcare providers frequently concentrate on the virological and immunological symptoms and pay less attention to the physical symptoms, such as pain and fatigue and the side effects of medication that can trigger mental health conditions, including anxiety and depression. Most studies in sub-Saharan Africa show a high prevalence of mental health conditions, which range between 11% and 38% in HIV-affected populations (125,221) and even close to 50% in young people living with HIV (212,222). The literature also shows that people with pre-existing mental health problems are at elevated risk of contracting HIV (223–225). Despite the substantial prevalence of depression and anxiety symptoms in the HIV-affected population, little evidence exists of HIV treatment centres screening for mental health problems (116).

Pregnant women and mothers face various challenges that affect their mental health and well-being. This is particularly true for women in limited-resource settings, such as Lesotho and Zimbabwe (73,84,226,227). They face high rates of HIV infection and gender-based violence, and they are limited to poor education and exposed to poverty, on top of their daily responsibilities and challenges of being mothers (228,229). Mothers living with HIV often struggle to cope with these intersecting factors, putting them at increased risk of developing common mental disorders. Reproductive-aged women account for the largest population affected by depression (230,231), with depression affecting close to 11%–18% of pregnant women or in the postpartum period (232).

Maternal mental health conditions, including depression and stress, which are common in women living with HIV, can disable maternal functioning, consequently affecting the health and development of their infants (233). HIV also reduces the potential for optimal parental care (234). Untreated depression or anxiety can result in an increased risk of complications during and post pregnancy, including pre-term birth, low birth weight, infant neurodevelopmental challenges, somatic symptoms and low rates of breastfeeding (19,235). Despite the evidence of the need for measures to address poor maternal mental health, research shows that in low- and middle-income countries (LMICs), maternal mental health is still neglected (90,236). There is a high prevalence of CMD in women living with HIV, especially those in limited-resource settings, such as rural areas (15,233,237).

5.2 The rationale of the study

Despite evidence of maternal mental health problems in LMICs, these challenges often remain undetected and untreated (31,191), including in Zimbabwe (33). This study sought to assess the prevalence of repeat common mental disorders in mothers living with HIV with infants residing in two rural districts in Zimbabwe and the factors associated with the high burden of poor mental health. The data were collected as part of the CHIDO trial (explained in detail in Chapter 1), which provides an unparalleled opportunity to study maternal mental health, namely common mental disorder

outcomes (measured using the eight-item Shona Symptom Questionnaire) and parenting stress (measured using the Parenting Stress Index – Short Form (PSI-SF)). My PhD includes a secondary analysis of the CHIDO trial dataset with a particular focus on CMD and parenting stress data, with other measures such as socio-demographic measures, parenting sense of competence, parental discipline, quality of life and relationship quality.

5.3 Study aims

This study sought to address the following questions:

i) What is the prevalence of repeat common mental disorders symptoms and parenting stress symptoms in mothers living with HIV?
ii) What factors are associated with repeat common mental disorders symptoms and parenting stress symptoms in mothers living with HIV?
iii) How are repeat common mental disorders symptoms and parenting stress symptoms associated with the parenting behaviour and livelihoods of mothers living with HIV?

5.4 Study hypotheses

- We hypothesised that mothers with repeat CMD symptoms will have raised parenting stress symptoms and a lower parenting sense of competence.
- We hypothesised that mothers with high levels of parenting stress symptoms will have compromised parenting behaviour as evidenced by i) negative discipline (having shouted, shaken or slapped their infant), ii) low parenting sense of competence and iii) low resilience for adverse events
- We hypothesised that high parenting stress might confound the association between CMD symptoms and harsh discipline
- We hypothesised that mothers with repeat CMD symptoms have a poor quality of life namely food insecurity, poor intimate partner relationships, physical pain and mobility.

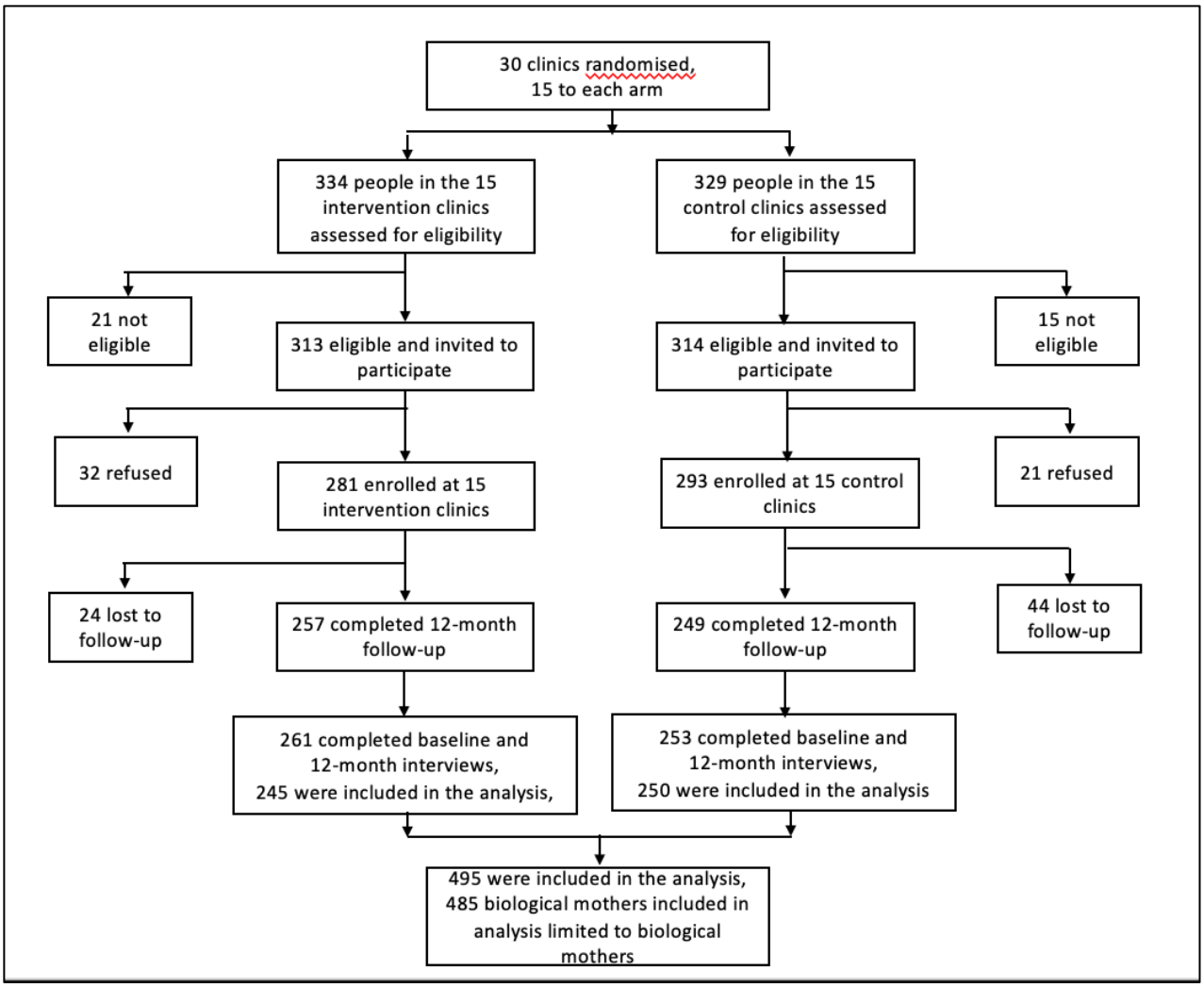
5.5 Methods

This chapter is a secondary analysis of the quantitative data collected at baseline and 12 months follow-up as part of the CHIDO trial data detailed in Chapter 1. The trial showed no effect of the CHIDO intervention on primary or secondary outcomes, including the mental health of the mothers (5). Maternal mental health data has therefore been pooled across the two arms of the trial for this secondary analysis.

5.5.1 Sample selection

Mother-dyads comprising of HIV exposed infants were recruited and enrolled from 30 clinics in two rural districts in Mashonaland East Province and randomly allocated into two arms: the CHIDO intervention or the Ministry of Health and Child Care standard of care. Participants were assessed at baseline and after 12 months of follow up. From the 574 trial participants, this analysis was confined to 495 primary mothers (485 biological and 10 non-biological) who participated in both the baseline and 12-month follow-up assessment (see **Error! Reference source not found.**).

Figure 5-1: CHIDO trial flow diagram highlighting participant recruitment and enrolment



5.5.2 Data collection tools

The analysis is based on data collected using screening tools administered at enrolment to the trial. A few tools were only administered at the 12-month follow-up. Each variable is described in detail below, and it is indicated whether the variable was only collected at follow-up. For variables only included at the 12-month follow-up, those were used in the analysis. Below, I will give a detailed summary of the outcomes assessed and the tools used in this analysis. Appendix 1 shows the CHIDO tool used at the 12-month follow-up.

5.5.2.1 Main outcomes

Repeat common mental disorders (eight-item Shona Symptom Questionnaire)

In an attempt to reduce the gap in the mental health treatment and care (50), there has been a shift towards decentralisation of mental health services, not only to the primary healthcare level but also to the community level. Lay health workers can provide mental health screening services (238) or even an advanced-level combination of screening and treatment interventions and rehabilitation practices (239,240). To ensure that screening tools and treatment interventions are appropriate, there is a need for them to be suitable for the relevant language and cultural norms and values (49,240,241). More recently, Chibanda et al. revalidated the SSQ-14 in a high-HIV-prevalence population to see how the tool performed in screening for CMD (62). A shorter version, the SSQ-8, was then validated in the same high-HIV-prevalence population (Chapter 4).

The SSQ-8 uses binary responses ('yes' and 'no') with scores ranging from 0 to 8, and a score of ≥6 indicates a risk of CMD. The CHIDO study screened mothers living with HIV for CMD at baseline and 12-month follow-up. At baseline, a six-item response range ('always', 'very often', 'quite often', 'sometimes', 'rarely' and 'never') was used, and this was then rectified to the binary responses for the 12-month follow-up. The baseline responses were recoded into 'yes' and 'no', with the responses from 'rarely' to 'always' being recorded as a 'yes' response and those with never recoded to 'no' answers.

For this analysis, mothers who screened positive on the SSQ-8 (≥6) at both baseline and 12-month follow-up were classified as having repeat CMD. Some mothers screened as at risk of CMD at baseline only, or endline only, and were classified as being at risk of CMD at one timepoint. Other mothers were not positive for CMD at either baseline or endline and were classified as not having CMD.

The Parenting Stress Index – Short Form (PSI-SF)

The PSI-SF is a screening tool developed by Abidin in 1995 in the United States of America (242). It is used for identifying different types of stress associated with parenting. It is based on the underlying assumption that parenting stress has multidimensional contributors such as child characteristics, parent characteristics, family context and life stress events (242). The tool is divided into three primary

subscales: difficult child temperament, dysfunctional parent–child interaction and parental distress. The difficult child temperament subscale indicates how easy or difficult the parent perceives her child to be, with high scores possibly showing problems with gaining the child's cooperation or managing the child's behaviour (243). The parental distress subscale seeks to examine to what extent the mother is experiencing stress in her role as a parent while considering the environmental stressors associated with her life, social support, intimate partner relationship quality and depression (243). Lastly, the dysfunctional parent–child interaction scores indicate the extent to which the parent finds her interaction with her child satisfying. The high scores indicate that the mother sees her child as a disappointment and as failing to meet her expectations, possibly resulting in the mother feeling like there is no strong bond between her and her child (243).

Each PSI-SF item is measured on a five-point Likert scale from 'strongly agree' to 'strongly disagree'. The PSI-SF can yield a total stress score and scores on three subscales. The respondent's raw scores are converted into percentile scores. High-stress scores are at or above the 85th percentile, while low-stress scores are below the 15th percentile (242). This scale has been validated for use in different setting (58,244–246), but to the best of my knowledge, no validation has been conducted in Africa.

5.5.2.2 Parenting variables

Three key parenting variables were further analysed for association with repeat common mental disorders and stress. These outcomes are parenting sense of competence, postpartum bonding and discipline.

The **Parenting Sense of Competence (PSOC) scale** is a measure introduced by Gibaud-Wallston and Wandersman, that is frequently used to assess parents' assessment of their parenting ability as a function of parenting satisfaction and self-efficacy (247,248). It has been validated in different populations, including Chinese and Portuguese mothers, but not in Zimbabwe (247). The CHIDO trial had a long data collection tool, and as a result, only eight questions were extracted from the 16-item PSOC scale. These questions were on being frustrated with the child, feeling like one

has not accomplished anything, grandparents being better prepared for parenting than the mothers themselves, satisfying personal parenting expectations, talent and skills in parenting, and feeling anxious and tense about parenting. Each item was rated on a six-point Likert scale from ‘strongly disagree’ (one point) to ‘strongly agree’ (six points), with five of the questions being reverse coded. Higher scores indicate a more heightened parenting sense of competence.

Postpartum bonding was measured using four of the 25 items in the Postpartum Bonding Questionnaire developed and validated for use by Brockington, Fraser and Wilson (249,250). The tool assessed signs of a disturbed mother–infant relationship. The four items from the scale considered whether the mother felt close to her baby, whether she regretted having the baby, whether she wished for the old days before she had the baby and whether she believed her baby was the most beautiful in the world. The questions were scored on a six-item Likert scale, with two items being scored from 0 to 5 and the other two being reverse-scored. The higher the score, the more suggestive it is of a poor mother–infant relationship.

Harsh discipline was assessed at 12 months follow-up, using eight questions derived from the Conflict Tactics Scale for Parent and Child (CTSPC). The CTSPC was developed by Straus et al. to measure the methods used by parents when they experience conflict with their children (251). The questions selected covered explaining to the child what they have done wrong, shaking the child, shouting at the child, hitting the child on the bottom, slapping the child, taking away privileges, threatening to spank the child but not doing so, and substituting an inappropriate activity with a positive one. Responses measured severity and ranged from this never having happened before to happening more than 20 times in the past year and were rated from one to seven. In this case, high scores indicate the use of corporal or physical punishment, which can be interchangeably referred to as negative discipline. For this study, five variables were assessed, focusing on the use of negative discipline to assess whether there is an association between negative discipline and repeat common mental disorders and stress. The baseline questionnaire did not include these questions, so the analysis is based on follow-up data.

5.5.2.3 Social interaction variables

Maternal social support was assessed using four questions (on lack of family support, low friendship network, lack of help from partner and conflict with partner) extracted from the Maternal Social Support Index (MSSI), developed by Pascoe et al. (1981) to identify a mother's self-identified support system and her satisfaction with that social support (252). It is a 21-item questionnaire that evaluates the mother's perception of daily task-sharing among family members, satisfaction with relationships, availability of emergency help and degree of community involvement.

Intimate partner relationship: The relationship quality with the intimate partner was also measured using the Relationship Assessment Scale (253), a seven-item scale scored on a five-point Likert scale. The higher the score, the more satisfied the respondent is with their relationship. However, the Relationship Assessment Scale was not included in the baseline assessment; thus analysis is based on follow-up data.

Intimate partner violence: The Hurt, Insulted, Threatened with Harm and Screamed (HITS) scale, developed by Sherin et al. (254) was another measure used to assess the quality of the relationship with the intimate partner, focusing on measuring any level of self-reported domestic violence within the household. This is a four-item scale asking whether the partner physically, verbally, or emotionally hurt them. It is scored on a five-point Likert scale with responses ranging from 'never' to 'frequently'. The range of scores is 4–20. A score greater than 10 signifies that someone is at risk of domestic violence abuse. The HITS was not included at baseline; thus, analysis is based on follow-up data.

5.5.2.4 Health variables

Health-related quality of life (EQ-5D) was assessed, with participants being asked to evaluate the quality of their mobility, ability to self-care, level of pain and any experience of anxiety and depression. This tool has been validated for use in Zimbabwe (255), and it uses a three-point scale with the responses 'mild', 'moderate' and 'extreme'. There were very few 'extreme' responses; thus, responses were recoded with 'moderate' and 'extreme' grouped together. This secondary analysis

sought to assess an association between having repeat common mental disorders and health-related quality of life. Other health-related variables considered were the child's HIV status and the viral load at the 12-month follow-up of the mothers.

Resilience in the mothers was measured using the Brief Resilience Scale (BRS), a six-item scale with each item rated using a five-point Likert scale from strongly disagree to strongly agree. The BRS was developed by Smith et al. (2008) to measure one's ability to bounce back in the face of adversity (256). The responses range from 'strongly disagree' to 'strongly agree', with the total scores in the range of 6–30. The lower the score, the higher the resilience and the mother's ability to bounce back from stress. This scale was not included during the CHIDO trial baseline data collection but was then added for collection at 12 months follow-up and used in the analysis.

5.5.2.5 Socio-demographic variables

Socio-demographic information was collected on participant characteristics (age, marital status) and socio-economic factors (educational level, employment status, asset index score and the number of adults living in the household) using interviewer-administered questionnaires.

5.5.3 Statistical analysis

In this chapter analysis was run using baseline variables when possible but not when variables were only measured at follow-up (i.e. Relationship Assessment Scale, Brief Resilience Scale, HITS scale and items from the Conflict Tactics Scale for Parent and Child). Univariate multilevel ordinal logistic regression was used to test for association of the variables listed below with CMD, with a random effect for the trial cluster:

- socio-demographic characteristics (age of mother, age of child, level of education, marital status, employment status, number of children under 18 in the household, number of adults in the household)
- economic stability (socio-economic status and food insecurity measured using a subset of questions from the Household Food Insecurity Access Scale (257))
- social support (four items from the Maternal Social Support Index)
- relationship quality (Relationship Assessment Scale & HITS scale)

- HIV viral load

Variables that were associated with repeat CMD in the univariate analysis at $p<0.2$ were carried forward into a multilevel mixed-effects multivariable ordinal logistic regression model with a random effect for cluster, and the trial arm was included as an *a priori* variable. The variables were removed sequentially if they were not associated with the outcome in the multivariate analysis. A p-value of ≤0.05 lower was statistically significant in this analysis.

I then investigated three research questions:

1. The association of CMD (the exposure) with parenting stress
2. The association of CMD with parenting sense of competence
3. The association of CMD with harsh discipline, adjusting for parenting stress

For analysis of the parenting stress outcome, the above-listed variables were assessed for association with PSI-SF total score using univariate multilevel linear regression, with a random effect for the trial cluster. Variables that were known to be relevant to the research question and were associated with the outcome and with the exposure (CMD) were included in a multivariate multilevel linear regression model to assess the association between CMD and parenting stress. The same method was followed for the Parenting Sense of Competence score. A likelihood ratio test was used to compare the models and determine whether repeat CMD modifies the effect of trial arm on parenting stress.

The prevalence of CMD by the distribution of scores was described for each of the discipline behaviours assessed. A binary variable was created for harsh discipline, defined as more than one instance of slapping, shaking or spanking the child in the past year. Multivariate multilevel logistic regression was used to model the association between repeat CMD and harsh discipline, adjusting for confounding variables identified as described above.

Responses to each of the first four items of (mobility, self-care, ability to perform usual activities and pain/discomfort) were recategorised into ‘no problem’ and ‘any

problems'. Multivariate multilevel ordinal logistic regression was used to model the association of repeat CMD with these outcomes, adjusting for known confounders.

5.5.4 Research ethics and approval

Informed consent was obtained from mothers who met the inclusion criteria of the CHIDO trial. Those who agreed to participate in the study were enrolled after signing a consent form. The consent process included giving them general information on the study, the risks and benefits associated with the study, confidentiality, and their freedom to decline to participate in the study. Mothers who had symptoms suggestive of depression and stress were offered referrals for counselling services at their local health facilities. They were also informed that their data might be used for future analysis approved by the study's principal investigator, but their confidentiality would be maintained as no participant-identifying information would be shared.

All hard-copy data files were kept in a locked file cabinet. Electronic data files were secured by a password known only by the study team. Data files were to be kept for five years, after which they would be destroyed.

5.6 Results

5.6.1 Comparison of CMD over time

Table 5-1 shows the prevalence of symptoms of common mental disorders (CMD), identified using the eight-item Shona Symptom Questionnaire, among the 495 mothers living with HIV who took part in the CHIDO trial at both baseline and follow-up.

Table 5-1: CMD at baseline and 12-month follow-up

	Follow-up CMD symptoms	No CMD symptoms at follow-up	Total
Baseline CMD symptoms	127	70	**197**
No CMD symptoms at Baseline	96	202	**298**
Total	**223**	**272**	**495**

5.6.2 Prevalence of repeat common mental disorders and associated risk factors

Table 5-2 shows the prevalence of no CMD symptoms and CMD symptoms either once or twice. The analysis was run using baseline predictor variables, unless specified otherwise. As detailed above, some variables were only collected at 12 months follow-up and in that case, the follow-up variable was included. The prevalence of repeat CMD symptoms was 25.7% (N=127) among mothers living with HIV: 26.9% in the control arm and 24.4% in the intervention arm. Of those whose children were living with HIV (n=16), 31.3% presented with repeat CMD symptoms. Prevalence of repeat CMD was highest (31.3%) among those mothers who had older children (18–24 months).

Prevalence of repeat CMD symptoms was similar across mother's age groups but higher among mothers without a partner (36/100, 36%) compared with those with a partner (90/394, 22.8%). The prevalence of repeat CMD symptoms was higher when there were more children in the household: up to 38.5% (n=10) among the 26 mothers with 6–8 children in the household. Of the mothers in the trial at baseline, 55 reported having no affiliation to any religious group, which in Zimbabwe can be a sign of social exclusion. Of these, 25.5% (n=14) had symptoms suggestive of repeat CMD. Of mothers (n=272) at baseline who said they had no food in the house in the past four weeks, 33.1% (n=90) had repeat CMD symptoms. Similarly, of the 184 mothers that reported having slept hungry in the past four at baseline, 37% (n=68) reported

symptoms of repeat CMD. Of those mothers who screened positive for experiencing domestic violence, 48.9% (n=44) had repeat CMD symptoms.

Table 5-2: Prevalence of no CMD, single and repeat CMD by risk factor

Variable:		Total	**No CMD, N (%)**	CMD once, n (%)	Repeat CMD, n (%)
Overall		495	202 (40.8%)	166 (33.5)	127 (25.7)
Trial arm	Control	245	103 (42.0%)	73 (29.8)	69 (26.9)
	Intervention	250	96 (38.4%)	93 (37.2)	61 (24.4)
Mother's HIV viral load at follow-up	Suppressed (<1000)	422	169 (40.0%)	143 (33.9)	110 (26.1)
	Unsuppressed	58	27 (46.6%)	18 (31.0)	13 (22.4)
Child's HIV status	Positive	16	5 (31.3%)	6 (37.5)	5 (31.3)
	Negative	470	192 (40.9%)	157 (33.4)	121 (25.7)
	Unknown	9	5 (55.6%)	3 (33.3)	1 (11.1)
Age of child	0-5 months	101	39 (38.6%)	40 (39.6)	22 (21.8%)
	6-11 months	146	66 (45.2%)	39 (26.7)	41 (28.1%)
	12-17 months	132	58 (43.9%)	46 (34.9)	28 (21.2%)
	18-24 months	116	39 (33.6%)	41 (35.3)	36 (31.3%)
Sex of child	Male	244	95 (38.9%)	80 (32.8)	69 (28.3%)
	Female	251	108 (43.0%)	86 (34.3)	57 (23.1%)
Number of children living at home	1	69	25 (36.2%)	27 (39.1)	17 (24.6)
	2-3	266	122 (45.9%)	85 (32.0)	59 (22.2)
	4-5	134	46 (34.3%)	47 (35.1)	41 (30.6)
	6-8	26	9 (34.6%)	7 (26.9)	10 (38.5)
Number of adults in the household	1	73	23 (31.5%)	25 (34.3)	25 (34.3)
	2-3	369	164 (44.4%)	121 (32.8)	84 (22.8)
	4-9	49	13 (26.5%)	19 (38.8)	17 (34.7)
Age of mother	17-20	22	8 (36.4%)	8 (36.4)	6 (27.3)

	21-30	167	70 (41.9%)	60 (35.9)	37 (22.2)
	31-40	256	108 (42.2%)	78 (30.5)	70 (27.3)
	41-50	50	16 (32.0%)	20 (40.0)	14 (28.0)
Marital status	No partner	100	29 (29.0%)	35 (35.0)	36 (36.0)
	Married/sexual partner	394	173 (43.9%)	131 (33.3)	90 (22.8)
Employed	Yes	186	69 (37.1%)	63 (33.9)	54 (29.0)
	No	309	133 (43.0%)	103 (33.3)	73 (23.6)
Education	None	13	4 (30.8%)	5 (38.5)	4 (30.8)
	Primary school only	222	80 (36.0%)	77 (34.7)	65 (29.3)
	Secondary school	258	117 (45.3%)	83 (32.2)	58 (22.5)
	A level, certificate, diploma, degree	2	1 (50.0%)	1 (50.0)	0
Ever had no food in the house in past 4 weeks	Yes	272	87 (32.0%)	95 (34.9)	90 (33.1)
	No	223	115 (51.6%)	71 (31.8)	37 (16.6)
Ever went to sleep hungry in past 4 weeks	Yes	184	55 (29.9%)	61 (33.2)	68 (37.0)
	No	311	147 (47.3%)	105 (33.8)	59 (19.0)
Ever went a day without eating in past 4 weeks	Yes	128	38 (29.7%)	39 (30.5)	51 (39.8)
	No	367	164 (44.7%)	127 (34.6)	76 (20.7)
HITS domestic violence screening tool at follow-up	11+ (abuse)	90	25 (27.8%)	21 (23.3)	44 (48.9)
	4-10 (no abuse)	310	147 (47.4%)	108 (34.8)	55 (17.7)
	No partner	91	27 (29.7%)	37 (39.0)	27 (29.7)
Time since first HIV positive test	Less than 1 year	37	13 (35.1%)	18 (48.7)	6 (16.2)
	1-2 years	204	96 (47.1%)	65 (31.9)	43 (21.1)
	3-5 years	136	50 (36.8%)	37 (27.2)	49 (36.0)
	6-10 years	81	32 (39.5%)	26 (32.1)	23 (28.4)
	11+ years	26	9 (34.6%)	14 (53.9)	3 (11.5)

Religion	No religion	55	20 (36.4%)	21 (38.2)	14 (25.5)
	Catholic	32	17 (53.1%)	9 (28.1)	6 (18.8)
	Protestant	24	13 (54.2%)	7 (29.2)	4 (16.7)
	Apostolic	255	93 (36.5%)	92 (36.1)	70 (27.5)
	Pentecostal	95	43 (45.3%)	28 (29.5)	24 (25.3)
	Muslim	5	1 (20.0%)	3 (60.0)	1 (20.0)
	Other	6	2 (33.3%)	4 (66.7)	0
Mobility	No problems	384	173 (45.1%)	130 (33.9)	81 (21.1)
	Some problems	111	29 (26.1%)	36 (32.4)	46 (41.4)
	Confined to bed	0	0 (0.0%)		
Self-care	No problems	483	200 (41.4%)	162 (33.5)	121 (25.1)
	Some problem	12	2 (16.7%)	4 (33.3)	6 (50.0)
	Unable to self-care	0	0 (0.0%)		
Usual activities	No problems	428	186 (43.5%)	145 (33.9)	97 (22.7)
	Some problems	67	16 (23.9%)	21 (31.3)	30 (44.8)
	Unable to perform	0	0 (0.0%)		
Pain/ discomfort	No pain	254	127 (50.0%)	83 (32.7)	44 (17.3)
	Moderate pain	222	68 (30.6%)	76 (43.2)	78 (35.1)
	Extreme pain	19	8 (42.1%)	6 (36.8)	5 (26.3)
Anxiety/ depression	Not anxious or depressed	123	82 (66.7%)	31 (25.2)	10 (8.1)
	Moderately anxious or depressed	188	85 (45.2%)	65 (34.6)	38 (20.2)
	Extremely anxious or depressed	184	35 (19.0%)	70 (38.0)	79 (42.9)

Mothers with symptoms suggestive of CMD reported having poor-quality relationships measured by several variables. The mothers were less resilient with CMD symptoms (once or repeat) as they had a lower mean (SD) score ((3.17 (0.65) and 2.96 (0.73) respectively) on the Brief Resilience Scale, as compared to those with no symptoms suggestive of CMD (3.32; (0.57) – see Table 5-3. This difference was statistically significant ($p<0.001$). Similarly, they had a lower mean relationship assessment score (mean (SD) 19.8; 7.2) – as well as a lower sense of parenting competence, low sense of maternal social support and low levels of postpartum bonding, all of which are associated with CMD symptoms at a statistically significant level ($p<0.001$). Note that the Maternal Social Support Index and Postpartum Bonding Questionnaire are negatively scored. In the Maternal Social Support Index, a higher number indicates less social support. In the Postpartum Bonding Questionnaire, a higher number indicates less bonding.

Table 5-3: Relationship Variables and CMD (Mean & SD), with results of univariate regression analysis

Variable	repeat CMD		CMD once		No CMD		beta (95% CI)	p-value
	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)		
Brief resilience scale at follow-up (range 1-5)	127	2.96 (0.73)	166	3.17 (0.65)	202	3.32 (0.57)	-0.18 (-0.25, -0.11)	<0.001
Relationship assessment scale at follow-up (range 7-35)	105	19.8 (7.2)	142	22.5 (8.1)	184	24.1 (8.0)	-2.12 (-3.06, -1.19)	<0.001
Maternal social support (range 1-5)	124	3.29 (0.78)	162	3.19 (0.84)	200	2.95 (0.81)	0.18 (0.09, 0.27)	<0.001
Parenting sense of competence (range 1.63-5)	124	2.84 (0.50)	162	3.13 (0.54)	199	3.34 (0.46)	-0.24 (-0.30, -0.19)	<0.001
Postpartum bonding (range 0-3.75 (0-5)	124	1.76 (0.94)	162	1.19 (0.84)	200	0.88 (0.77)	0.43 (0.34, 0.52)	<0.001

Table 5-4: Multivariate Analysis of CMD risk factors using ordinal logistic regression

Variables: *Measured at baseline unless specified	**N**	**Univariate**		**Multivariate 1 (N=475)**		**Multivariate 2 (N=393)**	
		OR (95% CI)	**p**	**OR (95% CI)**	**p**	**OR (95% CI)**	**p**
HIV viral load	Suppressed (<1000)	1	0.33				
	Unsuppressed	0.77 (0.46, 1.30)					
Age of child at baseline	0-5 months	1	0.23				
	6-11 months	0.97 (0.60, 1.56)					
	12-17 months	0.86 (0.53, 1.39)					
	18-24 months	1.39 (0.85, 2.90)					
Number of children living at home	1	1	0.06				
	2-3	0.75 (0.46, 1.22)					
	4-5	1.21 (0.71, 2.07)					
	6-8	1.37 (0.58, 3.26)					
Number of adults in the household	1	1.68 (1.05, 2.69)	**0.031**	2.01 (1.03, 3.93)	0.041		
	More than 1	1		1			
Age of mother	17-20	0.90 (0.36, 2.27)	0.65				
	21-30	0.70 (0.39, 1.25)					

Variables: *Measured at baseline unless specified	N	Univariate		Multivariate 1 (N=475)		Multivariate 2 (N=393)	
		OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
	31-40	0.78 (0.45, 1.36)					
	41-max	1					
Domestic violence at follow-up	Yes	3.52 (2.20, 5.64)	<0.001	3.12 (1.71, 5.70)	<0.001	1.85 (0.94, 3.64)	0.075
	No	1		1		1	
	No partner	1.99 (1.28, 3.09)	0.002	1.15 (0.60, 2.19)	0.68	-	
Education	None	1.66 (0.59, 4.64)					
	Primary school only	1.46 (1.04, 2.05)					
	Secondary school or more	1	0.07				
Food insecurity	Insecure	2.53 (1.78, 3.58)	<0.001	2.23 (1.32, 3.78)	0.003	2.44 (1.35, 4.41)	0.003
	Secure	1		1		1	
Employed	No	1					
	Yes	1.26 (0.89, 1.81)	0.19				
Time since first HIV positive test	0-2 years	1	0.05	1	0.084		
	3-5 years	1.74 (1.16, 2.61)		1.85 (1.05, 3.25)			
	6-10 years	1.41 (0.87, 2.28)		1.37 (0.71, 2.63)			

Variables: *Measured at baseline unless specified	N	Univariate		Multivariate 1 (N=475)		Multivariate 2 (N=393)	
		OR (95% CI)	p	OR (95% CI)	p	OR (95% CI)	p
	11+ years	1.13 (0.55, 2.33)		0.37 (0.07, 2.09)			
Trial arm	Control	1					
	Intervention	1.10 (0.75, 1.63)	0.63				
Mobility	No problems	1	<0.001	1		1	
	Some problems	3.99 (2.60, 6.11)		2.71 (1.55, 4.72)	<0.001	2.28 (1.20, 4.31)	0.011
Self-care	No problems	1	0.039				
	Some problem	3.18 (1.06, 9.55)					
Usual activities	No problems	1	<0.001				
	Some problems	2.95 (1.76, 4.93)					
Pain/discomfort	None	1	<0.001	1	0.015	1	0.037
	Moderate	2459 (1.72, 3.47)		1.99 (1.18, 3.34)		1.90 (1.06, 3.41)	
	Extreme	1.61 (0.67, 3.87)		0.68 (0.19, 2.43)		0.61 (0.14, 2.60)	
Brief resilience scale at follow-up		0.54 (0.42, 0.70)	<0.001	0.61 (0.42, 0.89)	0.010	0.70 (0.46, 1.06)	0.090
Relationship assessment scale at follow-up (N=431)		0.95 (0.93, 0.97)	<0.001			0.92 (0.87, 0.97)	0.004

Variables: *Measured at baseline unless specified	**N**	**Univariate**		**Multivariate 1 (N=475)**		**Multivariate 2 (N=393)**	
		OR (95% CI)	**p**	**OR (95% CI)**	**p**	**OR (95% CI)**	**p**
Maternal social support		1.48 (1.20, 1.82)	<0.001			1.36 (0.96, 1.94)	0.083
Postpartum bonding	<1	1		1		1	
	1-5	2.75 (1.94, 3.90)	<0.001	3.13 (1.78, 5.52)	<0.001	3.18 (1.72, 5.89)	<0.001

Table 5-4 shows the results of an exploratory multilevel ordinal logistic regression of CMD symptom risk factors. I identified potential confounding variables and included these in the analysis. The univariate analysis showed that the number of adults in the household, being exposed to domestic violence, food insecurity, time since first HIV-positive test, mobility, pain and discomfort, and postpartum bonding were all associated with repeat CMD symptoms. In the multivariable Model 1, CMD symptoms remained associated with being exposed to domestic violence, as shown by the statistically significant ($p<0.001$) adjusted odds ratio of 3.12 (95% CI: 1.71, 5.70). Similarly, food insecurity in a household was associated with repeat CMD (OR=2.23 (1.32, 3.78) p=0.003). Other risk factors associated with CMD symptoms included mobility problems (aOR=2.71 (1.55, 4.72) $p<0.001$), increased pain and discomfort (aOR=1.61 (0.19, 2.43) p=0.015), low resilience (aOR=0.61 (0.42, 0.89) p=<0.010) and low postpartum bonding (aOR=3.13 (1.78, 5.52) $p<0.001$).

Model 2 includes only the 393 women who were in a relationship and hence were asked additional questions. In this model, CMD symptoms were independently associated with lack of postpartum bonding (aOR=3.18 (95% CI: 1.72, 65.89) $p<0.001$), lower relationship quality (aOR=0.92 (0.87, 0.97) p=<0.004) and food insecurity (aOR=2.44 (1.35, 4.41) p-0.003). They were also weakly associated with domestic violence, mobility, and pain and discomfort.

5.6.3 Association of parenting stress with CMD

Table 5-5: Parenting stress at baseline and repeat CMD symptom

Variables		N	No repeat CMD n (%)	CMD once	repeat CMD n (%)	Beta coefficient (95% CI), p-value
PSI-SF parental distress	<=80%	234	144 (61.5)	69 (29.5)	21 (9.0)	4.7 (4.1-5.4), p<0.001
	81-<90%	92	30 (32.6)	43 (46.7)	19 (20.7)	
	90-100%	161	26 (16.2)	49 (30.4)	86 (53.4)	
	Mean (SD)	487	28.1 (5.8)	32.9 (6.4)	37.6 (6.8)	
PSI-SF difficult child	<=80%	342	169 (49.4)	115 (33.6)	58 (17.0)	2.8 (2.2, 3.5), p<0.001
	81-<90%	75	21 (28.0)	22 (29.3)	32 (42.7)	
	90-100%	68	9 (13.2)	24 (35.3)	35 (41.5)	
	Mean (SD)		26.2 (5.3)	28.1 (6.6)	32.0 (6.6)	
PSI-SF parent-child interaction	<=80%	270	124 (45.9)	98 (36.3)	48 (17.8)	1.8 (1.1-2.4), p<0.001
	81-<90%	25	10 (40.0)	9 (36.0)	6 (24.0)	
	90-100%	191	66 (34.6)	55 (28.8)	70 (36.7)	
	Mean (SD)	486	23.8 (5.5)	23.9 (5.5)	27.6 (6.7)	
PSI-SF total score	<=80%	215	126 (58.6)	73 (34.0)	16 (7.4)	9.33 (7.76, 10.90), p<0.001
	81-<90%	114	46 (40.4)	38 (33.3)	30 (26.3)	
	90-100%	156	27 (17.3)	50 (32.1)	79 (50.6)	
	Mean (SD)	485	78.0 (12.8)	84.8 (14.8)	97.1 (15.0)	

Table 5-5 shows parenting stress at baseline and CMD symptoms (taking into account both baseline and follow-up CMD symptoms). Prevalence of parenting stress ≥90% was high (156/485, 32.2%) and significantly associated with risk of symptoms suggestive of CMD. Mean parenting stress (total) scores (SD) were higher among mothers with repeat CMD symptoms (97.1, standard deviation (SD) 15.0) compared to those with CMD symptoms at one timepoint (84.8, SD 14.8) and those without CMD symptoms (78.0, SD 12.8). Each category of the PSI-SF was associated with CMD.

5.6.4 Association of parental sense of competence with CMD

Table 5-6 below, shows a multilevel linear regression analysis of the association of parenting stress with CMD. In univariate analysis, lack of education and food insecurity was associated with parenting stress. Those with no education scored on average 5.75 points higher for stress than those who had a secondary school education or more. Those who were food insecure scored 8.86 points higher for stress than those who were food secure. Problems with mobility and performing usual activities proved to be risk factors for parenting stress. The univariate model shows associations between parenting stress and other factors, including having a partner and domestic violence occurring in the relationship. Women with a partner who did not report domestic violence had lower parenting stress than women who reported domestic violence (β=8.69 (4.97, 12.40) p<0.001) and single women (β=5.14 (1.51, 8.77) p=0.005). The multivariate model showed that after adjusting for confounding, repeat CMD symptoms were associated with parenting stress (β=12.67 (9.58, 15.76) p-value <0.001). Food insecurity (β=5.22 (2.61, 7.83) p<0.001) and inability to perform usual activities (β=6.74 (2.74, 10.74) p=0.001) were also associated with parenting stress. A number of adults in the household, pain and discomfort and domestic violence were also weakly associated with parenting stress. After adjusting for confounders, CMD was associated with a higher parenting stress score (5.25 (2.34, 8.16) for CMD at one timepoint and 15.36 (11.97, 18.76) for CMD at both timepoints), indicating mothers were likely to have more parenting stress if they experienced CMD symptoms.

Table 5-6: Multilevel linear regression – parenting stress risk factors

Variable		Univariate		Multivariate (N=477)	
		Coefficient (95% CI)	**p-value**	**Coefficient (95% CI)**	**p-value**
CMD	Both times	19.19 (16.09, 22.29)	<0.001	15.36 (11.97, 18.76)	<0.001
	Once	7.29 (4.40, 10.18)		5.25 (2.34, 8.16)	
	Never	Ref		Ref	
Trial arm	Control	Ref	0.52		
	Intervention	-1.27 (-5.11, 2.56)			
Sex of child	Male	Ref	0.029		
	Female	-3.13 (-5.94, -0.31)			
Age of child	0-5 months	Ref	0.031		
	6-11 months	2.70 (-1.40, 6.80)			
	12-17 months	5.18 (1.03, 9.33)			
	18-24 months	5.75 (1.47, 10.04)			
Age of mother	17-20	Ref	0.53		
	21-30	-3.10 (-10.08, 3.88)			

Variable		Univariate		Multivariate (N=477)	
		Coefficient (95% CI)	**p-value**	**Coefficient (95% CI)**	**p-value**
	31-40	-1.14 (-7.99, 5.70)			
	41-max	-3.26 (-11.21, 4.68)			
Education	None	5.75 (-3.25, 14.75)	<0.001		
	Primary school only	5.86 (3.03, 8.69)			
	Secondary school or more	Ref			
Number of children living at home	1	Ref	0.13		
	2-3	3.70 (-0.53, 7.93)			
	4-5	3.67 (-0.98, 8.33)			
	6-8	8.26 (1.04, 15.47)			
Number of adults in the household	1	3.63 (-0.35, 7.60)	0.074	1.81 (-1.74, 5.37)	0.32
	More than 1	Ref		Ref	
Employed	No	Ref	0.57		
	Yes	0.89 (-2.20, 3.98)			
Food insecurity	Insecure	8.86 (6.10, 11.63)	<0.001	4.67 (2.07, 7.26)	<0.001
	Secure	Ref		Ref	

Variable		Univariate		Multivariate (N=477)	
		Coefficient (95% CI)	**p-value**	**Coefficient (95% CI)**	**p-value**
HIV viral load at follow up	Suppressed (<1000)	Ref	0.86		
	Unsuppressed	0.40 (-3.99, 4.79)			
Time since first HIV positive test	0-2 years	Ref	0.17		
	3-5 years	2.43 (-0.93, 5.80)			
	6-10 years	3.49 (-0.53, 7.50)			
	11+ years	-2.23 (-8.76, 4.30)			
Mobility	No problems	Ref	<0.001	Ref	0.76
	Some problems/confined to bed	7.31 (4.01, 10.61)		0.51 (-2.75, 3.77)	
Self-care	No problems	Ref	0.076		
	Some problems/unable to perform	8.17 (-0.85, 17.19)			
Usual activities	No problems	Ref	<0.001	Ref	0.001
	Some problems/unable to perform	12.06 (8.08, 16.03)		6.69 (2.73, 10.64)	
Pain/discomfort	None	Ref	<0.001	Ref	0.23
	Moderate	6.15 (3.31, 9.00)		1.44 (-1.26, 4.14)	

Variable		Univariate		Multivariate (N=477)	
		Coefficient (95% CI)	**p-value**	**Coefficient (95% CI)**	**p-value**
	Extreme	11.20 (3.96, 18.44)		5.23 (-1.30, 11.77)	
Domestic violence	Yes	8.69 (4.97, 12.40)	<0.001	2.67 (-0.76, 6.09)	0.13
	No	Ref		Ref	
	No partner	5.14 (1.51, 8.77)	0.005	2.08 (-1.26, 5.42)	0.22

Table 5-7: Multilevel linear ordinal regression – parenting sense of competence risk factors

Variable		Univariate		Multivariate	
		Coefficient (95% CI)	**p-value**	**Coefficient (95% CI)**	**p-value**
CMD	Both times	-0.49 (-0.60, -0.38)	<0.001	-0.38 (-0.50, -0.26)	<0.001
	Once	-0.20 (-0.31, -1.00)		-0.16 (-0.26, -0.05)	
	Never	Ref		Ref	
Trial arm	Control	Ref		Ref	0.57
	Intervention	-0.03 (-0.13, 0.08)	0.64	-0.03 (-0.11, 0.06)	
Sex of child	Male	Ref			

Variable		Univariate		Multivariate	
		Coefficient (95% CI)	p-value	Coefficient (95% CI)	p-value
	Female	0.08 (-0.01, 0.17)	0.091		
Age of child	0-5 months	Ref	0.24		
	6-11 months	-0.01 (-0.15, 0.12)			
	12-17 months	-0.02 (-0.16, 0.12)			
	18-24 months	-0.13 (-0.27, 0.01)			
Age of mother	17-20	Ref	0.50		
	21-30	0.18 (-0.06, 0.41)			
	31-40	0.13 (-0.10, 0.36)			
	41-max	0.15 (-0.12, 0.42)			
Education	None	-0.16 (-0.48, 0.16)	0.064		
	Primary school only	-0.11 (-0.21, -0.01)			
	Secondary school or more	Ref			
Number of children living at home	1	Ref	0.68		
	2-3	-0.01 (-0.15, 0.13)			
	4-5	-0.05 (-0.21, 0.11)			

Variable		Univariate		Multivariate	
		Coefficient (95% CI)	p-value	Coefficient (95% CI)	p-value
	6-8	-0.12 (-0.37, 0.12)			
Number of adults in the household	1	Ref	0.31		
	More than 1	-0.07 (-0.20, 0.06)			
Employed	No	Ref	0.96		
	Yes	0.00 (-0.10, 0.10)			
Food insecurity	Insecure	-0.30 (-0.40, -0.21)	<0.001	-0.20 (-0.29, -0.10)	<0.001
	Secure	Ref		Ref	
HIV viral load at follow up	Suppressed (<1000)	Ref	0.83		
	Unsuppressed	0.02 (-0.13, 0.16)			
Time since first HIV positive test	0-2 years	Ref	0.13		
	3-5 years	-0.03 (-0.14, 0.08)			
	6-10 years	-0.13 (-0.27, -0.00)			
	11+ years	0.11 (-0.10, 0.33)			
Mobility	No problems	Ref	<0.001	Ref	0.22

Variable		Univariate		Multivariate	
		Coefficient (95% CI)	**p-value**	**Coefficient (95% CI)**	**p-value**
	Some problems/confined to bed	-0.20 (-0.31, -0.09)		-0.07 (-0.19, 0.04)	
Self-care	No problems	Ref	0.31		
	Some problems/unable to perform	-0.16 (-0.46, 0.15)			
Usual activities	No problems	Ref		Ref	0.24
	Some problems/unable to perform	-0.26 (-0.39, -0.12)	<0.001	-0.09 (-0.23, 0.06)	
Pain/discomfort	None	Ref	0.06	Ref	0.83
	Moderate	-0.09 (-0.19, 0.00)		0.04 (-0.06, 0.14)	
	Extreme	-0.22 (-0.47, 0.03)		-0.04 (-0.28, 0.19)	
Domestic violence	Yes	-0.24 (-0.36, -0.11)	<0.001	-0.12 (-0.24, 0.01)	0.051
	No	Ref		Ref	
	No partner	-0.10 (-0.23, 0.02)	0.11	-0.05 (-0.17, 0.07)	0.42

A low parenting sense of competence is a poor self-assessment (by parents) of and satisfaction with one's parenting (258). I hypothesised that having CMD symptoms was associated with a parenting sense of competence. Table 5-7 shows that after adjusting for confounding, CMD was independently associated with parenting sense of competence; CMD at one timepoint was associated with a -0.16 (-0.26, -0.05) reduction in the outcome, and CMD at both timepoints was associated with a -0.38 (-0.50, -0.26) reduction, which was statistically significant (p<0.001). A low sense of competence was also independently associated with food insecurity (β-0.30 (-0.40, -0.21)) p=0.001), domestic violence, mobility, problems performing usual activities, and being in the intervention arm.

5.6.5 Association between CMD and harsh discipline

Table 5-8 describes parent-child discipline behaviours by symptoms of CMD. Discipline behaviour was measured and analysed at follow-up only. Most mothers (n=318) had slapped, shaken or spanked their infants one or more times in the past year. Children of parents with repeat CMD were almost three times as likely to have been spanked >20 times, as opposed to children of parents with no CMD symptoms (14.2% vs 5.0%). Of the 127 mothers with repeat CMD symptoms, 89 (70.1%) had either slapped, shaken or spanked their children at least once in the past year and those who had no repeat CMD were less likely to have disciplined their children in this way (63.4%).

Table 5-8: Association between discipline (measured at 12 months) and CMD symptoms

Variables related to discipline		**N**	**No CMD**	**CMD once**	**repeat CMD**
In the past year, have you or any adult					
Threatened to spank child but not actually done it	No	70	36 (17.8)	23 (13.9)	11 (8.7)
	1-5 times	59	25 (12.4)	15 (9.0)	19 (15.0)
	6-20 times	128	49 (24.3)	46 (27.7)	33 (26.0)

	More than 20 times	238	92 (45.5)	82 (49.4)	64 (50.4)
Shouted, yelled, or screamed at the child	No	103	52 (25.7)	30 (18.1)	21 (16.5)
	1-5 times	50	20 (9.9)	15 (9.0)	15 (11.8)
	6-20 times	162	69 (34.2)	58 (34.9)	35 (27.6)
	More than 20 times	180	61 (30.2)	63 (38.0)	56 (44.1)
Spanked child on the bottom	No	204	84 (41.6)	73 (44.0)	47 (37.0)
	1-5 times	107	50 (24.8)	32 (19.3)	25 (19.7)
	6-20 times	139	58 (28.7)	44 (26.5)	37 (29.1)
	More than 20 times	45	10 (5.0)	17 (10.2)	18 (14.2)
Shaken the child	No	370	163 (80.7)	119 (71.7)	88 (69.3)
	1-5 times	66	22 (10.9)	26 (15.7)	18 (14.2)
	6-20 times	46	12 (5.9)	18 (10.8)	16 (12.6)
	More than 20 times	13	5 (2.5)	3 (1.8)	5 (3.9)
Slapped the child on the face, head, or ears	No	441	187 (92.6)	146 (88.0)	108 (85.0)
	1-5 times	19	6 (3.0)	8 (4.8)	5 (3.9)
	6-20 times	30	7 (3.5)	10 (6.0)	13 (10.2)
	More than 20 times	5	2 (1.0)	2 (1.2)	1 (0.8)
Slapped, shaken or spanked the child	No	177	74 (36.6)	65 (39.2)	38 (29.9)
	One or more times	318	128 (63.4)	101 (60.8)	89 (70.1)

Table 5-9 shows the results from a logistic regression model of factors associated with the harsh discipline (calculated from eight questions derived from the Conflict Tactics Scale for Parent and Child). After adjusting for parenting stress and other confounders, there was no association between repeat CMD and harsh discipline. In univariate analysis, the harsh discipline of children was independently associated with the age of the child ($p<0.001$) and parenting stress ($p=0.001$), and weakly associated with the number of adults in the household, domestic violence, education, food insecurity, employment status, and time since the first HIV test and having repeat CMD

symptoms. In a multivariate model, there was no association between repeat CMD symptoms and harsh discipline after adjusting for parenting stress. The apparent association was due to confounding by parenting stress, domestic violence, the age of the child, and the number of adults per household.

Table 5-9: Logistic regression model showing risk factors for harsh discipline[1]

Variable		Univariate		Multivariate (N=477)	
		OR (95% CI)	p-value	aOR (95% CI)	p-value
CMD	Both times	1.45 (0.88, 2.38)	0.18	1.00 (0.54, 1.84)	0.59
	Once	0.91 (0.59, 1.41)		0.80 (0.49, 1.30)	
	Never	1		1	
Sex of child	Male	1	0.68		
	Female	0.93 (0.63, 1.35)			
HIV viral load at follow up	Suppressed (<1000)	1	0.45		
	Unsuppressed	0.80 (0.44, 1.43)			
Age of child at baseline	0-5 months	1	<0.001	1	<0.001
	6-11 months	2.45 (1.42, 4.23)		2.21 (1.25, 3.90)	

[1]Harsh discipline refers to negative methods of rebuking their children when they experienced conflict with their children (251). Harsh discipline refers to the negative methods of rebuking their child when they experienced conflict toward their child (251).

Variable		Univariate		Multivariate (N=477)	
		OR (95% CI)	p-value	aOR (95% CI)	p-value
	12-17 months	4.73 (2.63, 8.51)		4.07 (2.21, 7.48)	
	18-24 months	4.77 (2.59, 8.79)		4.13 (2.20, 7.74)	
Number of children living at home	1	1	0.94		
	2-3	0.90 (0.51, 1.61)			
	4-5	0.82 (0.44, 1.54)			
	6-8	0.94 (0.35, 2.50)			
Number of adults in the household	1	1	0.039	1	0.11
	More than 1	1.84 (1.03, 3.29)		0.59 (0.31, 1.12)	
Age of mother	17-20	1	0.83		
	21-30	0.80 (0.28, 2.12)			
	31-40	0.71 (0.26, 1.91)			
	41-max	0.62 (0.20, 1.90)			
Domestic violence	Yes	1.74 (1.02, 2.98)	0.042	1.54 (0.85, 2.80)	0.15
	No	1		1	
	No partner	1.50 (0.89, 2.51)	0.12	1.02 (0.69, 2.13)	0.49

Variable		Univariate		Multivariate (N=477)	
		OR (95% CI)	p-value	aOR (95% CI)	p-value
Education	None	0.51 (0.16, 1.62)	0.26		
	Primary school only	0.76 (0.52, 1.13)			
	Secondary school or more	1			
Food insecurity	Insecure	0.77 (0.52, 1.13)	0.18		
	Secure	1			
Employed	No	1	0.34		
	Yes	1.23 (0.81, 1.86)			
Time since first HIV positive test	0-2 years	1	0.26		
	3-5 years	0.71 (0.45, 1.11)			
	6-10 years	0.93 (0.54, 1.61)			
	11+ years	1.69 (0.64, 4.47)			
Trial arm	Control	1	0.84		
	Intervention	0.95 (0.59, 1.54)			
Mobility	No problems	1	0.75		

Variable		Univariate		Multivariate (N=477)	
		OR (95% CI)	p-value	aOR (95% CI)	p-value
	Some problems/confined to bed	0.93 (0.59, 1.46)			
Self-care	No problems	1	0.78		
	Some problems/unable to perform	0.84 (0.25, 2.82)			
Usual activities	No problems	1	0.56		
	Some problems/unable to perform	1.19 (0.67, 2.10)			
Pain/discomfort	None	1	0.53		
	Moderate	0.96 (0.65, 1.42)			
	Extreme	0.57 (0.22, 1.51)			
Parenting stress index		1.02 (1.01, 1.04)	0.001	1.02 (1.00, 1.03)	0.039

5.7 Discussion

This study assessed the prevalence of symptomatic CMD and symptomatic parenting stress while also identifying their association with parenting behaviour and the livelihoods of mothers living with HIV. This population of mothers living with HIV was at high risk of having symptoms of repeat CMD (25.7%) and symptoms of clinically significant parenting stress (32.2%). Several risk factors were associated with this high prevalence, including the household structure, age and sex of the child, food insecurity, domestic violence and relationship quality, maternal social support, health-related quality of life, pain and discomfort, resilience, and parenting sense of competence. These findings are discussed below.

5.7.1 Parenting stress

Parenting stress impacts the mother–infant interaction, with high parenting stress negatively affecting the mother's ability to react sensitively to her child's needs. Parenting stress can negatively impact the cognitive growth and development of a child as it may be associated with dysfunctional mother–infant interaction (44). There are several risk factors associated with parenting stress, with our study identifying the following: symptoms of CMD, lack of education, food insecurity, problems with mobility and performing usual activities among this population of mothers living with HIV.

Understanding common mental disorders is particularly important in parenting stress, as research has shown an association between depressive symptoms and parenting stress. Our study showed that parenting stress symptoms were significantly associated with having symptoms of CMD. This is consistent with other findings where a higher frequency of maternal depressive symptoms has been shown to be associated with higher parenting stress (44,259–261). The association between parenting stress and depressive symptoms can be bidirectional, as supported by research that has shown that depressed mothers may experience more parenting stress than mothers who are not depressed. At the same time, depressive symptoms may also affect the perceived parenting stress (44). A study in Germany investigated the development and potential mediation of postpartum depression and parenting

stress among new mothers. Its findings showed that women with acute depression experienced more parenting stress than those in the healthy control group (44). Another study showed that mental health could play a mediating role when it comes to parenting stress in the transition to parenthood (43). All these findings imply that depressive symptoms contribute to parenting stress, with the association being potentially bidirectional. There is a need for parenting interventions to try to factor in measures that help reduce both parenting stress and depressive symptoms, as addressing one aspect could, in turn, reduce the extent of the other.

5.7.2 Parenting sense of competence and resilience

Maternal well-being is influenced by maternal strengths and resilience. How people perceive themselves and cope in the face of adversities influences their mental health. Based on the results of this study, there was an association between a low parenting sense of competence and having symptomatic CMD. Parenting sense of competence depends on the parent's perception of their parenting role and ability to fulfil it (247,258,262). Parenting sense of competence was low in mothers with symptoms suggestive of CMD in comparison to those who had no depressive symptoms. This showed that those at risk of CMD were more likely to feel insecure about their parenting capabilities, failing to develop secure attachment parenting styles with their children. Studies show that depression may result from a mother feeling inadequate or doubting her effectiveness in her parenting role, with the opposite also being true, as women who feel incompetent as mothers may become depressed as well (263). Enhancing the sense of competence in mothers can prevent depression while fostering babies' positive psychosocial development. A study conducted in the USA showed that a parenting sense of competence is associated with a mother's level of postpartum depression and resilience. Mothers with low resilience and high depression reported low parenting sense of competence (262).

5.7.3 Relationship quality and intimate partner violence

Intimate partner or domestic violence is common worldwide and is associated with maternal mental health conditions (17,237,264) and adverse child health outcomes (264). This study showed that there is an association between having CMD

symptoms and domestic violence. Women who reported being hit, insulted, or threatened had a greater chance of CMD. A study by Fisher et al. suggested that women exposed to domestic violence have almost twice the odds of CMD symptoms compared to those who have not reported any form of domestic violence (17). Similarly, in the CHIDO trial, women exposed to domestic violence had over three times the odds of increased CMD compared to partnered women who did not report domestic violence. A study by Nguyen et al. showed that women exposed to domestic violence during pregnancy or post-pregnancy were less likely to recover from CMD in the first year post-delivery than non-exposed women (OR=0.25, 95% CI: 0.06–0.51) (264,265). Based on the marital relationship theory, poor marital relationships can be associated with an increased risk of depression (266). Belsky's (1984) process model states that marital relations are a primary stress factor undermining or supporting positive parenting (267,268).

5.7.4 Food insecurity

Food insecurity was associated with increased odds of CMD symptoms in univariate analysis (OR=2.53 (1.78, 3.58) p<0.001). This finding adds to the growing body of evidence of an association between mental health problems such as CMD and food insecurity, which can be a circular association (269–271). A cohort study conducted in Ethiopia showed that mothers who met the criteria for CMD had a four-times-higher risk of being severely food insecure (272). Similarly, a study in the USA showed that maternal depression during the postpartum year was strongly associated with family food insecurity 3–15 months later (273). Food insecurity is an attribute of poverty. Poverty is also associated with mental health conditions (274). The social causation theory states that the burden of poor mental health occurs due to poor socioeconomic conditions, while the social selection theory states that mental health conditions cause individuals to experience poor socio-economic conditions such as food insecurity and financial stress (272,275). Research on poverty alleviation through household economic strengthening programmes, including cash transfers, has proved them to have mental health benefits to individuals (274,276,277). A longitudinal cohort study in Kenya revealed a 24% reduction in the odds of depressive symptoms in households that received cash transfers (274). Studies in South Africa showed that mothers from

households that received child support grants had lower odds of having CMD (276,278). Previous studies have shown that both the social causation and social selection theories could be true, as both social causation and social selection may simultaneously cause and affect each other (275). Our study did not investigate the causal effect but was limited to analysing the association between food insecurity and CMD.

5.7.5 Discipline

Studies in Japan showed that aggressive parenting behaviours are more likely to occur in mothers with postpartum depression, as depressed mothers were more likely to show a negative attitude towards their infants (258,279). Similarly, another study in Japan explored the risk factors for family members spanking children below 3.5 years old (280). The CHIDO trial showed that harsh discipline was associated with CMD in crude analysis; for example, spanking the child >20 times was more prevalent among mothers with repeat CMD (14.2%) than among mothers with single CMD (10.2% or no CMD (5.0%). In the Japanese study, households with a boy child, a higher number of children, lower parental education levels, and low family income were associated with spanking (280). This is different from our study, in which the gender of the child and the presence of other children in the household were not risk factors for the child getting spanked. Instead, our study revealed that two risk factors significantly associated with spanking were the older age of the child ($p<0.001$) and the level of parenting stress ($p=0.039$). Parenting stress confounded the association of CMD with spanking.

Elevated parenting stress has been shown in other studies to be a parental risk factor associated with harsh punishment. A study conducted on a large sample of Chinese mother–father dyads with at least one child aged 3–6 years showed that there was a relationship between parenting stress and harsh discipline (268). Similarly, our study showed that parenting stress was significantly associated with mothers spanking their infants. The results of the Chinese research are consistent with this study, where mothers symptomatic of CMD more frequently reported having negatively disciplined their infant. The assumption is that high parenting stress may increase the likelihood that parents are irritable and may thus react to their children's misbehaviour with

spanking or psychological aggression. Stress contributes to the high burden of poor mental health, and there is evidence that maternal mental health problems are associated with a variety of adverse outcomes for women, children, and the whole household. More than 60% of the mothers in the study had parenting stress, and they had spanked their infants. This is evidence of the need to implement parenting interventions that help reduce parenting stress, address their socio-economic challenges, increase parenting skills, and equip parents with coping strategies, ultimately aiming to promote mothers' enforcement of positive rather than negative discipline.

5.7.6 Contextualising findings in the lives of mothers living with HIV

Mothers living with HIV in resource-limited settings are prone to other life stressors besides living with HIV. Consistent with other studies, this cohort of women had attributes of mental health conditions (155) and socio-economic challenges (154). They were vulnerable to poor relationship quality, all of which compromised their self-perception regarding their parenting capacity. Parenting sense of competence was relatively low (258), while parenting stress was high, potentially affecting their parenting behaviour and consequently child development (261,281). Thus, interventions targeting mothers in resource-limited settings need to be developed using a holistic approach that encompasses both individual and socio-ecological risk factors.

5.7.7 Strengths and limitations

A significant strength of this study is that it presents longitudinally collected mental health screening data (at two timepoints, 12 months apart) using a validated tool reporting the prevalence of maternal health challenges experienced by women living with HIV. The use of an ordinal categorical variable helped highlight that having CMD symptoms at more than one timepoint increased the risk of parental stress and lowered the sense of competence. This study contributes to the limited knowledge of the prevalence of repeat CMD symptoms and parenting stress symptoms in Zimbabwe and LMICs. There are few studies in Zimbabwe on maternal mental health challenges, precisely repeat depression, anxiety, and stress in mothers living with HIV. This study,

therefore, provides evidence of the need for interventions targeting the mental well-being of mothers living with HIV that try to mitigate against food insecurity, domestic violence, and lack of maternal support and help manage the pain and physical well-being challenges associated with their chronic illness.

There are several limitations of this study. The study can only comment on CMD symptoms as opposed to psychiatric conditions. Although the SSQ-8 has been validated and found reliable for use in a population with high HIV prevalence, this tool detects symptomatology and does not confirm a clinical diagnosis of depression. The same applies to the PSI-SF, which does not guarantee the diagnosis of parenting stress and has not been validated for use in Zimbabwe to assess its appropriateness. It has been validated in other settings (245,282,283), but there is a need for it to be validated for use in Zimbabwe, including among mothers with chronic illnesses such as HIV.

All tools used to measure parenting (stress, competence, or bonding) had yet to be validated in the Zimbabwean context. Our findings would have been strengthened if we had done a face and content validity check before administering the tools. For example, I could have convened a panel of experts to provide input on the cultural appropriateness of each tool (content check). I could have checked the face validity of these tools by asking women who would have been eligible for the trial (i.e., mothers living with HIV in the area) about the clarity and relevance of each of the questions included in the tools. An example of a statement within the PSI-SF that is unlikely to be culturally appropriate is, “My child turned out to be more of a problem than I expected”. In the Zimbabwean culture, a child is always considered a blessing unless born under culturally shunned circumstances (e.g., teenage pregnancy), and somebody rarely refers to a child as a problem. Even among mothers who may find their child difficult, it is unlikely that they would respond affirmatively to such a statement (social desirability bias), as it would culturally be unacceptable to do so.

5.7.8 Study recommendations and implications for practice and policy

The study's results emphasise the importance of screening and treating CMD symptoms from an early stage of parenting while trying to mitigate associated risk

factors. The findings support the need for interventions to address maternal mental health in LMICs. There is a need for additional support for mothers to manage their socioeconomic challenges, including food insecurity and domestic violence. Addressing these, their physical wellness and mental health can improve their lives.

Measures are needed at multiple levels to help reduce levels of parenting stress, starting by putting policies in place to help mitigate the high prevalence of CMD and high parenting stress. Structurally, continued decentralisation of mental health screening and treatment services are required to reach even the hard-to-reach grassroots level. This can be done by integrating screening and core mental health packages into routine primary healthcare services by developing locally adapted screening tools and effective treatments for use by non-specialists (lay health workers) and establishing effective referral mechanisms. In Zimbabwe, the Ministry of Health and Child Care has already started implementing this, as part of its Mental Health Strategy, through the scale-up of the Friendship Bench non-specialist mental health programme. However, it should be noted that increased screening and integration into primary care do not guarantee improved mental health outcomes. There is a need to develop complex enhanced collaborative care that includes coordinated client follow-up (284) and other contextual changes that address mental health risk factors. There is also a need to redesign the health systems to integrate support for maternal mental health with other chronic disease care while considering how the constant experience of pain and inability to self-care can lead to repeat CMD.

The study findings also show several factors that contribute to poor maternal mental health, most of which are structural and the social and economic circumstances of mothers' lives. Policymakers, programmers and researchers must try to construct and implement policies and activities aligned to the SDGs, which emphasise the need to address some of these socio-economic and cultural factors that affect women's health and mental well-being. We recommend that holistic programmes be set up that not only target aspects of maternal mental health but also address the socio-economic and cultural factors contributing to improving women's well-being. For these interventions to be successful, there is a need to raise awareness of the mental health problems that exist, and there is a need to normalise them to address the stigma

related to mental health challenges, which can impede the success of the integration of mental health services into programmes.

We have shown complex interactions between repeat CMD symptoms and intrapersonal, socio-economic, and parenting factors. For example, mothers with repeat CMD symptoms were less resilient and more likely to have pain and mobility problems and be food insecure. In addition, these mothers were likely to experience parenting stress and reduced postpartum bonding, both of which affect parenting sense of competence and result in negative discipline of the child. This research has implications for practice, suggesting the importance of addressing CMD, parenting stress and food insecurity by promoting resilience, social support, and positive intimate partner relationships. Improving parenting outcomes would consequently benefit child outcomes

6 Chapter 6: Understanding implementation and uptake of a multi-component parenting intervention targeting mother-dyads of HIV-exposed/-infected infants in Zimbabwe: process evaluation of the CHIDO trial

6.1 Background

Parenting skills and parent–child relationships play a vital role in the growth and development of children (285). Studies highlight the importance of "warm, responsive, and stimulating parent behaviours in supporting children's early development and long-term growth" (148,285–287). Mothers living with HIV in rural Zimbabwe face many challenges that potentially impair their ability to embrace these essential parenting behaviours. The physical and psychological burden of living with a chronic illness, fear of exposing and infecting your child, social stigma and discrimination are some of the risk factors that potentially affect their well-being and capacity to provide positive parenting (147,220,288,289). Poverty has also been shown to affect parenting and early child development, increasing parenting stress due to lack of resources, food insecurity and lack of social support in fending for themselves and their family (290). These factors have the potential to contribute to a home environment characterised by a depressed mother, struggling to be resilient under such circumstances, one that is less responsive and is struggling to maintain good parent–child interaction. Parenting and mental well-being under such extenuating circumstances can be hindered thus having a ripple effect on cognitive and physical development in children.

Given the challenges to the parenting capacities of mothers living with HIV, programmes in low-income settings targeting this group may be used to support them well-being parenting. Over the years, there has been an increase in interventions aimed at improving parenting and child development outcomes. Interventions in which mothers are taught about infant development and are shown how to engage and stimulate their infants and be more responsive and affectionate towards them appear

to improve maternal mood, strengthen the mother–infant relationship and lead to better infant health and development outcomes (15). A randomised pilot mothers and toddlers programme in the USA showed that a weekly individual therapy session offered as part of an attachment-based intervention could help enhance parent–child interactions between mothers with substance abuse challenges and their toddlers (291). Although not primarily targeted as an outcome group difference in depression and global psychiatric distress were examined for possible indirect treatment effects. The study found that mothers in the Mothers and Toddlers Program experienced slightly better outcomes for both depression and global psychiatric distress (291). A CRT in South Africa showed that home visits resulted in a better quality of caregiving for mothers without depressive symptoms, but for those mothers with depressive symptoms more intensive interventions were likely required (89). Rayce et al. (292) examined a systematic review of studies that assessed the effects of offering psychosocial intervention to at-risk families with infants aged 0–12 months and found that the interventions significantly improved parent–child relationships, child behaviour and maternal sensitivity post intervention.

Traditionally, public health intervention evaluations focused on measuring the impact of the intervention on specified outcomes (293). This approach has been critiqued as it did not provide insight into the mechanisms that led to the success or failure of the intervention. New techniques, such as process evaluation, have been developed in appreciation of the fact that interventions are implemented in settings where different intervention elements interact with other societal features. Each component seeks to address several outcomes in its diverse ways (294). The complexity of each context affects the impact of the intervention as the context can either amplify or dampen the effect of an intervention (294). Thorough evaluations are needed to help understand what has worked and how it has worked, thereby clarifying the underlying mechanisms (295). The UK Medical Research Council (MRC) Framework for the development of complex interventions (initially published in 2000 and updated in 2006 and 2021) has been used successfully across disciplines, which suggests that its flexible, non-linear approach may be usefully applied to the iterative design processes used for complex parenting interventions (185,296–298).

With parenting interventions increasing, there has also been an increasing emphasis on the need to develop comprehensive evaluations of these interventions, to gain an appreciation of a programme's outcomes as well as to gain an understanding of the mechanisms and elements of the programme that influence the outcomes (299). Although there are many community-level parenting programmes, only a few have been rigorously evaluated, especially in low- and middle-income countries (300,301). Previous studies have reported uncertainty around the determinants of programme success. A meta-analysis of home visiting programmes implemented in the United States showed that teaching parents how to select alternative caregivers was associated with better child maltreatment outcomes. However, the researchers did not analyse other programme variables that could have contributed to this outcome (302). Such variables include fidelity to the programme, background factors, content, length of the programme and delivery mode (group, individual, virtual), among others. Fidelity is one of the crucial elements in assessing the success and impact of an intervention. It refers to the "degree to which … programs are implemented … as intended by program developers" (303,304). The level of fidelity helps determine whether a lack of impact results from inadequacies inherent in the intervention or due to poor implementation by facilitators (305). A systematic review of parenting interventions showed that intervention fidelity was heavily reliant on the facilitators' competent adherence to the parenting programme (306). It showed the importance of having high-quality measures to assess facilitators' competence and fidelity. Similarly, it is essential to have high-quality measures for evaluating the mechanisms and context within which an intervention is implemented.

6.2 The CHIDO trial

This chapter describes a process evaluation of a multi-component parenting intervention, the CHIDO intervention. To contextualise the process evaluation, I will first summarise the CHIDO trial design and results, which are detailed in Chapter 1. The CHIDO trial was a cluster-randomised controlled trial (CRT) conducted in rural Zimbabwe (see trial overview in **Error! Reference source not found.**). The trial sought to determine the impact of a comprehensive parenting set up to simultaneously

enhance child stimulation, reduce economic insecurity, and improve retention in care among HIV-exposed and -infected children. Study participants comprised 574 primary mothers and their infants living with or exposed to HIV (aged 0–24 months) (2).

As described in Chapter 1, the trial evaluated a multi-component intervention with three elements: i) an 18-session early childhood stimulation (ECS) parenting programme conducted over nine months in sessions of 1.5 hours (Table 6-1), ii) an internal savings and lending scheme (ISALS) held once a month with ISALS sessions held for 30 minutes immediately after each ECS session, and iii) home visits conducted by community health workers (CHWs) each month (or more frequently in the case of non-attendance of group sessions or other problems) to support the learning and skills development taking place in the ECS sessions and promote retention in ART care (2). The parenting programme's content and the number of sessions were refined in response to formative work and piloting with feedback from participants about the preferred length and frequency of sessions. The trial's primary outcomes were child development in HIV-exposed infants, retention in HIV care in the mother-dyads, and viral suppression. The secondary outcomes included nutrition, maternal mental health (including parenting stress) and household food security. I played a leading role in this process evaluation, where I shaped the design and implementation of the process evaluation.

Table 6-1: CHIDO trial Early Childhood Stimulation Programme content

Session number	Delivered by	Parenting programme content
1	ECS facilitator	Relationships with people around you and your child
2–3	ECS facilitator	Responsive parenting practices
4–5	Nurse	A healthy infant and young child
6	Nurse	A well-nourished infant and young child
7–8	ECS facilitator	Physical/motor development
9–10	ECS facilitator	Social and emotional development
11	Nurse	A healthy infant and young child (focus PMTCT and treatment adherence)
12–13	Nurse	Complementary feeding
14–15	ECS facilitator	Communication and language development

16–17	ECS facilitator	Developing thinking and understanding of the world
18	ECS facilitator	Positive discipline

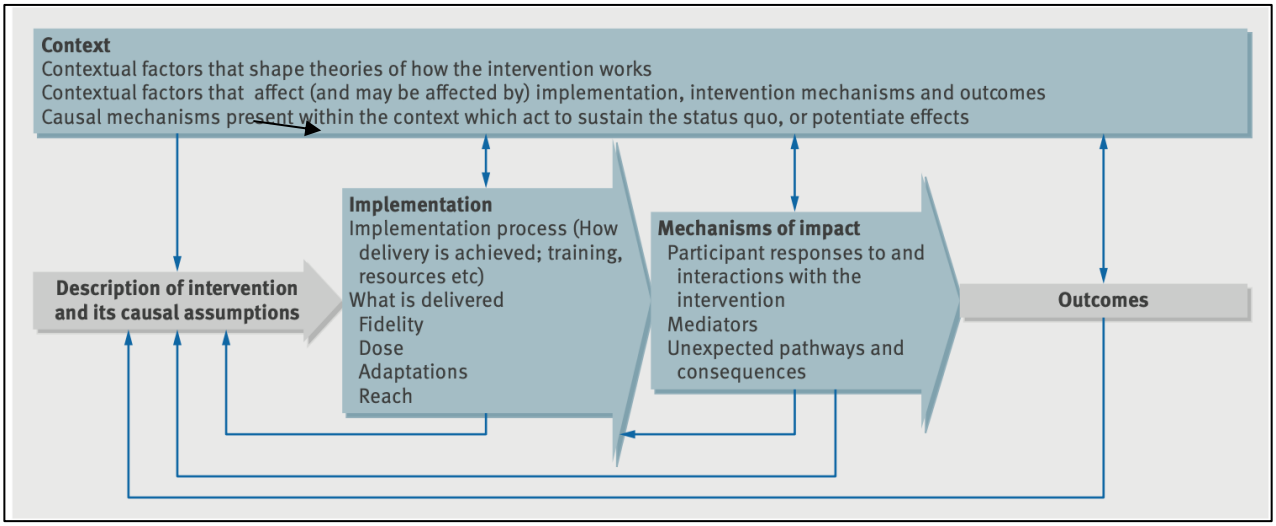
Of the 574 mother-dyads recruited to the CHIDO trial, 89.5% (514) were retained at 12-month follow-up. The first primary outcome of global child development, measured using the Mullens Scale of Early Learning, was similar between arms (intervention mean 88.1 vs standard of care mean 87.6; adjusted mean difference = 0.06; 95% CI: −2.68 to 2.80; p=0.97) (5). For the second primary outcome of infant retention in HIV care (proportion of children who had missed their most recent HIV-related visit), there was no evidence of an intervention effect (intervention 21.8% vs standard of care 16.9%; p=0.18) (5). Analysis of secondary outcomes suggested that the risk of mental health conditions among mothers was high, and that the intervention may have somewhat mitigated parenting stress (although not depression or common mental disorders more broadly). Of note the CHIDO intervention did not incorporate a mental health component no impact of the intervention on any other secondary outcomes including improved treatment adherence. There was however weak evidence that the proportion of mothers with parenting stress was reduced in the intervention arm (adjusted OR (aOR)=0.69; 95% CI: 0.45 to 1.05; p=0.08) and stronger evidence that parental distress was reduced (intervention arm 17.4% vs standard of care 29.1% scoring above the cut-off; aOR=0.56; 95% CI: 0.35 to 0.89; p=0.01). A full description of the CHIDO trial results has been published (5).

6.3 Theoretical framework

A case study approach was used to better understand the complexity of the CHIDO trial intervention. As described in Chapter 3, this approach was selected as it can provide a holistic and in-depth understanding of the relationship between an intervention and the contemporary context in which it was implemented (187). The guiding framework for the process evaluation was the MRC process evaluation framework (Figure 6-1). This framework states that in order to understand the pathways of an intervention, its causal assumptions and the outcomes produced, one needs to understand: 1) implementation (the structures and resources through which

the intervention is delivered); 2) the mechanisms of impact (how intervention activities and participant interaction trigger the change); and lastly 3) the context (the external factors that influence how the intervention is delivered and its outcome). This chapter focuses on understanding the impact of the CHIDO trial by evaluating these three components using the case study approach of applying a range of data collection methods, both qualitative and quantitative, to understand a phenomena.

Figure 6-1: MRC process evaluation framework (21)



Extracted from Moore et al., 2015 (182).

The CHIDO trial process evaluation hypothesised that:

i) To ensure a smooth process of **implementation**:
   - <u>What</u> was delivered was important.
     - Fidelity – for the CHIDO trial to be a success, the intervention had to administer the right content as intended. This meant delivering 18 ECS sessions of parenting classes that fostered child stimulation according to the CHIDO intervention manual; nine ISALS sessions where mothers saved money as a form of economic strengthening and support; and lastly nine home visits that fostered HIV retention in care and adherence to treatment using set checklists.

- Dose (quantity delivered) – for the intervention to be a success, most of the participants had to take up the complete intervention.
- Adaptations – were any intervention adaptations made to suit the local context? This would aid the acceptability and positive outcomes of the study.
- Reach – what proportion of those recruited were able to take part in the intervention?

- How it was delivered was important.
  - Positive outcomes could be achieved with well-established procedures that were fit for purpose and with effective training of the intervention facilitators.

ii) It is important to understand the **mechanisms** of impact that led to specific outcomes by taking note of:
- participant responses to and interaction with the intervention.
- mediators and unexpected pathways and consequences that affect implementation and the outcomes.

iii) The **context**, including push and pull factors, can shape how the intervention is implemented and its outcome. The trial hypothesised that by engaging a child development specialist, designing an intervention that had been informed by other interventions done in low- and middle-income countries (LMIC), and delivering it via local facilitators using a participatory approach, the intervention would have high acceptability and be a success.

6.4 Chapter aims and objectives

This process evaluation sought to:

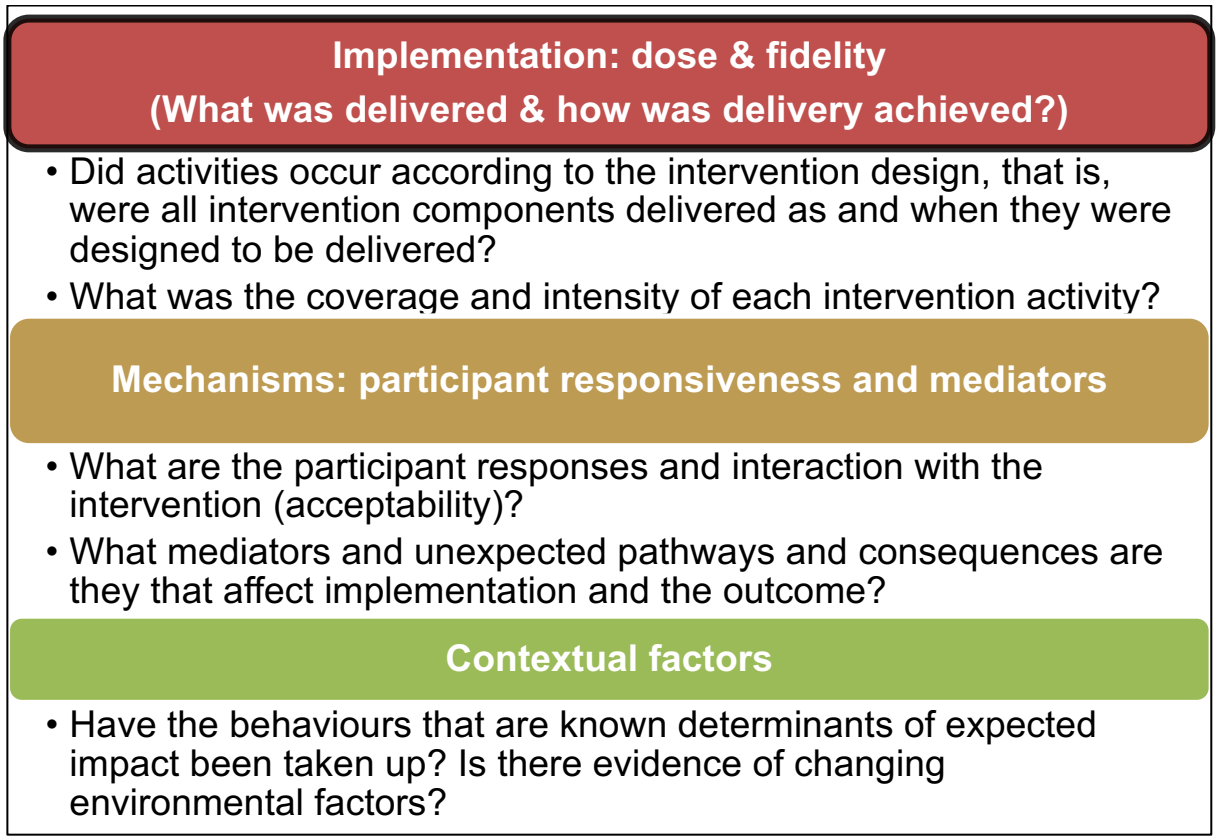
- assess the implementation (what and how) of a multi-component, group-based parenting programme delivered by community facilitators to mothers living with HIV, with children aged 0–24 months.
- understand the mechanisms of action (including the acceptability) and the context in which the intervention was implemented. It aimed to understand the

mediators and unexpected consequences that affected the intervention implementation and outcome.

- assess whether the intervention messages had been adopted and taken up in order to understand the impact of the intervention on the lives of mothers living with HIV and their children.

Using the MRC process evaluation framework, this study sought to answer the questions shown in Figure 6-2. Whilst the CHIDO intervention hypothesized that the intervention might have had an impact on maternal mental health (secondary outcome), the process evaluation did not directly explore the impact of the intervention on mental health. What it did ask was how the intervention affected their parenting, why the intervention was helpful, what they got from sessions thus putting the focus on the impact on parenting.

Figure 6-2: Process evaluation questions



6.5 Methodology

As explained in Chapter 3, the process evaluation was a case study that used a mixed-method approach, triangulating data collected with various tools. The section below will detail the different sampling and selection procedures and data collection for each process evaluation component.

6.6 Measurement of process evaluation indicators

Figure 6-3 shows the different tools used to collect data, concentrating on the data collection methods of the three process-evaluation elements under the MRC framework (implementation, mechanisms, context). To answer the research questions (in Figure 6-2) we used routinely collected programme data; follow-up survey interviews; structured observations collected by the research team; and in-depth interviews (with mothers, intervention implementers and representatives from the implementing partner organisation).

Figure 6-3: Data collection tools used during the CHIDO trial implementation and process evaluation

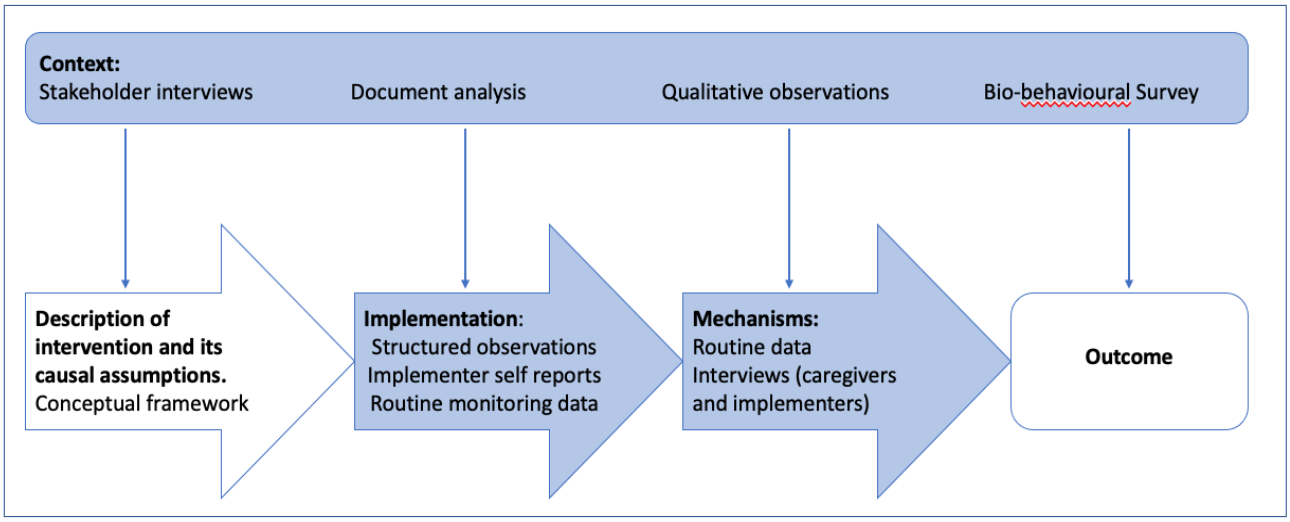


Table 6-2 gives an overview of what was assessed, how it was assessed, how it applies to the MRC framework, when it was assessed, who collected the data and who the target participants were. A mixed-method approach was chosen for this research to enable an extensive exploration of the process evaluation. The key sources of data

used were i) routinely collected programme data, ii) biobehavioural survey data including assessment of global childhood development, iii) in-depth interviews, iv) structured checklists, and v) structured observations. This data was triangulated with the qualitative data, complementing, and clarifying the quantitative findings by helping to identify the push and pull factors of participants affecting the uptake and implementation of the intervention.

Table 6-2: Overview of data collection tools

What is assessed	Tools	MRC framework	Time frame	Data collector	Respondents
Training of implementing staff	Observational checklist	Implementation	During initial and refresher trainings	Research team	Mavambo, ECS facilitator, CBTs, CHWs
Proportion of mothers attending ECS parenting classes	Attendance register – parenting sessions	Implementation – dose	During the intervention	ECS facilitator	Mothers & ECS facilitators
Proportion of mothers attending ISALS meetings	Attendance register – ISALS	Implementation – dose	During the intervention	CBTs	Mothers & CBTs
Proportion of mothers receiving home visits	Home visits log sheet	Implementation – dose	During the intervention	CHWs	Mothers & CHWs
Quality and extent to which the parenting sessions are implemented	Structured reporting checklists	Implementation – fidelity	After each parenting session	ECS facilitator & Mavambo	ECS facilitator
Quality and extent to which the parenting sessions are implemented	Observational checklist	Implementation – fidelity	3, 6 and 12 months	Research team	ECS facilitator & mothers
Quality and extent to which the ISALS are implemented	Structured reporting checklists	Implementation – fidelity	After each ISALS meeting	CHWs & Mavambo	CBTs
Quality and extent to which the ISALS are implemented	Observational checklist	Implementation – fidelity	3, 6 and 12 months	Research team	CBT & mothers
Quality and extent to which the home visits are implemented	Structured reporting checklists	Implementation – fidelity	After each home visit	CHWs & Mavambo	CHWs
Quality and extent to which the home visits are implemented	Observational checklist	Implementation – fidelity	3, 6 and 12 months	Research team	CHWs & mothers
Attitudes towards/perceptions and experiences of the intervention	In-depth interviews	Mechanisms/participant responsiveness & context	3-month intervals	Research team	Mothers

What is assessed	Tools	MRC framework	Time frame	Data collector	Respondents
Perceptions and experiences of intervention implementers	In-depth interviews	Implementation – fidelity	3-month intervals	Research team	Mavambo, ECS facilitator, CBTs, CHWs
Relevance of intervention to mothers	Structured questionnaire	Mechanisms/participant responsiveness & context	12-month follow-up	Research team	Mothers
Group unity	Structured questionnaire – 7 questions on group unity	Mechanisms/participant responsiveness & context	12-month follow-up	Research team	Mothers

6.7 Evaluation of the implementation process

6.7.1 Implementation: measuring dosage through routinely collected data

The assessment of participant involvement was based on data on enrolment, attendance and dropout rates collected through programme registers. Enrolment rate was defined as the percentage of participants in the study who attended at least one session. Dropout rate was defined as the percentage of enrolled participants who missed three consecutive sessions. We monitored the number of ECS sessions and ISALS meetings delivered, as well as the percentage of mother-dyads attending 80% of ECS meetings, percentage of mother-dyads allocated a CHW and the number of home visits that occurred.

Parents' perceptions of overall programme acceptability were assessed using an eight-item questionnaire, developed by the research team and delivered at 12-month follow-up. Participants reported the usefulness of each key component with 0 indicating 'not useful', 1 'a little useful' and 2 'very useful'. Questions asked were on uptake of the services, usefulness of the intervention to the mothers and child's well-being, usefulness of the child development sessions in improving parenting skills and parent–child interaction, impact of the ISALS training and sessions in strengthening their economic resilience and enabling them to meet their daily financial needs, and quality of the services provided (refer to the CHIDO trial endline survey questionnaire - Appendix 1).

6.7.2 Measuring fidelity through observations and self-reports

Programme fidelity was assessed using implementing staff's self-reports and observations which used structured checklists developed by the research consortium. These checklists were completed by facilitators, CBTs and CHWs after each session and home visit (see Appendix 2 Appendix 3, Appendix 4 respectively). The implementing staff recorded whether or not they delivered a particular component of each session as specified in the programme manual. After each session the staff were asked to reflect on their activity, indicating the objectives and content of the session,

the duration, self-ratings on whether they felt each of the session objectives was met, challenges and what they would try to do differently in the next session.

Observations of the ECS (Appendix 5) and ISALS sessions (Appendix 6) and of home visits (Appendix 7) by the research team were conducted at the three-month, six-month and 12-month points, with each mother group being visited twice in no particular order. Standardised assessment forms and checklist observation guides were developed. Researchers recorded the activities covered and the time spent on each activity, quality of delivery, participant attendance and participant engagement and responsiveness. A total of 30 observations among 15 groups were conducted by the research team. Project staff were also tasked with maintaining an 'events diary' to make note of events that were beyond the control of the trial yet had the potential to influence implementation or outcomes (natural disasters, introduction of other ISALS or early childhood development services, changes in the area in the Ministry of Health and Child Care standard of care, or other competing activities).

6.8 Mechanisms and context – an in-depth insight into participants' responsiveness (perceptions and experiences)

In pursuit of a deeper understanding of the relevance of the intervention, mothers were asked several questions in the 12-month follow-up survey, in addition to the qualitative approaches using a standardised observation tool and in-depth interviews. In the follow-up survey, mothers in the intervention arm were asked seven questions to assess unity in the parenting group. These questions included whether the mothers felt there was unity, felt free to share information, felt there was confidentiality or stuck together as members. The responses were based on a 4-point scale 0–3, from 'strongly disagree', 'disagree', 'agree' and 'strongly agree'. Scores ranged from 0–21, with group unity being worst at 0 and best at 21.

Semi-structured and in-depth interviews with mothers (see Appendix 8) and implementing staff – ECS facilitators, CBTs, CHWs and clinic staff (see Appendix 9) – were conducted mid-intervention and at the end of the intervention. The in-depth interviews sought to elicit perceptions of the acceptability and impact of the

intervention from the mothers and implementing staff with the aim of gaining an appreciation of participants' judgements about the outcomes, relevance, and importance of the intervention. Interviews were conducted at three-month intervals by trained social scientists. Sampling was purposive, and mothers were selected based on specific attributes such as high or low levels of engagement in activities and whether they were users or non-users of clinical services. These interviews explored perceptions of the community programme, perceptions of clinical and other available services, and positive and negative experiences of the intervention. Semi-structured interviews were conducted with healthcare staff at intervention clinics and the implementing stakeholders to elicit perceptions of the feasibility of implementing the intervention and understand their own levels of satisfaction and perspectives on its quality. The interviews also explored the acceptability of the intervention by the healthcare workers from their perspectives as care providers.

6.9 Sample selection and participants

The process evaluation was based on feedback from recipients and providers of the intervention. All mothers who were enrolled in the trial intervention arm (n=281) were eligible to take part in the process evaluation. Mothers from the intervention arm who took part in the follow-up survey (n=257) were eligible to give feedback on their experience of the programme. Selection of mothers for in-depth interviews was based on level of participation, attendance rates and age of participant or child. A second element of the process evaluation came from the study's implementing staff (ECS facilitators, community-based trainers (CBTs) and community health workers (CHWs), as well as project administrators from Mavambo Orphan Care). There were 17 ECS facilitators, 13 nurses for the parenting sessions, 15 CBTs for the ISALS and 24 CHWs for the home visits. From those, a total of 17 mothers (seven having dropped out), four CHWs, five ECS facilitators, four CBTs, four facility nurses and two project administrators from Mavambo Orphan Care were selected to participate in in-depth interviews.

6.10 Data analysis

Quantitative data consisted of i) the trial questionnaire responses at enrolment and follow-up collected on tablets using Open Data Kit (ODK), and ii) paper-based programme data from attendance registers on number of sessions attended and number of home visits received per participant, which were entered into Microsoft Access. All quantitative data were imported to Stata 15.1 for analysis. The descriptive analyses consisted of calculation of frequencies, percentages and median attendance overall and by group. The intervention dose of the different components was presented in a Venn diagram. Group unity scores were calculated at the individual level as the sum of scores from six questions on parenting group dynamics. Box plots of group unity scores were presented by group. Univariate linear regression was conducted of individual-level group unity score on number of ISALS sessions attended. The variables were presented in a scatter plot overlaid with the predicted regression line.

For qualitative analysis used a deductive thematic analysis approach. Thematic analysis is a method of analysing qualitative data involving searching for repeated themes and patterns from a data set (188,189). This approach was selected for its flexible nature, as it can be applied across frameworks including case studies. With the mixed method approach used in this process evaluation, thematic analysis allowed for themes to emanate from connecting different elements of data, reframing and organising the data into classification labels that holistically describe the data (189). It allowed for the research highlight, in-depth, the experiences, thoughts or behaviours of the CHIDO trial participants across the data set.

An initial step of familiarization with the data involved verbatimly transcribing and translating the audio-recorded in-depth interviews. These transcripts together with the detailed notes of participant observation were uploaded to QSR NVivo 12. Four transcripts were randomly selected to be used to further familiarise with the data and to develop the initial codes. Eventually the initial coding framework was created, with the researcher then reviewing all the other transcripts line by line, identifying tree nodes linked together under parent nodes representing a common theme. Themes were deductively identified, with findings concentrating on interrogating the hypothesis

made in the CHIDO trial theory of change which hypothesized that the multicomponent intervention would lead to improved child development, economic emancipation, and improved health outcomes. Emerging theoretical constructs were identified and iteratively built upon from the common themes across the interviews and analysis of the complete CHIDO trial data set. The findings from the analysis are described below.

6.11 Results

The CHIDO trial was a multi-component, complex intervention that aimed to impact child development through improved parenting, reduction in economic insecurity, and improved retention in HIV care. While there was no evidence of an impact on the primary outcomes, there was evidence that the intervention impacted parental distress (5). This process evaluation sought to unpack why the desired results were not achieved in the CHIDO trial. Some initial hypotheses were that the follow-up period was too short to detect an effect, that the dose received was inadequate as a relatively small proportion of the mothers received the intervention as well as intended possibly due to barriers such as lack of interest, group dynamics and stigma. implementation of the intervention was poor or that the combination of intervention elements was not effective. This research sought to understand what worked or did not and why this was so. The findings were categorised under the three elements of the MRC framework: implementation (fidelity, dosage, reach), the mechanisms (participant responsiveness) and context.

6.11.1 Evaluating the implementation

6.11.1.1 Fidelity (adherence to the intervention design and timeline)

The CHIDO intervention was initiated in all 15 intervention clusters, and 281 participants were enrolled; 21 ECS groups were run. One group ran per cluster in seven clusters two groups ran per cluster in the remaining clusters. One cluster had missing attendance data. Each ECS group was intended to have 12 participants. The intention was to deliver 18 ECS sessions to each group to enhance child stimulation and development. In addition, each group had nine ISALS sessions scheduled to

reduce economic insecurity. Participants in each group were expected to receive nine home visits to foster HIV retention and adherence to treatment, and to support parenting lessons in the home/ Programme data shows that all 18 ECS sessions were delivered in the 14 clusters with attendance registers. Routine registers indicated that ISALS groups were conducted directly following the ECS sessions as prescribed. Not every ECS group opted to participate in this component, and not all those who did join the ISALS actively contributed made a monthly financial contribution as specified. The home visits were conducted, but, as with the ISALS, not all the mothers got home visits as frequently as they should. In summary, while the trial components were delivered, they were not always delivered and received as prescribed.

6.11.1.2 Dose (intended intervention dose vs dose received)

Of the 268 mothers in the intervention arm from the 14 clusters with records, 232 (86.6%) attended at least one ECS session. Of the 268 participants, 43 (16.0%) attended all 18 ECS sessions and 118 (44.0%) attended 14–17 sessions. Over 60% (n=161) attended at least 14 sessions (i.e. over 75% of all sessions). Nine of the 18 sessions addressed child development (Table 6-1); 79 (29.5%) participants attended all nine ECS sessions, and 79 (29.5%) attended seven or eight sessions, and the median per group who attended seven to nine child development sessions was 7.5 (IQR 6–9).

Figure 6-4 shows the attendance rate for each session and show that the attendance was sustained throughout the intervention.

Figure 6-4: Early childhood stimulation session attendance

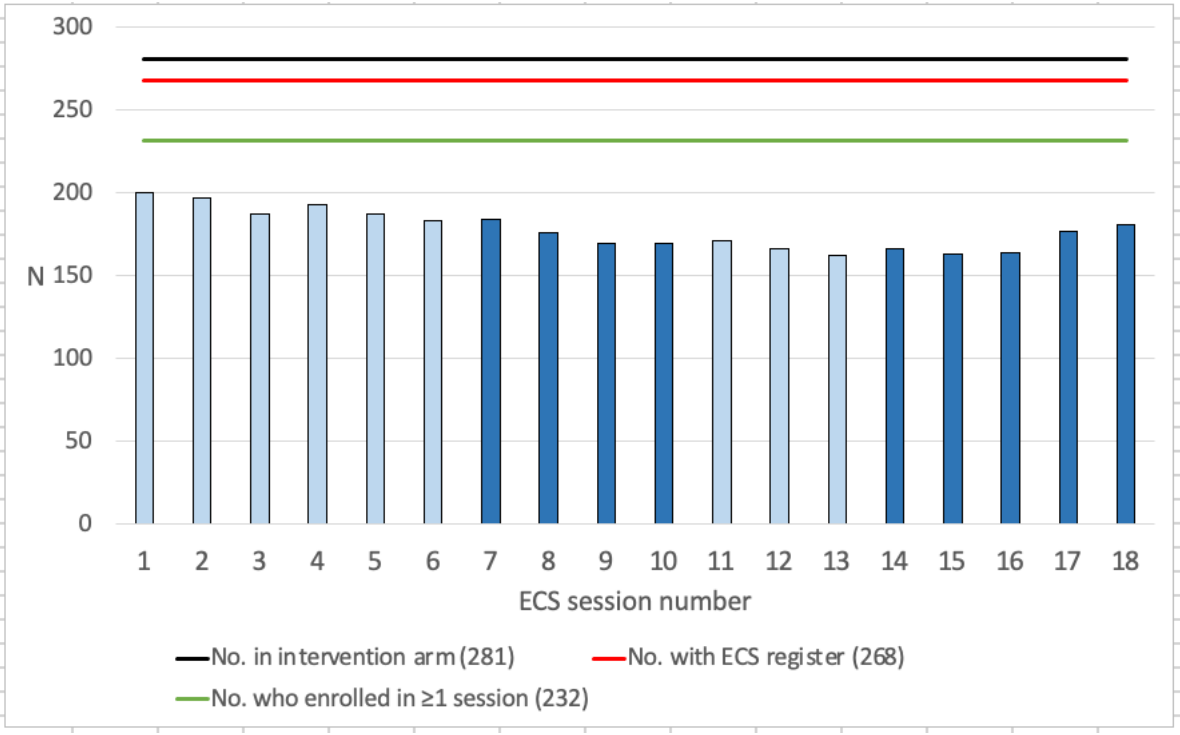


Figure 6-4 data were extracted from the ECS parenting attendance registers. The dark blue bars indicate sessions on child development (n=281 all trial participants; n=268 trial participants with ECS registers; n=232 whoever enrolled in a session).

ISALS ran immediately after the ECS sessions, and all women who attended an ECS session were assumed to have participated at an ISALS session. Notably, ISALS meetings were held as intended after each ECS session. ISALS registers were not available for four clusters. Where records were kept, 184 of the 232 mothers (79.3%) participated in at least one of the 18 ISALS sessions, and 155 (67%) made a financial contribution. The median number of sessions attended at which a financial contribution was made was five (IQR 2–9), and 14/232 (6.0%) made a financial contribution at least 12 times (equivalent to once monthly). Challenges to participation included financial constraints, lack of trust among group members and lack of interest in participating.

For home visits, three clusters did not have any data; 198/232 (85.3%) participants received at least one visit, and the median number of home visits per mother was seven (IQR 0–9). Some CHWs performed below expectation and did not visit each household as anticipated. Of the clusters with home visits data, 34/232 (14.7%) households reported not receiving a single home visit out of the expected minimum of six visits. Factors contributing to this poor performance include long distances between homes, lack of commitment from CHWs with conflicting priorities, and mothers opting out of receiving this intervention component due to fear of stigma. These factors will be explained in the sections below.

Figure 6-5 Venn diagram of trial participant uptake of intervention components: early childhood stimulation (ECS); home visits (HV); internal savings and lending scheme (ISALS)

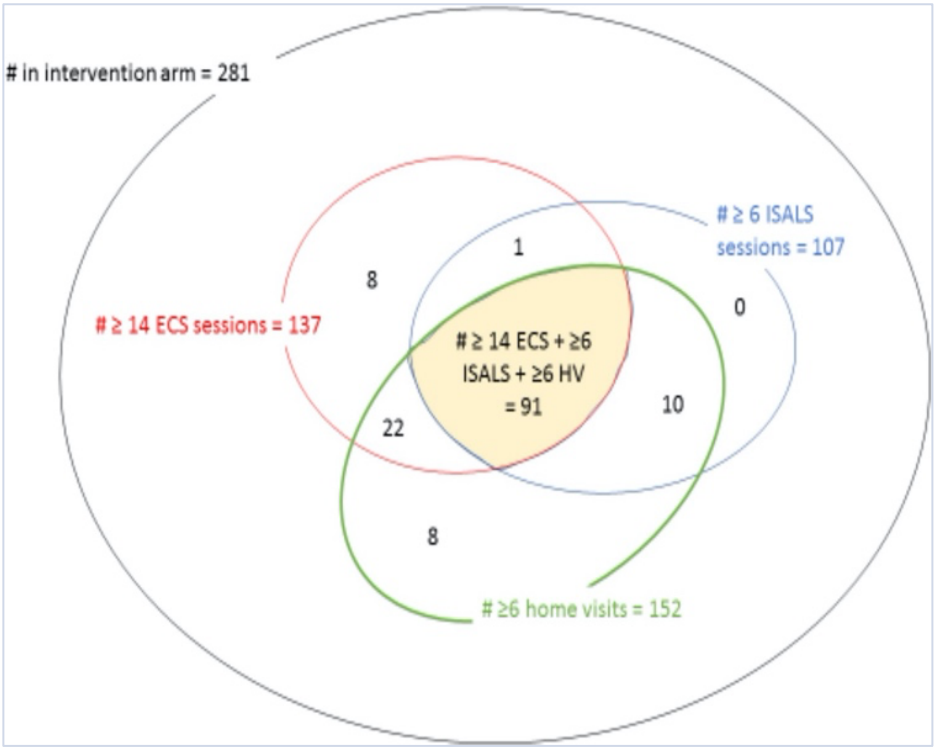


Figure 6-5 shows a Venn diagram of total participant uptake of intervention components. The black circle represents those in the intervention arm, the red those that took up the ≥14 ECS sessions, the blue those that took part in ≥6 ISALS, the green circle were those that got ≥6 home visits and those in the shaded box took part in all three intervention components.

The data shown in Figure 6-5 are extracted from the attendance registers. There were 281 mothers enrolled in the intervention arm (shown in the black circle). Of these, 137 (48.8%) are known to have attended ≥14 ECS sessions (red circle), 107 (38.1%) attended ≥6 ISALS meetings (blue circle) and 152 (54.1%) received at least six home visits (green circle). Only 91 out of 281 (32.4%) are confirmed to have received all three components (shown in yellow) at the minimum intended dose. Evaluation of the intervention dose revealed that i) routine programme data were not meticulously collected, hence the missing data and possible misrepresentation of the coverage (but not of the impact) of the intervention, ii) most participants did not receive the intended amount of each intervention component, and iii) few mothers (32%) received the 'full' intervention package. Failure of mothers to engage with all elements of the intervention package could have contributed to the lack of impact of the CHIDO

intervention on the outcomes. It failed to improve food security, increase social support, increase resilience, improved child development outcomes, all of which have have been shown in this thesis and highlighted studies to be mental health risk factors. Had fidelity and dose been better, potentially some of these risk factors may have been addressed.

6.11.2 Adaptations (any modifications made)

The implementation team made several adaptations when implementing the CHIDO intervention. One example was an attempt to address mothers' non-participation in ISALS, partly attributed to financial constraints. Mavambo created an opportunity for mothers to earn US$10 through a community work programme. The programme data show that this initiative did not improve participation in the ISALS.

A second adaptation was that Mavambo gave each CHW a bicycle to travel to his/her home visits to overcome the barrier of distance between homes. Programme data suggest that this adaptation slightly improved the number of people who received home visits, but this was not sufficient to ensure that all mothers got the anticipated number of home visits, suggesting that distance was not the only factor impeding implementation of the home visits.

6.11.3 Evaluation of how the intervention was implemented

Several steps were taken to optimise the quality of intervention delivery, including, i) careful selection and training of implementing staff, and ii) frequent monitoring and feedback to staff, to improve intervention delivery, by Mavambo, the USAID technical team and the research team.

6.11.3.1 Selection and training

The CHIDO intervention was implemented by people living in the communities where the intervention was implemented. For the ECS sessions, people recruited were all early childhood development paraprofessionals with existing skills and an appreciation of the importance of child development. Shortlisting qualified individuals from a list of

submitted applications was done by the local Sister in Charge, the Mavambo team and the World Education Inc. (Bantwana) technical team. Twenty-seven short-listed candidates underwent five days of rigorous step-down training of the trainers, and, during the practical assessments conducted during the pilot phase, 14 of those were selected as the intervention facilitators. The CBTs and CHWs were selected by the local health facility nurses and the local authorities from a list of those in the communities.

For the CHIDO ECS intervention, six days of participatory training were conducted in which all the implementing staff (ECS facilitators, CBTs, CHWs and nurses) were trained on an overview of the intervention, participatory facilitation skills, child development, how to train and monitor ISALS groups, and content to cover and things to assess during home visits. The research team observed the training, paying particular attention to the content covered and implementing staff's conceptualisation and understanding of the intervention design and content. These measures involved assessments to determine whether the parent trainers applied both verbal and active teaching strategies, as required by the intervention. From the observations, there was evidence that the implementing staff were excited about implementing the intervention, but there was also evidence that they had not fully grasped and internalised the concepts. Mavambo adapted and provided constant monitoring and support, but the intervention would probably have been better implemented had there been more prolonged training and skill-building before implementation.

6.11.3.2 Constant monitoring, evaluation and feedback

Quality intervention implementation can be guided by timely monitoring and evaluation data feedback. The CHIDO intervention used different monitoring and evaluation tools. The first was self-evaluations conducted by the implementing staff using standard checklists monitored by the implementing partner, Mavambo Orphan Care. The findings from the process evaluation indicate that the checklists helped the staff remember their objectives and ensure they implemented the intervention correctly. It also helped Mavambo Orphan Care to understand the challenges and how best to support the staff. Examples of challenges raised early on were session time

management and ensuring mothers' full grasp of the session concepts. Initial self-reports revealed that implementers felt unsure when they started session delivery but that they became more confident of the content as sessions progressed. The home visits checklists revealed that some participants were not receptive to the CHWs, while those who were receptive were happy to review the previous sessions with them.

Mavambo Orphan Care conducted the second component of monitoring and evaluation. It entailed unannounced support visits at sessions, where Mavambo Orphan Care would observe sessions, guided by structured checklists, and feed back to implementers based on their findings, to improve implementation. This process helped to identify staff who were failing to implement as well as intended. One ECS facilitator with consistently poor delivery had to be replaced. The ongoing support and supervision helped improve confidence in implementation:

> *At first, I was not confident. First few sessions I made mistakes and would read the manual a lot, I got feedback from Mavambo. Over time I improved, and I became more confident. (ECS facilitator_03)*

It also helped to ensure that those who were struggling were replaced by someone who could provide effective delivery of the intervention:

> *Unfortunately, there was one facilitator who despite the training, and personal support, was not improving in her facilitation skills […] She was even failing to connect with the intervention participants […] We felt this could affect the quality of service her group would get and thus we had to replace her. The replacement proved worthwhile as the group's momentum improved after that. (Implementing partner_01)*

Feedback from the facilitators shows that the weekly supervision sessions significantly improved their facilitation skills.

The research team conducted the third level of monitoring and evaluation by observing 33 ECS and ISALS sessions. The observations of the ECS sessions indicated that i) there was an improvement in the quality of delivery of the intervention over time as the

facilitators began to master their roles, ii) dropout rates among participants were high over the first few sessions, and as the sessions progressed the numbers became constant, iii) group cohesion improved over time, and iv) individual commitment increased over time as evidenced by mothers starting to do their assigned homework for later sessions.

Observation of the ISALS highlighted that i) challenges to implementation – including lack of capital or financial resources, husbands' refusal to allow their wives to participate and scepticism about trusting group members with one's money – prevented some members from contributing as often as required, or at all, ii) those groups that committed to the scheme managed to save and lend, and their group interaction improved over time into good support groups, and iii) most CBTs were able to support their groups and make sure that they had good record-keeping, but four did not monitor their groups, hence the missing data in such communities.

Monitoring the home visits highlighted several challenges in this intervention component. Not all CHWs conducted home visits were not implemented as well as they were intended in the intervention design due to impeding factors such as:

– long distances to households:

> *with over ten people to visit, it did not help that some of the households were far away. One household was more than 10 km, and I did not visit it. (CHW_05)*

– the health worker having competing commitments:

> *Apart from this programme, I still have the routine home visits I have to do, and other organisations have projects that give higher incentives than this programme. (CHW_02)*

– and some intervention participants being unwilling to be visited due to fear of stigma:

> *I never got visited […] I asked not to be visited because I do not want people knowing my HIV status […] people in this community talk too much. (Mother_14)*

Participants actively attending sessions were more likely to have regular home visits. If these mothers could not participate in the sessions, they would excuse themselves through the CHW, the facilitator or a fellow mother. In such households, the CHW could attest to seeing the participants applying the concepts they were taught:

> *Several households visited now had a 'Tippy Tap' as instructed in the hygiene session, others in my village are starting to copy from them. (CHW_02)*

Several households produced homemade toys for their children using available resources. At home visits, there was evidence of general interest in the intervention by non-study participants, who would ask:

> *When is the next enrolment? We want our children to come and play as well. (Neighbour seen at home visit 07)*

The findings of the observations made by the research team were regularly shared with the implementing partner, Mavambo. Monthly meetings were held across the teams (implementing partner, research partner and technical partner). When urgent issues were identified that affected intervention implementation, these were immediately communicated via email or telephone across the team. The frequent meetings were also used to strengthen intervention implementation.

6.11.4 Mechanism: participant responsiveness to and interactions with the intervention

Participants' view of the intervention impacts their level of engagement. The qualitative analysis of in-depth interviews identified several emergent themes that influenced participant involvement, intervention implementation and acceptability. Enablers and barriers to participant uptake and involvement are described below.

6.11.4.1 Enablers and positive outcomes leading to the successful implementation of the intervention

a) The desire for improved personal health and development of the child

The intervention provided a platform for mothers to address some of the problems they encountered. Living with HIV, and having a child who is HIV-exposed who is at increased risk of stunting and malnutrition is one of the factors cited by the mothers to be a problem. Findings in Chapter 5, showed that mothers in this study reported having food insecurity, and this toppled their concern on their ability to provide and keep their child alive and healthy:

> *I'm struggling to live […] I'm struggling because I have to fight for my child to stay healthy. (Mother_04)*

A mother naturally wants what is best for her child, failing to provide to a child at risk of HIV infection then contributes to the mothers low parenting sense of competence, stress and depressive symptoms. Findings from the process evaluation of the CHIDO intervention showed that among those mothers who attended, there was a high degree of receptivity to programme content that was perceived to strengthen or refine existing parenting skills:

> *I would always move around with her on my back, trying to find ways to survive; I then found out it was at the expense of my baby, I also need time with her. (Mother_01)*

The intervention also taught them practices such as spending quality time with children, and using praise and rewards to encourage positive child behaviour:

> *When I get home after doing my chores, I play with my baby with the dolls we made; I will be teaching her, watching if she is active and playing along. I have seen an improvement in how we interact. (Mother_11)*

Other than the child's development, the intervention also helped improve the mother's mental health. They provided a safe space that reduced their feelings of depression, an atmosphere where they found a release of that which was stressing them:

> *As a person living with HIV, my health had changed, I no longer think too much [a term commonly used for depression], and my health is now all right. (Mother_04)*

> *The lessons were good […]. They were interesting because sometimes my mind would be overloaded, but during the lessons I would feel better. (Mother_11)*

b) *Intervention content that is culturally sensitive and applicable*

The intervention content was contextualised in the local culture. The sessions were conducted in the local language with the course manual and handouts translated into Shona:

> *The handouts were easy to understand for most mothers; they had pictures, which helped those who could not read to remember what we had taught them. (ECS facilitator_04)*

This ensured that the facilitator and participants understood what was being taught. When being taught about feeding practices, for example the five-star diet, they were given practical examples of what they could cook that was affordable and accessible to them in their rural settings:

> *At first, I thought they would want to tell us to buy food we cannot afford, instead it was the stuff we could grow in our gardens. (Mother_06)*

Similarly, they learnt that they could make toys and improve their child's development skills using locally available materials that they did not need to pay for:

> *The toy-making session was the fun one. They brought materials from their homes including old T-shirts, used bottles and lids. (ECS facilitator_04)*

> *What they were taught is stuff that they could do because it was the thing that they had, and they did not need money for. (ECS facilitator_05)*

This process of contextualising the intervention content helped ensure that the community accepted the programme and made it more likely that it would be adopted in daily practice. Moreover, this offered the mothers the opportunity to realise they could be resourceful and still provide a good healthy diet, and toys for their children without having to be stressed over their financial capability. This could potentially have increased their coping strategies, reversed the feeling of them not being competent, and reduced their stress levels.

c) The desire for skills enhancement and economic emancipation

For the few participants who actively participated in ISALS, the intervention created a platform that fostered skills enhancement and their economic emancipation. Through the ISALS, these mothers felt that they had access to an alternative source of capital to start their businesses:

> *Aah, they are helping because looking at those who did not have anything to do, when they make their contributions they can borrow and order goods to sell and that's how they grow. (Mother_04)*

Another mother expressed how the intervention enabled her to be shift from a state of helplessness to a place of economic emancipation. Had everyone engaged in the intervention like her, the number of those that could have felt less helpless could have been high.

> *What I liked most when I became part of this programme is that it encourages us to have changed lives […] I was helpless and didn't know where to start, but because of being in the ISALS […] I now have chickens and also my own goats. (Mother_01)*

The mothers participating in the ISALS reported having a platform to borrow money in case of emergency:

My husband was sick, and I was able to use the money from the group to get money to transport him to the hospital. (Mother_07)

The lending scheme provides a platform for economic emancipation:

We learnt about business management, the flow of money, and all of this would vex me but with time, and because our CBT would explain and wouldn't give up on us, we understood. (Mother_07)

This enabled them to meet their daily needs such as putting food on the table, paying rent, paying school fees for the children and buying clothes:

I agree that these contributions are helpful! I can now sustain my family, sending them to school and also getting food for them. (Mother_01)

Lastly, it created a means to become somewhat financially independent from their partners:

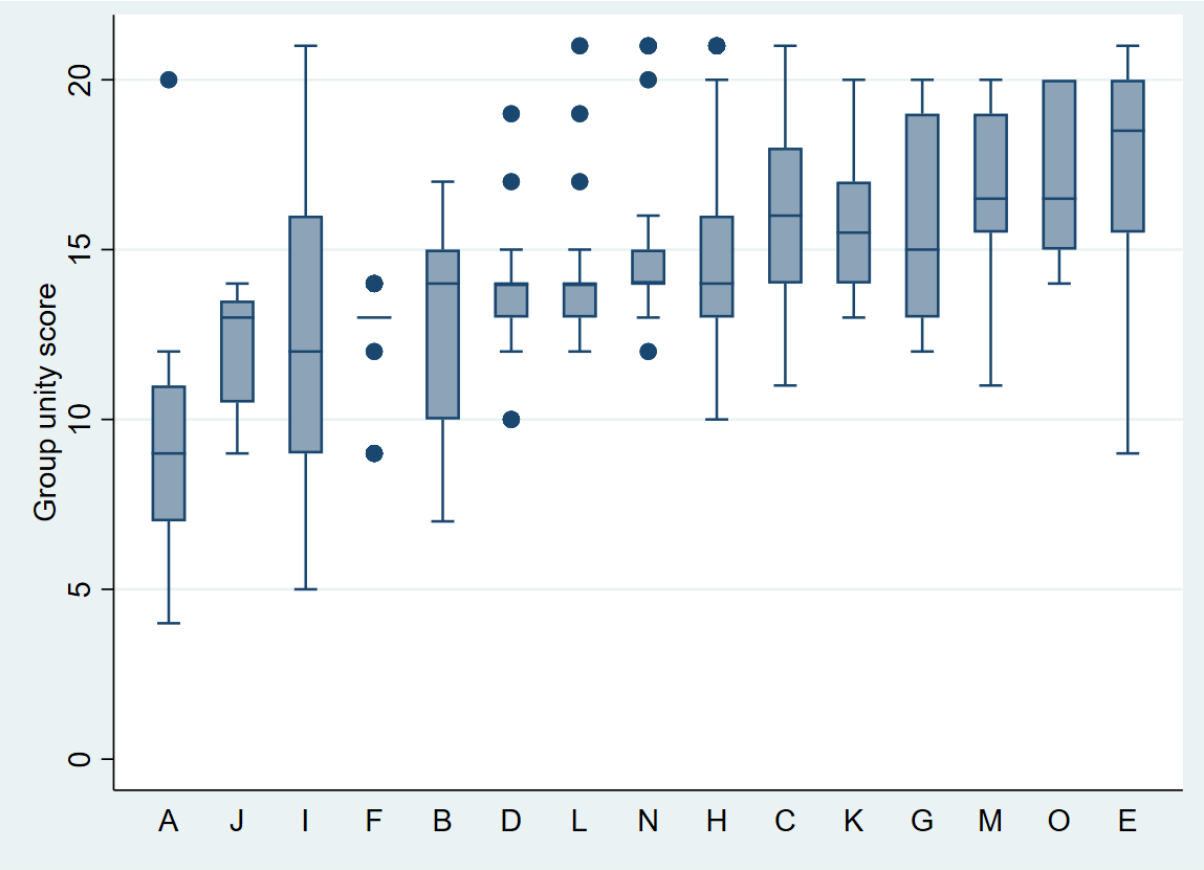
He didn't want it; he would say it wastes our time, and he didn't have money to give me to come here. I found my way of getting the money, and now it is paying off. I no longer need to rely on him for money. (Mother_06)

Overall, the intervention had potential to address several of the mental health risk factors. It could have addressed their financial needs, food insecurity, lack of income, and low parenting sense of competence stemming from failure to provide for their children.

d) The desire for companionship and a support network

Through the intervention groups, friendships and relationships were formed among the study participants and with the facilitators, CHWs and CBTs. Group unity was a crucial element in ECS and ISALS attendance. Figure 6-6 shows box plots of group unity scores by the clinic, ordered from lowest to highest. It shows that some groups (on the left) were mistrustful and did not work well together, while those from clinics on the right had better relationships.

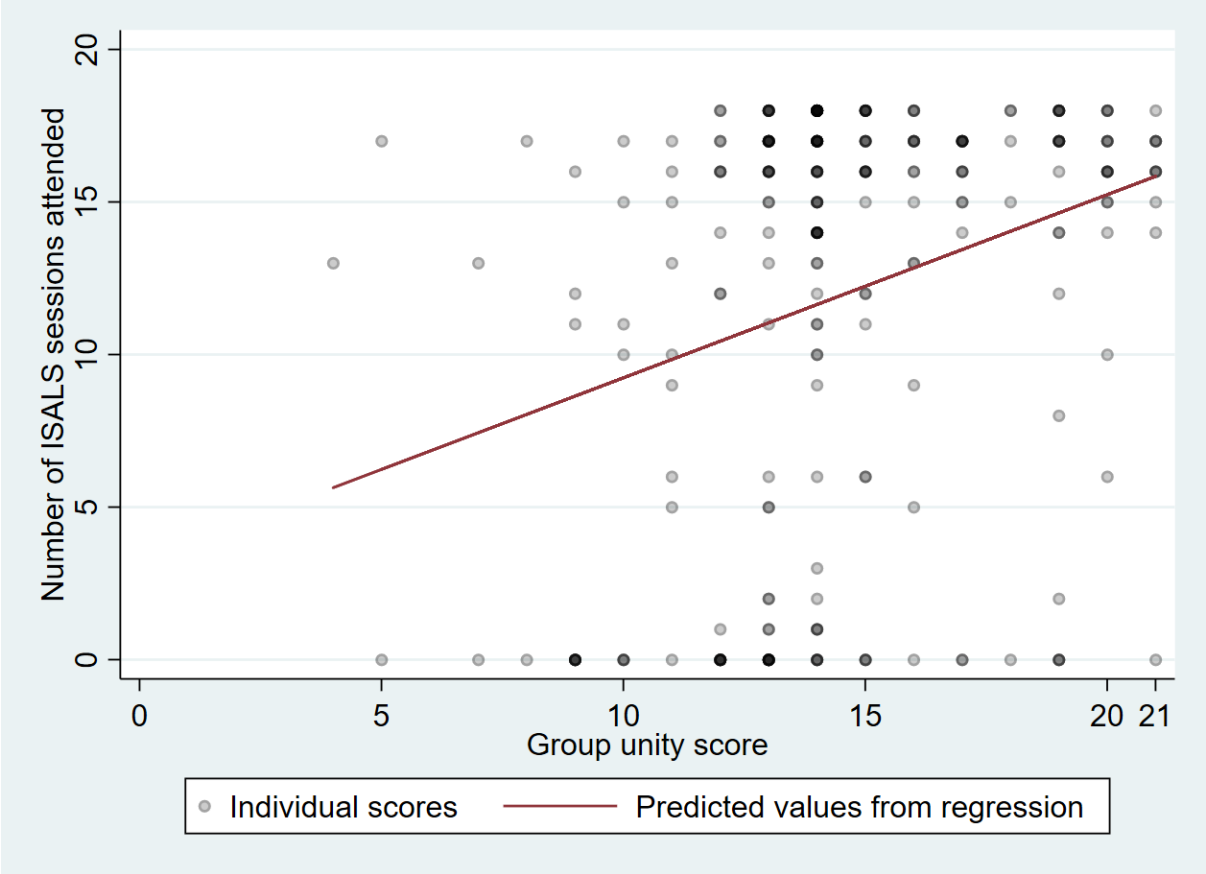
Figure 6-6: Box plots of group unity scores by clinic



The box plot represents the median and interquartile range of values. Whiskers represent the upper and lower adjacent values. Dots represent outliers.

Figure 6-7 is a scatter plot of group unity scores against the number of ISALS sessions attended at the individual level. The red line results from a univariate linear regression model of group unity scores against session attendance among the 249 participants with data on ISALS attendance. The higher the score, the more ISALS sessions a person attended (coefficient 0.60, 95% CI: 0.19 to 1.01; p=0.007), suggesting that lack of unity in the group (mistrust, feeling vulnerable, etc.) was a barrier to attendance.

Figure 6-7: Scatter plot of group unity against ISALS sessions attended



Findings from the in-depth interviews reveal that in a few groups where unity was strong, individuals continued to meet for ISALS even after the ECS sessions had ended:

> *Some wouldn't come to our meetings because we had finished our lessons, so they would say there is no need to go there anymore, even for the ISALS, but we kept on meeting even though we were no longer contributing all the time so that we would meet with each other as a group. (Mother_06)*

The ability to sustain their groups beyond the intervention shows that the intervention had a potential to increase the social capital of the mothers who fully engaged in the intervention.

e) Change emanating from participation

The intervention also contributed to improved relationships between the women and their husbands. Some reported that their financial contributions reduced the financial burden experienced by their husbands and that helped improve their relationships as their husbands respected them more:

> *Ahh, my husband thought it was something worthless, and we are coming here to play, but he later realised that it is something important. He now boasts to others because of the goats we now have. (Mother_04)*

Intervention participants testified to the improvement in their quality of life. Through the ISALS, the mothers achieved economic emancipation, which had a ripple effect of improving the livelihoods of their households:

> *When I started, I bought a goat and two chickens. I now have five goats from the one goat! Now if I want to pay for school fees, I can sell one goat and take the money and pay. (Mother_04)*

Some mothers testified that the group support, the intervention staff, and interactions with the local nursing staff helped improve their sense of self-worth and self-esteem as women living with HIV. The intervention formed a platform for HIV parents' support groups where these women felt they were no longer alone and had genuine companionship. The interactions with the local clinic staff helped to counter the notion that healthcare workers were harsh, thus making it easier for the women to go and collect their anti-retroviral treatment:

> *With this group, we found that their adherence to ART improved. They were now coming to get their medication on time. One once said to me, "Sister, I used to be scared of you, but now I know you are approachable." (Nurse_02)*

Some, on the other hand, felt the programme would increase their exposure to stigma in the community:

> *When this programme came, [my husband] didn't want me to be a part of it because he did not want people to go around in our neighbourhood saying those who are going there are on drugs. (Mother_11)*

The above findings show how the intervention could have possibly improved social capital, which is a key mediator to coping and resilience, and depression. With the right individual dose of the intervention, group unity, less exposure to stigma, and marital relationships the CHIDO intervention may have potentially addressed some major mental health risk factors.

6.11.4.2 Barriers to a successful intervention

Several barriers to the successful implementation of the CHIDO intervention were identified during the evaluation. These mainly emerged in trying to understand why mothers dropped out of the intervention. Barriers emanated from two sources: individual factors and factors relating to the contextual in which the intervention was implemented. The latter will be described in section below, on the influence of the context on the intervention.

a) Lack of interest and relevance

Lack of interest and lack of relevance explain why some mothers dropped out at the start of the intervention. These data came from in-depth interviews conducted with the mothers who had defaulted. One said:

> *I already have four children. I do not need to be taught parenting on my fifth child. After the first session, I realised the parenting classes would not add much value. In general, I am a person who does not like associating with people outside of my circle, so nothing that was offered was reason enough for me to remain in the intervention. (Mother_14)*

Some of those who dropped out said that they anticipated receiving incentives for participation, and when they realised that this was not the case they dropped out:

We know NGOs bring money and goods. When I enrolled, I hoped this would be the case. It was then made clear that this would be a long-term programme with minimal incentives. I lost interest and dropped out. (Mother_12)

b) Lack of trust

Findings from the interviews with those who had dropped out highlighted the fact that lack of trust among mothers contributed to their lack of engagement:

At first, I thought it was a good idea, but I did not like being in a group with people I did not know. I decided to try it out, but I only made contributions in the third meeting. Unfortunately, one person failed to return the money she had borrowed in the next meeting. I did not believe her excuse. At that time, I decided I wanted to leave the group and get back my money. On top of that, there was much gossiping. (Mother_10)

These findings coincide with the level of group unity, as previously shown in Figure 6-7. Lack of trust of mothers towards the intervention facilitators also affected attendance:

I left after I heard that the community health worker was talking about me and what she saw after the home visit. She had never visited me before this programme, and I thought it would be good to establish this relationship, but I was not happy when she told another health worker about my house. I thought there was meant to be confidentiality. (Mother_13)

The research team shared this feedback with Mavambo, who cascaded it down to the implementing staff, reinforcing the need to observe ethical guidelines such as respecting the confidentiality of participants.

6.11.5 Context: an evaluation of its role in the intervention

Context plays a crucial role in the success or failure of an intervention. The CHIDO trial was set up in a context where HIV is common, where early childhood stimulation methods are minimally used, and where poverty, patriarchy, marginalisation, and stigma are still dominating characteristics.

Stigma and discrimination is a risk factor associated with one's social support, coping mechanisms, resilience and ability to withstand having depressive symptoms. In the CHIDO intervention, fear of stigma and discrimination was expressed as a significant barrier to session attendance:

> *I went to one of the first sessions, and I saw one of my relatives there. I had not disclosed to anyone about my status. I was afraid he would go around disclosing my status. (Mother_15)*

> *People are saying these people who are attending the sessions are the ones who are positive and because of that, two participants in my group stopped coming after a few sessions. (ECS facilitator_03)*

> *They were saying that their relatives didn't know that they were on medication. So, if they continued coming here, they would be told by someone that they were coming to the hospital to attend the sessions that are being held for people living with HIV. (CHW_02)*

The stigma and discrimination were fuelled by the religious influence of the Apostolic sect, which was against access to health services. One mother who dropped out said:

> *I was warned that in the future I should be cautious because I would be told that I have HIV, but it won't be HIV but evil spirits evoked by the living. The prophecy also foretold that I would be asked to be initiated to take drugs, so I was warned not to be initiated on anything. I was enrolled in this study, but I did not fit their criteria. I dropped out because I do not believe I have HIV. (Mother_17)*

Aware of the possible stigma and discrimination, the CHIDO implementing staff ensured that during participant recruitment emphasis was placed on the need for child development rather than the fact that the child had been exposed to HIV:

> *I said to them that if you go and if you hear them talking about that, reply saying that you are going there to learn about how to take care of our children. That's what you should tell them so that these people stop talking bad things about […] somebody's health. (ECS facilitator_03)*

The use of local CHWs, as opposed to non-locals, to follow up intervention participants was identified as a positive mechanism to try to make the home visits seem like routine CHW visits. The CHWs would visit several other households as well as the trial participants' households to reduce the chances of stigmatisation of the mothers:

> *I already must conduct home visits in the village, so before I visit the mothers of this programme, I visit one or two that are close by. Doing this helps people not to know that the mother is part of the programme because she is HIV-positive. (CHW_01)*

Poverty was a significant barrier to full participation in the ISALS. Some participants could not afford to contribute to the savings groups, and some mothers left the programme:

> *There was no point in me continuing to come to the programme. We were told to participate in both the ECS sessions and ISALS. I wanted to attend the parenting classes, but I knew I did not have the money to participate in the ISALS […] I was afraid people would judge me for failure to afford it, that is why I stopped coming. (Mother_09)*

Provision of the start-up capital enabled everyone willing to participate in the ISALS to take part:

> *I did not contribute for the first few ISALs sessions as I did not have money. I kept hoping to find money, but the contributions [US$3] were too high for me to manage my other household financial demands.*

Luckily, Mavambo allowed us to work and raise US$10. Now I have been able to make contributions for the past two months and this month as well. (Mother_05)

The CHIDO trial was conducted in an African context that is patriarchal. Mothers had to seek permission from their husbands for them and their children to participate in the study. Husbands' refusal was a reason for some women's refusal to enrol or for their dropping out of the intervention:

Some of the people enrolled in the study at baseline then refused to attend the intervention, citing that their husbands would not let them join and they had no power to go against this. (Implementing partner_02)

Other mothers who had dropped out said:

My husband felt that the meetings were a waste of time. He thought it was us, women, using it as an excuse to gossip and not be productive. (Mother_08)

He was hesitant. Initially he refused, but I had to beg him to allow me to come. Over time, he saw the benefit and encouraged me to attend. (Mother_06)

To minimise refusals from the husbands during recruitment, the study personnel tried to explain the trial in detail to both the mothers and their husbands. While the women were identified as attending the sessions, an invitation was extended to the husbands for them to attend any sessions as and when they were available. In one such case, a father participated when the mother fell sick. Joining the sessions helped him appreciate the positive aspects of the intervention. Another strategy used was encouraging the women to share the training handouts and give feedback to their partners at the end of each session.

Distance from the clinic and to individual households was identified as a considerable deterrent to the successful uptake and implementation of the CHIDO intervention. In some cases, mothers had to travel long distances to get to the clinics where the

interventions were held. Findings show that communities far from where sessions were conducted had a high dropout rate. One mother said:

> *Learning is good, but I'm now tired of walking […] We take two and a half hours to get here, and when I arrive, others will be halfway through the session. (Mother_09)*

Similarly, some CHWs failed to do the home visits as frequently as prescribed in the intervention as the distances to participants' houses were long, making them inaccessible on foot. As part of the programme adaptation, the CHWs were given bicycles to make the implementation of the home visits more feasible:

> *My home visits increased as needed only after they gave us bicycles. Some of those distances were impossible to do on foot. (CHW_03)*

6.12 Discussion and implications for practice

Significant contributors to the trial outcomes included preparedness and implementation of the intervention, factors affecting dosage and fidelity, participant attitudes and the intervention design. I will discuss these results and apply the MRC process evaluation framework to understand the CHIDO trial's outcomes better.

Implementation: dose

Numerous factors influence the successful uptake of complex interventions, one of which is participants' attitude to and engagement with the intervention (307). The uptake of previous parenting interventions has varied: in some interventions, it has been good (308,309); in others, it has been low (307,310,311). While recruitment might be high, continued engagement in interventions can be challenging. The CHIDO process evaluation reveals that uptake was not universal and dropout from different components was high, especially at the beginning. A qualitative synthesis of parenting interventions showed similarly high dropout rates, which in most cases were attributed to situational barriers (such as distance, inconvenient timing), psychological barriers (such as fears, stigma, lack of interest), socio-economic barriers (such as partner

refusal, competing sources of income) and intervention factors (such as course content, style of delivery, intervention facilitators) (307,312).

In the CHIDO trial, the hypothesis was that combining three components would provide a holistic approach to what is needed to ensure effective parenting in mothers living with HIV. These three components were adapted to allow them to be integrated and adapted to make the intervention easier to evaluate in an RCT. However, such adaptations may have created barriers and negatively impacted the outcomes of the intervention. For example, the intervention was confined to women living with HIV only, to evaluate its success in this vulnerable group. However, for some, this type of group setting increased the fear of the stigma associated with women living with HIV. In addition, the clinic-based cluster design of the trial meant mothers were forced to participate in ISALS with people they did not know, thus potentially hindering trust within the group, compared to the normal process where ISALS groups consist of pre-existing friends and neighbours. Some barriers occurred across more than one intervention component. For example, the need to make financial contributions reduced women's participation in both the ISALS groups and the parenting sessions. Also, combining the components may have had a negative impact for their uptake and success. For example, participants had the parenting class directly followed by an ISALS session, which added up time spent to two hours which was too long for some mothers.

A lesson learnt from evaluating the CHIDO intervention is that while the need for an intervention may exist, successful uptake and full engagement of a programme is not always guaranteed. The location and accessibility of the intervention is a key element to be considered. Distance was seen as a major constraint to the successful uptake of interventions. Interventions must anticipate and prepare for other challenges such as societal stigma as well as facilitator attitudes and varying level of skills and commitments. One recommendation is for interventions to take note of the different levels of interest and engagement from the outset, taking into consideration the f actors that affect attendance, and to try to find ways to boost engagement where it is lacking.

Implementation: fidelity

A core determinant of the success and effectiveness of an intervention is ensuring that the intervention is delivered as intended: that is, not only in the correct dose, but as designed, achieving a particular quality. Fidelity is also affected by the steps taken in ensuring that the intervention content is delivered as anticipated. Although the intervention dose was less than intended in the CHIDO intervention, fidelity was generally observed in the two components (parenting sessions and ISALS). The CHIDO intervention reinforced facilitators' knowledge and skills through numerous training sessions, provision of structured training manuals, structured reporting, and monitoring and evaluation systems, all of which helped ensure that the parenting sessions and ISALS meetings were conducted as outlined in the manual. Mothers who fully engaged in the CHIDO intervention gave positive reviews. Some noted progress in their children's development, some noted the improved financial situations in their families, and others reported having improved their mental well-being through interaction with mothers in similar situations. This positive feedback reflects the views of those mothers who remained engaged. Many did not. If the uptake of and engagement with the CHIDO intervention had been better, the intervention might have had more impact. A lesson learnt from this positive feedback is that interventions that are well designed and implemented as intended can have a positive effect if other barriers (such as contextual barriers) are addressed.

Maintaining full fidelity to the original implementation plan is often difficult due to contextual factors (313). The structural barriers encountered during the CHIDO intervention resulted in suboptimal implementation fidelity of the home visits. The long distances between households, the stigma associated with home visits, competing programmes demanding the CHWs' time, and the CHWs' lack of motivation all affected the fidelity of the intervention. Utilising CHWs is a good way of making interventions sustainable and scalable (314), but there is a need to ensure motivation and provide suitable structures and support. In Zimbabwe, as in many low- and middle-income countries (315), CHWs are seen as volunteers and are given inadequate compensation for their services. Factors that influence CHW performance include financial incentives, and the availability of equipment and consumables (316–318). A

lack of these can compromise the quality of services, as impoverished CHWs cannot live off poorly paid activities, resulting in competing challenges arising through their involvement in multiple projects, some of which may be better paid. Some CHWs in the CHIDO trial had responsibilities to several other organisations above and beyond their usual Ministry of Health duties. This contributed to their prioritising "better-paying donor activities", thus explaining the low implementation rates of home visits. Other studies have shown that to ensure CHWs visit households more frequently and improve service delivery, constant training, mentoring and supervision and reasonable remuneration are necessary elements (319–321). These could have helped improve fidelity. The CHIDO intervention had in-person supervision, but this was not conducted frequently and consistently. Practical suggestions from other studies of monitoring and supporting CHWs include supervision in the form of peer supervision and telephone supervision (320). Providing reasonable financial compensation and sound monitoring and support can help prevent missed opportunities for CHWs to provide essential services such as home visits during interventions.

Mechanisms: participant responsiveness to uptake and continuation

Previous studies have shown that mother motivation and enthusiasm when enrolling in an intervention influence engagement with interventions and consequently contribute to their success or failure (322). Participants' views of the relevance of an intervention affect their engagement. Participant responsiveness – that is, their receptiveness to and active engagement with the intervention – is a crucial moderator when evaluating an intervention. It plays a vital element in contributing to the success or failure of the intervention (308). Berkel et al. theorised that participant responsiveness could moderate intervention outcome; as a programme can be characterised by high levels of fidelity, but if attendance or participant responsiveness is low, it is highly unlikely to achieve its intended outcomes (322). This was evident in the CHIDO trial as mothers who enrolled in the intervention mainly in anticipation of access to financial or material gain dropped out when they realised there were no financial incentives for participation. The findings on group unity by the clinic and its association with the involvement in ISALS reflect the fact that the mothers' lack of trust in each other translated to reduced group cohesion and consequently affected

engagement with the intervention. The groups with high unity showed that high participant responsiveness to an intervention could be associated with successful engagement with the intervention. Similar to these findings, a study by Borek and Abraham shows that establishing a climate of trust, among other things, in a group setting influences the socio-emotional environment in the group and the interaction within it, consequently influencing change in interventions (323).

Facilitation and managerial support play a central role in the effective implementation of interventions. In the CHIDO intervention, facilitation skills and group managerial support varied, as shown by the varied levels of mother participation in the intervention. How well facilitators engaged with the content and the mothers contributed to the success of the implementation. The evaluation showed that successful implementation was often challenging where skills and commitment were lacking. Implementers are considered participants, and their responsiveness to and perception and acceptance of the intervention moderate its success. The individuals who did not get home visits had CHWs who mostly faced challenges in providing the service, which resulted in the intervention not being implemented as well as intended. Observations of the intervention also showed that facilitation skills improved over time, and dropouts decreased. In the beginning, some facilitators struggled to manage the workload or understand or convey the course content well, thus jeopardising the mothers' understanding of and engagement with the intervention. Had the facilitators of the CHIDO intervention received more training before commencing the intervention, this could have resulted in maintained interest and reduced dropout in the early stages. When motivated and knowledgeable facilitators conduct interventions, their participants are more motivated to be engaged and not drop out. The process evaluation also highlighted the importance of intervention facilitators getting as much ongoing supervision and support as possible from their supervisors throughout the intervention. This contributes towards the fidelity of the intervention. Appropriate implementing staff must be hired for parenting interventions to have high fidelity. They should be motivated and well trained and supported and have the capacity to deliver the intervention as desired.

Reviewing the context

Several factors relating to the implementation of an intervention is implemented can affect its impact. These include structural factors that may influence participants' responses to the intervention (324). A significant factor that affected attendance in the CHIDO trial was the distance from participants' homes to the health facilities. Long distance was a substantial contributor to the intermittent use of and discontinuation of participation in the intervention. These findings are consistent with results from other studies where distance has deterred people from accessing healthcare services in Burkina Faso (325), Ethiopia (326) and Ghana (327). Long distances can demotivate participants who need to consistently access the services, as was the case for women who tried to access family planning services in Zambia (328). The physical strain of walking long distances, having to travel for hours to and from the clinics and spending an additional two hours taking part in the intervention made accessing the intervention very time-consuming for the mothers, who already had a list of other daily chores to prioritise. Long distances were also a deterrent for access to home visits as CHWs failed to visit all the participants. The fact that Mavambo Orphan Care did not think of providing bicycles for CHWs until halfway through the intervention showed that, for optimal implementation of interventions, it is necessary to conduct a scoping exercise of potential contextual barriers to successful implementation and uptake and put mitigation strategies in place.

Another factor that hindered successful uptake of the intervention was fear of societal stigma, cited by both mothers and CHWs as a reason for dropout. Similarly, previous research has shown that stigma negatively impacts aspects of HIV care (329). A mixed-method study done in Tanzania that investigated the prevalence of travelling long distances for HIV care showed that 40% of its participants experienced enacted stigma and some participants consequently preferred to travel out of their communities to seek care with the hope of not disclosing their status in their communities (330). As in the CHIDO intervention, CHWs in another HIV trial for children in Zimbabwe had to pretend to be friends or relatives during home visits as mothers feared being stigmatised (314). HIV stigma typically leads to social rejection. As a result of the fear of this discrimination, some individuals opt not to access services available to them,

as was the case with some of the CHIDO intervention dropouts. Stigma continues to be a barrier to access to care. A key lesson learnt from the CHIDO trial is that interventions must find strategic ways of addressing the issue of stigma to avoid poor retention.

Research has shown that "power differentials are an inherent part of the researcher–participant relationship" as research participants more often than not feel that the researcher is the 'expert' (331). In some cases, this has resulted in social desirability bias, where participants give feedback based on what they feel the researcher wants to hear instead of the actual situation (332–334). When responding to intervention evaluations, social desirability bias can lead to inaccurate self-reports and erroneous study conclusions. Responses to the CHIDO trial at 12-month follow-up show social desirability bias, as even participants who dropped out of the intervention gave positive reviews. This, however, was not fully translated into practice, as showcased by the low attendance and participation rates. Participants were comfortable giving negative feedback about their colleagues (for example, in answering group unity questions) but not about the intervention implementers. Research bias can result from participants feeling the need to be polite and respectful when evaluating researchers as the 'experts' or 'donors' instead of assessing them or giving feedback about them as people they view as equals. It is challenging for intervention trials to grow by learning from feedback where the culture is that the researcher is the expert and thus should not be negatively spoken of. Researchers using questionnaires to evaluate trials or interventions should consider the impact of social desirability bias on the validity of their research and use a scale such as the Marlowe–Crowne Social Desirability Scale (MCSDS) or the Balanced Inventory of Desirable Responding (BIDR) Short Form to detect and control for such bias (335–337).

The intervention design and its shortcomings

The design of the CHIDO intervention presented challenges to its impact. Complex interventions are challenging to develop and document, and demonstrating their effectiveness is not always achievable (296,338). Like most complex interventions, the CHIDO intervention consisted of multiple interdependent components conducted by different staff. Some intervention elements had manuals with clear and set guidelines

(the ECS sessions), while the ISALS and home visits were less structured, making it more challenging to ascertain the effects of the different programme components (324). Combining the various components of the intervention could have contributed to its lack of impact on the desired outcomes. Retention of participants could have been affected by participant responses to each element of the intervention: differing levels of participant commitment to the intervention components may have led to differential dropout rates, making it difficult to establish which parts of the intervention in particular led to high or low retention rates (338). This is not to say that the different components are inappropriate for the targeted beneficiaries. Several studies have shown the importance of parenting interventions (286,290,339), while others have demonstrated the importance of economic strengthening schemes and home visits (71–73) in promoting child stimulation, financial security and treatment adherence. A lesson learnt from the CHIDO intervention is that the different components could not be fitted into a single intervention without losing essential aspects. For example, forcing the ISALS and parenting sessions to involve the same people simultaneously was not optimal for either component. Future interventions must first explore at length the practical implications of combining intervention components. In cases where synergy is possible, interventions should be flexible to allow individuals to select which elements suit their needs and preferences.

Study strengths and limitations

A strength of this evaluation is that we used a well-established and recommended framework for assessment of the CHIDO trial intervention (182). We applied this framework using a mixed-method design that allows us to compare and interpret quantitative results from the programme data and study survey, and findings from the perspectives of the implementing staff and trial participants. This comparison adds to the validity of our results and the value of our conclusions on possible causal mechanisms of the impact of the CHIDO trial (340).

The process evaluation was conducted with the support of an experienced multidisciplinary team. Positive working relationships were created between the programme developers, implementing partner and research team. Regular communication across the board allowed the research team to feedback on areas that

needed improvement during implementation. The research team were also notified about any changes to programme content and delivery outside their observations. Working closely with the implementing partner also created an environment in which it committed to monitoring fidelity and implementing processes together with the research team.

There are two main limitations in the methodology used and the data received. The programme data had some data missing, from one of the parenting groups and some ISALS groups, thus affecting some of the findings. The missing registers meant an underreporting of the doses received by mothers who participated in the various components of the intervention. This may have influenced the measured outcomes. The research consortium developed structured self-reported and observational checklists as part of the methodology to evaluate the implementation process inherent in the CHIDO intervention. With these checklists, we wanted to assess the self-reported and observed competence of implementing staff in administering the intervention as prescribed. We also included an eight-item self-reported questionnaire on beneficiaries' attitudes towards and perceptions of the intervention. None of these tools was validated. However, attempts were made to ensure that these tools reflected the content of the intervention, and we do believe they measured, at least to some extent, the perceptions, and attitudes of the mothers.

One other limitation is that this process evaluation was performed by a CHIDO trial research consortium (182). The process evaluation data were collected during the trial, but data analysis was also performed when results from the trial were known. Both these phenomena could have created some bias in the data analysis. The researchers reflected on this and used data sources collected both during the trial and independently from it.

Implications and contributions of the process evaluation

To successfully evaluate complex interventions, there is a need to incorporate process evaluations, as conducted in the CHIDO trial. This study shows how the MRC framework can be operationalised for evaluating multi-component parenting interventions by mapping the activities, development, and outcomes of the intervention

so that these findings will enable comparison with other parenting interventions and support the development of new interventions. Although the trial did not find an impact of the intervention, this process evaluation showed that the intervention was acceptable and beneficial to those mothers who fully engaged in it. This study adds to the body of evidence by demonstrating the difficulties in implementing multifaceted interventions, in particular the challenges in keeping mothers engaged in parenting interventions.

Recommendations

The evaluation of the CHIDO intervention using the MRC framework has resulted in several lessons that can be applied in future research or multi-component parenting interventions. A positive lesson that came out from the findings is that women valued the early childhood stimulation intervention, as over 60 % went to more than 14 sessions despite the challenges. Those who fully engaged in the program were able to benefit and give positive outcomes such as improved parent-child interaction, economic emancipation, and increased social support (emanating from the newly established friendships). Intervention offering a platform for shared experiences, personal advancement, and one that fosters group unity can be well received by mothers living with HIV.

A lot of thought and consideration must be put when developing interventions, as was done in the CHIDO intervention where they tried to consider the key risk factors to poor child development and maternal mental health conditions. The intervention conducted a detailed pilot and adaptation was made in face of the pilot findings, and a lot of training was conducted to promote the fidelity of the intervention. Despite all these efforts, a key lesson of note is that the reality may be that such a complex intervention may not be readily implementable at scale under real world conditions. Restricting to mothers living with HIV was probably unnecessary and making it more inclusive would likely have improved attendance.

Implementers of complex interventions should not apply a one-size-fits-all approach when conducting and monitoring intervention activities. Integration of the various study components may warrant closer investigation. The CHIDO intervention participants

opted out of some features, but this was not by design, and it was assessed as lack of engagement. ISALS were valued but there needed to be flexibility about who was included. There is also a need to allow time to deliver interventions and set within a time frame that allows for measurement of impact. Short follow-up can result in missing the long-term implications.

In addition, training and routine programme monitoring and evaluation are crucial elements of the successful implementation of any intervention. Implementers need to receive intensive training to ensure quality services are delivered with skill and enthusiasm. There should be confidence that the implementers have fully mastered their roles and responsibilities before an intervention commences, as this affects service uptake. Unpolished facilitators who are learning on the job can contribute to poor implementation and high retention. The workforce assigned to the intervention needs to be appropriate for the tasks. A stretched workforce dilutes capabilities and ultimately affects the performance of the intervention and the desired outcomes.

When implementing complex interventions, it is essential to critically consider each step of the causal pathway underlying the intended effects and the context in which an intervention is being implemented (341). Doing this before and during the intervention will help in developing strategies to enhance fidelity, uptake, and the positive response of the intervention beneficiaries. Recommendations resulting from the lessons learnt from implementing the CHIDO intervention include:

i) Find ways to avoid and mitigate stigmatisation of beneficiaries.
ii) Address or avoid the need to travel long distances to provide or access the intervention.
iii) Create ISALS where there is trust.

These are briefly explained as follows: in a context where HIV stigma and discrimination are high, conducting parenting classes that target caregivers of HIV-exposed children might deter uptake. Extending the programme to HIV-negative caregivers might have reduced stigma and dropout related to fear of stigma and discrimination. Interventions should be implemented at a site near and accessible to participants, and adequate long-distance transport should be available. Conducting

ISALS in a limited-resource setting, with a group who do not know each other well and where trust and group unity are undeveloped, can be challenging. It is better to establish groups of people who know each other and already trust each other. Where this is not possible, there is a need to put mechanisms in place to promote trust and group unity before introducing the financial emancipation schemes.

6.13 Conclusions

The evaluation of the CHIDO trial has provided an understanding of why the intervention showed no impact on child development, economic insecurity or retention in care among HIV-exposed and -infected children. Mothers living with HIV and raising infants, living in a limited-resource setting are exposed to multiple vulnerabilities that affect their parenting capabilities, their own and their children's health, and their own and their children's psychosocial well-being. Conducting a complex intervention targeting these multiple vulnerabilities is a noble intention. Although the CHIDO intervention did not achieve its desired outcomes, the evaluation showed that the intervention had strengths and hence a lot of potential to achieve these desired outcomes had there been another opportunity to address the lessons learnt. The full engagement of the intervention, by over 60% of the mothers, is testimony of the desire of improved social support, improved livelihood, improved health expressed by mothers living with HIV. However, the evaluation has shown that an intervention's context, implementation, and mechanisms play a crucial role in determining whether the desired impact is achieved. At times, the combination of different components that are not directly linked can hinder a positive outcome. The time invested in preparation, support, monitoring, and evaluation also plays a vital role in successful implementation. Key lessons from the positive attitudes and perceptions reported by the CHIDO trial beneficiaries indicated that complex parenting interventions set up in a healthy group setting and delivered by dedicated and friendly implementing staff could positively impact the mental well-being of mothers. Future parenting interventions should prioritise parental mental health as an outcome and not just focus on child development.

7 Chapter 7: Conclusion

7.1 Background

The purpose of this PhD was to assess the burden of maternal mental health conditions, specifically depressive and stress symptoms, and understand the association between poor maternal mental health and parenting style. My literature review (Chapter 2) found that despite substantial evidence of the burden of poor maternal mental health in mothers living with HIV, very few have access to mental health services. Similarly, despite the evidence that complex interventions are effective in addressing the risk of CMD and enhancing parenting skills, very few have been tailored to address the mental health needs and the associated risk factors of mothers living with HIV who have HIV-exposed infants in LMICs. This PhD therefore aimed to do the following:

> Objective 1: To assess the prevalence of maternal mental health challenges and explore the associations and risk factors for maternal mental health attributes in mothers living with HIV in Zimbabwe.
>
> Objective 2: To explore how maternal mental health affects parenting and the livelihoods of mothers living with HIV.
>
> Objective 3: To evaluate the process of a multi-component parenting intervention implemented in the CHIDO trial.

To address these aims, I conducted the following steps in this PhD:

i) In Chapter 1, I defined the key maternal mental health indicators used in this thesis, and I gave background information leading to the rationale of this PhD study. As part of the rationale, I also gave an overview of the CHIDO trial in which the PhD is nested, my roles in the trial, and the results of the trial.
ii) In Chapter 2, I conducted a review of the literature, primarily focusing on synthesised evidence from systematic reviews that highlight the burden of maternal mental health conditions, showing the need for culturally appropriate

mental health screening tools in resource-limited settings and giving examples of interventions that have helped improve maternal mental health in mothers living with HIV.

iii) In Chapter 3, I gave a summary of the different methods employed in the main results chapters (chapters 4–6). This PhD has used a mixed-method approach.

iv) In Chapter 4, I conducted a validation of the eight-item Shona Symptom Questionnaire (SSQ-8) used in the CHIDO trial as a shorter version of the locally validated SSQ-14. This chapter reinforced the findings from previous research on the need to use validated tools applicable to the local context.

v) Having validated the use of the SSQ-8, I then used it as a screening tool for one of two variables to determine the burden of mental health conditions in mothers living with HIV and its association with parenting style (see Chapter 5). CMD and parenting stress were the two main variables of interest.

vi) In Chapter 6, I conducted a process evaluation of the CHIDO trial intervention using the MRC process evaluation framework to understand the enablers and barriers to implementation and the mediators through which the intervention worked.

This chapter synthesises the findings of each chapter in relation to the literature to answer the following questions:

i) Is there a general concern (in LMICs) about the burden of poor mental health in mothers living with HIV and its impact on their parenting capacity? What contribution can interventions that target these women make?

ii) Would using a shortened version of a locally validated screening tool (SSQ-8), as done in the CHIDO trial, lead to the correct classification of mothers at risk of CMD?

iii) What is the burden of (repeat) CMD and parenting stress in mothers living with HIV in the rural Zimbabwe setting, and what association does it have with their parenting style?

iv) What are the enablers and barriers to the implementation of the CHIDO intervention, and at the mediators through which the intervention worked? Of what benefit is it to conduct process evaluations of complex interventions, and

how can the lessons learnt from the evaluation of the CHIDO intervention best be used to optimise the implementation of future interventions?

In the following sections, I will summarise my key findings in relation to each research question.

7.2 Summary of findings

7.2.1 A review of the burden of maternal mental health conditions and interventions promoting maternal mental well-being

Mental health conditions are among the top leading causes of disability, with depression and anxiety affecting up to 322 million and 264 million people globally (8). Several systematic reviews have been conducted showing the varying burden of mental health conditions in Africa and LMICs. Depression was shown to be highly prevalent in women during the perinatal period, and this was even higher in mothers living with HIV (124,132,342). The weighted burden of mental health conditions in another review ranged from 5% to 10% in the general population and from 13% to 78% in people living with HIV. In five LMICs (Ethiopia, India, Nepal, South Africa and Uganda) the prevalence of maternal depression varied across settings ranging from 5% in Ethiopia to as high as 35% in South Africa (90). Socio-economic and contextual factors such as poverty, lack of education, food insecurity, lack of social support, domestic violence and living with chronic conditions were shown to be risk factors for depression, stress and anxiety, among other mental health conditions.

This thesis has shown that the high burden of maternal mental health conditions in LMICs is coupled with a treatment gap, as an estimated 85% of people identified with mental health conditions receive no treatment. The burden of mental health conditions has been shown to have a negative impact on parenting and child development outcomes. Women with depression were shown to have an increased risk of low self-worth, self-harm ideation and poor parent–child interaction, and their symptoms can restrict their consistency and availability when parenting (173,343). Consequently, their children are at increased risk of attachment difficulties and social, emotional,

behavioural and educational problems (127,174). In an attempt to prevent and address the effects of maternal mental health conditions on child development and the well-being of women, several interventions have been developed and evaluated. Some have been in the form of parenting groups or classes (88,286,287,344), some have used psychological approaches such as problem-solving therapy or cognitive behavioural therapy (345), and some have used home visits as a way to increase access to improved mental health outcomes (262,346,347).

7.2.2 Validation of the 8-item Shona Symptom Questionnaire: the benefits of having a valid short mental health screening tool.

The importance of diagnosing or screening for maternal mental health conditions has been discussed throughout this thesis. As discussed in chapters 2 and 4, mental health screening using screening tools that are culturally adapted and validated against a gold standard is recommended where there are no qualified mental health specialists to conduct diagnostic tests. It is also feasible to use validated screening tools in primary healthcare settings or research settings; in this case, the CHIDO trial used the SSQ-8 (a shortened version of the SSQ-14) to detect the risk of depressive symptoms.

In Chapter 4, I made a direct comparison of the performance of the SSQ-14 and the SSQ-8 in a population with high HIV prevalence. I showed that the SSQ-8 performed as well as the SSQ-14 with a sensitivity of 91% (95% CI: 84%–96%) and a specificity of 71% (95% CI: 56%–83%). The high prevalence of symptomatic CMD (72% among participants living with HIV) as identified by the SSQ-8, indicates an urgent need to develop a national or regional healthcare policy that promotes increased screening, diagnosis and treatment of CMD in primary healthcare settings, especially for patients with chronic conditions. Having a short screening tool would be beneficial in settings, such as the Zimbabwe healthcare system, that are short-staffed, with healthcare workers overwhelmed by their day-to-day responsibilities (81). Adding routine mental health screening would require a short tool able to correctly identify people at risk of mental health conditions (348). We have validated the SSQ-8 for CMD screening, but there is a need for validation of other maternal mental health screening tools for use

in routine settings or any other parenting programme, including validation of measures of parenting stress (e.g. PSI-SF).

7.2.3 The burden of maternal mental health conditions and its association with the parenting practices of mothers living with HIV in rural Zimbabwe

Using the validated SSQ-8 which was administered at baseline and 12 months, I investigated the burden of CMD and parenting stress symptoms in Chapter 5. The characteristics of mothers and the socio-economic and parenting factors relating to maternal mental health were also investigated. From the 574 mother–child dyads enrolled in the study, 495 mothers (including 485 mothers living with HIV) took part in both baseline and 12-month follow-up surveys. Of these, 25.7% (n=127) had repeat CMD symptoms: that is, they had depressive symptoms at two timepoints (baseline and 12-month follow-up). When assessing the prevalence of repeat CMD symptoms by risk factor, a multivariate analysis of mothers who took part in both the baseline and follow-up surveys (Model 1) showed that repeat CMD symptoms were independently associated with being the only adult in the household, food insecurity, domestic violence, mobility problems, a lack of resilience and a lack of postpartum bonding. In Model 2 of the analysis, which had 389 mothers who were in a relationship (with complete data for all variables), repeat CMD symptoms were independently associated with a lack of postpartum bonding and low relationship quality, and weakly associated with low resilience, a lack of social support, being the only adult in the house and food insecurity.

Findings from this thesis show that parenting stress was associated with CMD symptoms, pain and discomfort, a lack of education, problems performing one's usual activities, and domestic violence. Similarly, we showed that CMD symptoms were associated with parenting sense of competence and discipline. Mothers living with HIV with CMD symptoms were likely to have a low parenting sense of competence, and they were more likely to slap, shake or spank their infants. Of the 127 mothers with repeat CMD symptoms, 89 (70.1%) had either slapped, shaken or spanked their children.

In summary, our study showed that parenting stress was significantly associated with CMD. While the CHIDO intervention did not impact on child development, there was some evidence that it reduced parenting stress. If, indeed, child development is mediated by parenting (which was the assumption of the theory of change underpinning the CHIDO trial), then reducing parenting stress may be important. Therefore one could hypothesise that the CHIDO trial may have had an impact on a child with better dosage and coverage of the intervention and longer follow-up. Equally, given the association between CMD and parenting stress, interventions improving maternal mental health may reduce parenting stress and lead to better child development outcomes.

7.2.4 Enablers and barriers to implementation of the CHIDO intervention: a process evaluation of the intervention components

In Chapter 6, I conducted a process evaluation to understand the active ingredients of the CHIDO intervention that contributed to its outcomes, specifically those which improved parental distress (a subsection of the PSI-SF). I adopted the MRC process evaluation framework to understand the implementation, context and mechanisms leading to the uptake of and engagement with the parenting intervention by the mother–child dyads. The process evaluation showed that while the intervention components were delivered, fidelity was not well maintained: some components were not delivered as prescribed. Mothers did not access the intervention as a combined package, either because all components were not delivered to them or because they chose the components they preferred and opted out of the others. This had an impact on the intervention dose as only 32.4% (n=91) participated in the full, combined package at the minimum dose prescribed (≥14 ECS sessions, +≥6 ISALS sessions, +≥6 home visits). The dose for the ISALS sessions was generally poor as the medium number of sessions attended was five (IQR 2–9), and only 6.0% (n=14) made at least 12 financial contributions. Similarly, coverage of home visits was suboptimal; 14.7% (n=32) of households did not receive a single home visit, and the median number of home visits per mother was seven (IQR 0–9).

There were several factors that affected the intervention outcomes. The mothers in the CHIDO intervention lived in a context characterised by poverty, HIV-related stigma, and patriarchy. The desire for improved health, skills enhancement and a support network acted as enablers to participation, while the lack of interest and lack of group unity and trust were barriers to the intervention outcomes. The design of the CHIDO intervention may have presented challenges to its impact as it consisted of multiple interdependent components conducted by different staff, making it more challenging to ascertain the effects of the different components.

Another major barrier was that the intervention was offered only to those living with HIV, and thus findings could not be generalised to the wider population. Although the trial did not find any statistically significant impact of the intervention, the process evaluation showed that the intervention was acceptable and beneficial to those mothers who fully engaged with it. The positive feedback on perceived improved child health outcomes, economic emancipation, and establishment of social support during the intervention may potentially have had an impact on reducing parental distress, which is the distress that is derived from contextual factors in one's life. The fact that the intervention was branded as "parenting" may have reduced uptake and resulted in a lack of interest in those mothers that felt they did not need to be taught how to parent their children. The branding of the CHIDO intervention as a 'parenting intervention' was a conscious choice to prevent the intervention from being perceived as an HIV intervention, lest stigma became the deterring factor when it came to intervention uptake. Whether or not the branding of the intervention as 'parenting support' was a good decision is unclear, but mothers may have felt more inclined to participate if the intervention was described as a social club or as skills-enhancing.

7.3 Synthesis and interpretation of findings

7.3.1 Identifying the burden of maternal mental health conditions in resource-limited settings: the use of a locally validated screening tool in rural Zimbabwe

The presence of repeat common mental disorder symptoms (25.7%) and clinically significant parenting stress symptoms (43.6% in the full population and 73.2% in those with repeat CMD) in the present study indicates the magnitude of mental health conditions in mothers living with HIV in rural Zimbabwe. This is in agreement with previous studies in Zimbabwe (85,86,136,349) and in other LMICs (90,350). However, the comparison of study results in terms of both prevalence and incidence is complicated due to the use of different screening/diagnostic tools, different cut points, varying time periods (perinatal or general time) and cultural variables. This study showed that the SSQ-8 performed as well as the SSQ-14 in screening for CMD symptoms in a population of high HIV prevalence. This study assessed symptoms of CMD, rather than clinical depression, but when comparing them with the 37% prevalence of CMD obtained using the SCID criteria among a general population of high HIV prevalence (62), the prevalence of depression symptoms in this study is seen to be in alignment, showing the high burden of mental health conditions in women living with HIV.

As this study and others have noted, the continued existence of diagnostic and treatment gaps in maternal mental health has detrimental effects on the achievement of important targets such as the SDGs (216) and the 90-90-90 HIV treatment goal (33). It is crucial to integrate mental healthcare within existing maternal and child health in Zimbabwe at both policy and practice levels. This would entail screening for mental health conditions such as common mental disorders, perinatal depression, and parenting stress when women seek medical attention. Healthcare workers, including community health workers, can screen using validated screening tools, as this study and other studies have indicated that locally validated tools are a good replacement for diagnostic tests where they are not available (32,345,348). However, treatment or interventions need to be in place before the screening so that those at risk can get care.

7.3.2 Maternal mental health conditions, associated risk factors and impact on child and family well-being

This study identified several risk factors associated with maternal mental health conditions, and these include food insecurity, lack of social support, domestic violence, mobility problems, a lack of resilience and poor postpartum bonding, a lack of education, a low parenting sense of competence, and negative discipline. In some cases, these may have acted as risk factors for poor mental health and vice versa.

Studies have shown that the prevalence of mental health conditions is higher in LMICs than in high-income countries, supporting the notion that poverty and challenging socio-economic circumstances leading to food insecurity and a lack of education are risk factors for mental health conditions (154,276). Similarly, this research showed that mothers were more likely to have symptoms of depression at two timepoints if they reported having no food in the house, a sign of food insecurity, and if they had poor education. The relationship between poverty and common mental disorders has been well documented (152,276,351), suggesting that it is a universal problem occurring in all societies irrespective of their levels of development.

The context and cultural values one is exposed to can have a significant influence on social norms and contribute to distress and increased vulnerability to mental health conditions (352). Zimbabwe, like many LMICs, is a patriarchal society, where male dominance, rigid gender norms and inequities foster the occurrence of domestic violence (353). Women in the study who experienced domestic violence were more likely to report symptoms of depression and parenting stress than those in good relationships. Consistent with other studies (86,353,354), this study showed that having a poor marital relationship is an important vulnerability factor associated with both common mental disorders and parenting stress. While the CHIDO intervention sought to provide input relating to parenting skills and economic empowerment, it was not a mental health intervention, and despite the ISALs, it did not address the challenging socio-economic circumstances for most of the participants.

Women with low levels of social support lack effective psychosocial resources as they receive insufficient emotional and practical support from partners, family members and

friends. This lack of social support has been shown to be a stress-moderating variable for the onset of depressive symptoms (355,356). Lack of social support is common in people living with HIV, as HIV is associated with stigma and discrimination, which in turn leads to reduced social support and impacts people's mental and physical well-being (155). Addressing the culture of stigmatisation and discrimination against mothers living with HIV might help to address the lack of social support and consequently reduce their risk of depression and stress.

Maternal mental health conditions have been shown to have a negative impact on mother–child interaction, produce challenges in parenting and lead to changes in the family environment. This thesis explored the impact of maternal depression and parenting stress symptoms on parenting style in a cohort of mothers living with HIV. Consistent with other studies (44), this research found that women with depressive and parenting stress symptoms felt less competent in their parenting capacity, were less resilient to life's adversities and were more likely to have slapped their children. This association was independent of the effects of conventional risk factors for maternal mental health conditions such as poverty, lack of social support and poor intimate partner relationships. The results of the sub-analysis of the CHIDO trial also indicate that children of mothers reporting repeat mental health symptoms exhibit signs of developmental delay in verbal and visual subdomains (357). The negative association between maternal mental health conditions and parenting style is also reported: stressed and depressed mothers may be less emotionally sensitive or attuned to their children's needs, leading to harsh treatment (43,268,287).

7.3.3 Unpacking the importance of evaluating complex parenting interventions aimed at improving parenting skills and child development

Contextual factors in rural Zimbabwe, such as distance from services, a culture of patriarchy, and stigma in rural communities, indicated that mothers living with HIV could fail to access interventions beneficial to their mental well-being. Consistent with these findings, studies have shown that mental health stigma is a significant barrier to the uptake of services in the community (358–360). The results described in this research may be useful when considering the development, evaluation, and

successful implementation of future complex parenting interventions. Holistically addressing the potential barriers identified in this evaluation and the intersecting risk factors identified in Figure 2-1 could also inform the design and implementation of interventions intended to promote maternal mental health and enhance parenting. In Figure 7-1 below, I adapted the CHIDO trial theory of change, highlighted the multiple risk factors represented in Figure 2-1 and proposed types of intervention components that could address these multiple risk factors with the aim of ultimately improving maternal health and child outcomes.

Figure 7-1:Proposed theory of change for future parenting interventions

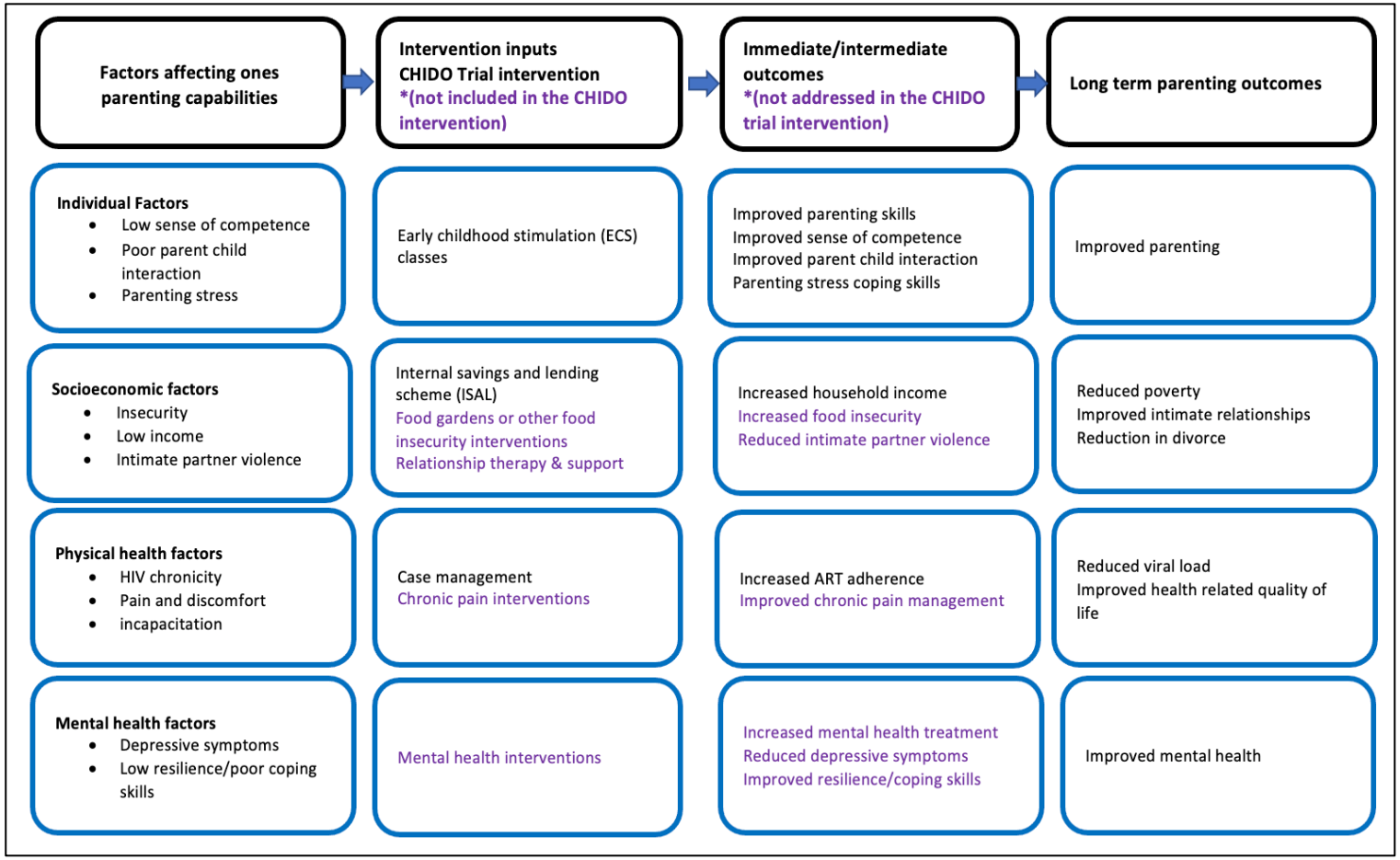


Figure 7-1:The proposed theory of change is based on refinement of the CHIDO intervention and suggests the incorporation of key intervention elements (in purple) to address risk factors impairing both the mother's parenting capacity and mental well-being.

The process evaluation, conducted using the MRC framework, highlighted potential reasons for the null effect of the intervention. Contextual factors in Zimbabwe, such as distance, a culture of patriarchy, and stigma in rural communities, indicated that mothers living with HIV could fail to access interventions. The low uptake and dose were shown to have been affected by context-specific logistical challenges, for example, long distances which meant that community health workers did not conduct home visits as planned. This has previously been documented by other studies, especially in rural settings where distances can be long and deter the provision of case management and treatment support by community health workers (361). In other studies, patriarchy has been shown to affect the uptake of intervention, where mothers often require permission from the partner or head of the household to engage in services. Equally, while HIV-related stigma has decreased in some settings, it is still prevalent in more rural communities (361).

The CHIDO intervention took a task-shifting approach by using non-specialist workers (ECS facilitators, community-based trainers and community health workers) to deliver the intervention. The process evaluation highlighted the need to train, adequately equip and support such non-specialist workers throughout any intervention. Several studies have shown that task-shifting is an effective way to improve access to health services (136,314,362–364). Understanding the challenges and barriers encountered during the CHIDO trial helped provide insight for future interventions. The intervention tried to address some of the socioeconomic risk factors by providing micro-financing. Unfortunately, the process evaluation highlighted several reasons why the uptake of microfinancing was limited. Initially, no financial support was provided by the trial for the microfinancing groups. This meant that the most impoverished mothers could not participate. As part of the process evaluation these findings were fed back to the trial steering committee resulting in changes to the microfinancing scheme. The trial provided start-up capital for microfinancing groups resulting in increased uptake. Importantly some mothers did not trust their peers within the microfinancing scheme resulting in fallouts among the ISALS groups despite the provision of start-up capital.

Given the association between symptoms of CMD and parenting stress and sense of competence, as described in Chapter 5, interventions to improve maternal mental

health may have a positive effect on parenting. Mental health is governed by multiple interacting factors (17), and thus successful interventions to reduce risks are often complex, as they try to address these multiple interacting factors. Complex interventions can, however, present challenges for implementation in practice as shown in this PhD thesis. The process evaluation of complex interventions such as the CHIDO trial is vital for the translation of evidence into wide-scale public health practice (365). However, the process evaluation of this thesis could not be linked directly to the other objectives of the PhD, which focused on maternal mental health. The intervention implemented as part of the CHIDO trial was not directly targeting maternal mental health. Thus, the process evaluation questions, and topic guide (see Appendix 8) did not specifically focus on the issue of evaluating the impact of the intervention on maternal mental health. It did not investigate how the issue of maternal mental health could have impacted on the uptake, engagement, or perceived benefits of the intervention. Given the many components of the CHIDO trial, it may have been difficult to add another component, such as a mental health intervention. However, it is perhaps not surprising that a parenting intervention which did not address the multiple underlying risk factors for suboptimal parenting such as maternal depression or poverty, had limited effects.

7.3.4 Strengths

The individual studies covered in this PhD have several strengths, and these were discussed in detail in the previous chapters. However, there are general strengths and limitations that apply to the overall thesis, and I will discuss these below.

This thesis contributes to the limited existing body of evidence of the burden of poor maternal mental health in rural settings in LMICs. The validation of the SSQ-8 (Chapter 4) extends the list of validated mental health screening tools for use by primary healthcare workers and researchers. The long-term follow-up of study participants, together with the repeated assessment of CMD and parenting stress symptoms, is a key strength that has allowed us to show the high burden of mental health conditions among mothers living with HIV. The study measured multiple outcomes in different domains, which enabled me to find the association between repeat CMD symptoms

and parenting stress symptoms. The association between parenting stress and parenting outcomes, such as parenting sense of competence and child discipline, showed the need to address maternal mental health conditions and contextual socio-economic challenges to avoid negative parenting.

This PhD contributed evidence and experience in conducting a complex intervention that targeted mothers living with HIV in a rural setting. The process evaluation contributed a clear and replicable description of the adaptation process and highlighted the factors affected by the context, implementation and mechanisms of complex interventions which may inform future multi-component research conducted in Zimbabwe and other LMICs.

The overall findings of this research emphasise the importance of maternal mental health for parenting outcomes. The results here also provide valuable information on the characteristics of mothers living with HIV at risk of (repeat) CMD symptoms and parenting stress symptoms in rural Zimbabwe. The evidence provided by this work contributes to highlighting the mental health screening and treatment gap for mothers living with HIV in Zimbabwe and other LMICs. The findings can contribute to the shaping of maternal and parenting interventions that include interventions to address maternal mental health conditions and socio-economic challenges as a way of enhancing parenting.

7.3.5 Limitations

A limitation of this study is that by the nature of embedding the PhD in the CHIDO trial, all participants were mothers living with HIV in a rural setting. This means that findings cannot be generalised to mothers without HIV or those living in urban and peri-urban settings. Nonetheless, there is scope to transfer the findings to other low-income, rural settings in Africa. Where feasible, future studies seeking to understand CMD and parenting stress in mothers living with HIV should include an appropriate comparison group of mothers living without HIV to clearly describe the burden.

Another limitation is that the CHIDO trial did not include a mental health intervention. As such, the process evaluation, while interesting in its own right, confirming some of

the findings of Chapter 5, is somewhat disjointed from the rest of the PhD. Lastly, an analysis of symptoms of repeat mental health conditions was done as part of this PhD over two years after the trial was completed. There were no funds to return to the study location or contact those at risk to arrange referrals to their local healthcare clinics. Future research measuring mental health would benefit from long-term follow-ups to measure chronic mental health conditions.

7.4 Reflections

My PhD journey has been a long, insightful, and challenging learning process. I was the coordinator of the CHIDO trial, and the opportunity to complete a PhD was part of the package. This was my first time coordinating a study, let alone a cluster-randomised trial conducted in 30 communities. When I began, I viewed it as a great and exciting career advancement opportunity but also found it daunting.

Choosing a topic was initially a struggle. The question I constantly asked myself was, “How do I make this my work if it is nested within another study?” As part of my Master of Social Science degree, I had looked at the burden and risk factors associated with parenting stress in mothers living with HIV (based on the CHIDO trial formative work), so I decided to look at the burden of CMD and perinatal depression and their association with parenting stress in this cohort of women. After consultation with my supervisors, I then chose to look at the burden of maternal mental distress (repeat CMD and parenting stress symptoms) and its effects on mothers’ parenting capacity. I dropped the focus on perinatal depression, as many CHIDO trial participants were more than 12 months post-delivery (outside the perinatal period) at baseline.

The role that I occupied within the trial team and my role as someone responsible for the process evaluation was not always clear to me. I constantly battled with the extent to which, as CeSHHAR, we would share findings and feed into the intervention implementation and the extent to which the process evaluation was meant to be independent. For the pilot phase, our role was formative to assist with optimising intervention delivery and identifying potential threats to implementation. In the main trial, our role was viewed as summative, but this was not clear cut as the rest of the

consortium team (Mavambo and World Education Bantwana Inc.) felt that we should make it known if we found an implementation issue that might affect outcomes and was correctable. This dilemma is a recognised issue in process evaluations (366), and in the CHIDO intervention, there were occasions we crossed the line during quarterly meetings held by the research consortium where we would sometimes discuss implementation challenges observed in the field such as reports by mothers that they had not received home visits. This influenced the continuous refinement of the intervention, an example being the acceleration of buying CHWs bicycles to use when conducting home visits.

In summary, my experience as Study Coordinator for the CHIDO trial led to many valuable insights into the CHIDO trial. The CHIDO trial was successfully completed, and through it, this PhD has produced insights into the high burden of maternal mental health conditions in mothers living with HIV. These findings and my PhD journey have led to my desire to continue to raise awareness of and address maternal mental health conditions in women in Zimbabwe.

7.4.1 Implications for future research

The CHIDO intervention was primarily conducted to improve child development outcomes in HIV-exposed infants through a multi-component parenting intervention, but no effect was found on child development outcomes. Instead, this parenting intervention indicated a likely effect on maternal mental health, shown through reduced parental distress. In addition, findings from this research show the high burden of, and associations between, repeat CMD, parenting stress and parenting practices, highlighting the need for future studies to advance the integration of mental health screening and treatment in all health-related interventions. Finally, this thesis shows that this can be achieved by offering short, validated screening tools and treatment using a task-shifting approach.

To the best of my knowledge, this thesis provides initial data on the burden of parenting stress in mothers living with HIV in Zimbabwe that contributes to the existing evidence in LMICs. The findings can be used to inform the design of prospective interventions

and studies to assess the burden of parenting stress in the general population and different populations within Zimbabwe. Validation of the PSI-SF as a screening tool for parenting stress has been shown to aid in identifying parents at risk of parenting stress, contributing to the evidence on the burden of parenting stress (244–246,282). Similarly, future research in Zimbabwe and other LMICs that involves parents should consider validation of the PSI-SF as a means of obtaining a validated tool to assess the burden of parenting stress. Assessment of the burden of parenting stress should be extended, and interventions should address risk factors leading to parenting stress to enhance parent–child interaction and, ultimately, child development.

Evidence from the process evaluation of the CHIDO intervention emphasises the need to understand the multilevel barriers to the successful implementation and outcomes of complex parenting interventions that target mothers living with HIV in rural settings. When a comprehensive package is being provided in an attempt to address multiple risk factors, there is a need to consider the complexity of the implementation and evaluation of such interventions and the possible impact this complexity has on the uptake and effectiveness of the intervention. Going forward, future research should adopt process evaluations as they help identify the active ingredients of interventions and enable findings to be scaled up.

7.4.2 Recommendations

Mental health treatment is critical for the successful implementation of global and national health policy recommendations, such as the WHO's 90-90-90 target (34) and the "treat all" recommendations (367), and given this, the implementation of proven, evidence-based and cost-effective strategies should be considered the duty and responsibility of public health policymakers and healthcare providers. Given the evidence presented in this thesis of the high burden of repeat CMD and clinically significant parenting stress symptoms, there is a need to integrate mental health service care packages into existing policies and services. There is also a need to develop packages of care that include screening and treatment of maternal mental health conditions, inclusive of CMD, stress and other mental, neurological and substance use conditions. It is also necessary to find strategies to address the burden

of comorbidity of maternal mental health conditions. Successful integration of such packages of care into primary healthcare will require a task-shifting approach that entails training primary healthcare personnel, such as those at primary healthcare clinics, in how to screen and manage mental health conditions using simplified guidelines like the WHO's mhGAP intervention guide (69), followed by regular supervision and support from mental health specialists.

The limited demand for interventions for CMD, compared to the number of people who meet the criteria for CMD and other mental health conditions, can be conceptualised as a lack of education or awareness about mental health issues, indicating a need for information, education and communication campaigns (191). There is a need to raise awareness of maternal mental health conditions within communities. This can be done through public and primary health facilities in the form of community drives and outreaches, health talks and circulation of the information material. Building awareness can focus on what are maternal mental health conditions, the signs and symptoms, when and where to seek help, and self-help tips or quick guides through forums such as peer-to-peer meetings. This, however, needs to be done when interventions have been put in place for treatment services to prevent raising unmet expectations.

The research in this thesis has shown several context-specific risk factors associated with maternal mental health conditions. Given this, efforts to address the burden in LMICs need to be context-specific and should not be limited to individual-level interventions. Interventions should be multifaceted to address several risk factors at the same time. For example, the association between CMD and parenting stress emphasises the need to include parental mental health in child health policies and interventions. The relatively consistent association between repeat CMD and poverty-related indicators, such as food insecurity and lack of education, strengthens the case for the inclusion of mental health on the agenda of development agencies and in international targets such as the SDGs (368). Similarly, the association between relationship quality and domestic violence shows the need to integrate mental health into interventions directed at both men and women and into policies under various departments – in Zimbabwe, such as the Ministry of Health and Child Care

departments and the Ministry of Women Affairs, Gender and Community Development. Interventions that attract men, or those that seek to enhance couples' communication, may create platforms to address domestic violence and alcohol and drug use problems, which are some drivers of maternal mental health conditions. More specifically, the findings of this study call for increased inclusion and precision in the detection and treatment of maternal mental health conditions in programmes/interventions addressing any of the maternal mental health disorder risk factors.

7.5 Conclusions

The research in this thesis focused on assessing the burden of mental health conditions (specifically CMD) and parenting stress symptoms in mothers with HIV and understanding the relationships between maternal mental health conditions and parenting. It has demonstrated a large burden of repeat CMD and parenting stress symptoms in mothers living with HIV and that these two aspects of poor mental health conditions are associated. Maternal mental health conditions were associated with risk factors such as somatic symptoms (having pain and discomfort), a lack of education, and domestic violence. Mothers living with HIV with symptoms of repeat CMD and parenting stress often reported a low sense of parenting competence and low resilience to life stressors. They were more likely to have shaken, slapped or beaten their infants. Our findings align with previous research that postulates that there is a high burden of maternal mental health conditions in LMICs, which causes suffering, distress and dysfunctionality among affected women and their families. However, some of the factors associated with maternal mental health conditions may be context-specific and may require contextualised intervention approaches.

Screening tools that have been validated and are appropriate to the local setting and population are important in improving the identification of women with repeat CMD and other mental health conditions. More and more research and programming interventions in LMICs are using screening tools to detect the burden of mental health conditions in mothers living with HIV. The tool I validated in this research is a useful

addition to the few culturally appropriate and validated screening tools available in southern Africa. More culturally relevant, feasible and acceptable interventions that effectively address maternal mental health conditions are needed in LMICs and should be taken to scale.

Appendices

Appendix 1: CHIDO CRT bio-behavioural survey at 12-month follow up

CHIDO RANDOMISED CONTROLLED TRIAL QUESTIONNAIRE

Captured automatically by ACASI:

- Participant ID
- Date of Interview
- Gender
- Time interview started and ended

SECTION 1: TO BE FILLED BY THE SURVEY ASSISTANT				
PRELUDE SECTION: MATERNAL AND CHILD DEATH				
Q No.	**Question**	**Responses**	**Instructions**	**Comments/skip rule**
1.1	**Are you the biological mother of the child enrolled in the study?** **Ndimi here amai vemwana ari kupinda muongororo ino?**	**Yes/No** **Hongu Kwete**		
1.2	**Are you the one who was enrolled into the study last year?** **Ndimi here makapinda mutsvakurudzo ino gore rakapera?**	**Yes/No** **Hongu/Kwete**	**If no, go to question 1.3**	
1.3	**If no, why not?**	**I am now the primary caregiver**	**If the primary caregiver**	

	Kana iri kwete, nemhakayei?	**Primary caregiver is away** **Primary caregiver (biological mother) passed on** **Primary caregiver is sick** **Ndini ndawamuchengeti wake** **Muchengeti/mubereki wake akambofamba** **Muchengeti/mubereki wake akashaya** **Muchengeti/mubereki ari kurwara** **[NOTE to surveyor, if no instruct them to go get the verbal autopsy conducted after your questionnaire]**	**passed on skip to 2.2**	
2.1	**Is the biological mother of the child alive?**	**Yes/No** **Hongu/Kwete**	**If Yes, skip to 3.**	

	Amai vakabereka mwana vapenyu here? [NOTE to surveyor, if no instruct them to go get the verbal autopsy conducted after your questionnaire]			
2.2	**When did the biological mother of the child pass on? (MM & YR)** **Amai vakabereka mwana vakashaya rinhi? (Mwedzi ne Gore)**	**Use the number**		
3.1	**Is the child who was enrolled into the study available for assessment?** **[NOTE to surveyor, if no instruct them to go get the verbal autopsy conducted after your questionnaire]** **Mwana akapinda mutsvakurudzo ino mupenyu here? [NOTE to surveyor, if no instruct them to go get the verbal autopsy conducted after your questionnaire]**	**Yes/No** **Hongu/Kwete**	**If Yes, skip to Section 1** **If no, go to 3.2**	

3.2	**If no why?**	**Child is away** **Child is sick** **Child passed on** **Mwana akamboshanya** **Mwana ari kurwara** **Mwana akashaya**	**If child passed on go to question 3.3**	
3.3	**When did the child pass on? (MM &YR)** **Mwana uyu akashaya rinhi? (Mwedzi neGore)**	**Use the number**		
SECTION 1: TO BE FILLED BY THE SURVEY ASSISTANT				
Q No.	**Question**	**Responses**	**Instructions**	**Comments/skip rule**

1		Name of child Zita remwana	Age in months and years Zera remwana mumwedzi nemakore	Record gender of child Munhuyi?	Relationship with caregiver Hukama nemuchengeti wemwana Mother/father 1 Sister /brother 2 Aunt/ Uncle 3 Grandmother/ father 4	Mother took PMTCT (ANC, delivery & breastfeeding) Mai vemwana vakapinda here muchirongwa chePMTCT Yes 1 No 2 Don't know 3	HIV status Mamiriro yemwana maererano nehutachiona hweHIV Positive 1 Negative 2 Not yet tested 3 Don't know 4	Please ask for all children below 18 years. In Q1 record the child in the study. *Ndapota nyorai vana vari pasi pemakore gumi nesere. PaQ1 nyora mwana apinda muongororo.*	Data Officer: Please link with c1.
		1	M / Y	B/G					
		2		B/G					
		3		B/G					
		4		B/G					
		5		B/G					
		6		B/G					
		7		B/G					
		8		B/G					

	9		B/G					
	10		B/G					
2	Do you have the maternity record of your baby's biological mother (from the hospital)? Mune kadhi rekusikero raamai here?			Yes seen Yes not seen No Skip to 9			Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	For not seen and No Skip to Q7
3	May I see this maternity record? Ndingarionewo here card rekusikero iri?			Yes (1) (Hongu) No (0) (Kwete) I cannot find the booklet at the moment (Ndashaya bhuku)			Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
4	Did the baby's biological mother seek antenatal care during this pregnancy			Yes/ Hongu No/ Kwete **Don't know/ handizive**			***To the surveyors:*** **Fill in information from this**	

	Mai vemwana vakaenda kusikero here vaine pamuviri?		**section from booklet and where it is not there ask the respondent.** *Kumushandi weongororo: Pindurai mibvunzo muchishandisa zvakanyorwa mubhuku. Kana risipo ita zvekubvunza wachapinda mutsvakurudzo iyi.*	
5	The baby's biological mother received antenatal care in a healthcare facility? Amai vemwana vakaenda kusikero kuchipatara here kana kuclinic?	Yes Hongu No skip to 12 Kwete Nothing written on card Hapana chakanyorwa pakadhi **Don't know/** Handizive		Skip to Q7
6	Number of antenatal visits the biological mother attended during the pregnancy. Vakaenda kusikero kangani vane pamuviri.	Record antenatal visits Nyora kuti akaenda kusikero kangani. Don't know/ handizive		

7	When were you (biological mother) last tested for HIV? Makagumisira kuongororwa hutachiona rinhi?	Before pregnancy (last pregnancy) Ndisati ndane nhumbu. **During pregnancy** Pandaive nepamuviri/nhumbu **Following pregnancy** Mushure mekusununguka **Don't know/** handizive	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
8	What was your (biological mothers) HIV test result? Chii chakabuda muongororo yenyu (yemai vemwana uyu) yehutachiona hwe HIV?	HIV negative HIV positive Prefers not to say (Handina kusununguka kutaura) Did not collect result (Handina kutora maresults) **Don't know** (Handizive)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
9	Do you have your baby's health card? Mune kadhi remwana rekusikero here?	Yes Hongu No Kwete	Please press on one box only *Ndapota dzvanya*	If response is No Skip to Section 2A

			mubhokisi rimwechete chete	
10	May I see the baby's health card? Ndingaonewo here kadhi rake?	Yes seen Yes not seen I cannot find the card at the moment	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	If response is: Yes not seen or I cannot find card then Skip to Section 2 A
11	The baby's weight at birth (in kilograms) and the apgar score Uremu hwemwana paakazvarwa (mumakg) ne apgar score (inorakidza kuti mwana akagwinya zvakadii achangobva mukusunungukwa)	Record kilograms Not recorded on the baby health card		
12	The baby received any of these forms of treatment	Yes-AZT Yes-NVP syrup single dose Yes-NVP multiple doses Yes-don't know type ART (i.e. continuous)	Please press ALL	

	Mwana akapihwa here umwe wemishonga inotevera	Nothing written on the card (Hapana chakanyorwa pakhadhi)	statements that apply to you *Dzvanya pane mitsara yose inoenderana nemi*	
13	The baby was given Cotrimoxazole. Mwana akapihwa Cotrimoxazole?	Yes (Hongu) No (Kwete) Nothing written on card (9) (Hapana chakanyorwa pakhadhi)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
14	Has the child attended growth monitoring in the last 6 months? Mwana wenyu akaenda here kusikero mumwedzi mitanhatu yakapfuura?	Yes (Hongu) No (Kwete)	Please press on one box only *Ndapota dzvanya mubhokisi*	Skip to Section 2 A:

			rimwechete chete	
15	***To the surveyors:*** record vaccination date for each vaccination from the child health card Kumushandi wetsvakurudzo: Nyora zuva rekubaiwa majekiseni ese emwana ari pakadhi rekusikero.	1 BCG 2 OPV 1 3 OPV 2 4 OPV3 5 OPV4 6 Pentavalent 1 7 Pentavalent 2 8 Pentavalent 3 9 Pneumococcal 1 10 Pneumococcal 2 11 Pneumococcal 3 12 Rotavirus 1 13 Rotavirus 2 14 Measles 15 DPT **16 DT**	**Please us the number pad to tell us month and year you were born** *Ndapota shandisai gwaro remanhamba kutiudza kuti mwana akabaiwa musi upi*	
16	Does the weight line on the baby health card show good, dangerous and very dangerous growth rate	Normal (Ari pakati nepakati) Moderate underweight (Akaderera) Severely Underweight (Akaderera zvakanyanya)	Please press on one box only *Ndapota dzvanya mubhokisi*	

	Mutsara unoratidza huremu hwemwana pakadhi rekusikero uri kuratidza kuti mwana ari kukura zvakanaka here, zvinotyisa, kana kuti zvinonyanyisa kutyisa		*rimwechete chete*	

SECTION 2:

A. SOCIODEMOGRAPHY: Tinoda kutangakubvunza mibvunzo yakanangana nehupenyu hwenyu (T205)

Q No.	Question	Responses	Instructions	Comments
A1	In what month and year were you born Makazvarwa mwedzi uye gore ripi (T1)		**Please us the number to tell us month and year you were born** *Ndapota shandisai gwaro remanhamba kutiudza kuti makazvarwa mwedzi negore ripi (T2)*	
A2	How old were you on your last birthday? *Mange mune makore mangani pabhavhadheyi renyu rekupedzisira?* *(T3)*	Number pad	Please use the number pad to tell us how old you are. If you are uncertain, enter your best guess.	

Q No.	Question	Responses	Instructions	Comments
			Ndapota shandisa gwaro remanhamba pakutiudza kuti une makore mangani. Kana usina chokwadi, tiudze aunofungidzira (T4)	
A3	What tribe/ethnic group do you belong to *Rudzi rwako nderwupi?* *(T5)*	• *Shona (0)* • *Ndebele (1)* • *Kalanga (2)* • Other (4) • *Rumwewo*	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete (T6)*	
A4	What is your religion? *Chitendero chenyu ndechipi?* *(T7)*	Roman Catholic Methodist Anglican Lutheran Presbyterian Pentecostal Apostolic	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

Q No.	Question	Responses	Instructions	Comments
		Baptist Moslem African Traditional Religion Other specify (Chimwewo) No religion (Handina chitendero)		
A5	What is the highest level of education that you have completed? Chikoro makagumira pachinhanho chipi? (T8)	None (Handina kuenda kuchikoro) Primary school (Ndakagumira kuprimary) Secondary School (Ndakagumira Secondary School Form 4) Secondary School Forms 5 to 6 (Ndakagumira Secondary Form 5 to 6) Certificate/Diploma/Degree (Ndakagumira paCertificate/ Diploma/Degree)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
A6	How many people were living in your house for at least 3 days in the last week? (Include yourself, all adults and all children)	• Number pad	Please write the number *Ndapota nyora nhamba*	

Q No.	Question	Responses	Instructions	Comments
	(T9) Mumba menyu munowanzo kugara vanhu vangani? (Zviverengeri, vanhu vakuru vese uye nevana vese).		*(T10)*	
A7	Think about the building in your home that is the most appealing. What material is it built of? Fungai pamusoro pemba yakanaka kupfura dzimwe dzese mumusha wenyu, yakawakwa nechii? (T11)	Pole and Dagga (Mapango nemadhaka) Wood (Mapuranga) Mud bricks (Mudhindirwa) Cement blocks (Yezvidhinha zvesamende) Stones (Nematombo) Other ---Specify (Zvimwewo)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete rinoenderana nemhinduro yenyu* *(T12)*	
A8	What type of sewage disposal system do you use? Munoshandisa chimbuzi chemhando ipi? *(T13)*	Flush Bowl System (Yekugweja) Our own Blair toilet (Bhureira yepamba) Neighbor's Blair toilet (Bhureira yemuvakidzani) Bush (Musango) Pit (Yegomba)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

Q No.	Question	Responses	Instructions	Comments
		Other (Imwewo)		
A9	What source of drinking water do you use in your house? Mvura yenyu yekumwa munoiwana payi? (T14)	Tapped communal (Pombi yenharaunda) Own tap (Pombi yepamusha) Own borehole (Chibhorani chepamusha) Communal borehole (Chibhorani chenharaunda) Unprotected well (Tsime risina kuchengetedzwa) Protected well (Tsime rakachengetedzwa) Stream/river (Murwizi, kana rukova) Other (Kumwewo)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

Q No.	Question	Responses	Instructions	Comments
A10	Do you have the following items in your household, working items? Mune zvinhu zvinotevera mumba menyu zvinoshanda here? (T15)	Electricity (0/1) (Magetsi) Battery / generator (0/1) (Bhatiri/Jenareta) Solar panel (0/1) (Sora) Refrigerator (0/1) (Firiji) Stove (electric, gas, or wood) (0/1) (Chitofu chemagetsi, chegasi, chehuni) Drinking tap water in the house (0/1) (Mvura yemupombi iri mumba) Livestock (goats, sheep, cattle, donkeys) (0/1) (Zvipfuyo zvakaita sembudzi, hwai, mombe, madhongi) Bicycle (0/1) (Bhasikoro) Motorcycle (0/1) (Mudhudhudhu) Car/truck in working condition (0/1) (Motokari/ Rori inoshanda) Scotch cart (0/1) (Ngoro)	Please press ALL statements that apply to you *Dzvanyai pane mitsara yose inoenderana nemi* *(T16)*	

Q No.	Question	Responses	Instructions	Comments
		Wheel barrow (0/1) (Bhara) Radio (0/1) (Dzangaradzimu) Television (0/1) (Chivhiti-vhiti) Computer (0/1) (Kombiyuta)		
A11	Did your village ever hold HIV testing days in the past year? Mubhuku muno makamboitwa mazuva ayiitwa ongororo dzeHIV mugore rakapfuura here? (T17)	• Yes/ Hongu • No/ Kwete Don't know / Handizive	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

B.Household Details: Income and food security/lyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B1	Are you employed at the moment? Pari zvino muri kushanda here? (T18)	• Yes full time Hongu nguva dzose • Yes part time Hongu dzimwe nguva • Yes informally Hongu zvekuzviitira • No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to B4
B2	What type of work do you do? Munoita basa rei? (T19)	• Professional/ managerial Repamusoro /Humaneja • Self employed Rekuzviitira • Skilled labor Randakadzidzira • Manual or unskilled Remaoko/ risina kudzidzirwa	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

B.Household Details: Income and food security/lyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B3	Approximately how much money do you earn/source each month in US dollars? Munotambira marii pamwedzi mumaUS dhora? (T20)	• $ 0 • $ 01-100 • $ 101-200 • $ 201- 300 • $301 and above /kana kupfuura	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
B4	What is your marital status? Makaroorwa/kana kuroora here? (T21)	• Married Ndakaroorwa/ ndakaroora • Divorced/Separated Takarambana • Widowed Ndiri shirikadzi/tsvimborume • Never been married handina kubvira ndamboroorwa/kuroora	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to B7 unless married

B.Household Details: Income and food security/lyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B5	Is your husband employed? Murume wenyu anoshanda here? (T22)	• Yes full time Hongu nguva dzose • Yes part time Hongu dzimwe nguva • Yes informally Hongu zvekuzviitira • No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
B6	Approximately how much money does your partner earn/source each month in US dollars? Murume wenyu anotambira marii pamwedzi mumaUS dhora? (T23)	• $ 0 • $ 01-100 • $ 101-200 • $ 201- 300 • $301 and above/ kana kupfura	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

B.Household Details: Income and food security/lyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B7	Are you financially dependent on anyone? Munoriritirwa nemumwe munhu here? (T24)	• Yes Hongu • No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to B9 if no

B.Household Details: Income and food security/Iyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B8	Who are you financially dependent on? Ndiani anokuriritirai? (T25)	• Husband/ partner Murume/mukadzi wako/shamwari yebabonde • Parents Vabereki • Mother/father in law Vamwene/tezvara • Brother/ Sister Hanzvadzi • Brother/ Sister in law Tsano/Muramu • Other relative Imwe hama • Other non-relative Mumwewo asiri wehukama	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

B.Household Details: Income and food security/Iyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B9	In the past four weeks, was there ever no food to eat of any kind in your house because of lack of resources to get food? Mumasvondo mana apfura, pane here pamakashaya chikafu chekudya mumba menyu nokuda kwekushaya? (T26)	• Yes Hongu • No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to B11 if no.
B10	How often did this happen? Zvakaitika kangani? (T27)	• Rarely (1-2 times) Kashoma kasingapfure kaviri • Sometimes (3-10 times) Dzimwe nguva dzisingapfure gumi • Often (more than 10 times) Kakawanda, kanopfura gumi	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

B.Household Details: Income and food security/Iyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B11	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food? Mumasvondo mana apfura, pane here imi kana mumwe munhu wemumba menyu pamakarara mune nzara nokuti panga pasina chikafu chakakwana? (T28)	• Yes Hongu • No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to B13 if no
B12	How often did this happen? Zvakaitika kangani? (T27)	• Rarely (1-2 times) Kashoma kasingapfure kaviri • Sometimes (3-10 times) Dzimwe nguva dzisingapfure gumi • Often (more than 10 times) Kakawanda, kanopfura gumi	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

B.Household Details: Income and food security/Iyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B13	In the past four weeks, have you had to go an entire day without eating because there was no food in your household? Mumasvondo mana apfura, pane pamakamboita zuva rese musina kumbodya nokuti panga pasina chikafu chokudya mumba menyu here? (T29)	• Yes Hongu • No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to B15 if no
B14	How often did this happen? Zvakaitika kangani?	• Rarely (1-2 times) Kashoma kasingapfure kaviri • Sometimes (3-10 times) Dzimwe nguva dzisingapfure gumi • Often (more than 10 times) Kakawanda, kanopfura gumi	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

B.Household Details: Income and food security/Iyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B15a	Which grants does your household receive to support your household expenditure? Mhuri yenyu inombowana here rubatsiro rwemari kubva kuhurumende kana kumwewo here? (T30)	• Social welfare grants (Mari yekuhurufeya) • Cash transfers • BEAM • Old age pension (Yemachembere) • Other (Dzimwewo) • No (Kwete)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to B16 if no

B.Household Details: Income and food security/lyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B15b	Specify amount. Tiudzei kuti imarii. (T31)	Record amount.	Please use the number pad to tell us how much it is. Ndapota shandisai gwaro remanhamba kutiudza kuti munovana marii (T32)	
B16	Did your household receive any other assistance in the past year? Mhuri yenyu yakambowana rumwe rubatsiro here mugore rapfuura? (T33)	• No (Hatina) • Food handouts (Takapihwa chikafu) • Inputs for nutrition gardens (Takapihwa zvekushandisa mugadeni) • Agricultual inputs (takapihwa mbeu nefeteraiza) • Clothes or blankets (takapihwa mbatya nemagumbeze) • Disability benefits (including crutches/wheelchairs etc) (Takapihwa rubatsiro nekuda kwehurema kusanganisira mawhiri cheya nemadondoro) • Other (Zvimwewo)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

B.Household Details: Income and food security/Iyezvino ndinoda kukubvunzai mibvunzo pamusoro pemawaniro emhuri yenyu mari nezvekudya(T206)				
Q No.	**Question**	**Responses**	**Instructions**	**Comments**
B17	Is anyone in your household participating in a savings scheme for the past six months? Pane here umwe wemumhuri menyu ari mumukando kubva mumwedzi mitanhatu yadarika (T34)	• Yes Hongu • No • Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
B18	Did your household receive visits from any community workers in the last month? Mhuri yenyu yakamboshanyirwa here nevashandi vehurumende vane chekuita nezvehutano vanoshandira munharaunda menyu mumwedzi wapfura (T35)	• No (kwete) • Village Health worker (vana mbuya utano) • Case care worker • Home based care (vehome based keya) • Behaviour change facilitator	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

C. ANTENATAL CARE, DELIVERY AND POSTNATAL CARE/ Iyezvino ndinoda kukubvunzai mibvunzo pamusoro pekuvhenekwa panguva yekuzvitakura kusununguka uye mushure mekusununguka (T207)

Q No	Question	Responses	Instructions	Skip / Comments
C1	Record baby's age Nyora mwedzi yemwana yekuzvarwa.	Record month	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Insert child age selected from for the study in Section Q1 line 1
C2	Record baby's sex. Nyora kuti mwanai? (T36)	Boy (Mukomana) Girl (Musikana)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

C3	Is the respondent the selected infant's biological mother? Apinda muchirongwa ndiye mai vemwana here? (T37)	Yes Hongu No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to C5 if yes Link with section E
C4	What relationship is the respondent to the infant? Mune hukama hwakadini nemwana wamuri kuchengeta (T38)	Father/stepmother Baba/mainini 1 Sister/ brother Mukoma/hanzvadzi 2 Aunt Tete/Maiguru/mainini 3 Uncle Sekuru/babamukuru 4 Grandmother Mbuya 5 Other specify Vamwewo 6	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
C5	Does the child have biological siblings? Mwana ane hanzvadzi, vakoma kana vanin'ina vemudumbu rimwe naye here? (T39)	Yes Hongu No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to C7 if no

C6	How many siblings does the child have? Ane vakoma, vanin'ina kana hanzvadzi ngani dzemudumbu rimwe naye? (T40)	Record number.	Please use the number pad to tell us how many sibling does the child have *Ndapota shandisa gwaro remanhamba pakutiudza kuti mwana ane vanin'ina kana vakoma kana hanzvadzi ngani (T41)*	
C7	Did you go to a clinic at some point after the birth of your baby so that your baby could receive immunizations? Makaenda here kukiriniki mushure mekunge mazvara mwana wenyu kuti anobaiwa? (T42)	Yes Hongu No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to C9 if yes

C8	Why did you not go to a clinic to have your baby immunized? Nemhaka yei musina kuenda kukiriniki kunoti mwana abaiwe? (T43)	I forgot Ndakakanganwa Drug Stock outs Kwange kusina mishonga Husband refused Murume wangu akaramba Religious reasons Nekuda kwechitendero Other (specify) Chimwewo chikonzero (tsanangura)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
C9	Was the baby ever tested for HIV? Mwana akamboongororwa hutachiona hweHIV here? (T44)	Yes Hongu No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to C13 if yes

C10	Why did you not test your baby for HIV? Nemhaka yei mwana wenyu asina kuongororwa hutachiona hweHIV? (T45)	I was not offered to have my baby tested for HIV Handina kumbopihwa mukana wekuti aongororwe. I was scared to find out the result Ndaitya kuziwa maresults acho. My husband would not let me Murume wangu aisandibvumidza. The test was too expensive Ongororo yacho yaidhura. I did not go back to a clinic after the baby was born Handina kudzokera kukiriniki ndaongororwa. The clinic was too far away Kiriniki yanga iri kure. Did not feel comfortable around the clinic staff Handina kusununguka nevashandi vehutano. I could not take time away from home/work to go to the clinic Ndakashaya nguva yekubva pamba/kusiya basa kuti ndiende kukiriniki. I knew I was HIV negative Ndanga ndichiziva kuti handina hutachiona. My church does not allow me to Chechi yangu hainditendere kudaro. It never occurred to me/ never thought about it Hazvina kumbopinda mupfungwa. Other Chimwewo chikonzero	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

C11	Do you plan to test your baby for HIV? Mune hurongwa here hwekundo ongororesa mwana uyu HIV (T46)	Yes Hongu No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to C13 if no
C12	When do you plan to test your baby for HIV? Muri kuronga kuenda zvarini (T47)	Record time	Please use the number pad to record months and year. *Ndapota shandisa gwaro remanhamba pakutiudza gore nemwedzi wamunoda kunomuongororesa (T48)*	
C13a	Was the baby ever tested for HIV? Mwana akamboongororwa hutachiona hweHIV here? (T44)	Yes Hongu No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to C28 if no

C13b	In what month and year was the baby **last** tested for HIV? (MM/YYYY) Mwana akagumisira kuongororwa hutachiona hweHIV mumwedzi upi uye gore ripi? (T49)	Record months and year	Please use the number pad to record months and year. *Ndapota shandisa gwaro remanhamba pakutiudza gore nemwedzi waakaoongororwa (T50)*	
C14	How old was the baby when **last** tested for HIV? (in months) Mwana paakagumisira kuongororwa hutachiona hweHIV anga ave nemwedzi mingani yekuzvarwa? (T51)	Record weeks/months	Please use the number pad to record weeks or months. *Ndapota shandisa gwaro remanhamba pakutiudza masvondo kana mwedzi paakagumisira kuongororwa hutachiwana hweHIV* *(T52)*	

C15	Did you receive the results of your baby's HIV test? Makapihwa here zvakabuda muongororo yemwana yehutachiwana hweHIV? (T53)	Yes Hongu No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
C16	What was the result of your baby's HIV test? Zvii zvakabuda muongororo yemwana yeHIV? *(T54)*	HIV negative Akaonekwa asina hutaciwana hweHIV HIV positive Akaonekwa ane hutachiwana hweHIV Prefers not to say Ndosarudza kusazvitaura Don't know (3) Handizive	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to C28 if HIV negative or don't know

C17	Was a viral load test ever done on your child? Mwana wenyu akambotorwa viral load here? Viral load iongororo yekuona uwandu hweutachiwana muropa? (T55)	Yes, and I know the results. Hongu uye ndinoziva dudziro dzacho Yes. My child has had a viral load test but I don't know the result. Hongu, mwana wangu akaitwa ongororo yeviral load asi handizivi dudziro dzacho. No My child has never had a viral load test. Kwete, mwana wangu haana kuitwa ongororo yeviral load.	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to c19 if Yes do not know the result & No, my child has bever had a viral load test.
C18	What is your child's latest viral load result? Ndiudzeiwo dudziro yeviral load yemwana wenyu yekupedzisira?	***Record what is on the card*** *Nyorai sezviri pacard* copies/ml	Please use the number pad to record viral load result *Ndapota shandisa gwaro remanhamba pakutiudza uwandu hweutachiona huri muropa remwana (nyorai sezviri pacard)*	

C19	Did health staff recommend that your baby is put on treatment for HIV infection, specifically on ART drugs? Vashandi vehutano vakambokukurudzirai kuti muise mwana pachirongwa chemishonga yeHIV, zvikurukuru mishonga yeART here? (T58)	Yes Hongu No Kwete Don't know Handizivi	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
C20	How old was the baby when baby was put on treatment for HIV infection specifically on ART drugs? (MM) Mwana ange ane mwedzi mingani paakaiswa pamushonga weHIV tichinyanyotarisa weART? (T59)	Record months Nyora mumwedzi Not yet initiated Haasati aiswa pamushonga	Please use the number pad to record how old baby was *Ndapota shandisa gwaro remanhamba pakutiudza kuti mwana ange ane mwedzi mingani (T60)*	Skip to C28 if not yet initiated

C21	What are the names of ART drugs your child was prescribed? Ndiudzeiwo mazita emishonga YE HIV yakapihwa mwana wenyu (T61)	Neverapine 1 Combivar 2 Zidovudine/ Lamuvidine 3 Abacavar 4 Efaverinz 5 Lopinavir/ritonavir (Aluvia) 6 Other Mimwewo 7	Please tick all that apply to you Ndapota sarudzai mishonga yose yaari kunwa (T62)	
C22	Was your baby given the treatment as directed by the health facility, in terms of the number of days and dosage? Makapa mwana wenyu mushonga sezvamakanzi muite kuchipatara, tichitarisa mazuva neuhwandu hwemishonga yacho? (T63)	Yes Hongu No Kwete Don't know Handizivi	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

C23	Who administers the ART drugs your child was prescribed? Ndiyani anonyanya kupa mwana wenyu mushonga yakanzi anwe T64	Primary caregiver Muchengeti wake wemazuva ose Siblings vana vemudumbu rimwe chete naye Father/stepmother Baba/mainini Sister/ brother Mukoma/hanzvadzi Aunt Tete/Maiguru/mainini Uncle Sekuru/babamukuru Grandmother Ambuya Other Vamwewo	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
C24	Are you still giving your baby ART treatment as directed by the health facility Muchiri kupa mwana wenyu here mishonga yema ARVs sezvamakataurirwa kukiriniki (T65	Yes Hongu No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
C25	Did the baby ever stop or miss taking the treatment you were given? Mwana akamborega here kana kudarikira kunwa mishonga yaamainge mapihwa? (T66	Yes for one day Hongu kwezuva rimwe Yes for a week Hongu kwesvondo Yes for a month Hongu kwemwedzi No Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to C28 if no

C26	What were the main reasons for missing treatment? Zvikonzero zvipi zvakaita kuti mwana adarikire kana kuti asanwe mishonga yake (T67)	Forgot to give medication Ndakakanganwa kumupa mishonga. Didn't want my child to take the medication Ndanga ndisingade kuti mwana wangu atore mishonga. Didn't trust the medication Handivimbi nemishonga yacho Had visited and forgot the medication Ndakashanya ndikakanganwa mishonga yacho. Didn't want people to see me giving the medication Ndakanga ndisingade kuti vanhu vandione ndichimupa mishonga. Child not sick Mwana anga asingarware Other specify Chimwewo chikonzero	Please tick all that apply to you You are allowed to tick more than one response Ndapota sarudzai mhinduro dzese dzinoenderana nemi Munotenderwa kutipa mhinduro dzakawanda (T68)	

C27	What was the main reason for stopping treatment altogether? Nemhaka yei akaregedza mishonga yacho? (T69)	Baby would not take it Mwana aisabvuma It made the baby sick Yairwarisa mwana. I forgot Ndakakanganwa A household member told me not to Ndakaudzwa nevandinogara navo kuti ndisamupe I ran out of the medicine too quickly Mishonga yacho yaikakasika kupera The treatment was too expensive Mushonga wacho yaidhura Other Chimwewo chikonzero	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
C28	Has the baby ever spent the night in a clinic or hospital **after** being discharged from birth facility? Mwana akamborara here mukiriniki kana muchipatara mushure mekunge abuda muchipatara achizvarwa? (T70)	Yes (Hongu) No (Kwete) Don't know/remember (Handizivi/handicharangarira)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to D1 if no or don't know

C29	How many times has your baby been hospitalized? Mwana wenyu akapihwa mubhedha kangani? (T71)	1 time Kamwe chete 2 times Kaviri 3 times Katatu 4 times Kana 5 times or more Kashanu kana kupfura Don't know/ remember (Handizivi/Handicharangarira)	Please use the number pad to record how many times baby was hospitalised *Ndapota shandisa gwaro remanhamba pakutiudza kuti mwana wenyu akapihwa mubhedha kangani (T72)*	

D: Infant and child feeding practices Iyezvino ndakudakukubvanzai pamusoro petsika dzokupa vana vacheche chikafu (T208)				
Q No	**Question**	Responses	**Instructions**	**Skip / Comments**
D1	Was this child breastfed? Mwana akayamwiswa here? (T73)	Yes exclusive (Hongu mukaka wemuzamu chete) Yes mixed (Hongu mukaka wemuzamu nekumwe kudya) No (Kwete) Don't know/remember (Handizivi/Handichacharingarira)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	skip to E1 if child not breastfed and/or don't know or remember

D2	Are you still breastfeeding this child? Muchiri kuyamwisa mwana uyu here? (T74)	Yes (Hongu) No (Kwete) Don't know/remember (Handichazivi/Handicharangarira)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	Skip to D4 if Don't know/remember
D3	For how many months was the child breastfed after s/he was born. Mwana uyu akayamwa kwenguva yakareba sei kubva pakuzvarwa (T75)	Record Months Don't know (Handizivi)	Please use the number pad to record how many months child was breastfed. If don't know enter 999. *Ndapota shandisa gwaro remanhamba pakutiudza kuti mwana wenyu akayamwiswa mwedzi mingani. Kana zvanzi handizivi nyora 999.* *(T76)*	

D4	Did you ever exclusively breastfeed your baby? (did you feed the baby only breast milk and nothing else for any period of time) Pane here nguva yamakayamwisa mwana chete musingamupe kumwe kudya? (T77)	Yes (Hongu) No (Kwete)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
D5	For how many months was the child breastfed exclusively? (milk only) Mwedzi mingani yamakayamwisa mwana chete musingamupe kumwe kudya? (T78)	Record Months (Nyora mwedzi) Don't know (Handizivi)	Please use the number pad to record how many months child was exclusively breastfed *Ndapota shandisai gwaro remanhamba pakutiudza kuti mwana wenyu akapihwa mukaka wemuzamu chete pasina kumwe kudya kwemwedzi mingani (T79)*	

D6	Did anyone at the health facility instruct you on how to feed your baby? Pane akambokudzidzisai here kuchipatara kuti mwana anofidwa sei? (T80)	Yes (Hongu) No, no one instructed me (Hapana akandidzidzisa)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

E: Biological mothers (skip to F if C3 is no)				
Maternal Mental Health lyezvino ndakudakukubvanzai mibvunzo yakanangana nezvamainzwa mushure mekunge masununguka (T209)				
QNo	**Question**	Responses	**Instruction**	**Skip/comment**
E1 (T81)	For some women being a mother can be wonderful and rewarding but some women find it difficult to cope with the demands of a new baby. How did you feel during the first two weeks after birth? Kune vamwe vakadzi kuve amai chinhu chakanaka asi kune vamwe vakadzi vanoona iri nguva yakavaomera nekuda kwezvinounzwa nemwana mucheche. Imi makanzwa sei muvhiki mbiri dzekutanga muchangobva kusununguka?	Easy to cope (Zvirinyore) Fairly difficult to cope (Zvakaoma zvirinani) Very difficult to cope (Zvakaoma zvachose)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

E2 (T82)	After giving birth did you feel that you had advice and support from family or close friends? Mushure mekusununguka makanzwa here sekunge maiwana mazano uye rutsigiro kubva kuhama ne shamwari?	Yes full support (Hongu ndakabatsirwa mune zvose) Yes partial support (Hongu, dzimwe nguva) No support (Handina kubatsirwa) Don't know (Handizivi)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

E3 (T83)	Who are the people who supported you? Ndevapi vanhu vakakutsigira?	Husband /partner (murume/shamwari yepabonde Mother/ Father (mai/baba vekubereka) Mother /father in law (vamwene/tezvara) Brother/ sister (hanzvadzi/mukoma/munin'ina) Brother /sister in law (mukoma/munin'ina/hanzvadzi yemurume/mukadzi) Aunt (tete/mainini/maiguru) Uncle (bamukuru,bamunini, sekuru) Neighbor (Muvakidzani) Other relatives specify (Dzimwe hama) Friend (shamwari)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

Edinburgh Postnatal Depression Scale (EPDS)				
E4 (T84)	I have been able to laugh and see the funny side of things? Ndaikwanisa kuseka nekuona zvinhu zvinosekesa?	As much as I always could (Kazhinji kacho kandaikwanisa) Not quite so much now (Kashoma pane zvandaimboita) Definitely not (Kana) Not at all (Kana zvachose)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
E5 (T85)	I have looked forward with enjoyment to things? Ndavakutarisira ndine mufaro kune zvinhu zvakawanda?	As much as I ever did (Sezvandisati ndamboita) Rather less than I used to (Kashoma pane zvandaita) Definitely less than I used to (Kashoma kupfura zvandaita) Hardly at all (Kure nekure)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

E6 (T86)	I have felt scared or panicky for no good reason. Ndinonzwa kutya kana kuvhunduka pasina chikonzero.	Yes, quite a lot (Hongu, kazhinji kacho) Yes, sometimes (Hongu, dzimwe nguva) No, not much (Aewa, kure nekure) No, not at all (Aewa, kana)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
E7 (T87)	Things have been overwhelming me. Zvinhu zvange zvichindikurira.	Yes, most of the time I haven't been able to cope at all Hongu panguva dzakawanda ndanga ndisingakwanise kuzvikunda. Yes, sometimes I haven't been coping as well as usual Hongu, dzimwe nguva ndaisakwanisa kukunda. No, most of the time I have coped quite well Kwete, ndaikwanisa kuzvikunda kakawanda kacho. No, I have been coping as well as ever Kwete, ndiri kukwanisa kukunda kupfura pamwe pese.	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
E8 (T88)	I have been so unhappy that I have had difficulty sleeping? Ndange ndisina mufaro zvekuti ndainetseka kuwana hope.	Yes, most of the time (Hongu, kazhinji kacho) Yes, sometimes (Hongu, dzimwe nguva) Not very often (Kwete kazhinji kacho) No, not at all (Kwete, kana)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

E9 (T89)	I have blamed myself unnecessarily when things went wrong. Ndaizvipomera mhosva pasina kana zvinhu zvisinga fambi zvakanaka.	Yes, most of the time (Hongu nguva dzakawanda) Yes, quite often (Hongu, dzimwe nguva) Only occasionally (Pano nepano) No, never (Kwete)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
E10 (T91)	I have been anxious or worried for no good reason. Ndainzwa kukarira nekushushikana pasina.	No, not at all (Aiwa, kana) Hardly ever (Zvine mazuva ari kure) Yes, sometimes (Hongu, dzimwe nguva) Yes, very often (Hongu, kazhinji kacho)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
E11 (T90)	I have felt sad or miserable. Ndainzwa kusafara nekushushikana.	Yes, most of the time (Hongu nguva dzakawanda) Yes, quite often (Hongu, dzimwe nguva) Only occasionally (Pano nepano) No, never (Kwete)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

E12 (T92)	I have been so unhappy that I have been crying. Ndainzwa kushaya mufaro zvekuti ndaimbochema kana kunzwa kuda kuchema.	Yes, most of the time (Hongu nguva dzakawanda) Yes, quite often (Hongu, dzimwe nguva) Only occasionally (Pano nepano) No, never (Kwete)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
E13 (T93)	The thought of harming myself has occurred to me. Pfungwa dzekuda kuzvikuvadza dzaimbouya mandiri.	Yes, quite often (Hongu, kakawanda) Sometimes (Dzimwe nguva) Hardly ever (Zvine mazuva ari kure) Never (Kana)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
From the following statement indicate how much the statement applies to you **Pamitsara inotevera ndiudzei kuti zvinoenderana nemi zvakadini (T210)**				
E14 (T94)	My family is always there for me. Mhuri yangu inomira neni nguva dzose.	Always (Nguva dzose) Most of the time (Nguva dzakawanda) Sometimes (Dzimwe nguva) Rarely (Pano nepano) Never (Kana) Not applicable Hazvipindirane neni		

E15 (T95)	I have good friends who support me. Ndine shamwari dzakanaka dzinonditsigira.	Always (Nguva dzose) Most of the time (Nguva dzakawanda) Sometimes (Dzimwe nguva) Rarely (Pano nepano) Never (Kana) Not applicable/Hazvipindirane neni		
E16 (T96)	My husband /partner helps me a lot. Murume wangu /shamwari yangu yepabonde inondibatsira kakawanda.	Always (Nguva dzose) Most of the time (Nguva dzakawanda) Sometimes (Dzimwe nguva) Rarely (Pano nepano) Never (Kana) Not applicable Hazvipindirane neni		
E17 (T97)	There is a lot of conflict with my husband/ partner. Pane kusawirirana kwakawanda pakati pangu nemurume /shamwari yangu yepabonde.	Always (Nguva dzose) Most of the time (Nguva dzakawanda) Sometimes (Dzimwe nguva) Rarely (Pano nepano) Never (Kana) Not applicable Hazvipindirane neni	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

E18 (T98)	Even though being a parent can be rewarding I am frustrated now while my child is at his/her present age. Kunyangwe zvazvo kuita mubereki kuchifadza ini ndinonzwa kusvotekana pazera rine mwana wangu.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuzivi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose		
E19 (T99)	I go to bed the same way I wake up in the morning, feeling I have not accomplished a whole lot. Ndinoenda kunorara ndichinzwa zvimwechetezvo zvandinonzwa ndichimuka kunzwa kunge pasina zvikuru zvandaita.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuzivi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose		
E20 (T100)	My mother/father was better prepared to be a good mother/father than I am. Amai vangu kana baba vangu vaive vakagadzirira kuva vabereki vari nani kupfuura ini.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuzivi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

E21 (101)	Being a parent is manageable and any problems are easily solved. Kuva mubereki chinhu chinogoneka uye matambudziko anogadziriswa nyore nyore.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuzivi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
E22 (102)	I meet my own personal expectations for expertise in caring for my child. Ndinozadzikisa zvandinotarisira pakuchengeta mwana wangu.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuzivi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose		
E23 (T103)	My talents and interests are in other areas, not being a parent. Zvandinoda nezvandinogona zviri kune zvimwewo kwete kuva mubereki	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuzivi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose		

E24 (T104)	I honestly believe I have all the skills necessary to be a good mother. Ndinovimba kuti ndine ruzivo rwese runodikanwa pakuita amai vakanaka.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuzivi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose		
E25 (T105)	Being a parent makes me feel tense and anxious. Kuva mubereki kunoita kuti ndinzwe kusagadzikana nekushushikana.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuzivi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose		

E26 (T106)	I wish the old days when I had no baby would come back. Ndinoshuvira kuti dai mazuva ekare andange ndisina mwana aidzokerwa.	Always (Nguva dzose) Very often (Kazhinji kacho) Quite often (Nguva dzakawanda) Sometimes (Dzimwe nguva) Rarely (Pano nepano) Never (Kana)		
E27 (107)	Things would be a lot better if my parents were alive to support me. Zvinhu zvingadayi zviri nani dai vabereki vangu vari vapenyu kuti vandibatsire.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuziwi Disagree Handibvumiraninazvo Strongly Disagree Handibvumirani nazvo zvachose Not Applicable Hazvipindirane neni	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
E28 (T108)	I feel close to my baby. Ndinonzwa kuva pedyo zvakanyanya nemwana wangu.	Always (Nguva dzose) Very often (Kazhinji kacho) Quite often (Nguva dzakawanda) Sometimes (Dzimwe nguva) Rarely (Pano nepano) Never (Kana)		
E29 (T109)	I regret having this baby. Ndinokungura kuti ndakaitirei mwana uyu.	Always (Nguva dzose) Very often (Kazhinji kacho) Quite often (Nguva dzakawanda) Sometimes (Dzimwe nguva) Rarely (Pano nepano) Never (Kana)		

E30 (T110)	My baby is the most beautiful baby in the world. Mwana wangu ndiye akanakisa pasi rose.	Always (Nguva dzose) Very often (Kazhinji kacho) Quite often (Nguva dzakawanda) Sometimes (Dzimwe nguva) Rarely (Pano nepano) Never (Kana)		

F. Shona Symptom Questionnaire (SSQ8)				
F1 (T111)	There were times in which I was thinking deeply or thinking about many things. Pane pandaimboona ndichinyanya kufungisisa kana kufunga zvakawanda.	Yes (Hongu) No (Kwete)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
F2 (T112)	I sometimes failed to sleep or lost sleep. Pane pandaimbotadza kurara kana kushaya hope.	Yes (Hongu) No (Kwete)		

F3 (T113)	There were moments when I felt life was so tough that I cried or wanted to cry. Pane pandaimbonzwa kuomerwa nehupenyu zvekuti ndaimbochema kana kunzwa kuda kuchema.	Yes (Hongu) No (Kwete)		
F4 (T114)	I felt run down (tired). Pane pandaimbonzwa kuneta	Yes (Hongu) No (Kwete)		
F5 (T115)	At times I felt like committing suicide. Pane pandaimboita pfungwa dzekuda kuzviuraya	Yes (Hongu) No (Kwete)		
F6 (T116)	I was generally unhappy with things that I would be doing each day. Ndainzwa kusafara nezvinhu zvandaiita zuva nezuva	Yes (Hongu) No (Kwete)		

F7 (T117)	My work was lagging behind. Basa rangu rainge rava kusarira kumashure	Yes (Hongu) No (Kwete)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
F8 (T118)	I felt I had problems in deciding what to do. Ndainzwa zvichindiomera kuti ndizive kuti ndoita zvipi	Yes (Hongu) No (Kwete)		

G: Biological mothers (skip to H if C3 is no)				
HIV Testing, disclosure and Treatment history lyezvino ndakudakukubvanzai mibvunzo yakanangana nezvekuongororwa ropa, kuudza vanhu zvabuda muongororo pamwe nezvenhoroondo pamushonga (T211)				
Q No	**Question**	Responses	**Instructions**	**Skip/comment**

G1 **(T119)**	How old were you when you first tested HIV positive? Manga mune makore mangani pamakatanga kuudzwa kuti mune hutachiona hweHIV?	Record age in completed years	Please use the number pad to record how old you were when you first tested HIV positive. *Ndapota shandisa gwaro remanhamba kutiudza kuti mange mune makore mangani* pamakatanga kuudzwa kuti mune *hutachiona hweHIV.* **(T120)**	
G2 **(T121)**	What made you go for an HIV test? Chii chakaita kuti muende kunoongororwa HIV?	Was sick/ ndairwara Advised by the healthcare worker/ ndakaudzwa nemushandi wezve hutano Pregnancy/ ndaive nepamuviri/ nhumbu Decided to get tested/ ndakangodawo kuongororwa ropa Other specify/ Zvimwewo		

G3 **(T122)**	Have you told anyone the results of your test? Pane munhu here wamakaudza zvakabuda muongororo yenyu?	Yes (Hongu) No (Kwete)		
G4 **(T123)**	I am going to read to you the people you could have told. Please tell me if you have told them and these should not include people who knew about it. Ndava kukuverengera vanhu vamungaday makaudza. Ndapota ndiudzeyi kana pane vanhu amakataurira uye vanofanira kunge vari vanhu vanga vasingazive nezvavo.	• Spouse/partner (Murume kana mukadzi wako) • Parents (Vabereki) • Brother(s) (Hanzvadzi/ Munin'na/Mukoma) • Sister(s) (Hanzvadzi/ Munin'na/Mukoma) • Sister or brother in law (Munin'na kana mukoma wemukadzi/murume wako) • Other family relatives specify (Vamwe vehukama)		
G5a **(T124)**	Were you ever inititiated on ARVs Makamboiswa pamushonga here wemaARVs	• Yes (Hongu) • No (Kwete	Please press on one box only	skip to H1 if no

G5b **(T125)**	Are you currently taking ARVs? Pari zvino muri pamushonga here we maARV?	• Yes (Hongu) • No (Kwete	*Ndapota dzvanya mubhokisi rimwechete chete*	
G5c	When were you initiated on ARVs? (State date dd/mm/yr) Makaiswa rinhi pamushonga we maARVs? (Taura zuva racho dd/mm/yr)	• Record date in dd/mm/year format • if not known record 0		
G6a **(T126)** G6b	Did you know your CD4 count when you started taking ARVs? Munoziva kuti CD4 count yenyu yakange iri pap pamakatanga kuiswa pamushonga wema ARVS What was it? Yanga iri chiii? **(T127)**	• Yes/Hongu • No/ kwete • Record number of copies/ml • Ndapota nyorai nhamba yenyu yeCD4 **(T128)**		

G7a G7b G7c	Do you know your recent CD4 count? What is it? When was it taken? Munoziva here CD4 count yenyu yekupedzisira**(T129)** Yange iri chii? **(T130)** Makapedzisirwa kutorwa riinhi**(T131)**	• Record number and date of last CD4 test • Ndapota shandisai manhamba kunyora mwedzi negore ramakapedzisira kutorwa CD4 count (T132)		
G8 **(T133)**	How long did it take you to be put on ART since the first time you were tested? *(Tick where applicable)* Zvakatora nguva yakareba sei kubva panguva yamakaongororwa HIV kusvika yakamazoiswa pamushonga?	• Same day I was tested (zuva rimwe chete randakaongororwa) • Within a week of testing (Musvondo rimwe chete randakaongororwa) • Between 1 - 11 months (Pakati pemwedzi mumwe chete nemwedzi gumi nerimwe) • Between 1 -5 years (Pakati pegore rimwe kusvika makore mashanu)	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
G9 **(T134)**	Which treatment center do you currently go to? Pari zvino munoenda kuchipatara kupi?	• Local clinic (Kukiriniki yemunharaunda) • Local hospital (Kuchipatara chemunharaunda) • Parirenyatwa hospital (Kuchipatara cheParirenyatwa) • Harare hospital (Kuchipatara cheHarare – Kugomo) • Nazareth/Beatrice hospital (Chipatara cheNazareth) • Other (Chimwewo chipatara/kiriniki)		

G10 **(T135)**	How long is it since you first took these drugs (ARVs)? Pava nenguva yakareba seyi kubva pamakatanga kunwa mishonga iyi (maARVs).	• Record number of years or months if less than a 1 years Ndapota shandisai gwaro remanhamba kunyora makore kana musati masvitsa gore nyorai mwedzi (T136)		
G11 **(T137)**	Have you stopped taking these drugs (ARVs)? Makamira here kutora mishonga iyi (ARVs)?	• Yes (Hongu) • No (Kwete)		skip to G13 if no
G12 **(T138)**	Why have you stopped taking these drugs (ARVs)? Chikonzero chipi chakaita kuti mumire kutora mishonga iyi (ARVs)?	• Didn't want them anymore (Ndanga ndisisangaade) • Not available at the clinic (Anga apera kukiriniki) • Advised not to take them at my church (Ndakanzi ndisaamwe kuchechi) • Side effects (Aindirwarisa) • Not needed: in good health (Ndapora) • Other specify (Chimwewo chikonzero)		
G13	Did you stop taking your drugs at some point from firs initiation and then resume after some time?	• Yes (Hongu) • No (Kwete)		Skip to G15 if no

G14	Why did you stop taking these drugs during that time?	• Didn't want them anymore (Ndanga ndisisangaade) • Not available at the clinic (Anga apera kukiriniki) • Advised not to take them at my church (Ndakanzi ndisaamwe kuchechi) • Side effects (Aindirwarisa) • Not needed: in good health (Ndapora) • Other specify (Chimwewo chikonzero)		
G15 (T139)	Some people may miss taking their medication no because they don't want to, talking about you how often do you miss taking your ARVS on average? Vamwe vanhu vanokundikana kunwa mapiritsi avo sezvavanotariswa kunge vachiita asi kusiri kuda kwavo takatarisa imi mungati kangani pamunodarikira kunwa mapiritsi enyu?	• Once a day (Kamwe pazuva) • Twice a week (Kawiri pasvondo) • Once a week (Kamwe pasvondo) • Once every two weeks (Kamwe pamasvondo maviri) • Once a month (Kamwe pamwedzi) • Other (Imwewo nguva) • Never (handisati ndambodarikira)		
G16 (140)	In the last 7 days how many doses have you missed? Musvondo rapfuura makakanganwa kunwa mapirits kangani?	• Record no of doses • Ndapota shandisai gwaro remanhamba kunyora kuti makakanganwa kangani (T141)		

G17 (142)	In the last 7 days how many doses did you not take on time? Musvondo rapfuura mapiritsi mangani amusina kunwa nenguva?	• Record no of doses • Ndapota shandisai gwaro remanhamba kunyora kuti kanngani pamusina kunwa nenguva (T143)		
G18 (T144)	Have you experienced any unpleasant side effects since you started taking treatment? Makambotadza kuwirirana nemushonga here?	• Yes a lot of times • Hongu kakawanda • Yes a few times • Hongu kashoma • No • Kwete	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	
G19 (T145)	Have you received any of the following as part of your treatment for HIV? Makamboita here zvimwe zvezvinotevera mukurapwa kwenyu HIV?	• Changes in ARVs due to complications (Makambochinjirwa mushonga ye HIV here mushure mekunge yakurwarisai • TB treatment (kurapwa TB) • Treatment for other OI (kurapwa tumwe tuzvirwere tunokonzerwa ne HIV) • Cotrimoxazole (kupiwa mamacotri) • Hospital admission (kupihwa mubhedha) • Other/ Zvimwewo		

G20 (T146)	Did you receive any treatment to take **yourself** to prevent the baby from getting infected with HIV? Makambopiwa mishonga here yekuti mudzivirire mwana kuti asabatire utachiwana hweHIV?	Yes AZT Yes NVP single dose Yes other (specify) No Don't know Was already on ART		
G21	How many people living in the same household as you are HIV positive? Vanhu vangani vanogara mumba menyu vari kurwara nechirwere cheHIV?	• Record number of people Ndapota shandisai gwaro remanhamba kunyora kuti vanhu vangani		
G22	What is your husband's/sexual partner's HIV status? Murume wenyu kana shamwari yenyu yepabonde yakamira seyi maererano nehutachiona hweHIV	• HIV positive • HIV negative • I do not know		Skip to H if it is HIV negative and I do not know.

G23	Is your husband/sexual partner on treatment (ARVs)? Murume wenyu kana shamwari yenyu yepabonde iri pamushonga wemaARVs her e	• Yes • No		If yes, skip to H
G24	Why is your husband/sexual partner not on treatment Nemhaka yei murume wenyu kana shamwari yenyu yepabonde asiri pamushonga	•		

H: Health-related quality of life (EQ-5D) – Adult			
Please indicate which statements best describes your own health state today Ndapota taridzai mitsara inonyatsotsanangura zvamuri kunzwa maererano nehutano hwenyu muzuva ranhasi (T212)			
H1 **(147)**	Mobility 1 = I have no problems in walking about 2 = I have some problems in walking about 3 = I am confined to bed 1 = Handina matambudziko pakufamba 2 = Ndine matambudziko pakufamba 3 = Handitokwanisi kufamba zvachose ndinongogara ndirere	Please press on one box only *Ndapota dzvanya mubhokisi rimwechete chete*	

H2 **(148)**	Self-care 1 = I have no problems with self-care 2 = I have some problems washing or dressing myself 3 = I am unable to wash or dress myself 1 = Handina matambudziko nekuzvichengeta 2 = Ndine dambudziko nekuzvigeza nekuzvipfekedza 3 = Handitokwanisi kuzvigeza nekuzvipfekedza zvachose		
H3 (149)	Usual Activities (e.g. work, study, housework, family or leisure activities) 1 = I have no problems with performing my usual activities 2 = I have some problems with performing my usual activities 3 = I am unable to perform my usual activities 1 = Handina dambudziko nekuita mabasa angu emazuva ose 2 = Ndinoita matambudziko pakuita mabasa angu emazuva ose 3 = Handitokwanisi kuita mabasa emazuva ose		
H4 **(**150)	Pain/Discomfort 1 = I have no pain or discomfort 2 = I have moderate pain or discomfort 3 = I have extreme pain or discomfort 1 = Handina panondirwadza uye ndakagadzikana 2 = Ndinonzwa kurwadziwa uye kusagadzikana 3 = Ndinonzwa kurwadziwa zvakanyanya uye kusagadzikana zvakanyanya		
H5 (T151)	Anxiety/Depression 1 = I am not anxious or depressed 2 = I am moderately anxious or depressed 3 = I am extremely anxious or depressed 1 = Handishushikane neramangwana kana kunzwa kushungurudzika mupfungwa zvakanyanya 2 = Ndinonzwa kushushikana neramangwana zvishoma uye kushungurudzika mupfungwa zvishoma 3 = Ndinonzwa kushushikana neramangwana zvakanyanya uye kushungurudzika mupfungwa zvakanyanya		

Biological mothers (skip to J if C3 is no) (Skip to J if G11 is Yes)			
Medication Adherence Ratings Scale (MARS) Iyezvino ndoda kukubvanzai mibvunzo maererano nemanwiro amunoita mushonga (T213)			
Q No	Question	Responses	Instructions

I1 (T152)	Do you ever forget to take your medicine? Pane pamunombokanganwa kumwa mushonga here?	Yes (Hongu) No (Kwete)	Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete
I2 (T153)	Are you careless at times about taking your medicine? Munomboshaya hanya here maererano nekumwa mushonga wenyu?		
I3 (T154)	When you feel better, do you sometimes stop taking your medicine? Pamunenge muchinzwa zviri nani munomborega here kumwa mushonga yenyu?		
I4 (T155)	Sometimes if you feel worse when you take the medicine do you stop taking it? Dzimwe nguva pamunonzwa kunge makunyanya kurwara muchinwa mushonga munomborega here kuumwa?		
I5 (T156)	I take my medication only when I am sick. Ndinomwa mushonga wangu pandinenge ndichirwara chete.		
I6 (T157)	It is unnatural for my mind and body to be controlled by medication. Pfungwa dzangu nemuviri wangu hazvina kujaira kushandisa mushonga.		
I7 (T158)	My thoughts are clearer on medication. Pfungwa dzangu dzakajeka kana ndiri pamushonga.		
I8 (T159)	By staying on medication, I can prevent getting sick. Ndikaramba ndiri pamushonga, ndinokwanisa kudzivirira kurwara.		
I9 (T160)	I feel weird, like a 'zombie', on medication. Ndinonzwa kuzungaira kunge dununu kana ndiri pamushonga	Yes (Hongu) No (Kwete)	
I10 (T161)	Medication makes me feel tired and sluggish. Mushonga unoita kuti ndinzwe kuneta nekurukutika.		

J: Parental Stress Index/ Iyezvino ndoda kukubvanzai mibvunzo yakanangana nekushungurudzika mupfungwa kwevabereki (T214)			
Q No	Question	Responses	Instruction

J1 (T162)	I often have the feeling that I cannot handle things very well. Ndinowanzo kunzwa sekunge pane nguva yandisingatambire zvinhu zvakanaka.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuziwi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete
J2 (T163)	I find myself giving up more of my life to meet my children's needs than I ever expected. Ndinoona ndichizvipira kakawanda muhupenyu hwangu kupfura zvandaifungidzira kuti ndikwanise kuriritira vana vangu.		
J3 (T164)	I feel trapped by my responsibilities as a parent. Ndinonzwa sekunge ndakabatikana nokuda kwezvandinofanira kuita semubereki.		
J4 (T165)	Since having this child, I have been unable to do new and different things, Kubvira pandakaita mwana uyu, ndakutadza kuita zvinhu zvitsva kana zvakasiyana-siyana.		Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete
J5 (T166)	Since having a child, I feel that I am almost never able to do things that I like to do. Kubvira pandakaita mwana, ndinonzwa sekunge handichakwanisa kuita zvandinofarira kuita.		Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete
J6 (T167)	I am unhappy with the last purchase of clothing I made for myself. Handisi kufara nembatya dzandakazvitengera.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo	

J7 (T168)	There are quite a few things that bother me about my life. Pane zvinhu zvishoma zvinondinetsa pamusoro pehupenyu hwangu.	Not Sure Handinyatsokuziwi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete
J8 (T169)	Having a child has caused more problems than I expected in my relationship with my spouse (male/female friend). Kuita mwana kwakakonzera matambudziko andaisatarisira mukuwirirana kwangu nemurume wangu kana shamwarikadzi yangu).		
J9 (T170)	I feel alone and without friends. Ndinonzwa sekunge ndakaraswa sekunge ndisina shamwari.		
J10 (T171)	When I go to a social gathering, I usually expect not to enjoy myself. Pandinowanzo kuenda kumabiko, ndinowanzo tarisira kusafara.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuziwi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	
J11 (T172)	I am not as interested in people as I used to be. Handichisina hanya nevanhu sezvandaisimboita.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure	Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete
J12 (T173)	I do not enjoy things as I used to. Handichanakidzwe nezvinhu sezvandaimboita.		

J13 (T174)	My child rarely does things for me that make me feel good. Kashoma mwana wangu achiita zvinhu zvinoita kuti ndinzwe kufara.	Handinyatsokuziwi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	
J14 (T175)	Sometimes I feel my child doesn't like me and doesn't want to be close to me. Dzimwe nguva ndinombonzwa sekunge mwana wangu haandifarire uye haadi kunge ari pedyo neni.		
J15 (T176)	My child smiles at me much less than I expected. Mwana wangu haasekerere kwandiri sezvandaitarisira.		
J16 (T177)	When I do things for my child, I get the feeling that my efforts are not appreciated very much. Pandinoitira mwana wangu zvimwe zvinhu, ndinonzwa sekunge zvandinoita haazvikoshese zvakanyanya.		
J17 (T178)	When playing, my child doesn't often giggle or laugh. Kana achitamba mwana wangu haawanzo sekenyeka kana kuseka.		
J18 (T179)	My child doesn't seem to learn as quickly as most children. Mwana wangu anoita seasingabate zvinhu nekukasika sevamwe vana.		
J19 (T180)	My child doesn't seem to smile as much as most children. Mwana wangu haawanzo sekerere kakawanda sevamwe vana.		Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete
J20	I feel very close to my child		

J21 (T181)	My child is not able to do as much as I expected. Mwana wangu haakwanise kuita zvinhu zvakawanda sezvandaiitarisira.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuziwi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	
J22 (T182)	It takes a long time and it is very hard for my child to get used to new things. Zvinotora nguva yakareba, uye zvinonetsa mwana wangu kuti ajairire zvinhu zvinyowani.		
For the next statement, choose your response for the choices “1” to “5” below. Pane mubvunzo unotevera, sarudza mhinduro pakati pemhinduro shanu dzakapihwa pasi .(T215)			
J23 (T183)	I feel that I am: Ndinonzwa sekunge:	1. Not very good at being a parent Handisikugona pakuvamubereki. 2. A person who has some trouble being a parent. Ndiri munhu arikunetsekana pakuvamubereki. 3. An average parent. Sendingori mubereki ari pakati nepakati. 4. A better than average parent Sendiri mubereki ari nani pane ari pakati nepakati. 5. A very good parent Sendiri mubereki akanaka.	Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete

J24 (T184)	I expected to have closer and warmer feelings for my child than I do and this bothers me. Ndaitarisira kuti ndinenge ndine rudo rwakawanda kune mwana wangu kupfura zvandiri kuita saka zvinondishungurudza.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuziwi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete
J25	I love being a parent		
J26 (T1 84)	Sometimes my child does things that bother me just to be mean. Dzimwe nguva mwana wangu anoita zvinhu zvinondibhowa achida.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuziwi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	
J27 (T186)	My child seems to cry or fuss more often than most children. Mwana wangu anongochema kana kunetsa kupfura vamwe vana.		
J28 (T187)	My child generally wakes up in a bad mood. Mwana wangu anombomuka akapfundumwara.		
J29 (T188)	I feel that my child is very moody and easily upset. Ndinoona sekuti mwana wangu anongopfundumwara achikasika kutsamwa.		

J30	My child has a lovely nature		
J31 (T189)	My child does a few things which bother me a great deal. Pane zvimwe zvinhu zvishoma zvinoitwa nemwana wangu zvinondibhowa zvisingaite.		
J32 (T190)	My child reacts very strongly when something happens that my child doesn't like. Mwana wangu anotsamwa kana pane chinoitika chaasingafarire.		
J33	My child is a happy child		
J34 (T191)	My child gets upset over the smallest thing. Mwana wangu anotsamwira zvinhu zvidiki-diki.		
J35 (T192)	My child's sleeping or eating schedule was much harder to establish than I expected. Nguva yekurara nekudya yemwana wangu yakanetsa kuti ibatire kupfura zvandaifungira.		
For the next statement, choose your response for the choices "1" to "5" below. Pane mubvunzo unotevera, sarudza mhinduro pakati pemhinduro shanu dzakapihwa pasi			

J36 (T193)	I have found that getting my child to do something or stop doing something is: Ndinoona sekuti kuti mwana wangu aite chimwe chinhu kana kuti aregera kuita chimwe chinhu:	1. Much harder than I expected Sekunge zvakaoma pane zvandaitarisira. 2. Somewhat harder than I expected. Sekunge zvakatiomei kupfura zvandaitarisira. 3. About as hard as I expected. Sekunge zvakaoma sezvandaitarisira. 4. Somewhat easier than I expected. Sekunge zvakapfawa zvishoma pane zvandaitarisa. 5. Much easier than I expected. Sekunge zvakapfawa kupfura zvandaitarisira.	Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete
For the next statement, choose your response from the choices “10+” to “1-3”. Pane mubvunzo unotevera, sarudza mhinduro pakati pemhinduro dzakapihwa pazasi (T216)			
J37 (T194)	Think carefully and count the number of things which your child does that bother you. Fungai zvakanaka muverenge zvinhu zvinoitwa nemwana wenyu zvinokunetsai.	10+ 8-9 6-7 4-5 1-3 0	Please press on one box only
J38	My child brings me joy		

J39 (T195)	There are some things my child does that really bother me a lot. Pane zvimwe zvinhu zvinoitwa nemwana wangu zvinokushungurudza zvakanyanya.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuziwi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	Ndapota dzvanya mubhokisi rimwechete chete
J40 (T195)	My child turned out to be more of a problem than I expected. Mwana wangu idambudziko kupfura zvandaitarisira.		Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete
J41 (T197))	My child makes more demands on me than most children. Mwana wangu anoda zvakawanda kubva kwandiri kupfura vamwe vana.	Strongly Agree Ndinobvumirana nazvo zvakapfurikidza Agree Ndinobvumirana nazvo Not Sure Handinyatsokuziwi Disagree Handibvumirana nazvo Strongly Disagree Handibvumirani nazvo zvachose	
J42	My child has a lovely nature		
J43	Even though it is difficult being a parent, I find it rewarding.		
J44	It is wonderful to watch my child grow and develop		

	K: ALCOHOL USE DISORDERS IDENTIFICATION TEST (AUDIT)/ Iyezvino ndoda kuubvunzai mibvunzo maererano nekunwa hwahwa ((T217)			
Q No	Questions	Resposes	Instructions	Comments
K1 (T198)	How often do you have a drink containing alcohol? Kangani muchimwa zvimwiva zvinehwahwa?	Never Handina kumbobvira ndambomwa Monthly or less Zvisingasviki kuita mwedzi wega wega 2-4 times per month Kaviri kusvika kanokwana kuita kana pamwedzi. 2-3 times per week Kaviri kana katatu pasvondo 4+ weeks Masvondo mana zvichipfurira.	Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete	skip to K6 if no
K2 (T199)	How many bottle of alcohol you drink on a typical day when you are drinking? Munomwa mabhodhoro mangani ehwahwa pazuva ramunowanzomwa?	1-2 3-4 5-6 7-9 10+ (T200)		

K3 (T201)	How often have you had 6 or more units if female, or 8 or more if male, on a single occasion in the last year? Kangani pamakamwa mabhodhoro matanhatu (kana muri munhukadzi), masere (muri munhurume) pazuva rimwe mugore rapera?	Never Kana Less than monthly Zvisingasvike mwedzi wega wega Monthly Mwedzi wega wega Weekly Pasvondo rega rega Daily or almost daily Zvinokwanisa kusvika pazuva rega rega.	Please press on one box only Ndapota dzvanya mubhokisi rimwechete chete	
K4 (T202)	How often during the last year have you failed to do what was normally expected from you because of your drinking? Kangani mugore rakapera pamakatadza kuita zvamaitarisirwa kuita nekuda kwekudhakwa kwenyu?			
K5 (T203)	How often during the last year have you been unable to remember what happened the night before because you had been drinking? Kangani mugore rapera pamusina kukwanisa kuyeuka zvakaitika madeko apfura nekuda kwekuti manga makadhakwa?			
K6	Record time			
L. Hurts, insulted, threatened with Harm and Screamed (HITS) Scale and Relationship Quality Questions				
Q No	Question	Responses		
L1	How often does your partner/husband physically hurt you? Kangani murume wenyu kana shamwari yenyu yepabonde ichikukuvadzai panyama yenyu?	Never Rarely Sometimes Fairly Often Frequently		
L2	How often does your partner/husband insult or talk down to you? Kangani shamwari yenyu yepabonde kana murume wenyu achikudzikisirayi kana kukutukai?	Never Rarely Sometimes Fairly Often Frequently		

L3	How often does your partner/husband threaten you with harm? Kangani shamwari yenyu yepabonde kana murume wenyu achikuvhundutsirayi nokuda kukukuvadzai?	Never Rarely Sometimes Fairly Often Frequently		
L4	How often does your partner/husband scream or curse at you? Kangani shamwari yenyu yepabonde kana murume wenyu achikupopoterai kana kukwidza izwi rake kwamuri?	Never Rarely Sometimes Fairly Often Frequently		
M. Relationship Assessment Scale				
Q No	Questions	Resposes	Instructions	Comments
M1	How well does your partner meet your needs? Murume wenyu anozadzikisa zvakadiyi zvishuvo zvemoyo wenyu?	1 2 3 4 5	Scale of 1-5 with 1 being low and 5 being high	
M2	In general, how satisfied are you with your relationship? Munogudzikana zvakadini nehukama hwenyu?	1 2 3 4 5	Scale of 1-5 with 1 being low and 5 being high	
M3	How good is your relationship compared to most? Hukama hwenyu hwakanaka zvakadiyi tichihutarisa nehwevamwe vanhu?	1 2 3 4 5	Scale of 1-5 with 1 being low and 5 being high	
M4	How often do you wish you had not gotten into this relationship? Kakawanda zvakadiyi muchikungura kuti makapindireyi muhukama uhu?	1 2 3 4 5	Scale of 1-5 with 1 being low and 5 being high	

M5	To what extent has your relationship met your original expectations? Hukama uhu hwakazadzikisa zvakadiyi zvishuviro zvenyu zvekutanga?	1 2 3 4 5	Scale of 1-5 with 1 being low and 5 being high	
M6	How much do you love your partner? Munoda shamwari yenyu yepabonde zvakadiyi?	1 2 3 4 5	Scale of 1-5 with 1 being low and 5 being high	
M7	How many problems are there in your relationship? Matambudziko mangani ari muhukama hwenyu?	1 2 3 4 5	Scale of 1-5 with 1 being low and 5 being high	
N. Brief Resilience Scale (BRS)				
Q No	Questions	Resposes	Instructions	Comments
N1	I tend to bounce back quickly after hard times Ndinokurumidza kunzwa zviri nani mushure mekushungurudzika/kunetseka	Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)	Scale of 1-5 as indicated next to response	
N2	I have a hard time making it through stressful events. Ndinoona zvakandiomera kubuda muzvinhu zvinoshungurudza.	Strongly Disagree (5) Disagree (4) Neutral (3) Agree (2) Strongly Agree (1)	Scale of 1-5 as indicated next to response	
N3	It does not take me long to recover from a stressful event. Hazvinditoreri nguva yakareba kubuda muzvinhu zvinoshungurudza.	Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)	Scale of 1-5 as indicated next to response	

N4	It is hard for me to snap back when something bad happens. Zvakandiomera kuti ndidzoke mugwara kana pane chinhu chakaipa chaitika kwandiri	Strongly Disagree (5) Disagree (4) Neutral (3) Agree (2) Strongly Agree (1)	Scale of 1-5 as indicated next to response	
N5	I usually come through difficult times with little trouble. Ndinowanzobuda pazvinhu zvakandiomera	Strongly Disagree (1) Disagree (2) Neutral (3) Agree (4) Strongly Agree (5)	Scale of 1-5 as indicated next to response	
N6	I tend to take a long time to get over set-backs in my life. Ndinowanzotora nguva refu kukanganwa zvimhingamupinyini muhupenyu hwangu	Strongly Disagree (5) Disagree (4) Neutral (3) Agree (2) Strongly Agree (1)	Scale of 1-5 as indicated next to response	
O. Discipline (Questions derived from the Conflict Tactics Scale for Parent and Child)				
Q No	Questions	Resposes	Instructions	Comments
O1	In the past year, have you or any adult explained to (name of the child) why something was wrong? Mugore rapfuura imi kana mumwe munhu mukuru wemumhuri makambotsanangurira (Zita) seyi paive nezvisina kumira zvakanaka?	Once in the past year (01) Twice in the past year (02) 3-5 times (03) 6-10 times (04) 11-20 times (05) More than 20 times (06) Not in the past year, but happened before (07) This has never happened (00)	Scale of 00-07 as indicated next to response	

O2	In the past year, have you or any adult shaken him/her? Mugore rapfuura imi kana mumwe munhu mukuru makambomuzunza here?	Once in the past year (01) Twice in the past year (02) 3-5 times (03) 6-10 times (04) 11-20 times (05) More than 20 times (06) Not in the past year, but happened before (07) This has never happened (00)	Scale of 00-07 as indicated next to response	
O3	In the past year, have you or any adult shouted, yelled, or screamed at him/her? Mugore rapfuura imi kana mumwe munhu mukuru pane here akambotuka, kukwidza izwi, kana kudeedzera kumwana here?	Once in the past year (01) Twice in the past year (02) 3-5 times (03) 6-10 times (04) 11-20 times (05) More than 20 times (06) Not in the past year, but happened before (07) This has never happened (00)	Scale of 00-07 as indicated next to response	
O4	In the past year, have you or any adult spanked him/her on the bottom with bare hands, a stick, or any object? Mugore rapfuura imi kana mumwe munhu mukuru pane here pamakarova mwana kumadziko nemaoko, chimuti kana chimwewo chinhu	Once in the past year (01) Twice in the past year (02) 3-5 times (03) 6-10 times (04) 11-20 times (05) More than 20 times (06) Not in the past year, but happened before (07) This has never happened (00)	Scale of 00-07 as indicated next to response	

O5	In the past year, have you or any adult slapped him/her on the face or head or ears? Mugore rapfuura imi kana mumwe munhu mukuru pane here pamakarova mwana kumeso, mumusoro kana kutsunya nzeve	Once in the past year (01) Twice in the past year (02) 3-5 times (03) 6-10 times (04) 11-20 times (05) More than 20 times (06) Not in the past year, but happened before (07) This has never happened (00)	Scale of 00-07 as indicated next to response	
O6	In the past year, have you or any adult taken away privileges? Mugore rapfuura imi kana mumwe munhu mukuru pane here	Once in the past year (01) Twice in the past year (02) 3-5 times (03) 6-10 times (04) 11-20 times (05) More than 20 times (06) Not in the past year, but happened before (07) This has never happened (00)	Scale of 00-07 as indicated next to response	
O7	In the past year, have you or any adult threatened to spank or hit him/her but did not actually do it? Mugore rapfuura imi kana mumwe munhu mukuru pane here pamavhundutsira mwana nokuda kumurova asi mukazorega	Once in the past year (01) Twice in the past year (02) 3-5 times (03) 6-10 times (04) 11-20 times (05) More than 20 times (06) Not in the past year, but happened before (07) This has never happened (00)	Scale of 00-07 as indicated next to response	

O8	Have you or any adult substituted a positive activity for whatever he/she was doing wrong? Imi kana mumwe munhu mukuru pane here pamakaita zvinhu zvinonakidza muchitsiva zvaiitwa nemwana zvakaipa	Once in the past year (01) Twice in the past year (02) 3-5 times (03) 6-10 times (04) 11-20 times (05) More than 20 times (06) Not in the past year, but happened before (07) This has never happened (00)	Scale of 00-07 as indicated next to response	
P. Social/Group Cohesion (Questions derived from Group Cohesion Scale) [NOTE TO SURVEY ASSISTANT: THIS IS ONLY TO BE ASKED TO THE INTERVENTION CLINICS]				
Q No	Questions	Resposes	Instructions	Comments
P.1	There is a feeling of unity and togetherness among our group members. Pane huvepo nokubatana pakati pevanhu vari muchikwata chedu.	Strongly Disagree (1) Disagree (2) Agree (3) Strongly Agree (4)	Scale of 1-4 as indicated next to response	
P.2	Group members usually feel free to share information or their feelings. Vanhu vemuchikwata chedu vanowanzonge vakasununguka kutaura zvavanoziva kana zvavanonzwa.	Strongly Disagree (1) Disagree (2) Agree (3) Strongly Agree (4)	Scale of 1-4 as indicated next to response	
P.3	I dislike going to this group's meetings. Handifariri kuenda kumisangano yechikwata ichi?	Strongly Disagree (1) Disagree (2) Agree (3) Strongly Agree (4)	Scale of 1-4 as indicated next to response	
P.4	Despite group tensions, members tend to stick together Kunyangwe kune kusawirirana muboka vanhu vemuchikwata chedu vairamba vakabatana.	Strongly Disagree (1) Disagree (2) Agree (3) Strongly Agree (4)	Scale of 1-4 as indicated next to response	
P.5	Minimal attempts are made to include quieter members of this group.	Strongly Disagree (1) Disagree (2) Agree (3) Strongly Agree (4)	Scale of 1-4 as indicated next to response	

P.6	Group members respect the agreement of confidentiality. Vanhu vemuchikwata chedu vanokoshesa zvatakawirirana pakuchengetedza tsindidzo	Strongly Disagree (1) Disagree (2) Agree (3) Strongly Agree (4)	Scale of 1-4 as indicated next to response	
P.7	Many members engage in 'back-stabbing' in this group. Vanhu vakawanda vemuchikwata chino vanofarira kuita makuhwa.	Strongly Disagree (1) Disagree (2) Agree (3) Strongly Agree (4)	Scale of 1-4 as indicated next to response	
P.8	I feel vulnerable in this group. Ndinonzwa ndiri padanho rekuti ndinokwanisa kumbunyikidzika zviri nyore.	Strongly Disagree (1) Disagree (2) Agree (3) Strongly Agree (4)	Scale of 1-4 as indicated next to response	
Q. Process Evaluation Questions [NOTE THIS IS ONLY TO BE ASKED TO THE INTERVENTION CLINICS]				
Q No	Questions	Resposes	Instructions	Comments
Q1	How many early childhood stimulation sessions did you attend Makaenda kuzvidzidzo zvingani zveECD	0-18	Insert Number pad	Skip the rest of Q if answer is 0
Q.2	How useful did you find the intervention components for your; Makaona zvidzidzo izvi zvichikubatsirayi zvakadiyi pa:			
Q. 2.1	Wellbeing/health	Very useful A little useful Not useful	Please press on one box only	
Q.2.2	Child's development	Very useful A little useful Not useful	Please press on one box only	

Q.2.3	Parenting skills	Very useful A little useful Not useful	Please press on one box only	
Q.2.4	Economic stability	Very useful A little useful Not useful	Please press on one box only	
Q.3	How useful did you find the Early childhood stimulation sessions below Makaona zvidzidzo izvi zvichikubatsirayi zvakadiyi			
Q.3.1	Session 1: Social support and accessing services (Relationships with people around you and the child session)	Very useful A little useful Not useful	Please press on one box only	
Q.3.2	Session 2-3: A well-nourished baby and young child	Very useful A little useful Not useful	Please press on one box only	
Q.3.3	Sessions 4-5: A healthy child	Very useful A little useful Not useful	Please press on one box only	
Q.3.4	Session 6: The role of a good parent (responsive parenting practices)	Very useful A little useful Not useful	Please press on one box only	
Q.3.5	Session 7: General information on child development overview	Very useful A little useful Not useful	Please press on one box only	

Q.3.6	Session 8: Physical/motor development	Very useful A little useful Not useful	Please press on one box only	
Q.3.7	Session 9: Social and emotional development	Very useful A little useful Not useful	Please press on one box only	
Q.3.8	Session 10: Communication and language development	Very useful A little useful Not useful	Please press on one box only	
Q.3.9	Session 11: Developing thinking and understanding of the world (cognitive)	Very useful A little useful Not useful	Please press on one box only	
Q.3.10	Session 12: Positive discipline sessions	Very useful A little useful Not useful	Please press on one box only	
Q.4	From the Internal Savings and Lending Scheme programme, how useful did you find the followings sessions: Kubva kuma ISALs makaona zvidzidzo zvinotevera zvichikubatsirayi zvakadiyi			
Q.4.1	Individual self-screening	Very useful A little useful Not useful	Please press on one box only	
Q.4.2	Groups and leadership	Very useful A little useful Not useful	Please press on one box only	

Q.4.3	Constitution development	Very useful A little useful Not useful	Please press on one box only	
Q.4.4	Group fund development	Very useful A little useful Not useful	Please press on one box only	
Q.4.5	Record keeping	Very useful A little useful Not useful	Please press on one box only	
Q.4.6	Saving pay-outs	Very useful A little useful Not useful	Please press on one box only	
Q.5	How useful did you find the Internal Savings and Lending Scheme programme in:		Please press on one box only	
Q.5.1	Assisting you to access health facilities		Please press on one box only	
Q.5.2	Assisiting in any other health treatment for you and members of your household		Please press on one box only	
Q.5.3	Assisting you to improve your household food security (i.e access to consistent meals)		Please press on one box only	
Q.5.4	Assisting you to establish personal business		Please press on one box only	
Q.5.5	Assisting in enhancing your financial literacy skills		Please press on one box only	

Q.6	Reflecting back on the last year, do you believe you have developed any new concepts or ideas on;			
Q.6.1	Understanding the needs of young children	A lot A little bit Not at all	Please press on one box only	
Q.6.2	Managing your finances appropriately	A lot A little bit Not at all	Please press on one box only	
Q.7	Overall, how would you rate the programme in terms of;			
Q.7.1	Number of sessions delivered	Good Fair Poor	Please press on one box only	
Q.7.2	Length of sessions delivered	Good Fair Poor	Please press on one box only	
Q.7.3	Quality of sessions' delivery	Good Fair Poor	Please press on one box only	
Q.8	Finally, would you recommend the programme to others?	Yes, definitely will Yes, probably will No, probably won't No, definitely won't	Please press on one box only	
Q.7.3	Quality of sessions' delivery	Good Fair Poor	Please press on one box only	
Q.8	Finally, would you recommend the programme to others?	Yes, definitely will Yes, probably will No, probably won't No, definitely won't	Please press on one box only	

Appendix 2: Facilitator's Reporting Checklist

CHIDO INTERVENTION: SESSION REPORT FORM

Session Topic: #: _____

Facilitator's Name: _____ Date: ____ / _____/

Clinic Site: ____Village:___

Start Time: ____ End Time: __

Group Child Demographics:

Sex: Boys __ Girls: ___

Age: Below 12months__ Above 12 months __

Attendance: ____

1) Did you cover the lesson as outlined in the facilitator's guide? Yes ☐ No ☐

1.1) If not, why not?

_____

_____

_____

1.2) If not, how did you change the lesson?

_____

_____

_____

2) Did the mothers enjoy the lesson? Yes ☐ No ☐

2.1) What did they do to give you that impression?

3) Which exercise(s) worked well and why

	Name of exercise	Why did the exercise work well?	Participatory Tech Used*
i.			
ii.			
iii.			

4) Which exercise(s) did not work well and why

	Name of exercise	Why did the exercise not work?	Participatory Tech Used*
i.			
ii.			
iii.			
iv.			

5) Overall how well did you think the lesson ran?

|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|

very badly very well

6) Overall how well do you think you used participatory teaching methods?

|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|

very badly very well

7) Did you face any challenges when administering the session?
8) Do you have any other comments about the session?

Appendix 3:CBT ISALS reporting form

CHIDO INTERVENTION: ISALS SESSION CBT REPORT FORM

ISALS Session Topic: #: _____

CBT's Name: _____ Date: ____ / _____/ _____

Clinic Site: _____Village:___

Start Time: _____End Time: __

Attendance: ____

1) What did you cover in the ISALS meeting? as outlined in the facilitator's guide?

_____

_____

2) Did the mothers enjoy the session? Yes ☐ No ☐

What did they do to give you that impression?

3) How were the contributions and paybacks in this session? How are those who have borrowed reporting to have utilised the money? Were there any challenges with paybacks or during the session?
.
4) Overall how well did you think the lesson ran?

|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|

very badly very well

5) Do you have any other comments about the session?

Appendix 4: CHW reporting checklist

CHIDO INTERVENTION: HOME VISITS REPORT FORM

Session Topic: #:

CHW's Name: Date: ____ / _____/

Clinic Site: _____Village:___

Start Time: _____ End Time: __

1) What did you cover or reinforce in the home visit?

2) Which exercise(s) worked well and why?

	Name of exercise	Why did the exercise work well?	Participatory Tech Used*
i.			
ii.			

3) Which exercise(s) did not work well and why?

	Name of exercise	Why did the exercise not work?	Participatory Tech Used*
i.			
ii.			

4) Overall how well did you think the lesson ran?

|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|

very badly very well

5) Overall how well do you think you used participatory teaching methods?

|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|_____|

very badly very well

6) Did you face any challenges with the home visit?
7) Do you have any other comments about the session?

.

Appendix 5: Researchers' session observation checklist

CHIDO INTERVENTION RESEARCHER'S

SESSION OBSERVATION CHECKLIST

Session Topic: Session #:

Facilitator's Name: Date: ____ / _____/

Clinic Site: ____ Village:_

Start Time: ____ End Time: __

Group Child Demographics:

Sex: Boys __ Girls: ___

Age: Below 12months__ Above 12 months __

Attendance: ____

1) Did the facilitator cover the lesson as outlined in the facilitator's guide?
   Yes ☐ No ☐

1.1) If not, why not?

1.2) If not, how did the facilitator change the lesson?

2) Did the mothers enjoy the lesson? Yes ☐ No ☐

2.1) What did they do to give you that impression?

_____

_____

3) Which exercise(s) worked well and why?

NOTE CODES BELOW:

* Use the codes below to list the participatory techniques used during each exercise

aq1. Class Discussion	3. Role Play	5. Games & Simulations	7. Story Telling
2. Brainstorming	4. Small Group	6. Case Studies	8. Q&A

	Name of exercise	Why did the exercise work well?	Participatory Tech Used*
i.			
ii.			

4) Which exercise(s) did not work well and why? Use the above codes for technique used.

	Name of exercise	Why did the exercise not work?	Participatory Tech Used*
i.			
ii.			

5) Overall, how well did you think the lesson ran? (#out of 10)

I_____I_____I_____I_____I_____I_____I_____I_____I_____I_____I

very badly very well

6) Overall, how well do you think the facilitator used participatory teaching methods? (#out of 10)

I_____I_____I_____I_____I_____I_____I_____I_____I_____I_____I

very badly very well

7) How can the sessions have been improved?
8) Are there any other observations worth noting?

Appendix 6:Researchers' ISALS observation checklist

CHIDO INTERVENTION RESEARCHER'S

ISALS OBSERVATION CHECKLIST

Clinic Site & Code:__ ISALS Group: ___

CBT Name: ___ Duration of ISALS #:___

Date of ISALS Session:___ Number of attendees:__

Observed By: ____

Observational Comments:

1) What did the ISALS group do at the session?
2) Comment on the CBT & participants' relationship. Is there rapport?
3) Describe how the contributions are made, what agreement does the group have about payment, what percentage is charged, when is the agreed share-out period?
4) Describe the participants' attitudes throughout the meeting. Is everyone actively involved, are they in disagreements?

ISALS questions to the mothers

5) How beneficial are you finding the sessions?
6) What challenges have you encountered related to ISALS?
7) Any other comment or observation

Appendix 7: Researchers' home visits observation checklist

CHIDO INTERVENTION RESEARCHER'S

HOME VISITS OBSERVATION CHECKLIST

Clinic Site & Code:__ Village: ____

VHW Name: ___ Last Session #:___

Mother's Name: __ Child's Name: ___

Date of Home visit observation:__Observed By: ____

Observational comments:

1) What did the VHW do upon arrival?
2) Comment on the VHW & Participant Relationship. Is there rapport?
3) What activities did the VHW carry out?
4) What did you observe about the participant's home environment?
5) What did you observe about the parent child relationship?
6) What issues of adherence were brought up?
7) Describe the well-being of the mother and the child.

Home visit questions for the mother:

8) How many times have you been visited by the VHW?
9) In which months were you visited?
10) What activities did you carry out in the previous visits?
11) Did the VHW ask about your scheduled visit for collecting your medication? If yes, how did they ensure that you were adhering to your treatment?
12) Where you ever asked or been advised about adherence to treatment?
13) Any other comment or observation?

Appendix 8: Process evaluation caregiver's topic guide

CHIDO INTERVENTION CAREGIVER PROCESS EVALUATION GUIDE

Study Title: A trial to determine the effects of a comprehensive community-based multi-component intervention on early childhood development, household economic resilience, and adherence and retention in paediatric HIV care and treatment programs.

Principal Investigator: Frances Cowan Phone number: (04) 308042

Process Evaluation

Topic guide: Mothers/Caregivers

1. Tell me your overall impressions of the programme (see if they fully understand what the programme is about).
2. What do like most about this programme (why)?
3. Can you please tell me about your own personal experience of the programme
    a. Probe their experience of working with village health workers?
        I. How where you recruited? How did you feel about the way you were recruited?
        II. Have you had problems attending clinic visits when you are meant to? Why?
        III. Have you had problems taking your own medication? Have you had problems giving your baby medication? Why has it been difficult?
            i. If a village health worker (Case care worker) is to visit you during the period of the programme can you think of anything that could make the case care workers visits more helpful?
    b. Probe on the sessions
        i. How many sessions have you attended so far? Which sessions were these? Have you missed any sessions? If they have missed a session ask why was that? Do they intend to keep going to sessions?

ii. What about the duration of the sessions – are they too long or too short? Ask why?
iii. Currently sessions are run once a week/ every two weeks/ month – is this too often not often enough. Could you come if sessions were held more frequently/less frequently?
iv. Is the session facilitator helpful/ approachable? If yes, please can you give some examples of this? If not, please can you give me an example of how she was unhelpful?
v. Do you enjoy the sessions? If not, why not? If yes, why?
vi. Have you seen any benefits of performing any of the exercises you have learnt with your child? If yes, please provide examples.
vii. Do you think what you will learn in the sessions will have an effect on how you behave as a parent – if yes how? If no, why not?
viii. What was the most valuable thing that you have learnt from the sessions so far?
ix. Are there things you are finding difficult to comprehend? (If yes probe on what /why they are finding difficult to comprehend)
x. Do you have any suggestions on how we could improve the session (delivery)?
xi. Are you married? What does your husband feel about you taking part in this programme? If he is unhappy with your participation, can you explain why? If he is happy with your participation, can you explain why?

c. Probe experiences with ISALS
i. Are you in a self-selected or non-selection ISAL group? How much did your group agree to contribute according to your constitution? How often do you contribute?
ii. Do you think ISALS are helpful in your community and why?
iii. Have you found being part of this ISALS helpful or unhelpful? Please explain why?

iv. Can you think of any examples of how being part of an ISALS has enabled you to pay for something you could not have afforded previously?
v. What challenges has your group had in forming an ISALS group?
vi. What challenges have you had in taking part in an ISALS group? What challenges have other group members encountered?
vii. How often do your group meet, and for how long? Would it be better to meet more or less frequently? Why? Would it be better to meet for longer or shorter periods? Why?
viii. You were allocated to this ISALS group because you had agreed to be part of a research study? Would it have been better if you had been able to choose the people in your ISALS group yourself? Why?
ix. Are you married? What does your husband feel about you taking part in this ISALS? If he is unhappy with your participation, can you explain why? If he is happy with your participation, can you explain why?

4. Have you heard anyone in the community expressing views about the programme?
5. What were they?
6. Have you heard anyone in the community expressing views about the ISALS programme?
7. What were they?
8. What do people in the community think /say if a case care worker visits someone's house?
    a. Are there any myths and misconceptions going around about the /ISALS/ case care worker programme?
9. In terms of the programme overall, do you think it could be improved (probe to see what precisely is not working and get specific ideas on how to improve them)?

10. Have you noticed any changes in how other mothers interact with and take care of their babies? (if so, what kinds of changes have you seen in this community since the programme began?)
11. Have you noticed any changes at the local health centre? (If so, what changes?)

Recommendations

12. Do you have any questions, or are there other things related to this topic that you feel might help us better understand the implementation of intervention?

Appendix 9: Process evaluation implementers' topic guide

CHIDO INTERVENTION IMPLEMENTERS' PROCESS EVALUATION GUIDE

Study Title: A trial to determine the effects of a comprehensive community-based multi-component intervention on early childhood development, household economic resilience, and adherence and retention in paediatric HIV care and treatment programs.

Principal Investigator: Frances Cowan Phone number: (04) 308042

Intervention Implementers Topic Guide

Healthcare workers:

1. Please tell me about your own personal experience with the programme?
   a. Probe on the recruitment:
      i) Can you tell me about the recruitment process and your involvement (how was it done?)
      ii) Do you think the recruitment process could be improved in any way, if so, how?
      iii) What are the challenges you encountered during the recruitment process, the study stuff, and the participants?
   b. ECS sessions:
      i. What is the general attendance rate for your group members?
      ii. What challenges did you encounter ensuring high attendance to the ECS sessions, and how do you suggest we work on these challenges?
      iii. How many sessions have you watched? Which session were these?
      iv. How many sessions have you delivered? Which sessions were these?
      v. What do you think about the duration of the sessions – are they too long or too short? Why?
      vi. Currently, the sessions are run once a week – is this too often or not enough? How does their frequency affect your work?

vii. Of both the sessions watched and delivered, which sessions did you enjoy, and which sessions did you not enjoy? Why?

viii. Do you think these ECS sessions have made a difference in your patients' lives? If yes, how and why? If not, why?

ix. What are the participants' expressed sentiments about these sessions in your village?

x. What do you think could be done to improve the sessions?

c. Probe on ISALS sessions:

i. Have you attended any ISALS meetings?

ii. Do you think ISALS help improve the life of your patients? If yes, how? Can you give examples based on the testimonies of the participants in your group?

iii. What were the challenges encountered by your group, and how best do you think these challenges can be addressed?

ISALS Facilitator:

1. Please tell me about your own personal experience with the ECS programme? Probe on the ISALS sessions:

i. How many ISAL groups do you facilitate? How many people are in each group?

ii. How many sessions have you had with each group? Are the meetings enough, not enough or too many? (Ask why for whichever response is given).

iii. How have the intervention beneficiaries accepted ISALS?

iv. What are the challenges that have been encountered in carrying out the ISALS?

v. What can you suggest can improve the ISAL component of the intervention?

Probe on ECS sessions:

i) Did you sit in any of the ECS sessions? If so, how many?

ii) What did you think about these sessions? (What were the good and the bad encounters)

iii) How do you think we can improve these sessions?

ECS Facilitator:

1. Please tell me about your own personal experience with the ECS programme?
   a. Probe on the ECS sessions:
      i. How many sessions have you watched? Which session were these?
      ii. How many sessions have you delivered? Which sessions were these?
      iii. What do you think about the duration of the sessions – are they too long or too short? Why?
      iv. Currently, the session is run once a week, fortnightly and monthly – is this too often or not often enough? How does their frequency affect your work? Based on the quantity of work you have to put in, how many sessions do you think you can deliver in a month given a choice to decide?
      v. Of the sessions watched and delivered, which sessions did you enjoy and not want? Why?
      vi. What attitude did you denote from the intervention beneficiaries as you watched/delivered the intervention?
      vii. What do you think could be done to improve the sessions?
      viii. How do you think the other component of the intervention (ISALS) helps improve the intervention beneficiaries' lifestyle?

To all implementing partners

2. Do you have any questions, or are there other things related to this topic that you feel might help us understand the implementation of the programme better?

8 References

1. Chingono RMS, Nzvere FP, Marambire ET, Makwembere M, Mhembere N, Herbert T, et al. Psychological distress among healthcare workers accessing occupational health services during the COVID-19 pandemic in Zimbabwe. Compr Psychiatry [Internet]. 2022;e00484. Available from: https://doi.org/10.1016/j.geodrs.2022.e00484

2. Chingono R, Mebrahtu H, Mupambireyi Z, Simms V, Weiss HA, Ndlovu P, et al. Evaluating the effectiveness of a multi-component intervention on early childhood development in paediatric HIV care and treatment programmes: A randomised controlled trial. BMC Pediatr [Internet]. 2018;18(1):1–10. Available from: http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L622971984%0Ahttp://dx.doi.org/10.1186/s12887-018-1201-0

3. Mebrahtu H, Simms V, Chingono R, Mupambireyi Z, Weiss HA, Ndlovu P, et al. Postpartum maternal mental health is associated with cognitive development of HIV-exposed infants in Zimbabwe: a cross-sectional study. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV [Internet]. 2018;30:74–82. Available from: https://doi.org/10.1080/09540121.2018.1468015

4. Mebrahtu H, Sherr L, Simms V, Weiss HA, Chingono R, Rehman AM, et al. The impact of common mental disorders among caregivers living with HIV on child cognitive development in Zimbabwe. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV [Internet]. 2020;0(0):1–8. Available from: https://doi.org/10.1080/09540121.2020.1739216

5. Mebrahtu H, Simms V, Mupambireyi Z, Rehman AM, Chingono R, Matsikire E, et al. Effects of parenting classes and economic strengthening for caregivers on the cognition of HIV-exposed infants: A pragmatic cluster randomised controlled trial in rural Zimbabwe. BMJ Glob Heal. 2019;4(5).

6. World Health Organisation. Mental health: strengthening our response. Fact sheet N220 [Internet]. 2014;(August 2014):1–4. Available from:

http://www.who.int/mediacentre/factsheets/fs220/en/

7. Sturgeon S. Promoting mental health as an essential aspect of health promotion. Health Promot Int. 2006;21 Suppl 1:36–41.

8. World Health Organization (WHO). Depression and other common mental disorders: global health estimates. 2017.

9. Patel V, Saxena S, Lund C, Thornicroft G, Baingana F, Bolton P, et al. The Lancet Commission on global mental health and sustainable development. Lancet [Internet]. 2018 Oct 27;392(10157):1553–98. Available from: https://doi.org/10.1016/S0140-6736(18)31612-X

10. Prady SL, Pickett KE, Petherick ES, Gilbody S, Croudace T, Mason D, et al. Evaluation of ethnic disparities in detection of depression and anxiety in primary care during the maternal period: Combined analysis of routine and cohort data. Br J Psychiatry. 2016;208(5):453–61.

11. Murphy DA, Marelich WD, Armistead L, Herbeck DM, Payne DL. Anxiety/stress among mothers living with HIV: Effects on parenting skills and child outcomes. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV. 2010;22(12):1449–58.

12. Gorman S. Why Maternal Mental Health Should be a Priority | Speaking of Medicine. PLOS Med Community Blog [Internet]. 2013;1–6. Available from: http://blogs.plos.org/speakingofmedicine/2013/09/11/why-maternal-mental-health-should-be-a-priority/

13. Dennis CL, Vigod S, Letourneau N, Oberlander T. Impact of maternal and paternal postpartum depression: Assessing concurrent depression in the family (the impact study). Arch Womens Ment Health [Internet]. 2015;18 (2):381–2. Available from: http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emed13&AN=71915724%5Cnhttp://imp-primo.hosted.exlibrisgroup.com/openurl/44IMP/44IMP_services_page?sid=OVID&isbn=&issn=1434-1816&volume=18&issue=2&date=2015&title=Archives+of+Women%27s+Me

14. Barnes J, Theule J. Maternal depression and infant attachment security: A meta-analysis. Infant Ment Health J. 2019;40(6):817–34.

15. Rahman A, Fisher J, Bower P, Luchters S, Tran T, Yasamy MT, et al. Interventions for common perinatal mental disorders in women in low- and middle-income countries: a systematic review and meta-analysis. Bull World Health Organ [Internet]. 2013;91(8):593-601I. Available from: http://www.who.int/entity/bulletin/volumes/91/8/12-109819.pdf

16. Satyanarayana VA, Lukose A, Srinivasan K. Maternal mental health in pregnancy and child behavior. Indian J Psychiatry. 2011;53(4):351–61.

17. Fisher J, Tran T, Duc Tran T, Dwyer T, Nguyen T, Casey GJ, et al. Prevalence and risk factors for symptoms of common mental disorders in early and late pregnancy in Vietnamese women: A prospective population-based study. J Affect Disord [Internet]. 2013;146(2):213–9. Available from: http://dx.doi.org/10.1016/j.jad.2012.09.007

18. Swain C. Systematic Literature Review: A Family Approach to Postnatal Depression. 2015.

19. Jahan N, Went TR, Sultan W, Sapkota A, Khurshid H, Qureshi IA, et al. Untreated Depression During Pregnancy and Its Effect on Pregnancy Outcomes: A Systematic Review. Cureus. 2021;13(8).

20. Stein A, Pearson RM, Goodman SH, Rapa E, Rahman A, McCallum M, et al. Effects of perinatal mental disorders on the fetus and child. Lancet (London, England). 2014 Nov;384(9956):1800–19.

21. Mangla K, Hoffman MC, Trumpff C, O'Grady S, Monk C. Maternal self-harm deaths: an unrecognized and preventable outcome. Am J Obstet Gynecol. 2019 Oct;221(4):295–303.

22. Kugbey N, Ayanore M, Doegah P, Chirwa M, Bartels SA, Davison CM, et al. Prevalence and Correlates of Prenatal Depression, Anxiety and Suicidal Behaviours in the Volta Region of Ghana. Int J Environ Res Public Health. 2021

May;18(11).

23. Shi P, Ren H, Li H, Dai Q. Maternal depression and suicide at immediate prenatal and early postpartum periods and psychosocial risk factors. Psychiatry Res. 2018 Mar;261:298–306.

24. Whisman MA, Robustelli BL, Labrecque LT. Specificity of the Association between Marital Discord and Longitudinal Changes in Symptoms of Depression and Generalized Anxiety Disorder in the Irish Longitudinal Study on Ageing. Fam Process. 2018 Sep;57(3):649–61.

25. Wong JJ, Frost ND, Timko C, Heinz AJ, Cronkite R. Depression and family arguments: disentangling reciprocal effects for women and men. Fam Pract. 2020 Feb;37(1):49–55.

26. Salinger JM, Whisman MA, Randall AK, Hilpert P. Associations Between Marital Discord and Depressive Symptoms: A Cross-Cultural Analysis. Fam Process. 2021 Jun;60(2):493–506.

27. Ciesla JA, Roberts JE. Meta-analysis of the relationship between HIV infection and risk for depressive disorders. Am J Psychiatry. 2001 May;158(5):725–30.

28. Brandt R. The mental health of people living with HIV/AIDS in Africa: A systematic review. African J AIDS Res. 2009;8(2):123–33.

29. Kapetanovic S, Dass-Brailsford P, Nora D, Talisman N. Mental health of HIV-seropositive women during pregnancy and postpartum period: A comprehensive literature review. AIDS Behav. 2014;18(6):1152–73.

30. Zhu QY, Huang DS, Lv J Da, Guan P, Bai XH. Prevalence of perinatal depression among HIV-positive women: a systematic review and meta-analysis. BMC Psychiatry. 2019;19(1):330.

31. Fairall L, Petersen I, Zani B, Folb N, Georgeu-Pepper D, Selohilwe O, et al. Collaborative care for the detection and management of depression among adults receiving antiretroviral therapy in South Africa: Study protocol for the CobALT randomised controlled trial. Trials. 2018;19(1):1–24.

32. Mutyambizi-Mafunda V, Myers B, Sorsdahl K, Lund C, Naledi T, Cleary S. Integrating a brief mental health intervention into primary care services for patients with HIV and diabetes in South Africa: Study protocol for a trial-based economic evaluation. BMJ Open. 2019;9(5):1–11.

33. Chibanda D. Depression and HIV: Integrated care towards 90-90-90. Int Health. 2017;9(2):77–9.

34. Joint United Nations Programme on HIV/AIDS (UNAIDS). 90-90-90 An ambitious treatment target to help end the AIDS. United Nations. 2014.

35. Uthman OA, Magidson JF, Safren SA, Nachega JB, Group IH, Service M, et al. Depression and adherence to antiretroviral therapy in low-, middle- and high-income countries: a systematic review and meta-analysis. Curr HIV/AIDS Rep. 2014;11(3):291–307.

36. World Health Organization. Global action plan for the prevention and control of noncommunicable diseases 2013-2020. World Health Organization. 2013.

37. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition). Fifth. Arlington V, editor. Encyclopedia of Applied Psychology, Three-Volume Set. American psychiatric association Washington, DC; 2013.

38. World Health Organization (WHO). International Statistical Classification of Diseases and Related Health Problems. 11th ed. 2019.

39. American Psychiatric Association DS, Association AP. Diagnostic and statistical manual of mental disorders: DSM-5. Vol. 5. American psychiatric association Washington, DC; 2013.

40. Hanlon C, Medhin G, Selamu M, Breuer E, Worku B, Hailemariam M, et al. Validity of brief screening questionnaires to detect depression in primary care in Ethiopia. J Affect Disord. 2015 Nov;186:32–9.

41. Howard LM, Molyneaux E, Dennis C-L, Rochat T, Stein A, Milgrom J. Non-psychotic mental disorders in the perinatal period. Lancet (London, England).

2014 Nov;384(9956):1775–88.

42. Abidin RR. The Parenting Stress Index--Clinical trials. Annu Meet Am Psychol Assoc 87th. 1979;13.

43. Rollè L, Prino LE, Sechi C, Vismara L, Neri E, Polizzi C, et al. Parenting stress, mental health, dyadic adjustment: A structural equation model. Front Psychol. 2017;8(839):1–10.

44. Reck C, Zietlow AL, Müller M, Dubber S. Perceived parenting stress in the course of postpartum depression: the buffering effect of maternal bonding. Arch Womens Ment Health [Internet]. 2016;19(3):473–82. Available from: http://dx.doi.org/10.1007/s00737-015-0590-4

45. Ramsauer B, Mühlhan C, Mueller J, Schulte-Markwort M. Parenting stress and postpartum depression/anxiety in mothers with personality disorders: indications for differential intervention priorities. Eur Child Adolesc Psychiatry. 2016;25(6):589–600.

46. Schulte MT, Armistead L, Marelich WD, Payne DL, Goodrum NM, Murphy DA. Maternal Parenting Stress and Child Perception of Family Functioning Among Families Affected by HIV. J Assoc Nurses AIDS Care [Internet]. 2017;28(5):784–94. Available from: http://dx.doi.org/10.1016/j.jana.2017.05.004

47. Li ST, Chiu NC, Kuo YT, Shen EY, Tsai PC, Ho CS, et al. Parenting stress in parents of children with refractory epilepsy before and after vagus nerve stimulation implantation. Pediatr Neonatol. 2017;58(6):516–22.

48. Dakić T. Mental health burden and unmet needs for treatment: A call for justice. Br J Psychiatry. 2020;216(5):241–2.

49. Kozinszky Z, Dudas RB. Validation studies of the Edinburgh Postnatal Depression Scale for the antenatal period. J Affect Disord [Internet]. 2015;176:95–105. Available from: http://dx.doi.org/10.1016/j.jad.2015.01.044

50. Keynejad RC, Dua T, Barbui C, Thornicroft G. WHO Mental Health Gap Action Programme (mhGAP) Intervention Guide: A systematic review of evidence from

low and middleincome countries. Evid Based Ment Health. 2018;21(1):29–33.

51. Chibanda D, Verhey R, Gibson LJ, Munetsi E, Machando D, Rusakaniko S, et al. Validation of screening tools for depression and anxiety disorders in a primary care population with high HIV prevalence in Zimbabwe. J Affect Disord [Internet]. 2016;198:50–5. Available from: http://dx.doi.org/10.1016/j.jad.2016.03.006

52. Ali GC, Ryan G, De Silva MJ. Validated screening tools for common mental disorders in low and middle income countries: A systematic review. PLoS One. 2016;11(6):1–14.

53. Bolton P. Cross-cultural validity and reliability testing of a standard psychiatric assessment instrument without a gold standard. J Nerv Ment Dis. 2001 Apr;189(4):238–42.

54. Spitzer RL, Williams JB, Gibbon M, First MB. The Structured Clinical Interview for DSM-III-R (SCID). I: History, rationale, and description. Arch Gen Psychiatry. 1992 Aug;49(8):624–9.

55. Sheehan D V, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. J Clin Psychiatry. 1998;59 Suppl 2:22–57.

56. Kirmayer LJ. Cultural variations in the clinical presentation of depression and anxiety: implications for diagnosis and treatment. J Clin Psychiatry. 2001;62 Suppl 1:22–30.

57. Mitchell AJ, Mitchell AJ. Rapid Screening for Depression and Emotional Distress in Routine Cancer Care: Local Implementation and Meta-Analysis. 2012.

58. Lee SJ, Gopalan G, Harrington D. Validation of the Parenting Stress Index - Short Form with minority caregivers. Res Soc Work Pr. 2016;26(4):429–40.

59. Fuster-RuizdeApodaca MJ, Laguía A, Safreed-Harmon K, Lazarus J V, Cenoz S, Del Amo J. Assessing quality of life in people with HIV in Spain: psychometric testing of the Spanish version of WHOQOL-HIV-BREF. Health Qual Life

Outcomes. 2019 Aug;17(1):144.

60. Nakimuli-Mpungu E, Mojtabai R, Alexandre PK, Katabira E, Musisi S, Nachega JB, et al. Cross-cultural adaptation and validation of the self-reporting questionnaire among HIV+ individuals in a rural ART program in southern Uganda. HIV AIDS (Auckl). 2012;4:51–60.

61. Chongwo E, Ssewanyana D, Nasambu C, Mwangala PN, Mwangi PM, Nyongesa MK, et al. Validation of a Swahili version of the World Health Organization 5-item well-being index among adults living with HIV and epilepsy in rural coastal Kenya. Glob Heal Res policy. 2018;3:26.

62. Chibanda D, Verhey R, Gibson LJ, Munetsi E, Machando D, Rusakaniko S, et al. Validation of screening tools for depression and anxiety disorders in a primary care population with high HIV prevalence in Zimbabwe. J Affect Disord [Internet]. 2016;198:50–5. Available from: http://dx.doi.org/10.1016/j.jad.2016.03.006

63. Lipps GE, Lowe GA, De La Haye W, Longman-Mills S, Clarke TR, Barton EN, et al. Validation of the Beck Depression Inventory II in HIV-positive patients. West Indian Med J. 2010 Jul;59(4):374–9.

64. Lombardi D, Mizuno LT, Thornberry A. The use of the Zung Self-Rating Depression Scale to assist in the case management of patients living with HIV/AIDS. Care Manag journals J case Manag ; J long term home Heal care. 2010;11(4):210–6.

65. Wouters E, Booysen F le R, Ponnet K, Baron Van Loon F. Wording effects and the factor structure of the Hospital Anxiety & Depression Scale in HIV/AIDS patients on antiretroviral treatment in South Africa. PLoS One. 2012;7(4):e34881.

66. Thai TT, Jones MK, Harris LM, Heard RC. Screening value of the Center for epidemiologic studies - depression scale among people living with HIV/AIDS in Ho Chi Minh City, Vietnam: a validation study. BMC Psychiatry. 2016 May;16:145.

67. Chibanda D, Mangezi W, Tshimanga M, Woelk G, Rusakaniko P, Stranix-Chibanda L, et al. Validation of the Edinburgh Postnatal Depression Scale among women in a high HIV prevalence area in urban Zimbabwe. Arch Womens Ment Health. 2010;13(3):201–6.

68. Su X, Lau JTF, Mak WWS, Chen L, Feng T, Chen X, et al. Development of the perceived stress scale for people living with HIV/AIDS in China. AIDS Patient Care STDS. 2008 Dec;22(12):989–98.

69. World Health Organization. mhGAP Intervention Guide Mental Health Gap Action Programme Version 2.0 for mental, neurological and substance use disorders in non-specialized health settings. World Heal Organ. 2016;1–173.

70. World Health Organization (WHO). Mental health atlas. Geneva; 2018.

71. Abas M, Ali GC, Nakimuli-Mpungu E, Chibanda D. Depression in people living with HIV in sub-Saharan Africa: time to act. Trop Med Int Heal. 2014;19(12):1392–6.

72. Chibanda D, Benjamin L, Weiss HA, Abas MA. Mental, neurological, and substance use disorders in people living with HIV/AIDS in low-and middle-income countries. J Acquir Immune Defic Syndr. 2014;67(SUPPL.1):S54–67.

73. Nyamukoho E, Mangezi W, Marimbe B, Verhey R, Chibanda D. Depression among HIV positive pregnant women in Zimbabwe: A primary health care based cross-sectional study. BMC Pregnancy Childbirth. 2019;19(1):1–7.

74. Kessler RC, The WHO World Mental Health Survey. Prevalence, Severity, and Unment Need for Treatment of Mental Disorders in the World Health Organization World Mental Health Surveys. Jama. 2004;291(21):2581–90.

75. World Health Organization (WHO). The global burden of mental disorders and the need for a comprehensive, coordinated response from health and social sectors at the country level [Internet]. 2011. Available from: http://www.who.int/mental_health/WHA65.4_resolution.pdf

76. Fisher J, de Mello MC, Patel V, Rahman A, Tran T, Holton S, et al. Prevalence

and determinants of common perinatal mental disorders in women in low-and lower-middle-income countries: A systematic review. Bull World Health Organ. 2012;90(2):139–49.

77. Dadi AF, Wolde HF, Baraki AG, Akalu TY. Epidemiology of antenatal depression in Africa: A systematic review and meta-analysis. BMC Pregnancy Childbirth. 2020;20(1):1–13.

78. Lasater ME, Beebe M, Gresh A, Blomberg K, Warren N. Addressing the Unmet Need for Maternal Mental Health Services in Low- and Middle-Income Countries: Integrating Mental Health Into Maternal Health Care. J Midwifery Women's Heal. 2017;62(6):657–60.

79. Government of Zimbabwe. Towards a Prosperous & Empowered Upper Middle Income Society by 2030 [Internet]. 2020. Available from: https://www.veritaszim.net/sites/veritas_d/files/NDS.pdf

80. United Nations Joint Programme on HIV/AIDS (UNAIDS). UNAIDS Data 2021 [Internet]. 2021. Available from: https://www.unaids.org/sites/default/files/media_asset/JC3032_AIDS_Data_book_2021_En.pdf

81. United Nations. The United Nations Common Country Analysis. Zimbabwe; 2021.

82. Zimstats. Poverty, Income, Consumption and Expenditure Survey Report. 2017;(December).

83. United Nations Human Rights. Report of the Special Rapporteur on the right to food. International Organization. 2020.

84. Kaiyo-Utete M, Dambi JM, Chingono A, Mazhandu FSM, Madziro-Ruwizhu TB, Henderson C, et al. Antenatal depression: An examination of prevalence and its associated factors among pregnant women attending Harare polyclinics. BMC Pregnancy Childbirth. 2020;20(1):1–8.

85. Chibanda D, Cowan F, Gibson L, Weiss HA, Lund C. Prevalence and correlates

of probable common mental disorders in a population with high prevalence of HIV in Zimbabwe. BMC Psychiatry [Internet]. 2016;16(1):1–9. Available from: http://dx.doi.org/10.1186/s12888-016-0764-2

86. Nyamukoho E, Mangezi W, Marimbe B, Verhey R, Chibanda D. Depression among HIV positive pregnant women in Zimbabwe: A primary health care based cross-sectional study. BMC Pregnancy Childbirth. 2019;19(1).

87. Chibanda D, Weiss HA, Verhey R, Simms V, Munjoma R, Rusakaniko S, et al. Effect of a primary care-based psychological intervention on symptoms of common mental disorders in Zimbabwe: A randomized clinical trial. JAMA - J Am Med Assoc. 2016;316(24):2618–26.

88. Skeen S, Tomlinson M, MacEdo A, Croome N, Sherr L. Mental health of carers of children affected by HIV attending community-based programmes in South Africa and Malawi. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV. 2014;26(SUPPL. 1):11–20.

89. Christodoulou J, Rotheram-Borus MJ, Bradley AK, Tomlinson M. Home Visiting and Antenatal Depression Affect the Quality of Mother and Child Interactions in South Africa. J Am Acad Child Adolesc Psychiatry [Internet]. 2019;(April). Available from: https://doi.org/10.1016/j.jaac.2019.03.016

90. Baron EC, Hanlon C, Mall S, Honikman S, Breuer E, Kathree T, et al. Maternal mental health in primary care in five low- and middle-income countries: a situational analysis. BMC Health Serv Res [Internet]. 2016;16(53). Available from: http://dx.doi.org/10.1186/s12913-016-1291-z

91. Liese BH, Gribble RSF, Wickremsinhe MN. International funding for mental health: A review of the last decade. Int Health. 2019;11(5):361–9.

92. Patel V, Prince M. Global Mental Health: a new global health field comes of age. JAMA. 2010;303(19):1976–7.

93. World Health Organization. Mental Health Action Plan 2013-2020 [Internet]. World Health Organisation. 2013. Available from:

http://apps.who.int/iris/bitstream/10665/89966/1/9789241506021_eng.pdf

94. Bandelow B, Michaelis S. Epidemiology of anxiety disorders in the 21st century. Dialogues Clin Neurosci. 2015;17(3):327–35.

95. Drissi N, Ouhbi S, Idrissi, M, A J, Fernandex-Luque L, Ghogho M. Connected mental health: Systematic mapping study. J Med Internet Res. 2020;22(8):131–41.

96. Prince M, Patel V, Saxena S, Maj M, Maselko J, Phillips MR, et al. No health without mental health. Lancet [Internet]. 2007 Sep 8;370(9590):859–77. Available from: https://doi.org/10.1016/S0140-6736(07)61238-0

97. Meintjes I, Field S, Sanders L, Van Heyningen T, Honikman S. Improving child outcomes through maternal mental health interventions. J Child Adolesc Ment Health. 2010;22(2):73–82.

98. Giallo R, Cooklin A, Wade C, D'Esposito F, Nicholson JM. Maternal postnatal mental health and later emotional-behavioural development of children: The mediating role of parenting behaviour. Child Care Health Dev. 2014;40(3):327–36.

99. Enns J, Holmqvist M, Wener P, Halas G, Rothney J, Schultz A, et al. Mapping interventions that promote mental health in the general population: A scoping review of reviews. Prev Med (Baltim) [Internet]. 2016;87:70–80. Available from: http://dx.doi.org/10.1016/j.ypmed.2016.02.022

100. World Health Organization (WHO). The European mental health action plan 2013–2020. World Health Organization. Regional Office for Europe; 2015.

101. Nakimuli-Mpungu E, Wamala K, Okello J, Alderman S, Odokonyero R, Mojtabai R, et al. Group support psychotherapy for depression treatment in people with HIV/AIDS in northern Uganda: a single-centre randomised controlled trial. Lancet HIV [Internet]. 2015;2(5):e190–9. Available from: http://dx.doi.org/10.1016/S2352-3018(15)00041-7

102. Arksey H, O'Malley L. Scoping studies: Towards a methodological framework.

Int J Soc Res Methodol Theory Pract. 2005;8(1):19–32.

103. Colquhoun HL, Levac D, O 'brien KK, Straus S, Tricco AC, Perrier L, et al. Scoping reviews: Time for clarity in definition, methods and reporting Scoping reviews: Time for clarity in definition How to cite TSpace items. J Clin Epidemiol [Internet]. 2014;67(12):3–13. Available from: http://www.sciencedirect.com/science/article/pii/S0895435614002108%5Cnhttp://dx.doi.org/10.1016/j.jclinepi.2014.03.013

104. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. Int J Soc Res Methodol [Internet]. 2005 Feb 1;8(1):19–32. Available from: https://doi.org/10.1080/1364557032000119616

105. Peters MDJ, Godfrey CM, Khalil H, McInerney P, Parker D, Soares CB. Guidance for conducting systematic scoping reviews. Int J Evid Based Healthc. 2015;13(3):141–6.

106. Tricco AC, Lillie E, Zarin W, O'Brien K, Colquhoun H, Kastner M, et al. A scoping review on the conduct and reporting of scoping reviews. BMC Med Res Methodol [Internet]. 2016;16(1):1–10. Available from: http://dx.doi.org/10.1186/s12874-016-0116-4

107. Norhayati MN, Nik Hazlina NH, Asrenee AR, Wan Emilin WMA. Magnitude and risk factors for postpartum symptoms: A literature review. J Affect Disord [Internet]. 2015;175:34–52. Available from: http://dx.doi.org/10.1016/j.jad.2014.12.041

108. Niu L, Luo D, Liu Y, Silenzio VMB, Xiao S. The mental health of people living with HIV in China, 1998–2014: A systematic review. PLoS One. 2016;11(4):1998–2014.

109. Lofgren SM, Bond D., Nakasujja N, Boulware DR. Burden of Depression in Outpatient HIV-infected adults in Sub-Saharan Africa; Systematic Review and Meta-Analysis. AIDS Behav. 2020;24(6):1752–64.

110. Verhey R, Chibanda D, Gibson L, Brakarsh J, Seedat S. Validation of the

posttraumatic stress disorder checklist - 5 (PCL-5) in a primary care population with high HIV prevalence in Zimbabwe. BMC Psychiatry [Internet]. 2018;18(1):1–8. Available from: https://embase.com/search/results?subaction=viewrecord&from=export&id=L621766849%0Ahttp://dx.doi.org/10.1186/s12888-018-1688-9

111. Collins PY, Holman AR, Freeman C, Patel V. What is the relevance of mental health to HIV/AIDS care and treatment programs in developing countries? A systematic review. AIDS. 2006;20(12):1571–82.

112. Breuer E, Myer L, Struthers H, Joska JA, Breuer E, Myer L, et al. HIV/AIDS and mental health research in sub- Saharan Africa : a systematic review. African J AIDS Res. 2011;10(2):101–22.

113. Sherr L, Clucas C, Harding R, Sibley E, Catalan J. HIV and depression - A systematic review of interventions. Psychol Heal Med. 2011;16(5):493–527.

114. Steel Z, Marnane C, Iranpour C, Chey T, Jackson JW, Patel V, et al. The global prevalence of common mental disorders: A systematic review and meta-analysis 1980-2013. Int J Epidemiol. 2014;43(2):476–93.

115. Duko B, Wolde D, Alemayehu Y. The epidemiology of postnatal depression in Ethiopia: a systematic review and meta-analysis. Reprod Health. 2020 Nov;17(1):180.

116. Nakimuli-Mpungu E, Musisi S, Wamala K, Okello J, Ndyanabangi S, Birungi J, et al. Effectiveness and cost-effectiveness of group support psychotherapy delivered by trained lay health workers for depression treatment among people with HIV in Uganda: a cluster-randomised trial. Lancet Glob Heal [Internet]. 2020;(19). Available from: http://dx.doi.org/10.1016/S2214-109X(19)30548-0

117. Spies G, Konkiewitz EC, Seedat S. Incidence and Persistence of Depression Among Women Living with and Without HIV in South Africa: A Longitudinal Study. AIDS Behav. 2018;22(10):3155–65.

118. Rochat TJ, Houle B, Stein A, Pearson RM, Newell ML, Bland RM. Psychological

morbidity and parenting stress in mothers of primary school children by timing of acquisition of HIV infection: A longitudinal cohort study in rural South Africa. J Dev Orig Health Dis. 2018;9(1):41–57.

119. Davis EC, Rotheram-Borus MJ, Weichle TW, Rezai R, Tomlinson M. Patterns of Alcohol Abuse, Depression, and Intimate Partner Violence Among Township Mothers in South Africa Over 5 Years. AIDS Behav. 2017;21(Suppl 2):174–82.

120. Verkuijl NE, Richter L, Norris SA, Stein A, Avan B, Ramchandani PG. Postnatal depressive symptoms and child psychological development at 10 years: A prospective study of longitudinal data from the South African Birth to Twenty cohort. The Lancet Psychiatry [Internet]. 2014;1(6):454–60. Available from: http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L601117890%0Ahttp://dx.doi.org/10.1016/S2215-0366(14)70361-X%0Ahttp://sfx.library.uu.nl/utrecht?sid=EMBASE&issn=22150366&id=doi:10.1016%2FS2215-0366%2814%2970361-X&atitle=Postnatal+d

121. Barthel D, Kriston L, Barkmann C, Appiah-Poku J, Te Bonle M, Esther Doris KY, et al. Longitudinal course of ante- and postpartum generalized anxiety symptoms and associated factors in West-African women from Ghana and Côte d'Ivoire. J Affect Disord. 2016 Jun;197:125–33.

122. Tuthill EL, Maltby A, Conteh J, Sheira LA, Miller JD, Onono M, et al. Persistent Food Insecurity, but not HIV, is Associated with Depressive Symptoms Among Perinatal Women in Kenya: A Longitudinal Perspective. AIDS Behav. 2021;25(3):847–55.

123. Banti S, Mauri M, Oppo A, Borri C, Rambelli C, Ramacciotti D, et al. From the third month of pregnancy to 1 year postpartum. Prevalence, incidence, recurrence, and new onset of depression. Results from the Perinatal Depression-Research & Screening Unit study. Compr Psychiatry [Internet]. 2011;52(4):343–51. Available from: http://dx.doi.org/10.1016/j.comppsych.2010.08.003

124. Brandt R. The mental health of people living with HIV/AIDS in Africa: a

systematic review. Afr J AIDS Res. 2009 Jun;8(2):123–33.

125. Bernard C, Dabis F, De Rekeneire N. Prevalence and factors associated with depression in people living with HIV in sub-Saharan Africa: A systematic review and meta-analysis. PLoS One. 2017;12(8):1–22.

126. Catalan J, Harding R, Sibley E, Clucas C, Sherr L, Catalan J, et al. HIV infection and mental health : Suicidal behaviour – Systematic review. Psychol Heal Med. 2011;16(5):588–611.

127. Parsons CE, Young KS, Rochat TJ, Kringelbach ML, Stein A. Postnatal depression and its effects on child development: A review of evidence from low- and middle-income countries. Br Med Bull. 2012;101(1):57–79.

128. Atuhaire C, Brennaman L, Cumber SN, Rukundo GZ, Nambozi G. The magnitude of postpartum depression among mothers in africa: A literature review. Pan Afr Med J. 2020;37(89):1–11.

129. Grussu P, Lega I, Quatraro RM, Donati S. Perinatal mental health around the world: priorities for research and service development in Italy. BJPsych Int. 2020;17(1):8–10.

130. Parcesepe AM, Bernard C, Agler R, Ross J, Yotebieng M, Bass J, et al. Mental health and HIV: research priorities related to the implementation and scale up of “treat all” in sub-Saharan Africa. J virus Erad [Internet]. 2018;4(Suppl 2):16–25. Available from: http://www.ncbi.nlm.nih.gov/pubmed/30515310%0Ahttp://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC6248852

131. Hanlon C, Whitley R, Wondimagegn D, Alem A, Prince M. Between life and death: exploring the sociocultural context of antenatal mental distress in rural Ethiopia. Arch Womens Ment Health. 2010 Oct;13(5):385–93.

132. Sowa NA, Cholera R, Pence BW, Gaynes BN. Perinatal depression in HIV-infected African women: a systematic review. J Clin Psychiatry [Internet]. 2015 Oct;76(10):1385—1396. Available from: https://doi.org/10.4088/JCP.14r09186

133. Rochat TJ, Tomlinson M, Newell ML, Stein A. Detection of antenatal depression in rural HIV-affected populations with short and ultrashort versions of the Edinburgh Postnatal Depression Scale (EPDS). Arch Womens Ment Health. 2013;16(5):401–10.

134. Weldesenbet AB, Kebede SA, Tusa BS. The Effect of Poor Social Support on Depression among HIV/AIDS Patients in Ethiopia: A Systematic Review and Meta-Analysis. Depress Res Treat. 2020;2020.

135. Stranix-Chibanda L, Chibanda D, Chingono A, Montgomery E, Wells J, Maldonado Y, et al. Screening for psychological morbidity in HIV-infected and HIV-uninfected pregnant women using community counselors in Zimbabwe. J Int Assoc Physicians AIDS Care. 2005;4(4):83–99.

136. Kaseke T, January J, Tadyanemhandu C, Chiwaridzo M, Dambi JM. A structural equation modelling of the buffering effect of social support on the report of common mental disorders in Zimbabwean women in the postnatal period. BMC Res Notes [Internet]. 2019;12(1):1–7. Available from: https://doi.org/10.1186/s13104-019-4151-1

137. Deater-Deckard K. Parenting stress and child adjustment: Some old hypotheses and new questions. Clin Psychol Sci Pract. 1998;5(3):314–32.

138. Holly LE, Fenley AR, Kritikos TK, Merson RA, Abidin RR, Langer DA. Evidence-Base Update for Parenting Stress Measures in Clinical Samples. J Clin Child Adolesc Psychol [Internet]. 2019;48(5):685–705. Available from: https://doi.org/10.1080/15374416.2019.1639515

139. Nithya S, Thomas S. Parental stress among parents across their parenting role. Int J Indian Psychol. 2021;9(1):611–5.

140. Dardas LA, Ahmad MM. Quality of life among parents of children with autistic disorder: A sample from the Arab world. Res Dev Disabil [Internet]. 2014;35(2):278–87. Available from: http://dx.doi.org/10.1016/j.ridd.2013.10.029

141. Golfenshtein N, Srulovici E, Medoff-Cooper B. Investigating parenting stress

across pediatric health conditions - A systematic review. Compr Child Adolesc Nurs [Internet]. 2016;39(1):41–79. Available from: http://dx.doi.org/10.3109/01460862.2015.1078423

142. Cousino MK, Hazen R a. Parenting stress among caregivers of children with chronic illness: a systematic review. J Pediatr Psychol. 2013;38(1465-735X (Electronic)):809–28.

143. Pinquart M. Parenting stress in caregivers of children with chronic physical condition—A meta-analysis. Stress Heal. 2018;34(2):197–207.

144. Wiener LS, Vasquez MJP, Battles HB. Brief report: Fathering a child living with HIV/AIDS: Psychosocial adjustment and parenting stress. J Pediatr Psychol. 2001;26(6):353–8.

145. Potterton J, Stewart A, Cooper P. Parenting stress of caregivers of young children who are HIV positive. African J Psychiatry (South Africa). 2007;10(4):210–4.

146. Allen AB, Finestone M, Eloff I, Sipsma H, Makin J, Triplett K, et al. The role of parenting in affecting the behavior and adaptive functioning of young children of HIV-infected mothers in South Africa. AIDS Behav. 2014;18(3):605–16.

147. Travaglini LE, Himelhoch SS, Fang LJ. HIV Stigma and Its Relation to Mental, Physical and Social Health Among Black Women Living with HIV/AIDS. AIDS Behav [Internet]. 2018;22(12):3783–94. Available from: https://doi.org/10.1007/s10461-018-2037-1

148. Lachman JM, Cluver LD, Boyes ME, Kuo C, Casale M. Positive parenting for positive parents: HIV/AIDS, poverty, caregiver depression, child behavior, and parenting in South Africa. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV. 2014;26(3):304–13.

149. Murphy DA, Armistead L, Marelich WD, Herbeck DM. Parenting deficits of mothers living with HIV/AIDS who have young children. Vulnerable Child Youth Stud [Internet]. 2015;10(1):41–54. Available from:

http://dx.doi.org/10.1080/17450128.2014.931614

150. Huang X, Meyers K, Liu X, Li X, Zhang T, Xia W, et al. The double burdens of mental health among AIDS patients with fully successful immune restoration: A cross-sectional study of anxiety and depression in China. Front Psychiatry. 2018;9(AUG):1–8.

151. Da W, Li X, Qiao S, Zhou Y, Shen Z. Antiretroviral therapy and mental health among people living with HIV/AIDS in China. Psychol Heal Med [Internet]. 2020;25(1):45–52. Available from: https://doi.org/10.1080/13548506.2019.1616101

152. Lund C, Breen A, Flisher AJ, Kakuma R, Corrigall J, Joska JA, et al. Poverty and common mental disorders in low and middle income countries: A systematic review. Soc Sci Med [Internet]. 2010;71(3):517–28. Available from: http://www.unboundmedicine.com/evidence/ub/citation/20621748/Poverty_and_common_mental_disorders_in_low_and_middle_income_countries:_A_systematic_review_

153. Kidia K, Machando D, Bere T, Macpherson K, Nyamayaro P, Potter L, et al. “I was thinking too much”: Experiences of HIV-positive adults with common mental disorders and poor adherence to antiretroviral therapy in Zimbabwe. Trop Med Int Heal. 2015;20(7):903–13.

154. Kinyanda E, Woodburn P, Tugumisirize J, Kagugube J, Ndyanabangi S, Patel V. Poverty, life events and the risk for depression in Uganda. Soc Psychiatry Psychiatr Epidemiol. 2011;46(1):35–44.

155. Duko B, Toma A, Abraham Y. Prevalence and correlates of common mental disorder among HIV patients attending antiretroviral therapy clinics in Hawassa City, Ethiopia. Ann Gen Psychiatry [Internet]. 2019;18(1):1–6. Available from: https://doi.org/10.1186/s12991-019-0241-7

156. Kane JC, Elafros MA, Murray SM, Mitchell EMH, Augustinavicius JL, Causevic S, et al. A scoping review of health-related stigma outcomes for high-burden diseases in low- and middle-income countries. BMC Med. 2019;17(1).

157. Hou F, Zhang X, Cerulli C, He W, Mo Y, Gong W. The impact of intimate partner violence on the trajectory of perinatal depression: A cohort study in a Chinese sample. Epidemiol Psychiatr Sci. 2020;

158. Winter SC, Obara LM, McMahon S. Intimate partner violence: A key correlate of women's physical and mental health in informal settlements in Nairobi, Kenya. PLoS One [Internet]. 2020;15(4):1–18. Available from: http://dx.doi.org/10.1371/journal.pone.0230894

159. Shamu S, Zarowsky C, Roelens K, Temmerman M, Abrahams N. High-frequency intimate partner violence during pregnancy, postnatal depression and suicidal tendencies in Harare, Zimbabwe. Gen Hosp Psychiatry [Internet]. 2016;38:109–14. Available from: http://dx.doi.org/10.1016/j.genhosppsych.2015.10.005

160. Chibanda D, Mesu P, Kajawu L, Cowan F, Araya R, Abas MA. Problem-solving therapy for depression and common mental disorders in Zimbabwe: Piloting a task-shifting primary mental health care intervention in a population with a high prevalence of people living with HIV. BMC Public Health [Internet]. 2011;11(1):828. Available from: http://www.biomedcentral.com/1471-2458/11/828

161. Gulliver A, Griffiths KM, Christensen H. Perceived barriers and facilitators to mental health help-seeking in young people: a systematic review. BMC Psychiatry. 2010;10(113):9.

162. Tripathy P, Nair N, Barnett S, Mahapatra R, Borghi J, Rath S, et al. Effect of a participatory intervention with women's groups on birth outcomes and maternal depression in Jharkhand and Orissa, India: a cluster-randomised controlled trial. Lancet [Internet]. 2010;375(9721):1182–92. Available from: http://dx.doi.org/10.1016/S0140-6736(09)62042-0

163. Chaudhury S, Brown FL, Kirk CM, Mukunzi S, Nyirandagijimana B, Mukandanga J, et al. Exploring the potential of a family-based prevention intervention to reduce alcohol use and violence within HIV-affected families in Rwanda. AIDS

Care - Psychol Socio-Medical Asp AIDS/HIV [Internet]. 2016;28(January 2017):118–29. Available from: http://dx.doi.org/10.1080/09540121.2016.1176686

164. Powell-Jackson T, Pereira SK, Dutt V, Tougher S, Haldar K, Kumar P. Cash transfers, maternal depression and emotional well-being: Quasi-experimental evidence from India's Janani Suraksha Yojana programme. Soc Sci Med [Internet]. 2016;162:210–8. Available from: http://dx.doi.org/10.1016/j.socscimed.2016.06.034

165. Santos IS, Munhoz TN, Blumenberg C, Barcelos R, Bortolotto CC, Matijasevich A, et al. Post-partum depression: a cross-sectional study of women enrolled in a conditional cash transfer program in 30 Brazilian cities. J Affect Disord [Internet]. 2021;281(October 2020):510–6. Available from: https://doi.org/10.1016/j.jad.2020.12.042

166. Hargreaves J, Hatcher A, Strange V, Phetla G, Busza J, Kim J, et al. Process evaluation of the Intervention with Microfinance for AIDS and Gender Equity (IMAGE) in rural South Africa. Health Educ Res. 2010;25(1):27–40.

167. Nabunya P, Ssewamala FM, Ilic V. Reprint of "Family economic strengthening and parenting stress among caregivers of AIDS-orphaned children: Results from a cluster randomized clinical trial in Uganda." Child Youth Serv Rev [Internet]. 2014;47(P2):182–6. Available from: http://dx.doi.org/10.1016/j.childyouth.2014.09.016

168. Weiser SD, Bukusi EA, Steinfeld RL, Frongillo EA, Weke E, Dworkin SL, et al. Shamba Maisha: Randomized controlled trial of an agricultural and finance intervention to improve HIV health outcomes in Kenya. AIDS. 2015;29(14):1889–94.

169. Goodman ML, Elliott AJ, Gitari S, Keiser P, Onwuegbuchu E, Michael N, et al. Come Together to Decrease Depression: Women's mental health, social capital, and participation in a Kenyan combined microfinance program. Int J Soc Psychiatry. 2021;67(6):613–21.

170. Singla DR, Kumbakumba E, Aboud FE. Effects of a parenting intervention to address maternal psychological wellbeing and child development and growth in rural Uganda: A community-based, cluster-randomised trial. Lancet Glob Heal [Internet]. 2015;3(8):e458–69. Available from: http://dx.doi.org/10.1016/S2214-109X(15)00099-6

171. Rochat T, Dube S, Bland RM, Richter L. An evaluation of a combined psychological and parenting intervention for HIV-positive women depressed in the perinatal period , to enhance child development and reduce maternal depression : Study Protocol for the Insika Yomama Cluster Randomised Controlle. Trials. 2021;22(914):1–38.

172. Grigoriadis S, VonderPorten EH, Mamisashvili L, Tomlinson G, Dennis C-L, Koren G, et al. The impact of maternal depression during pregnancy on perinatal outcomes: a systematic review and meta-analysis. J Clin Psychiatry. 2013 Apr;74(4):e321-41.

173. Jarde A, Morais M, Kingston D, Giallo R, MacQueen GM, Giglia L, et al. Neonatal outcomes in women with untreated antenatal depression compared with women without depression: A systematic review and meta-analysis. JAMA Psychiatry. 2016;73(8):826–37.

174. Bauer A, Pawlby S, Plant DT, King D, Pariante CM, Knapp M. Perinatal depression and child development: Exploring the economic consequences from a South London cohort. Psychol Med. 2015;45(1):51–61.

175. Herba CM, Glover V, Ramchandani PG, Rondon MB. Maternal depression and mental health in early childhood: an examination of underlying mechanisms in low-income and middle-income countries. The Lancet Psychiatry [Internet]. 2016;3(10):983–92. Available from: http://dx.doi.org/10.1016/S2215-0366(16)30148-1

176. Bonell C, Oakley A, Hargreaves J, Strange V, Rees R. Assessment of generalisability in trials of health interventions: suggested framework and systematic review. BMJ [Internet]. 2006;333(7563):346–9. Available from:

https://www.bmj.com/content/333/7563/346

177. Munro A, Bloor M. Process evaluation: The new miracle ingredient in public health research? Qual Res. 2010;10(6):699–713.

178. Pawson R, Tilley N. Realist Evaluation. Sage Pubilcation Ltd. London; 1997.

179. Jack K. What is realist evaluation? Evid Based Nurs. 2022;25(4):111–3.

180. Fynn JF, Hardeman W, Milton K, Jones AP. A scoping review of evaluation frameworks and their applicability to real-world physical activity and dietary change programme evaluation. BMC Public Health. 2020;20(1):1000.

181. Hasson H. Systematic evaluation of implementation fidelity of complex interventions in health and social care. Implement Sci. 2010 Sep;5:67.

182. Moore G, Audrey S, Barker M, Bond L, Bonell C, Hardeman W, et al. Process Evaluation of Complex Interventions: UK Medical Research (MRC) Guideline. Br Med J [Internet]. 2015;350. Available from: https://mrc.ukri.org/documents/pdf/mrc-phsrn-process-evaluation-guidance-final/

183. Centers for Disease Control and Prevention. Framework for program evaluation in public health. MMWR. 1999;48(RR-11):1–40.

184. Jolley G. Evaluating complex community-based health promotion: Addressing the challenges. Eval Program Plann [Internet]. 2014;45:71–81. Available from: http://dx.doi.org/10.1016/j.evalprogplan.2014.03.006

185. Skivington K, Matthews L, Simpson SA, Craig P, Baird J, Blazeby JM, et al. A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. BMJ. 2021 Sep;374:n2061.

186. Creswell JW. Qualitative Inquiry & Research Design: Choosing Among Five Approaches. 3rd ed. Sage Pubilcation Ltd. London: SAGE Publications; 2013.

187. Grant A, Bugge C, Wells M. Designing process evaluations using case study to explore the context of complex interventions evaluated in trials. Trials.

2020;21(1):1–10.

188. Braun V, Clarke V. Using Thematic Analysis in Psychology; in Qualittaive Research in Psychology. Uwe Bristol [Internet]. 2006;3(2):77–101. Available from: http://eprints.uwe.ac.uk/11735

189. Kiger ME, Varpio L. Thematic analysis of qualitative data: AMEE Guide No. 131. Med Teach [Internet]. 2020;42(8):846–54. Available from: https://doi.org/10.1080/0142159X.2020.1755030

190. Patel V, Simunyu E, Gwanzura F, Lewis G, Mann A. The Shona Symptom Questionnaire: The development of an indigenous measure of common mental disorders in Harare. Acta Psychiatr Scand. 1997;95(6):469–75.

191. Rathod SD, Roberts T, Medhin G, Murhar V, Samudre S, Luitel NP, et al. Detection and treatment initiation for depression and alcohol use disorders: Facility-based cross-sectional studies in five low-income and middle-income country districts. BMJ Open. 2018;8(10):1–10.

192. Medeiros GC, Smith FA, Trivedi MH, Beach SR. Depressive Disorders in HIV/AIDS: A Clinically Focused Narrative Review. Harv Rev Psychiatry. 2020;28(3):146–58.

193. Bantjes J, Kagee A. Common mental disorders and psychological adjustment among individuals seeking HIV testing: A study protocol to explore implications for mental health care systems. Int J Ment Health Syst [Internet]. 2018;12(1):1–10. Available from: https://doi.org/10.1186/s13033-018-0196-0

194. Kaida A, Matthews LT, Ashaba S, Tsai AC, Kanters S, Robak M, et al. Depression during pregnancy and the postpartum among HIV-infected women on antiretroviral therapy in Uganda. J Acquir Immune Defic Syndr. 2014;67:S179–87.

195. Harrington BJ, Hosseinipour MC, Maliwichi M, Phulusa J, Jumbe A, Wallie S, et al. Prevalence and incidence of probable perinatal depression among women enrolled in Option B+ antenatal HIV care in Malawi. J Affect Disord. 2018;

196. Solano-Flores G, Nelson-Barber S. On the cultural validity of science assessments. J Res Sci Teach. 2001;38(5):553–73.

197. Huang WY, Wong SH. Cross-Cultural Validation. In: Michalos AC, editor. Encyclopedia of Quality of Life and Well-Being Research [Internet]. Dordrecht: Springer Netherlands; 2014. p. 1369–71. Available from: https://doi.org/10.1007/978-94-007-0753-5_630

198. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the Process of Cross-Cultural Adaptation of Self-Report Measures. Spine (Phila Pa 1976). 2000;25(24):3186–91.

199. Patel V, Simunyu E, Gwanzura F, Lewis G, The MA, Symptom S. The Shona Symptom Questionnaire: the development of an indigenous measure of common mental disorders in Harare. Acta Psychiatr Scand. 1997;(95):469–75.

200. Chibanda D, Mangezi W, Tshimanga M, Woelk G, Rusakaniko S, Stranix-Chibanda L, et al. Postnatal Depression by HIV Status Among Women in Zimbabwe. J Women's Heal [Internet]. 2010;19(11):2071–7. Available from: https://doi.org/10.1089/jwh.2010.2012

201. Langhaug LF, Pascoe SJ, Mavhu W, Woelk G, Sherr L, Hayes RJ, et al. High prevalence of affective disorders among adolescents living in Rural Zimbabwe. J Community Health. 2010 Aug;35(4):355–64.

202. Mavhu W, Willis N, Mufuka J, Mangenah C, Mvududu K, Bernays S, et al. Evaluating a multi-component, community-based program to improve adherence and retention in care among adolescents living with HIV in Zimbabwe: Study protocol for a cluster randomized controlled trial. Trials. 2017;18(1):1–11.

203. Chibanda D. Development and scaling up of a psychological intervention for common mental disorders among people living with HIV in Zimbabwe [Internet]. 2016. Available from: https://open.uct.ac.za/handle/11427/20855

204. Chen WT, Shiu CS, Yang JP, Simoni JM, Fredriksen-Goldsen karen I, Lee TSH,

et al. Antiretroviral therapy (ART) side effect impacted on quality of life, and depressive symptomatology: A mixed-method study. J AIDS Clin Res. 2013;4(6).

205. Chandia PJ. The experiences of HIV positive patients on antiretroviral drugs attending the public service health institutions in the Eastern Cape Province : A qualitative study. 2017;(March).

206. Silva AG, Cerqueira AT de AR, Lima MCP. Social support and common mental disorder among medical students. Rev Bras Epidemiol. 2014;17(1):229–42.

207. Polo TCF, Miot HA. Use of roc curves in clinical and experimental studies. J Vasc Bras. 2020;19:1–4.

208. Beckford Jarrett S, De La Haye W, Miller Z, Figueroa JP, Duncan J, Harvey K. High prevalence of psychiatric and substance use disorders among persons seeking treatment for HIV and other STIs in Jamaica: a short report. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV. 2018;30(5):604–8.

209. Alexander LK, Lopes B, Ricchetti-masterson K, Yeatts KB. Sources of Systematic Error or Bias : Information Bias Second Edition Authors : PA G E 2 ERIC at the UNC CH Department of Epidemiology Medical Center. Eric Noteb [Internet]. 2014;(16). Available from: https://sph.unc.edu/epid/eric/

210. Venkat Narayan KM, Miotti PG, Anand NP, Kline LM, Harmston C, Gulakowski R, et al. HIV and noncommunicable disease comorbidities in the era of antiretroviral therapy: A vital agenda for research in low-and middle-income country settings. J Acquir Immune Defic Syndr. 2014;67(SUPPL.1):2–7.

211. Gilbody S, House A, Sheldon T. Screening and case finding instruments for depression. Cochrane Database Syst Rev. 2005;

212. Nyongesa MK, Mwangi P, Kinuthia M, Hassan AS, Koot HM, Cuijpers P, et al. 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. 2021;21(1):1–17.

213. Rosenberg AL, Greenfield MVH, Dimick JB. Secondary data analyses. Clin Res Methods Surg. 2007;175–200.

214. Secondary Data Analysis - The Encyclopedia of Research Methods in Criminology and Criminal Justice -.pdf.

215. Thygesen LC, Ersbøll AK. When the entire population is the sample: Strengths and limitations in register-based epidemiology. Eur J Epidemiol. 2014;29(8):551–8.

216. Votruba N, Eaton J, Prince M, Thornicroft G. The importance of global mental health for the Sustainable Development Goals. J Ment Heal. 2014;23(6):283–6.

217. Assembly WH. The global burden of mental disorders and the need for a comprehensive, coordinated response from health and social sectors at the country level. 2012.

218. Haregu TN, Oldenburg B, Setswe G, Elliott J. Epidemiology of Comorbidity of HIV / AIDS and Non-communicable Diseases in Developing Countries: A systematic review. J Glob Heal Care Syst. 2012;(November).

219. Erdbeer G, Sabranski M, Sonntag I, Stoehr A, Horst H-A, Plettenberg A, et al. Everything fine so far? Physical and mental health in HIV-infected patients with virological success and long-term exposure to antiretroviral therapy. J Int AIDS Soc [Internet]. 2014;17(0):19673. Available from: https://doi.org/10.1080/09540121.2020.1733466

220. Cocksedge KA, Simon C, Shankar R. A difficult combination: Chronic physical illness, depression, and pain. Br J Gen Pract. 2014;64(626):440–1.

221. Gaynes BN, Pence BW, Atashili J, O'Donnell JK, Njamnshi AK, Tabenyang ME, et al. Changes in HIV outcomes following depression care in a resource-limited setting: Results from a pilot study in Bamenda, Cameroon. PLoS One. 2015;10(10):1–12.

222. Bankole KO, Bakare MO, Edet BE, Igwe MN, Ewa AU, Bankole IA, et al. Psychological complications associated with HIV/AIDS infection among children

in South-South Nigeria, sub-Saharan Africa. Cogent Med [Internet]. 2017;4(1):1372869. Available from: https://doi.org/10.1080/2331205X.2017.1372869

223. Lundberg P, Rukundo G, Ashaba S, Thorson A, Allebeck P, Stergren PO, et al. Poor mental health and sexual risk behaviours in Uganda: A cross-sectional population-based study. BMC Public Health. 2011;11.

224. German D, Latkin CA. Boredom, depressive symptoms, and HIV risk behaviors among urban injection drug users. AIDS Behav. 2012;16(8):2244–50.

225. Mthembu JC, Mabaso MLH, Khan G, Simbayi LC. Prevalence of psychological distress and its association with socio-demographic and HIV-risk factors in South Africa: Findings of the 2012 HIV prevalence, incidence and behaviour survey. SSM - Popul Heal [Internet]. 2017;3:658–62. Available from: https://doi.org/10.1016/j.ssmph.2017.07.009

226. McLeish J, Redshaw M. Mothers' accounts of the impact on emotional wellbeing of organised peer support in pregnancy and early parenthood: A qualitative study. BMC Pregnancy Childbirth [Internet]. 2017;17(1):1–14. Available from: http://dx.doi.org/10.1186/s12884-017-1220-0

227. Toska E, Laurenzi CA, Roberts KJ, Cluver L, Sherr L. Adolescent mothers affected by HIV and their children: A scoping review of evidence and experiences from sub-Saharan Africa. Glob Public Health [Internet]. 2020;15(11):1655–73. Available from: https://doi.org/10.1080/17441692.2020.1775867

228. Ramjee G, Daniels B. Women and HIV in Sub-Saharan Africa. AIDS Res Ther. 2013;10(1):1–9.

229. USAID. Gender and extreme poverty. 2015.

230. Yeaton-Massey A, Herrero T. Recognizing maternal mental health disorders: Beyond postpartum depression. Curr Opin Obstet Gynecol. 2019;31(2):116–9.

231. Brody DJ, Pratt LA, Ph D, Hughes JP. Prevalence of Depression Among Adults

Aged 20 and Over : Natl Cent Heal Stat. 2018;(303):2013–6.

232. Earls MF, Yogman MW, Mattson G, Rafferty J. Incorporating recognition and management of perinatal depression into pediatric practice. Pediatrics. 2019;143(1).

233. Heyningen T Van, Myer L, Onah M, Tomlinson M, Field S, Honikman S. Antenatal depression and adversity in urban South Africa. J Affect Disord [Internet]. 2016;203:121–9. Available from: http://dx.doi.org/10.1016/j.jad.2016.05.052

234. Omoni AO, Ntozini R, Evans C, Prendergast AJ, Moulton LH, Christian PS, et al. Child Growth According to Maternal and Child HIV Status in Zimbabwe. Pediatr Infect Dis J. 2017;36(9):869–76.

235. Madlala SS, Kassier SM. Antenatal and postpartum depression: Effects on infant and young child health and feeding practices. South African J Clin Nutr [Internet]. 2018;31(1):1–7. Available from: http://doi.org/10.1080/16070658.2017.1333753

236. Rahman A, Fisher J, Bower P, Luchters S, Tran T, Yasamy MT, et al. Bulletin of the World Health Organization Interventions for common perinatal mental disorders in women in low - and middle - income countries : a systematic review and meta - analysis. 2016;1–15.

237. Tran TD, Biggs BA, Tran T, Simpson JA, De Mello MC, Hanieh S, et al. Perinatal common mental disorders among women and the social and emotional development of their infants in rural Vietnam. J Affect Disord [Internet]. 2014;160:104–12. Available from: http://dx.doi.org/10.1016/j.jad.2013.12.034

238. Munetsi E, Simms V, Dzapasi L, Chapoterera G, Goba N, Gumunyu T, et al. Trained lay health workers reduce common mental disorder symptoms of adults with suicidal ideation in Zimbabwe: A cohort study. BMC Public Health. 2018;18(1):1–7.

239. Chen SP, Krupa T, Lysaght R, McCay E, Piat M. The development of recovery

competencies for in-patient mental health providers working with people with serious mental Illness. Adm Policy Ment Heal Ment Heal Serv Res. 2013;40(2):96–116.

240. Rapisarda F, Corbière M, Lesage AD, De Benedictis L, Pelletier JF, Felx A, et al. Development and validation of the mental health professional culture inventory. Epidemiol Psychiatr Sci. 2019;29.

241. Tsai AC, Scott JA, Hung KJ, Zhu JQ, Matthews LT, Psaros C, et al. Reliability and validity of instruments for assessing perinatal depression in African settings: Systematic review and meta-analysis. PLoS One. 2013;8(12):1–12.

242. Abidin RR, Ed D. Parenting Stress Index: A measure of the parent-child system. In: Zalaquett C, Wood R, editors. Evaluating stress: A book of resources. 1997. p. 277–91.

243. Abidin R. Parenting Stress Index — Short Form Guidance Document * Instructions to Parent for Completing the PSI-SF Scoring the PSI-SF Understanding the scores on the PSI-SF. 2013;1–4.

244. Tam K-K, Chan Y-C, Wong C-KM. Validation of the parenting stress index among Chinese mothers in Hong Kong. J Community Psychol [Internet]. 1994 Jul 1;22(3):211–23. Available from: https://doi.org/10.1002/1520-6629(199407)22:3%3C211::AID-JCOP2290220302%3E3.0.CO

245. Pérez-Padilla J, Menéndez S, Lozano O. Validity of the Parenting Stress Index Short Form in a Sample of At-Risk Mothers. Eval Rev. 2015;39(4):428–46.

246. Aracena M, Gómez E, Undurraga C, Leiva L, Marinkovic K, Molina Y. Validity and Reliability of the Parenting Stress Index Short Form (PSI-SF) Applied to a Chilean Sample. J Child Fam Stud. 2016;25(12):3554–64.

247. Bui E, Zakarian RJ, Laifer LM, Sager JC, Chen Y, Cohen S, et al. Psychometric Properties of the Parenting Sense of Competence Scale in Treatment-Seeking Post-9/11 Veterans. J Child Fam Stud [Internet]. 2017;26(2):464–70. Available from: http://dx.doi.org/10.1007/s10826-016-0580-9

248. Heerman WJ, Taylor JL, Wallston KA, Barkin SL. Parenting self-efficacy, parent depression, and healthy childhood behaviors in a low-income minority population: a cross-sectional analysis. Matern Child Heal J. 2017;21(5):1156–65.

249. Brockington IF, Fraser C, Wilson D. The Postpartum Bonding Questionnaire: A validation. Arch Womens Ment Health. 2006;9(5):233–42.

250. Brockington IF, Oates J, George S, Turner D, Vostanis P, Sullivan M, et al. A screening questionnaire for mother-infant bonding disorders. Arch Womens Ment Health. 2001;3(4):133–40.

251. Straus MA, Hamby SL, Finkelhor D, Moore DW, Runyan D. Identification of child maltreatment with the parent-child Conflict Tactics Scales: Development and psychometric data for a national sample of American parents. Child Abus Negl. 1998;22(4):249–70.

252. Pascoe JM, Ialongo NS, Horn WF, Reinhart MA, Perradatto D. The reliability and validity of the maternal social support index. Fam Med. 1988;20(4):271–6.

253. Hendrick SS, Dicke A, Hendrick C. The Relationship Assessment Scale. J Soc Pers Relat. 1998;15(1):137–42.

254. Sherin KM, Sinacore JM, Li XQ, Zitter RE, Shakil A. HITS: a short domestic violence screening tool for use in a family practice setting. Fam Med. 1998;30(7):508–12.

255. Jelsma JM. The validity of the Shona version of the EQ-5D, of life measure. South African J Physiother. 2002;58(3).

256. Smith BW, Dalen J, Wiggins K, Tooley E, Christopher P, Bernard J. The brief resilience scale: assessing the ability to bounce back. Int J Behav Med [Internet]. 2008;15(3):194–200. Available from: http://www.ncbi.nlm.nih.gov/pubmed/18696313

257. Coates J, Swindale a, Bilinsky P. Household Food Insecurity Access Scale (HFIAS) for measurement of food access: indicator guide. Washington, DC Food

Nutr Tech …. 2007;(August):Version 3.

258. Chung F, Wan G, Kuo S, Lin K, Liu H. Mother – infant interaction quality and sense of parenting competence at six months postpartum for first-time mothers in Taiwan : a multiple time series design. 2018;1–13.

259. Deniz Can D, Ginsburg-Block M. Parenting stress and home-based literacy interactions in low-income preschool families. J Appl Dev Psychol [Internet]. 2016;46:51–62. Available from: http://dx.doi.org/10.1016/j.appdev.2016.07.002

260. Huang CY, Costeines J, Ayala C, Kaufman JS. Parenting Stress, Social Support, and Depression for Ethnic Minority Adolescent Mothers: Impact on Child Development. J Child Fam Stud [Internet]. 2014;23(2):255–62. Available from: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3956110&tool=pmcentrez&rendertype=abstract

261. Eom S, Lee YM. Preliminary Study of Neurodevelopmental Outcomes and Parenting Stress in Pediatric Mitochondrial Disease. Pediatr Neurol [Internet]. 2017;71:43-49.e1. Available from: http://dx.doi.org/10.1016/j.pediatrneurol.2017.01.019

262. Martinez-Torteya C, Katsonga-Phiri T, Rosenblum KL, Hamilton L, Muzik M. Postpartum depression and resilience predict parenting sense of competence in women with childhood maltreatment history. Arch Womens Ment Health. 2018;21(6):777–84.

263. Bagherinia M, Meedya S, Mirghafourvand M. Association between maternal sense of competence and self-efficacy in primiparous women during postpartum period. Shiraz E Med J. 2018;19(3):e59286-1-e59286-8.

264. Do HP, Tran BX, Nguyen CT, Vo T Van, Baker PRA, Dunne MP. Inter-partner violence during pregnancy, maternal mental health and birth outcomes in Vietnam: A systematic review. Child Youth Serv Rev [Internet]. 2019;96:255–65. Available from: https://doi.org/10.1016/j.childyouth.2018.11.039

265. Nguyen PH, Van Nguyen S, Nguyen MQ, Nguyen NT, Keithly S, Mai LT, et al. The association and a potential pathway between gender-based violence and induced abortion in Thai Nguyen province, Vietnam. Glob Health Action. 2012;5(1):19006.

266. Yamada A, Isumi A, Fujiwara T. Association between Lack of Social Support from Partner or Others and Postpartum Depression among Japanese Mothers: A Population-Based Cross-Sectional Study. Int J Environ Res Public Health. 2020;17(4270):1–15.

267. Belsky J. The Determinants of Parenting: A Process Model. Child Dev. 1984;55(1):83–96.

268. Liu L, Wang M. Parenting stress and harsh discipline in China: The moderating roles of marital satisfaction and parent gender. Child Abus Negl [Internet]. 2015;43(88):73–82. Available from: http://dx.doi.org/10.1016/j.chiabu.2015.01.014

269. Koury AJ, Dynia J, Dore R, Logan JAR, Purtell KM, Joy E, et al. Food Insecurity and Depression among Economically Disadvantaged Mothers: Does Maternal Efficacy Matter? Appl Psychol Heal Well-Being. 2020;

270. Pourmotabbed A, Moradi S, Babaei A, Ghavami A, Mohammadi H, Jalili C, et al. Food insecurity and mental health: A systematic review and meta-analysis. Public Health Nutr. 2020;23(10):1778–90.

271. Mesbah SF, Sulaiman N, Shariff ZM, Ibrahim Z. Does food insecurity contribute towards depression? A cross-sectional study among the urban elderly in Malaysia. Int J Environ Res Public Health. 2020;17(9):1–9.

272. Prince M, Hanlon C. Impact of Common Mental Disorders on Food Insecurity among Women in Butajira , Ethiopia : A Cohort Study. :1–16.

273. Noonan K, Corman H, Reichman NE. Effects of maternal depression on family food insecurity. Econ Hum Biol. 2016;22(609):201–15.

274. Shangani S, Operario D, Genberg B, Kirwa K, Midoun M, Atwoli L, et al.

Unconditional government cash transfers in support of orphaned and vulnerable adolescents in western Kenya: Is there an association with psychological wellbeing? PLoS One. 2017;12(5):1–15.

275. Elwell-Sutton T, Folb N, Clark A, Fairall LR, Lund C, Bachmann MO. Socioeconomic position and depression in South African adults with long-term health conditions: A longitudinal study of causal pathways. Epidemiol Psychiatr Sci. 2019;28(2):199–209.

276. Plagerson S, Patel V, Harpham T, Kielmann K, Mathee A. Does money matter for mental health? Evidence from the Child Support Grants in Johannesburg, South Africa. Glob Public Health. 2011;6(7):760–76.

277. Kilburn K, Thirumurthy H, Halpern CT, Pettifor A, Handa S. Effects of a large-scale unconditional cash transfer program on mental health outcomes of young people in Kenya. J Adolesc Heal [Internet]. 2016;58(2):223–9. Available from: http://dx.doi.org/10.1016/j.jadohealth.2015.09.023

278. Eyal K. Follow the child: the effect of an unconditional cash transfer on adolescent human capital and mental health. 2016; Available from: https://open.uct.ac.za/handle/11427/22814

279. Sagami A, Kayama M, Senoo E. The relationship between postpartum depression and abusive parenting behavior of Japanese mothers: A survey of mothers with a child less than one year old. Bull Menninger Clin. 2004;68(2):174–87.

280. Baba S, Ehab ES, Shirai K, Fujiwara T, Yamaoka Y, Iso H. Factors Associated With Family Member's Spanking of 3.5-year-old Children in Japan. 2020;19–22.

281. Borre A, Kliewer W. Parental strain, mental health problems, and parenting practices: A longitudinal study. Pers Individ Dif. 2014;68(October):93–7.

282. Lee SJ, Gopalan G, Harrington D. Validation of the Parenting Stress Index–Short Form With Minority Caregivers. Res Soc Work Pract. 2016;26(4):429–40.

283. Toucheque M, Etienne A-M, Stassart C, Catale C. Validation of the French

version of the Parenting Stress Index - Short Form (Fourth Edition). J Community Psychol. 2016;44(4):419–25.

284. Gilbody S, Sheldon TA, House A. Screening and case-finding instruments for depression: a meta-analysis. Can Med Assoc J. 2008;178(8):997–1003.

285. Rispoli KM, Sheridan SM. Feasibility of a school-based parenting intervention for adolescent parents. Adv Sch Ment Health Promot [Internet]. 2017;10(3):176–94. Available from: https://doi.org/10.1080/1754730X.2017.1325329

286. Baker-Henningham H. The role of early childhood education programmes in the promotion of child and adolescent mental health in low- and middle-income countries. Int J Epidemiol. 2014;43(2):407–33.

287. Brahm P, Cortázar A, Fillol MP, Mingo MV, Vielma C, Aránguiz MC. Maternal sensitivity and mental health: Does an early childhood intervention programme have an impact? Fam Pract. 2016;33(3):226–32.

288. Waldron EM, Burnett-Zeigler I, Wee V, Ng YW, Koenig LJ, Pederson AB, et al. Mental Health in Women Living With HIV: The Unique and Unmet Needs. J Int Assoc Provid AIDS Care. 2021;20:1–18.

289. Cowgill BO, Bogart LM, Corona R, Ryan G, Schuster MA. Fears about HIV Transmission in Families with an HIV-infected Parent: A Qualitative Analysis. Pediatrics. 2008;122(5):e950–8.

290. Cates CB, Weisleder A, Dreyer BP, Berkule Johnson S, Vlahovicova K, Ledesma J, et al. Leveraging Healthcare to Promote Responsive Parenting: Impacts of the Video Interaction Project on Parenting Stress. J Child Fam Stud. 2016;25(3):827–35.

291. Suchman NE, Decoste C, Castiglioni N, Mcmahon TJ, Rounsaville B, Mayes L. The Mothers and Toddlers Program, an attachment-based parenting intervention for substance using women: Post-treatment results from a randomized clinical pilot. Attach Hum Dev. 2010;12(5):483–504.

292. Rayce SB, Rasmussen IS, Klest SK, Patras J, Pontoppidan M. Effects of

parenting interventions for at-risk parents with infants: A systematic review and meta-analyses. BMJ Open. 2017;7(12):1–20.

293. Grant RL, Hood R. Complex systems, explanation and policy: implications of the crisis of replication for public health research. Crit Public Health [Internet]. 2017 Oct 20;27(5):525–32. Available from: https://doi.org/10.1080/09581596.2017.1282603

294. McGill E, Marks D, Vanessa E, Penney T, Petticrew M, Egan M. Qualitative process evaluation from a complex systems perspective: A systematic review and framework for public health evaluators. PLoS Med [Internet]. 2020;17(11):1–27. Available from: http://dx.doi.org/10.1371/journal.pmed.1003368

295. Chen M, Chan KL. Effects of Parenting Programs on Child Maltreatment Prevention: A Meta-Analysis. Trauma, Violence, Abus. 2016;17(1):88–104.

296. Faes MC, Reelick MF, Esselink RA, Rikkert MGO. Developing and evaluating complex healthcare interventions in geriatrics: The use of the medical research council framework exemplified on a complex fall prevention intervention. J Am Geriatr Soc. 2010;58(11):2212–21.

297. Odgers-Jewell K, Isenring E, Thomas R, Reidlinger DP. Process evaluation of a patient-centred, patient-directed, group-based education program for the management of type 2 diabetes mellitus. Vol. 74, Nutrition and Dietetics. 2017. p. 243–52.

298. Bobrow K, Farmer A, Cishe N, Nwagi N, Namane M, Brennan TP, et al. Using the Medical Research Council framework for development and evaluation of complex interventions in a low resource setting to develop a theory-based treatment support intervention delivered via SMS text message to improve blood pressure control. BMC Health Serv Res. 2018;18(1):1–15.

299. Arlington V. Evaluation brief: Measuring Implementation Fidelity. James Bell Assoc [Internet]. 2009;(October). Available from: https://www.acf.hhs.gov/sites/default/files/cb/measuring_implementation_fidelit

y.pdf%0Ahttp://www.jbassoc.com/ReportsPublications/Evaluation Brief - Measuring Implementation Fidelity_Octob….pdf

300. Knerr W, Gardner F, Cluver L. Improving Positive Parenting Skills and Reducing Harsh and Abusive Parenting in Low- and Middle-Income Countries: A Systematic Review. Prev Sci. 2013;14(4):352–63.

301. Skar AMS, Sherr L, Macedo A, Tetzchner S von, Fostervold KI. Evaluation of Parenting Interventions to Prevent Violence Against Children in Colombia: A Randomized Controlled Trial. J Interpers Violence. 2017;

302. Filene JH, Kaminski JW, Valle LA, Cachat P. Components Associated With Home Visiting Program Outcomes: A Meta-analysis. Pediatrics [Internet]. 2013 Nov 1;132(Supplement_2):S100–9. Available from: https://doi.org/10.1542/peds.2013-1021H

303. Durlak JA, DuPre EP. Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. Am J Community Psychol. 2008;41(3–4):327–50.

304. Little MA, Riggs NR, Shin H-S, Tate EB, Pentz MA. The Effects of Teacher Fidelity of Implementation of Pathways to Health on Student Outcomes. Eval Heal Prof. 2015;38(1):21–41.

305. Carroll C, Patterson M, Wood S, Booth A, Rick J, Balain S. A conceptual framework for implementation fidelity. Implement Sci. 2007;2(1):1–9.

306. Martin M, Steele B, Lachman JM, Gardner F. Measures of Facilitator Competent Adherence Used in Parenting Programs and Their Psychometric Properties: A Systematic Review. Clin Child Fam Psychol Rev [Internet]. 2021;24(4):834–53. Available from: https://doi.org/10.1007/s10567-021-00350-8

307. Taylor JA, Valentine AZ, Sellman E, Bransby-Adams K, Daley D, Sayal K. A qualitative process evaluation of a randomised controlled trial of a parenting intervention in community (school) settings for children at risk of attention deficit hyperactivity disorder (ADHD). BMC Psychiatry [Internet]. 2015;15(1):1–11.

Available from: http://dx.doi.org/10.1186/s12888-015-0670-z

308. Álvarez M, Rodrigo MJ, Byrne S. What implementation components predict positive outcomes in a parenting program? Res Soc Work Pract. 2018;28(2):173–87.

309. Doyle SL, Jennings PA, Brown JL, Rasheed D, DeWeese A, Frank JL, et al. Exploring Relationships Between CARE Program Fidelity, Quality, Participant Responsiveness, and Uptake of Mindful Practices. Mindfulness (N Y). 2019;10(5):841–53.

310. Clarke S -A., Calam R, Morawska A, Sanders M. "Developing web-based Triple P 'Positive Parenting Programme' for families of children with asthma": Erratum. Child Care Health Dev. 2015;41(3):503.

311. Epstein M, Oesterle S, Haggerty KP. Effectiveness of Facebook Groups to Boost Participation in a Parenting Intervention. Prev Sci. 2019;20(6):894–903.

312. Koerting J, Smith E, Knowles MM, Latter S, Elsey H, McCann DC, et al. Barriers to, and facilitators of, parenting programmes for childhood behaviour problems: A qualitative synthesis of studies of parents' and professionals' perceptions. Eur Child Adolesc Psychiatry. 2013;22(11):653–70.

313. Healy P, Smith V, Savage G, Clarke M, Devane D, Gross MM, et al. Process evaluation for OptiBIRTH, a randomised controlled trial of a complex intervention designed to increase rates of vaginal birth after caesarean section. Trials. 2018;19(1):1–10.

314. Busza J, Dauya E, Bandason T, Simms V, Chikwari CD, Makamba M, et al. The role of community health workers in improving HIV treatment outcomes in children: Lessons learned from the ZENITH trial in Zimbabwe. Health Policy Plan. 2018;33(3):328–34.

315. Palazuelos D, Ellis K, Im DDE, Peckarsky M, Schwarz D, Farmer DB, et al. 5-SPICE: The application of an original framework for community health worker program design, quality improvement and research agenda setting. Glob Health

Action. 2013;6(1).

316. Mays DC, O'Neil EJ, Mworozi EA, Lough BJ, Tabb ZJ, Whitlock AE, et al. Supporting and retaining Village Health Teams: An assessment of a community health worker program in two Ugandan districts. Int J Equity Health. 2017;16(1):1–10.

317. Geldsetzer P, De Neve JW, Boudreaux C, Bärnighausen T, Bossert TJ. Improving the performance of community health workers in Swaziland: Findings from a qualitative study. Hum Resour Health. 2017;15(1):1–9.

318. Taylor C, Griffiths F, Lilford R. Affordability of comprehensive community health worker programmes in rural sub-Saharan Africa. BMJ Glob Heal. 2017;2(3):1–7.

319. Wilford A, Phakathi S, Haskins L, Jama NA, Mntambo N, Horwood C. Exploring the care provided to mothers and children by community health workers in South Africa: Missed opportunities to provide comprehensive care. BMC Public Health. 2018;18(1):1–10.

320. Hill Z, Dumbaugh M, Benton L, Källander K, Strachan D, ten Asbroek A, et al. Supervising community health workers in low-income countries - a review of impact and implementation issues. Glob Health Action. 2014;7(1):1–10.

321. Rowe HJ, Wynter KH, Burns JK, Fisher JRW. A complex postnatal mental health intervention: Australian translational formative evaluation. Health Promot Int. 2017;32(4):610–23.

322. Berkel C, Mauricio AM, Schoenfelder E, Sandler IN. Putting the Pieces Together: An Integrated Model of Program Implementation. Prev Sci [Internet]. 2011;12(1):22–33. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5591031/pdf/nihms894430.pdf

323. Borek AJ, Abraham C. How do Small Groups Promote Behaviour Change? An Integrative Conceptual Review of Explanatory Mechanisms. Appl Psychol Heal Well-Being. 2018;10(1):30–61.

324. Hickey G, McGilloway S, Furlong M, Leckey Y, Bywater T, Donnelly M. Understanding the implementation and effectiveness of a group-based early parenting intervention: A process evaluation protocol. BMC Health Serv Res [Internet]. 2016;16(1):1–14. Available from: http://dx.doi.org/10.1186/s12913-016-1737-3

325. Mwase T, Brenner S, Mazalale J, Lohmann J, Hamadou S, Somda SMA, et al. Inequities and their determinants in coverage of maternal health services in Burkina Faso. Int J Equity Health. 2018;17(1):1–14.

326. Fisseha G, Berhane Y, Worku A, Terefe W. Distance from health facility and mothers' perception of quality related to skilled delivery service utilization in northern Ethiopia. Int J Womens Health. 2017;9:749–56.

327. Dotse-Gborgbortsi W, Dwomoh D, Alegana V, Hill A, Tatem AJ, Wright J. The influence of distance and quality on utilisation of birthing services at health facilities in Eastern Region, Ghana. BMJ Glob Heal. 2020;4.

328. Silumbwe A, Nkole T, Munakampe MN, Milford C, Cordero JP, Kriel Y, et al. Community and health systems barriers and enablers to family planning and contraceptive services provision and use in Kabwe District, Zambia. BMC Health Serv Res. 2018;18(1):1–11.

329. Li ATW, Fung KPL, Maticka-Tyndale E, Wong JPH. Effects Of HIV stigma reduction interventions in diasporic communities: insights from the CHAMP study. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV [Internet]. 2018;30(6):739–45. Available from: https://doi.org/10.1080/09540121.2017.1391982

330. Fonner VA, Geurkink D, Chiwanga F, Amiri I, Likindikoki S. Long-Distance Travel for HIV-Related Care—Burden or Choice?: A Mixed Methods Study in Tanzania. AIDS Behav [Internet]. 2021;25(7):2071–83. Available from: https://doi.org/10.1007/s10461-020-03136-1

331. Dodgson JE. Reflexivity in Qualitative Research. J Hum Lact. 2019;35(2):220–2.

332. Bogner K, Landrock U. Response Biases in Standardised Surveys. GESIS Surv Guidel. 2016;Version 2.(December):1–7.

333. Bou Malham P, Saucier G. The conceptual link between social desirability and cultural normativity. Vol. 51, International Journal of Psychology. 2016. p. 474–80.

334. Latkin CA, Edwards C, Davey-Rothwell MA, Tobin KE. The relationship between social desirability bias and self-reports of health, substance use, and social network factors among urban substance users in Baltimore, Maryland. Addict Behav. 2017;73:133–6.

335. van de Mortel TF. Faking it: social desirability response bias in self- report research. Aust J Adv Nurs. 2008;25(4):40–8.

336. Katkin ES. The Marlowe-Crowne Social Desirability Scale independent of psychopathology? Psychol Rep. 1964;15:703–6.

337. Hart CM, Ritchie TD, Hepper EG, Gebauer JE. The Balanced Inventory of Desirable Responding Short Form (BIDR-16). SAGE Open. 2015;5(4).

338. Campbell, Michelle; Fitzpatrick, R; Haines, Andrew; Kinmonth, Anne Louise; Sandercock, Peter; Spiegelhalter, David; Tyrer P. Framework for design and evaluation of complex interventions to improve health. BMJ. 2000;321:694–6.

339. Li X, Chi P, Sherr L, Cluver L, Stanton B. Psychological resilience among children affected by parental HIV/AIDS: a conceptual framework. Heal Psychol Behav Med. 2015;3(1):217–35.

340. Creswell JW. Mixed Method Design (Creswell).Pdf. In.

341. Toomey E, Hardeman W, Hankonen N, Byrne M, McSharry J, Matvienko-Sikar K, et al. Focusing on fidelity: narrative review and recommendations for improving intervention fidelity within trials of health behaviour change interventions. Heal Psychol Behav Med. 2020;8(1):132–51.

342. Sikkema KJ, Dennis AC, Watt MH, Choi KW, Yemeke TT, Joska JA. Improving

mental health among people living with HIV: a review of intervention trials in low- and middle-income countries. Glob Ment Heal. 2015;2.

343. Prady SL, Pickett KE, Croudace T, Mason D, Petherick ES, McEachan RRC, et al. Maternal psychological distress in primary care and association with child behavioural outcomes at age three. Eur Child Adolesc Psychiatry. 2016;25(6):601–13.

344. Lönnberg G, Jonas W, Unternaehrer E, Bränström R, Nissen E, Niemi M. Effects of a mindfulness based childbirth and parenting program on pregnant women's perceived stress and risk of perinatal depression–Results from a randomized controlled trial. J Affect Disord [Internet]. 2020;262(September 2019):133–42. Available from: https://doi.org/10.1016/j.jad.2019.10.048

345. Abas M, Bowers T, Manda E, Cooper S, Machando D, Verhey R, et al. "Opening up the mind": Problem-solving therapy delivered by female lay health workers to improve access to evidence-based care for depression and other common mental disorders through the Friendship Bench Project in Zimbabwe. Int J Ment Health Syst. 2016;10(1):1–8.

346. Rotheram-Borus MJ, Tomlinson M, Roux I Le, Stein JA. Alcohol Use, Partner Violence, and Depression: A Cluster Randomized Controlled Trial Among Urban South African Mothers Over 3 Years. Am J Prev Med [Internet]. 2015;49(5):715–25. Available from: http://dx.doi.org/10.1016/j.amepre.2015.05.004

347. Tomlinson M, Doherty T, Ijumba P, Jackson D, Lawn J, Persson LÅ, et al. Goodstart: A cluster randomised effectiveness trial of an integrated, community-based package for maternal and newborn care, with prevention of mother-to-child transmission of HIV in a South African township. Trop Med Int Heal. 2014;19(3):256–66.

348. Van Heyningen T, Honikman S, Tomlinson M, Field S, Myer L. Comparison of mental health screening tools for detecting antenatal depression and anxiety disorders in South African women. PLoS One. 2018;13(4).

349. Verhey R, Gibson L, Brakarsh J, Chibanda D, Seedat S. Prevalence and

correlates of probable post-traumatic stress disorder and common mental disorders in a population with a high prevalence of HIV in Zimbabwe. Eur J Psychotraumatol [Internet]. 2018;9(1):1536286. Available from: https://doi.org/10.1080/20008198.2018.1536286

350. Christodoulou J, Le Roux K, Tomlinson M, Le Roux IM, Katzen LS, Rotheram-Borus MJ. Perinatal maternal depression in rural South Africa: Child outcomes over the first two years. Vol. 247, Journal of Affective Disorders. 2019. p. 168–74.

351. Garg A, Toy S, Tripodis Y, Cook J, Cordella N. Influence of maternal depression on household food insecurity for low-income families. Acad Pediatr [Internet]. 2015;15(3):305–10. Available from: http://dx.doi.org/10.1016/j.acap.2014.10.002

352. Kieling C, Baker-Henningham H, Belfer M, Conti G, Ertem I, Omigbodun O, et al. Child and adolescent mental health worldwide: evidence for action. Lancet [Internet]. 2011;378(9801):1515–25. Available from: https://www.sciencedirect.com/science/article/pii/S0140673611608271

353. Mugoya GCT, Witte T, Bolland A, Tomek S, Hooper LM, Bolland J, et al. Depression and Intimate Partner Violence Among African American Women Living in Impoverished Inner-City Neighborhoods. J Interpers Violence. 2020;35(3–4):899–923.

354. Brar SK, Beattie TSH, Abas M, Vansia D, Phanga T, Maseko B, et al. The relationship between intimate partner violence and probable depression among adolescent girls and young women in Lilongwe, Malawi. Glob Public Health. 2020;15(6):865–76.

355. Lockwood Estrin G, Ryan EG, Trevillion K, Demilew J, Bick D, Pickles A, et al. Young pregnant women and risk for mental disorders: findings from an early pregnancy cohort. BJPsych Open. 2019;5(2):1–7.

356. Ohara M, Okada T, Aleksic B, Morikawa M, Kubota C, Nakamura Y, et al. Social support helps protect against perinatal bonding failure and depression among

mothers: A prospective cohort study. Sci Rep [Internet]. 2017;7(1):1–8. Available from: http://dx.doi.org/10.1038/s41598-017-08768-3

357. Mebrahtu H. The impact of maternal mental health on child cognitive development in the presence of HIV-a study in Zimbabwe. University College London; 2019.

358. Alonso J, Buron A, Rojas-Farreras S, de Graaf R, Haro JM, de Girolamo G, et al. Perceived stigma among individuals with common mental disorders. J Affect Disord [Internet]. 2009;118(1–3):180–6. Available from: http://dx.doi.org/10.1016/j.jad.2009.02.006

359. Heim E, Kohrt BA, Koschorke M, Milenova M, Thronicroft G. Reducing mental health-related stigma in primary health care settings in low- and middle-income countries: A systematic review. Epidemiol Psychiatr Sci. 2018;29(3):1–10.

360. Dow DE, Turner EL, Shayo AM, Mmbaga B, Cunningham CK, O'Donnell K. Evaluating mental health difficulties and associated outcomes among HIV-positive adolescents in Tanzania. AIDS Care - Psychol Socio-Medical Asp AIDS/HIV. 2016;28(7):825–33.

361. Lifson AR, Workneh S, Hailemichael A, MacLehose RF, Horvath KJ, Hilk R, et al. A multi-site community randomized trial of community health workers to provide counseling and support for patients newly entering HIV care in rural Ethiopia: study design and baseline implementation. HIV Clin Trials. 2018;19(3):112–9.

362. Petersen I, Lund C, Bhana A, Flisher AJ. A task shifting approach to primary mental health care for adults in South Africa: Human resource requirements and costs for rural settings. Health Policy Plan. 2012;27(1):42–51.

363. Chibanda D, Bowers T, Verhey R, Rusakaniko S, Abas M, Weiss HA, et al. The Friendship Bench programme: A cluster randomised controlled trial of a brief psychological intervention for common mental disorders delivered by lay health workers in Zimbabwe. Int J Ment Health Syst. 2015;9(1):1–7.

364. Sibeko G, Milligan PD, Roelofse M, Molefe L, Lund C, Stein DJ. Piloting a mental health training programme for community health workers in Cape Town, Western Cape, an exploration of changes in attitude, skills and confidence. 2016;1–10.

365. Moore G, Audrey S, Barker M, Bond L, Bonell C, Cooper C, et al. Process evaluation in complex public health intervention studies: the need for guidance. Vol. 68, Journal of epidemiology and community health. 2014. p. 101–2.

366. Moore GF, Audrey S, Barker M, Bond L, Bonell C, Hardeman W, et al. Process evaluation of complex interventions: Medical Research Council guidance. BMJ. 2015;350:1–7.

367. World Health Organization, WHO. Progress Report 2016 Prevent HIV, test and treat all. Who/Hiv/201624. 2016;64.

368. World Health Organization. Millennium Development Goal 5-Improving maternal mental health. 2008;1–4. Available from: https://www.who.int/mental_health/prevention/suicide/Perinatal_depression_mmh_final.pdf