Screening for Common Perinatal Mental Disorders in South Africa

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Abstract

Background: In South Africa the burden of common perinatal mental disorders, is approximately three times higher than in high-income countries, with negative consequences for maternal and child health. The high prevalence and 80% treatment gap may be attributable to multiple contextual risk factors that women encounter as well as health care system barriers. This thesis sought to establish the diagnostic prevalence and psychosocial predictors for Common Perinatal Mental Disorders (CPMD) amongst women living in adversity and to develop a brief screening tool to detect such disorders in low-resource settings.

Methods: This cross-sectional study was conducted at a primary level, midwife-run obstetric unit in Hanover Park, Cape Town. The data from 376 pregnant women attending their antenatal, "booking" visit were included. These data were collected using a diagnostic interview and self-reporting screening questionnaires. Logistic regression models explored demographic and socio-economic characteristics, psychosocial risk factors and psychiatric comorbidity as predictors for CPMD. The Area Under the Curve (AUC) from Receiver Operator Characteristic (ROC) curve analysis compared screening tool performance. Best-performing items from screening tools were analysed against diagnostic data using multiple logistic regression and ROC analysis to develop a novel screening tool.

Findings: Prevalence of diagnosable major depressive episode (MDE) and anxiety disorders were 22% and 23% respectively, 50% of depressed women expressed suicidality. CPMD diagnosis was significantly associated with multiple risk factors, including a history of mental health problems, food insecurity, traumatic life events and lower perceived social support. Multigravidity, unintended and unwanted pregnancy and pregnancy loss were strongly associated with antenatal anxiety. The Edinburgh Postnatal Depression Scale (EPDS) and Whooley questions were the best performing screening instruments. Multiple logistic regression identified four items independently predictive of CPMD. At a cut-off of 2, the combined items yielded an AUC of 0.83, with a sensitivity of 78% and specificity of 82%, comparable to the EPDS.

Conclusions: These findings confirm the high prevalence of antenatal CPMD in low- and middle-income country (LMIC) settings, where women experience multiple risk factors. Ultrashort screening tools adequately detect CPMD, and a novel, four-item screening tool may be useful for the early identification of mental health symptoms in pregnancy, as part of collaborative stepped care. This is the first measure of its kind developed in South Africa,

further novelty is that it is a combined depression and anxiety tool, and includes screening for suicidal ideation.

Declarations

This thesis is presented in fulfilment of the requirements for the degree of Doctor of Philosophy (PhD) in the School of Public Health and Family Medicine, Faculty of Health Sciences, University of Cape Town.

The work submitted in this thesis is based on my original work and has not, in whole or in part been submitted for another degree at this or any other university. The contents of this thesis are entirely my own work or, in the case of multi-authored papers, constitutes work for which I was the lead author. My contribution to multi-authored papers is outlined at the beginning of each chapter depicting such a publication.

I confirm that I have been granted permission by the University of Cape Town's Doctoral Degrees Board to include the following publications in my PhD thesis, and where co-authorships are involved, my co-authors have agreed that I may include the publications:

1. van Heyningen T, Myer L, Onah M, Tomlinson M, Field S, Honikman S. Antenatal depression and adversity in urban South Africa. *Journal of Affective Disorders*. 2016; *203*; 121–129.
2. van Heyningen T, Honikman S, Myer L, Onah MN, Field S, & Tomlinson, M. Prevalence and predictors of anxiety disorders amongst low-income pregnant women in urban South Africa: a cross-sectional study. *Archives of Women's Mental Health*. 2017; *20*(6); 765–775.
3. 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); e0193697.
4. van Heyningen T, Myer L, Tomlinson M, Field S, & Honikman S. (2019). The development of an ultra-short, maternal mental health screening tool in South Africa. *Global Mental Health*, *6* (e24), 1–14.

Per University guidelines, the text of each paper is presented verbatim in this thesis. As such, there are minor discrepancies in terminology between papers; these have not been changed in order to reflect the publications. Minor changes have been made to style and to figure and table numbers to ensure consistency throughout this thesis.

Acknowledgements

This PhD, which began purely as an academic and professional pursuit, became very personal when I was diagnosed with postpartum depression after the birth of my twins. I gained first-hand experience of the very thing that I was researching and writing about. This experience not only added depth to my understanding of maternal mental health, but gave me insight into the challenges that perinatal women face in accessing care and support. Being privileged to have both clinical knowledge and access to resources, I was able to overcome this. However, countless women in South Africa suffer without ever receiving the care or support that they need. This thesis is dedicated to them.

There are many people who have supported and encouraged me through my PhD journey. In particular, I would like to thank the following people:

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List of Abbreviations

ALPHA	Antenatal Psychosocial Health Assessment
ANC	Antenatal care
ANRQ	Antenatal Risk Questionnaire
aOR	Adjusted odds ratio
APA	American Psychiatric Association
APC	Adult Primary Care
ARV	Anti-retroviral treatment
AUC	Area under the curve
BDI	Beck's Depression Inventory
CETA	Common Elements Treatment Approach
CHC	Community Health Centre
CHW	Community health workers
CI	Confidence interval
CMD	Common mental disorders
CPMD	Common perinatal mental disorders
CSC	Collaborative stepped care
CTS	Conflict Tactics Scale
CTS2	Revised Conflict Tactics Scale
DSM-IV-TR	Revised Diagnostic and Statistical Manual of Mental Disorders, 4th Ed
DSM-V	Diagnostic and Statistical Manual of Mental Disorders, 5th Ed
ECD	Early childhood development
EPDS	Edinburgh Postnatal Depression Scale
EPDS-3A	Edinburgh Postnatal Depression Scale (3-item anxiety sub-scale)
FASD	Foetal Alcohol Spectrum Disorders
GAD	Generalised Anxiety Disorder
GAD2	Generalised Anxiety Disorder scale (two-item version)
GAD7	Generalised Anxiety Disorder scale
GBV	Gender-based violence
HADS	Hospital Anxiety and Depression Scale
HFSSM	US Household Food Security Survey Module
HIC	High-income countries
HIV	Human Immuno-deficiency Virus

ICD10	International Classification of Disease, 10th Edition
IPV	Intimate partner violence
K10	Kessler Psychological Distress scale
K6	Shortened Kessler Psychological Distress scale (6-item version)
LMIC	Low- and middle-income countries
LTE	List of Threatening Experiences
MCH	Maternal and Child Health
MDE	Major Depressive Episode
MDT	Multi-disciplinary team
MINI	Mini Neuropsychiatric Interview
MOU	Midwife Obstetric Unit
MSPSS	Multidimensional Scale of Perceived Social Support
NPV	Negative predictive value
OCD	Obsessive-Compulsive Disorder
OR	Odds ratio
PHC	Primary Health Care
PHQ9	Patient Health Questionnaire
PMHP	The Perinatal Mental Health Project
PNC	Postnatal Care
PPV	Positive predictive value
PRIME-MD	Primary Care Evaluation of Mental Disorders Procedure
PTSD	Post-traumatic Stress Disorder
RCT	Randomised Controlled Trial
SCID	Structured Clinical Interview for Diagnosis
SDG	Sustainable Development Goal
SES	Socioeconomic status
SIB	Suicidal ideation and behaviour
SRQ20	Self-reporting Questionnaire
SSA	Statistics South Arica
TB	Tuberculosis
UK	United Kingdom
US	United States
VIF	Variance inflation factor
WHO	World Health Organisation

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Chapter 1. Introduction

1.1 Introduction and background

Mental disorders contribute a significant proportion of the global disease burden and present a major public health challenge as they have significantly disabling effects on individuals, their family and communities. The disability burden and impact of mental disorders in low- and middle-income countries (LMIC) is substantial, and their prevalence and associated morbidity and mortality are greater than in high-income countries (HIC) (1). This imbalance is further exacerbated by the substantial treatment gap in LMIC, which is estimated to be between 76% and 85%, which is, in part, due to lack of resources for care and treatment (2, 3).

1.1.1 Public Mental Health

Mental health is not just the absence of mental illness, but is "a state of wellbeing in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community" (4). Public mental health is centred around research, advocacy, policy-making and clinical activities aimed at the promotion of positive mental health and the treatment and prevention of mental disorders at population-level (5). As a public health strategy, mental health promotion entails:

> "the creation of individual, social and environmental conditions that enable optimal psychological and psycho-physiological development [the achievement of] positive mental health, enhancement of quality of life and narrowing the gap in health expectancy between groups. It is an enabling process done by, with and for the people" (World Health Organisation; 2004; pg. 16) (6).

Prevention and early intervention describe public health strategies to reduce the incidence, prevalence, progression and recurrence of mental disorders, time spent with symptoms, or risk factors for a mental illness thereby decreasing the impact of illness for the affected person, their families and society (6). Prevention activities typically fall into three categories. Primary prevention measures are focused on stopping healthy individuals from developing a disease or condition in the first place, secondary prevention targets individuals with subclinical presentation and is aimed at early detection through screening. Tertiary prevention is aimed at mitigating the severity of a disease or condition and to reduce the impact or associated sequelae (39).

1.1.2 Perinatal mental health

Perinatal mental health, which refers to a woman's mental health from conception, during pregnancy and up to 12 months postpartum, is a significant public mental health concern with important implications for maternal, foetal, neonatal, and early childhood outcomes (7, 8). The perinatal period is a period when women are particularly vulnerable to developing mental health problems due to a combination of biological, psychological and social factors (9). Women who are first-time mothers, or who have a history of mental health problems or who are living with psychosocial and socioeconomic adversity, are at an increased risk of developing mental health problems (9). Mental ill-health can compromise maternal functioning and care-giving capacity which is central to child development (10). Maternal mental illness is associated with unfavourable child development, as well as infant under-nutrition, which is the single most deleterious determinant of child development (10-12). These factors are also strongly linked to poor mental health, reduced cognitive functioning and behavioural difficulties in children (10, 12).

The clinical focus with regards to perinatal mental health has mostly been on intervention and treatment of puerperal psychosis and severe mental disorders (13). Where research has been conducted on CPMD, this has concentrated on perinatal depression and its associated negative outcomes for maternal wellbeing and for the health and developmental of children. In HIC, perinatal depression prevalence ranges between 7% to 15% in pregnancy and around 10% in the postnatal period (7). Higher prevalence is found in LMIC with a recent systematic review reporting estimates between 16% and 25% during pregnancy and around 20% in the postnatal period. However, LMIC results are based on limited data from relatively few countries, with wide variance between estimates and study quality (14).

The public health focus of CPMD in LMIC has also been on the social determinants that influence perinatal mental health and impact the likelihood that women will have access to adequate care and support, or will seek and receive effective treatment (15, 16). In LMICs, the higher prevalence of CPMD is attributed to widespread poverty and inequality, gender-based violence, lack of support and HIV (17, 18). Addressing perinatal mental health is challenging in settings where resources are limited, which also serves to widen the gap between the burden of disease and treatment (13, 19, 20).

Despite some improvements in the post-Apartheid era, mental health care in South Africa remains underfunded and under-resourced with a disproportionate focus on tertiary level and institutionalised treatment for chronic and psychotic psychiatric illness (21, 22). High prevalence common mental disorders, such as depression and anxiety, are overlooked, with the majority of cases remaining undetected and untreated (23). This has been attributed to a combination of complex factors that include inadequate health system resources, the “hidden” nature of CMD, competing high prevalence of infectious diseases, structural barriers such as

poverty, cultural and religious beliefs, poor mental health literacy amongst both health care providers and the general population, and mental health stigma (21, 24). This is despite evidence that perinatal women with mild and moderate CPMD symptoms can be identified and effectively treated with low-intensity, cost-effective approaches (25-28). There is also strong evidence to support early intervention with effective programmes to improve maternal mental health that can be implemented in low resource settings through a task-shifting approach (17, 25, 26).

1.2 Rationale for this PhD research

There is evidence of a substantial burden of CPMD in South Africa and a corresponding gap in detection and treatment of such disorders. However, these data are from only a few studies, and most are based on screening prevalence. There is a need for high-quality diagnostic data in order to inform the development of methods for improving detection of CPMD while taking into account the challenges and constraints that exist in LMIC. This in turn, can guide effective, primary level interventions to manage and treat CPMD in South Africa.

In order to narrow the treatment gap, an important first step is to enhance the detection of CPMD and to improve the capacity of those working with perinatal women in primary care (16). In the framework of the re-engineered Primary Health Care (PHC) plan, where mental health care is to be integrated at primary care level, there is a need to find practical solutions which are feasible and acceptable, that can facilitate the implementation of perinatal mental health care (29). This includes the need for efficient, accurate ways to identify women who are at risk of developing CPMD (primary prevention) in order to monitor their mental health or refer them to support resources for specific challenges related to their distress, for example food insecurity or domestic violence; and to identify women who are symptomatic (secondary prevention) who require treatment to prevent the onset of more serious mental disorders (30).

Despite global evidence for the use of screening tools to improve detection, attempts to implement CPMD screening in LMICs have proven to be difficult for a multitude of reasons: 1) To date almost all screening tools for CPMD have been developed in HIC contexts with few resource constraints, which makes tools not immediately transferable. Related to this is the culture and language-specific content of tools developed in HIC contexts, which require translation and cross-cultural adaptation and validation; 2) These tools are time-consuming to administer due to their length and Likert-scale format which may make them less feasible for use in busy, low-resource settings; 3) The Likert-scale format also adds complexity to scoring, and items which have reverse scoring increase the chance for error in administration and scoring; 4) The severely constrained public health system which has to operate with high patient volumes, scarcity of resources and has to manage the competing priorities of chronic diseases and infectious diseases such as HIV and TB (24, 31).

Primary health care providers, which include nurses, doctors and lay providers without professional qualifications (e.g., community health workers, lay counsellors), who have a range of tasks to perform, do not have the time to administer lengthy screening protocols. These staff may not have the training, skills or clinical judgement to assess the mental health of perinatal women without the assistance of a screening tool (16). There is a need to develop local screening tools that can be implemented as part of routine primary care, to improve the detection and management of women who may need further follow-up for their mental health (16). The development of such a screening tool must take into account the existing resources and model of care as well as the local barriers to treatment and referral (15, 16).

A locally-developed screening tool, that is short, accurate and straightforward to administer, score and interpret, may be more feasible and effective for integration into existing primary care services (32 , 33). These factors can also make the screening process more acceptable to primary health care providers, who can be aided rather than hindered in their activities (34). As this task can be conducted by non-specialist staff, such tools may also provide a cost-effective first step if screening for CPMD is to occur as part of routine primary level care (17, 18).

Screening may be a relatively cost-effective and efficient way to initiate perinatal mental health care in environments where there are high levels of socioeconomic and psychosocial risk and where health systems are limited (16, 17). The development of a local screening tool that is clinically useful and accurate can make a contribution to improving maternal mental health in South Africa, by facilitating access to treatment, care and resources for under-resourced women (35).

1.3 Aims and objectives

The aim of this thesis is to develop a screening tool to detect common mental disorders amongst pregnant women, for use by non-specialist, primary health care providers in low-resource settings as part of a triage or stepped approach.

There are several inter-related objectives:

1. To determine the diagnostic prevalence of common perinatal mental disorders (depression and anxiety disorders) amongst pregnant women attending their first antenatal visit at a primary-level obstetric clinic;

2. To describe the psychosocial and sociodemographic factors that are associated with CPMD diagnosis;
3. To compare the psychometric performance of commonly-used mental health screening tools in detecting CPMD in an under-resourced context;
4. To ascertain which CPMD symptoms and psychosocial risk factors are independently associated with CPMD in pregnant women and use this information to develop a brief mental health screening tool for use in low-resource, primary care settings in South Africa.

1.4 Data source

Data for this thesis were collected as part of the Perinatal Mental Health Project (PMHP) Screening Tool Development Study. This was a cross-sectional study undertaken at the Hanover Park Midwife Obstetric Unit (MOU), which provides primary level maternity services attached to a Community Health Centre (CHC) in Cape Town, South Africa. Participants were enrolled between 22 November 2011 and 28 August 2012. Every third woman arriving at the Hanover Park MOU for their first antenatal visit was invited to participate in the study.

Ethical approval for the original study was granted by the University of Cape Town's Faculty of Health Sciences Human Research and Ethics Committee (HREC REF: 131/2009) and the Provincial Government of the Western Cape's Department of Health Research Committee (Ref 19/19/RP88/2009). The data analyses undertaken for this thesis were approved by the University of Cape Town's Faculty of Health Sciences Human Research Ethics Committee (HREC REF: 507/2015). All women provided written, informed consent prior to enrolment. (See Appendix 1 for ethics approval letters and Appendix 2 for consent form).

1.4.1 Overview of data collected

Study measures for data collected as part of the PMHP Screening Tool Development Study are included in Appendix 3. These measures included a demographics questionnaire to elicit information on age, education, marital status, socioeconomic status (SES), HIV status as known by the participants themselves, obstetric information, whether the pregnancy was intended and wanted, and whether participants had experienced anxiety or depression in the past. Further measures were included to screen for perceived social support, food security, experience of intimate partner violence and past threatening life events. The Expanded Mini-International Neuropsychiatric Interview (MINI Plus) Version 5.0.0 was used as to determine diagnostic prevalence of CPMD (Sheehan et al., 1998) (Appendix 4). Clinical data on HIV status was collected from women's clinic files retrospectively, following routine antenatal HIV testing.

1.4.2 My role in the PMHP Screening Tool Development Study

I was the study coordinator for this research and assisted with the development of the research protocol and study design. As study coordinator I conducted the groundwork in preparation for the study which included liaising with the Western Cape Provincial Government's department of health, study funders, staff and management at the MOU and CHC, community leaders and community-based referral organisations. I established referral protocols with the MOU and CHC for women who required higher-level psychological, psychiatric or social welfare interventions. I recruited, trained, supervised and supported the mental health officer and research assistant in their research activities: the research assistant was trained to recruit women, administer the demographics questionnaire and manage the study database. The mental health officer was trained to administer the MINI Plus diagnostic interview as well as to counsel women who received a diagnosis with a common mental disorder and to refer those

with severe mental disorder to the CHC psychiatric services. I trained primary health care staff at Hanover Park MOU in maternal mental health, to educate and sensitise them to the mental health needs of their patients. I managed the construction of a separate, dedicated space, adjacent to the MOU that was built specifically for the study and now continues as a maternal mental health service site and ongoing PMHP research site.

1.4.3 My role in the analysis of data for this thesis

With input from my supervisor, I conceptualised the analyses reported in Chapters 3 to 6, developed specific research objectives, carried out the analyses, and led the interpretation of data. I was also responsible for the drafting of manuscripts and the publication process.

1.5 Overview and structure of this thesis

As stated previously, the major outcomes of interest in this thesis are the diagnostic prevalence of depression and anxiety disorders and their associated psychosocial factors (Chapters 3 and 4), the performance of existing screening tools (Chapter 5) and the development of a screening tool that is accurate and valid (Chapter 6). Additional information regarding the measures included is detailed in Chapters 3 and 4.

This introductory chapter introduces public mental health and perinatal mental health. It includes a brief overview of the issues that this thesis will address and the rationale and aims and objectives. This chapter includes a description of the broader study from which these data were derived, the measures included and a brief overview of my role in that study. Following this introductory chapter, this thesis includes a literature review, four method and results chapters and a discussion chapter summarising the contribution of this work as well as recommendations for research, policy and practice.

Chapter 2 provides the background to this thesis in a review of the literature on each of the major constructs of interest which form the basis of this thesis. Details regarding the method and the focus of the literature review are described. Although not exhaustive, the literature review in Chapter 2 provides an orientation to CPMD, reviews and summarises the existing body of knowledge on the prevalence and determinants of CPMD in low-and-middle-income countries (LMICs); as well as the literature on screening for these disorders in such settings.

Four method and results chapters, in the form of published papers, are presented in Chapters 3-6. These correspond with the objectives of the thesis. A summary of these chapters including the primary focus and methodologies used, is presented in Table 1 below.

Chapter 3 addresses the first objective of this thesis by reporting the diagnostic prevalence of antenatal depression amongst women presenting for antenatal care at the Hanover Park MOU. Diagnostic prevalence data is limited in South Africa as most studies have reported prevalence based on screening data. This chapter also addresses the second objective of the thesis by exploring whether there are significant associations between diagnosis of Major Depressive Episode (MDE) on the MINI Plus and psychosocial risk variables. Adjusted logistic regression is conducted to identify associations between the outcome of interest, antenatal depression diagnosis, and key associated factors. This contributes to the growing body of literature on the social determinants of perinatal mental health conditions in LMIC, and highlights the psychosocial and socioeconomic risk factors that are experienced by pregnant women with depression living in adverse circumstances in South Africa.

Table 1 Summary of thesis results chapters including methodologies and outcomes.

Chapter	Publication title	Objective	Methodology	Outcome
3	Antenatal depression and adversity in urban South Africa	To determine the diagnostic prevalence of antenatal depression and describe the psychosocial and sociodemographic predictors associated with this diagnosis.	Cross-sectional analysis; logistic regression	Diagnostic prevalence of antenatal depression; psychosocial predictors
4	Prevalence and predictors of anxiety disorders amongst low-income pregnant women in urban South Africa: a cross-sectional study	To determine the diagnostic prevalence of antenatal anxiety disorders and describe the psychosocial and sociodemographic predictors associated with this diagnosis	Cross-sectional analysis, logistic regression	Diagnostic prevalence of antenatal anxiety disorders; psychosocial predictors
5	Comparison of mental health screening tools for detecting antenatal depression and anxiety disorders in South African women	To compare the psychometric performance of commonly-used mental health screening tools in detecting CPMD in this population	ROC analysis of cross-sectional data	Comparison of screening tools' performance
6	The development of an ultra-short, maternal mental health screening tool in South Africa	To ascertain which mood symptoms and mental health risk factors are independently associated with CPMD in pregnant women and use this information to develop a brief mental health screening tool for use in low-resource, primary care settings in South Africa	ROC analysis, multiple logistic regression	A novel, ultra-short screening tool

Chapter 4 addresses the first objective of this thesis by reporting the diagnostic prevalence of anxiety disorders amongst the same sample of pregnant women. This is relevant and novel because perinatal anxiety disorders are often neglected, despite their deleterious effects on maternal and child health and their high comorbidity with depression, which compounds the risk for poor outcomes. Little is known about the diagnostic prevalence of antenatal anxiety disorders in South Africa, and there is a notable dearth of studies from LMIC that report on the diagnostic prevalence of the spectrum of anxiety disorders for women in the perinatal period. This chapter also addresses the second objective of this thesis by describing the psychosocial factors associated with these disorders, which overlap with those for antenatal depression. This

chapter highlights the necessity for interventions for CPMD in South Africa to include antenatal anxiety disorders with antenatal depression, and to acknowledge the significant negative impact of contextual risk factors on women's mental health during pregnancy.

Chapter 5 addresses the third objective of this thesis by comparing the psychometric performance of five commonly used screening tools to determine how well they detect both antenatal depression and antenatal anxiety disorders. This chapter also identifies the best-performing screening tool amongst these to detect antenatal depression and anxiety symptoms simultaneously, which is a novel undertaking in South Africa. This chapter also includes an analysis of the psychometric properties of short and ultra-short versions of commonly-used screening tools in order to examine and compare their performance in detecting CPMD. This is of interest considering the practical aspects of implementing screening tools in low resource settings, where short and ultra-short screening tools may be more feasible than longer screening tools.

Chapter 6 addresses the fourth objective of this thesis by describing the development of a novel screening tool for CPMD, building on the analysis of the three previous chapters. This is the first study to develop a screening tool for CPMD in South Africa, furthermore it is the first such screen to include enquiry about depressed mood, anxiety symptoms and suicidal ideation. Importantly, this tool is developed for clinical application as an initial screening instrument to identify women who need further in-depth, mental health screening as part of a collaborative, stepped-care approach. As such, the tool has been developed to be brief, with a binary scoring system that makes it quick and easy to administer, score and interpret. These qualities may make the screening tool more feasible and acceptable for integration into busy, low-resource

settings for use by non-specialist health care providers as part of a collaborative, stepped/task-sharing approach.

Finally, Chapter 7 summarises the findings of this thesis and considers the public health implications of these results. This chapter concludes with recommendations for research, policy and practice, based on the evidence presented in this thesis.

1.6 Public health significance

Perinatal mental health is an important public health concern with significant negative implications if maternal mental disorders are left untreated (36). Furthermore, these consequences not only affect the individual women concerned, but have demonstrated, harmful impacts on the health and development of their children. These effects can occur throughout the perinatal period, and can persist long after the immediate postpartum, especially in settings where women experience chronic adversity. Associations are found between CPMD and preterm delivery, low birth weight, impaired postnatal infant growth, insecure infant-mother attachments and suboptimal breastfeeding practices (37). It is essential to identify and treat CPMD so as to prevent or mitigate these consequences, and the antenatal period provides an opportunity for early intervention due to the high uptake of antenatal care.

However, CPMD largely remain undetected and untreated in primary care maternity settings in South Africa. This has been attributed to a combination of factors including the hidden nature of common mental disorders, inadequate screening and referral systems, poor mental health literacy amongst the general population, a lack of mental health training for generalist and maternity health care providers, competing health priorities and scarcity of health system resources.

This thesis aims to address one of the barriers to early intervention for CPMD by producing a practical, short screening tool that facilitates detection and referral in low-resource primary-level settings. Screening may assist in the identification of symptomatic women for further in-depth enquiry to ensure that women experiencing perinatal mental health issues are properly screened, diagnosed and treated (17). As part of the development of this screening tool, this thesis also seeks to acknowledge the psychosocial factors that are associated with CPMD by presenting a set of risk factors that can be enquired about as an adjunct to screening. This may enhance screening outcomes by offering a way to triage vulnerable women and identify the referral resources or services that cater to the specific difficulties they may be experiencing (8, 38).

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Chapter 2. Literature Review

2.1. Overview

The aim of this literature review is to provide an orientation to common perinatal mental disorders (CPMD); review and summarise the existing body of knowledge on the prevalence and determinants of CPMD in low-and-middle-income countries (LMICs); and review the literature on screening for these disorders in such settings.

Section two of this chapter describes how the literature review was conducted and how articles were selected for inclusion. The third section gives a definition of CPMD and an overview of aetiology, impact on maternal and child health outcomes and impact on child development. The fourth section describes the prevalence and determinants of CPMD globally, in LMICs and in South Africa. This section also includes an overview of common risk factors. The fourth section describes the public health significance of CPMD as well as the barriers and opportunities for managing these disorders in LMICs. Section five is an overview of screening for CPMD and the contextual challenges for detection and treatment in LMICs. The last section has a brief discussion and recommendations followed by a conclusion.

2.2 Method for literature review

This is not intended to be a systematic or exhaustive literature review but is meant to provide an overview of the topics related to the aims of the research study including an overview on CPMD describing aetiology, prevalence and predictors as well as consequences of CPMD in LMICs. Following on from this was a search for literature describing the challenges associated

with detecting and treating CPMD in LMICs. A subsequent search was undertaken for literature on screening for CPMD globally and in LMICs.

2.2.1 Search strategy

The literature search was conducted using the University of Cape Town's Libraries online portal (Ex Libris Primo) to access various databases (including PubMed, PsychInfo and Global Health) using various combinations of the key search terms in Table 2. A forward and backward search of references from key papers was also conducted.

Table 2. Key search terms for literature review

Main concept	***Related (sub-) concept***	***Context***
Mental health	Common perinatal mental disorders	Low- and middle-income country
Common mental disorders	Depression	Africa
Perinatal	Anxiety	Sub-Saharan Africa
Maternal	Prevalence	Southern Africa
Postpartum/ postnatal	Predictors	South Africa
Pregnancy/ antenatal/ antepartum	Psychosocial risk factors	Resource poor / low resource
Screening	Screening tools	Obstetric care
Integrated	Social determinants	Health facility
Task-shifting	Perinatal mental health screening	Community health centre
Task-sharing	Antenatal mental health screening	Midwife-lead
SDG's	Depression screening	Non-specialist
	Anxiety screening	
	Psychosocial assessment	
	Screening tool properties	
	Psychometric properties	
	Feasibility and acceptability of screening	
	Barriers and facilitators to screening	
	Screening protocols and guidelines	
	Culture	

2.2.2 Article selection criteria

English language, peer-reviewed, published articles; whole thesis documents; policy documents and position statements were included for review. The focus of the search for literature was on articles that described the prevalence and predictors of CPMD as well as the

aetiology of CPMD and its associations with maternal and child health outcomes. This search was focused on research from LMICS.

A later stage of the literature review focused on screening as a strategy to improve detection of CPMD. Here the search was focused on studies from HIC and Low and LMICs. The research around screening strategies and the inclusion of psychosocial assessment was of particular interest considering the growing interest in this topic amongst perinatal mental health researchers, clinicians and policy makers.

2.3 Common Perinatal Mental Disorders

The term "common perinatal mental disorders (CPMD)" refers to non-psychotic mental disorders primarily major depression and anxiety disorders (including generalised anxiety disorder (GAD), panic disorder, phobias, social anxiety disorder, obsessive-compulsive disorder (OCD) and post-traumatic stress disorder (PTSD)) that have their onset during the perinatal period. Traditionally the perinatal period has been defined as the period including pregnancy and the first four weeks postpartum (1). There is mounting evidence from longitudinal studies that women who are first-time mothers and those living with adversity, are at an increased risk of developing mental health problems beyond this four-week period, and that the definition of the postnatal period should be extended to include at least the first year, if not until the child is five years old (2–5).

Clinically, the American Psychiatric Association's (APA) Diagnostic and Statistical Manual, fifth edition (DSM-V) with revised text (2013) does not distinguish the onset of major depressive disorder or anxiety disorders during the perinatal period from their onset at any other time of a woman's life. Under DSM-V, episodes of CPMD fall under the classification

of mood or anxiety disorders, with specification of peri-partum onset (1,3). The DSM-V time specifier has remained up to four weeks postpartum despite recommendations from global perinatal mental health experts to extend this to at least 6 months postpartum (4).

Mild symptoms of depressed mood and anxiety are commonly experienced during the first 10 to 14 days postpartum. These so-called "baby blues" usually resolve spontaneously without having any long-term, negative consequences. In contrast, diagnosable perinatal depression or anxiety disorders are specific to the perinatal period and are characterised by severe, persistent symptoms including depressed mood, severe anxiety and agitation, intrusive, ruminating or obsessive thoughts, thoughts of harming the new-born infant, lack of interest in the infant, feelings of rage and possibly suicidal thoughts and behaviour (6).

2.3.1 Aetiology of common perinatal mental disorders

The causal pathways for CPMD are complex and involve biological, psychological and social factors, often acting upon each other simultaneously (7). During the perinatal period, these factors may elicit a predisposing vulnerability to develop a mental disorder (6). These pathways may be aggravated by psycho-social stressors that are both generic (for example, poverty and food insecurity) as well as pregnancy- or post-partum-specific (for example relationship difficulties, or whether the pregnancy is intended) and moderated by styles of coping (8). These stressors will be described in greater detail in section 2.3.3. below. Studies examining personality factors have found that antenatal distress and anxiety are associated with lower self-directedness and resilience and higher harm avoidance and trait anxiety. These personality factor risks are moderated by higher levels of social support (9). Postnatal CPMD has similar aetiology to antenatal depression, although in the postpartum period, physiological changes and stressors such as sleep deprivation coupled with poor support structures and complications

around birth may also contribute. It is also important to note the heterogeneity of CPMD and that there are differences in onset, presentation, time course, trajectory and comorbidities. There is also moderately high overlap/correlation between depression and anxiety and they share presenting features despite being distinct emotional states (235).

2.3.2 Prevalence and determinants of CPMD

2.3.2.1 Global context

Globally, approximately 10% of pregnant women and about 13% to 15% of postpartum women experience depression or anxiety (10). Although there is relatively little prevalence data available from LMICs, the rates of CPMD appear to be substantially higher. Two systematic reviews of CPMD prevalence in low and lower-middle income countries reported pooled prevalence's of 15.9% and 25.3% for antenatal depression and 19% and 19.8% for postnatal depression (11,12). For LMICs, these findings translate as one in four women experiencing antenatal depression and one in five women experiencing postnatal depression, which is almost double the rate of one in ten women described in HICs. A systematic review and meta-analysis focused specifically on data from African studies found a pooled prevalence of 26% for antenatal depression (13) and 17% for postnatal depression (14). It is important to note, however, that these figures are combined from facility-based and community-based studies, are mostly not diagnostic and many do not use validated measures for the context.

2.3.2.2 South African context

Prevalence of perinatal depression reported in South Africa has varied greatly depending on study design, study population or methods of identification used. Most studies reporting on

prevalence have used screening tools which reported figures ranging between 27 - 46% for antenatal depression, and 18 – 45% for postnatal depression (15–25).

There have not been many prevalence studies which have used diagnostic methods. In mental health research, diagnostic methods usually refer to the use of tools, instruments and other methods (e.g., clinical observation or history taking), that are based on the Diagnostic and Statistical Manual of Mental Disorders' (DSM) categories of psychiatric diagnosis and are designed for administration by a clinician or mental health professional trained in diagnostic interviewing (26). One study using the Structured Clinical Interview for Diagnosis (SCID) reported a diagnostic prevalence of 47% amongst pregnant women living in rural KwaZulu-Natal, concomitant with a high prevalence of HIV (27). Two other studies measuring diagnostic rates of perinatal depression using the SCID reported rates that differed greatly at 12% (postnatal) and 35% (antenatal) respectively (28,29). Differences could be attributed to a number of factors including sample size, characteristics of the sample, context and study design.

There has been comparatively little research on perinatal anxiety disorders despite high rates of prevalence and comorbidity with perinatal depression. South African studies on perinatal anxiety disorders report diagnostic rates of between 3% and 30% during the antenatal period, which includes generalised anxiety disorder, obsessive-compulsive disorder, phobic disorders, panic disorder, and post-traumatic stress disorder (30–32). Using the State-Trait Anxiety Index, a 2018 study reported a 15% screening prevalence of anxiety symptoms amongst women in their first trimester of pregnancy (23). There is growing consensus that perinatal anxiety disorders are as debilitating as perinatal depression for mothers, have similar negative

outcomes for infants and need to be included for consideration alongside perinatal depression (232, 233).

2.3.3 Risk factors for CPMD

In addition to the biological factors described earlier, there are multiple, interactive risk factors which have been consistently associated with poor maternal mental health (11,33). Bronfenbrenner's ecological model can be used to depict the demographic, psychosocial, socioeconomic, cultural and environmental factors that influence an individual's mental health (33,34). During the perinatal period, there is a culmination of factors located within this framework, which render women particularly vulnerable to developing CPMD (35–39). The nature of the grouping or clustering of these risk factors may vary in different contexts, and women may experience more than one risk factor simultaneously, which has a compounding, cumulative effect on vulnerability (40). A life course perspective on cumulative risk locates risks for adverse outcomes across the life course, whereby encounters adverse factors may occur from as early on as in utero, throughout childhood and adolescence and into adulthood (41). Through mechanisms of biological embedding and developmental cascades, early environmental experiences and influences elicit biological, psychological and behavioural changes resulting in different trajectories of health and development (41). Cumulative risk is a mechanism whereby social environmental risks can accumulate or be experienced simultaneously, which exponentially heightens the chances of poor outcomes (41,42). Furthermore, there is a bi-directional association whereby those who experience poor mental health are also more susceptible to social and economic risks such as poverty, food insecurity and GBV (33). It is important to take these concepts into consideration when examining the social determinants and causal pathways of CPMD in LMICs. See Figure 1.

2.3.3.1 Individual level risk factors

Systematic reviews of the literature have consistently found that the individual level risk factors most strongly associated with CPMD are: a history of mental health problems (most notably depression and anxiety), alcohol and substance abuse, experience of threatening life events in the recent past, perceived lack of social support and social conflict, a discordant or abusive relationship with a partner and a pregnancy that is both unintended and unwanted (12,35,43,44). Antenatal CMD have also been associated with a prior pregnancy termination, miscarriage, stillbirth or traumatic birth experience (35,45). In addition, many obstetric-related experiences around pregnancy may generate maternal distress, for example, assisted reproduction, HIV testing, genetic testing and obstetric complications (46). Equivocal results have been reported for socio demographic factors such as maternal age, education level, employment status and ethnicity (47).

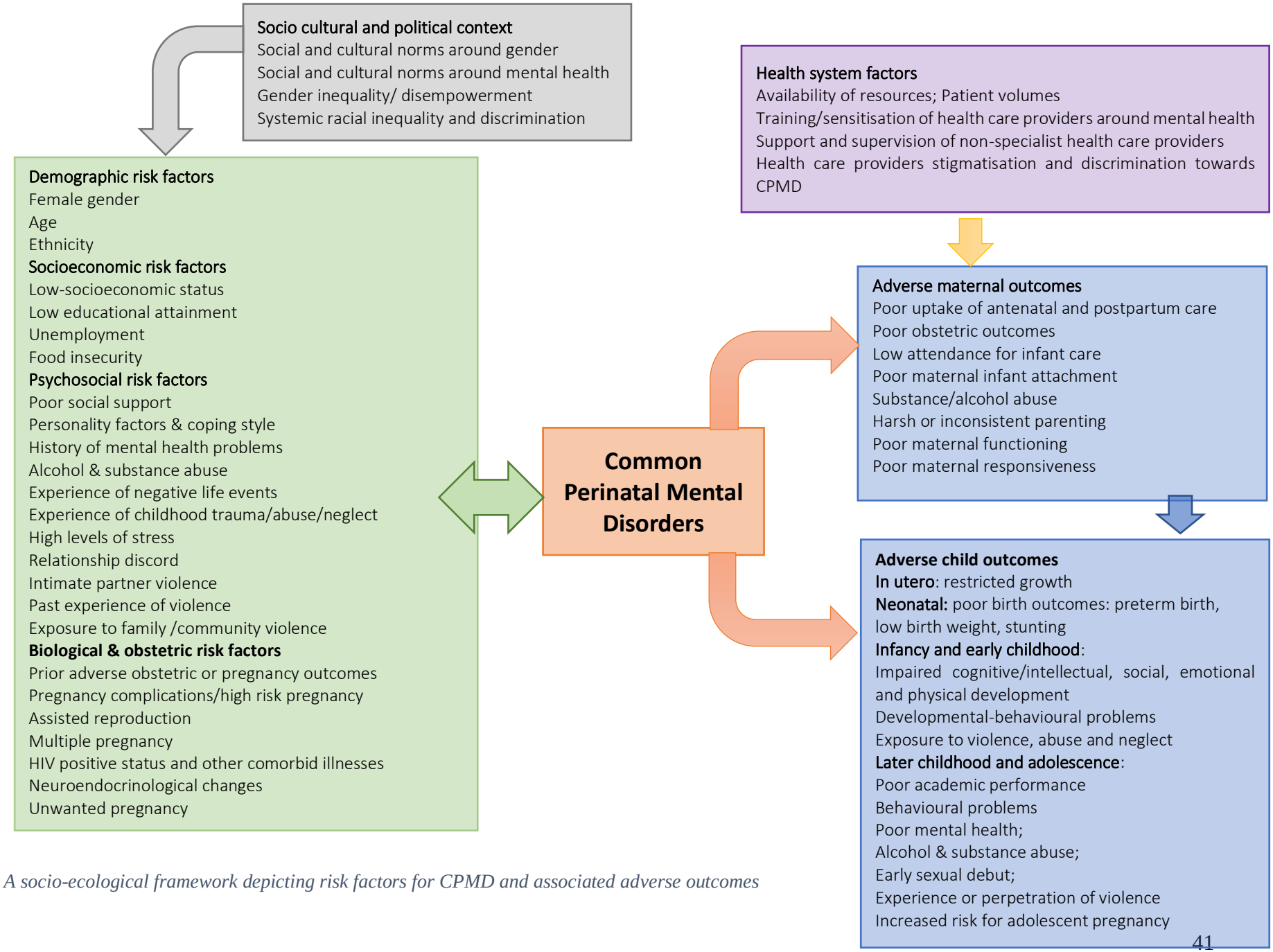


Figure 1. A socio-ecological framework depicting risk factors for CPMD and associated adverse outcomes

2.3.3.2 Socioeconomic stressors

For women living in LMICs, vulnerability to developing CPMD may be increased by the multiple, adverse psychosocial and socioeconomic stressors which they experience (12,14,27,38). The stress of pregnancy and child birth may be exacerbated by poverty or unemployment, escalating risk (48–51). Women of low socio-economic status (SES) and with poor levels of education may also experience difficulties that contribute to mental health problems: they are less likely to have adequate access to mental health services and are least likely to report symptoms of depression to health care professionals (40,52–54). Other socioeconomic factors that have been associated with CPMD include overcrowded housing, social exclusion consequent to illiteracy, race and gender inequality and disempowerment, social instability and gender-based violence (55). Poverty is a strong risk factor for exposure to trauma and violence, which in turn increases the risk for perinatal post-traumatic stress disorder (PTSD), anxiety disorders, and depression (56).

2.3.3.3 Food insecurity as a risk factor

Food insecurity is a significant barrier to physical and mental health and evidence has shown these to be separate from, and additional to, the effects of poverty (57). Food insecurity and malnutrition are consistently associated with poor mental health in adults and compromised cognitive, social-emotional and motor development in children (33). In LMICs food insecurity is a recognised social determinant of perinatal depression and anxiety disorders (18,58,59). Food insecurity has also been cited as a significant barrier for interventions aimed at improving detection and treatment of depression in South Africa (60). In the perinatal period low SES and food insecurity are also associated with negative obstetric outcomes, harmful maternal behaviours such as hazardous alcohol use or high-risk suicidal behaviour and with poor foetal and infant development (16,61–63). There are high levels of food insecurity in South Africa,

especially amongst female-headed households (64). A recent study reported that 42% of pregnant participants were food insecure and this was associated with significantly increased odds for depression, suicidal behaviour and substance use (64).

2.3.3.4 Gender based violence and CPMD

Although women in LMICs experience high rates of gender-based violence across their lifetime, they are particularly vulnerable during the perinatal period when rates of intimate partner violence (IPV) reportedly increase (35,65–68). Systematic review data on antenatal IPV from nineteen African countries reported prevalence rates between 2% and 57% with an overall prevalence rate of 15% (69). Alcohol abuse by a partner and young maternal age were the most salient risk factors (69). IPV, family and gender-based violence are associated with psychological distress and diagnosed mental disorders during the perinatal period (65). In a recent systematic review, depression, anxiety and PTSD amongst pregnant women were significantly associated with experience of IPV, as well as increase in suicidal thoughts and behaviour (70). IPV can include physical violence, sexual violence and emotional abuse (including threats or coercive tactics meant to induce harm) by a current partner or spouse. Where IPV occurs in more than one form (i.e., emotional, physical and/or sexual) the risk for CPMD and suicidal ideation is significantly elevated (71). Furthermore, abuse (especially physical violence) during pregnancy confers considerable risk to the physical health of the woman and the developing foetus. For women who experience IPV during pregnancy, there may be numerous physiological and psychological complications, including adverse infant outcomes and high risk for morbidity and mortality for the woman and the foetus (72). South African women experience high levels of IPV and gender-based violence during their lifetime, which reportedly escalate during pregnancy (65,68,69,73–75), with one study reporting a prevalence rate of 33% (76). High rates of IPV, combined with the stress of poverty and food

insecurity, and increased risk of harmful substance use, underpin the incidence of CPMD (19,57,64,65,77).

2.3.3.5 Alcohol and substance use

Alcohol and tobacco use is common amongst pregnant women with perinatal mental health problems (78) and has been associated with maternal depression and use of other substances during pregnancy (79–81). Alcohol use amongst pregnant women in South Africa is a critical public health issue, and the Western Cape region has one of the highest rates of Foetal Alcohol Spectrum Disorders (FASD) in the world (82). There are a range of factors influencing high levels of alcohol consumption by pregnant South African women including: as a coping strategy to reduce stress and negative affect; to maintain social connection whilst navigating difficult life transitions; the normalisation of alcohol use during pregnancy by peers; ambivalence or emotional detachment around the pregnancy; and physiological alcohol addiction (83). Perinatal alcohol use has been associated with IPV and CPMD in South Africa (68,84,85), and tobacco use is also more common amongst pregnant women who experience IPV than their non-abused counterparts. Increased use of other illicit substances, such as methamphetamine, amongst pregnant women experiencing IPV has also been demonstrated (65,72,86). IPV, alcohol and other substance use, CPMD and HIV are often co-occurring health problems and have been described as connected epidemics making up a "syndemic" (16,86). These coinciding risk factors present a substantial deleterious impact on women and children in LMICs where these issues abound.

2.3.3.6 HIV status and CPMD

South Africa also has one of the highest HIV rates in the world and positive HIV status has well-documented effects on mental health, with elevated depression rates amongst the HIV

positive population (between 31% and 40%) (22,77,79,87–89). Women who are HIV positive may first receive a diagnosis during pregnancy as this is a point of routine testing. This event is associated with emotional distress during the perinatal period (27,75,90–92). Depressive symptoms amongst HIV positive pregnant women are associated with poor ARV adherence, increased alcohol intake and reduced antenatal care uptake, all of which have significant, adverse effects on maternal health and child health (63,79,90).

2.4 Consequences of CPMD

Maternal mental disorders have significantly deleterious effects on the ability of women to care for themselves and for their children. Perinatal mental disorders are directly linked to maternal mortality and morbidity (93,94). Antenatal depression and anxiety are significant risk factors for the onset of postnatal depression (35,45,49,95). Both antenatal and postnatal depression are associated with adverse outcomes for women and their offspring (62,96). Depression affects women's health seeking behaviour, and pregnant women who experience CPMD are at increased risk for poor obstetric outcomes, including preterm labour, low birth weight neonates, poor infant growth, and poor infant cognitive development (93,97,98). Anxiety in pregnancy may be harmful through intrauterine growth impairment of the foetus and adverse obstetric outcomes (99,100).

Furthermore, untreated CPMD negatively affects child health outcomes and child development (38,62,101–103). Reports have demonstrated that nearly 75% of the long-term costs to society of untreated CPMD relate to their adverse impact on the health and development of children of affected mothers (104). Both antenatal and postnatal maternal depression are independently associated with long-term emotional and behavioural disturbances in offspring (105). Maternal depression during pregnancy affects neonatal physiology and may lead to perinatal

complications for the infant (106). Prolonged maternal anxiety during pregnancy may negatively influence neurodevelopment of the foetus (100). Untreated maternal anxiety and post-traumatic stress disorder are salient risk factors for undesirable child health outcomes, with negative consequences for physiological, psychological and social development (107–109). Postnatal depression has demonstrated negative effects on maternal infant attachment, maternal responsiveness and functioning, and may have long-term negative consequences for the physical, cognitive and socioemotional development of offspring.

Women who experience CPMD are vulnerable to developing serious long-term mental health problems, as mental illness during pregnancy may elicit or trigger an underlying vulnerability and increase the likelihood of chronic, lifelong mental health problems (110). Women who experience CPMD also have a greater chance of experiencing recurrent episodes in subsequent pregnancies (111,112). A significant proportion of women with CPMD will develop recurrent, long-term mood disorders (unipolar and bipolar depression and OCD), with important consequences for the short and long-term functioning of the family. CPMD has also been linked to long-term maternal disease risk that may contribute directly to subsequent cardiometabolic disease through both neuroendocrine mechanisms and the effects of mental illness on health behaviours (110).

2.5. Public health considerations of CPMD in low-resource settings

The negative sequelae of CPMD are well documented and constitute a significant public health burden (54,104). There are strong correlations between antenatal and postnatal mental disorders (45,95,113). Despite lower rates of identification and treatment of CPMD during pregnancy, there is reliable evidence from some settings that CPMD frequently have their onset during the antenatal period and persist during the postnatal period (10,12,36). This correlation

has important implications for interventions aimed at improving the identification and treatment of CPMD in that their focus may be shifted from the postnatal period to pregnancy. Some studies from sub-Saharan Africa, however, show variation on the course and trajectory of depression across the perinatal period (18). In this regard, studies have demonstrated the improved cost-effectiveness and impact of interventions that are delivered during the antenatal period. Preventative programmes that begin during the antenatal period may have significant long-term benefits for child health and development, and may alleviate intergenerational cycles of mental health disorders (101).

2.5.1 Costs and benefits of prevention

Independent investigation into the cost of perinatal mental illness in the United Kingdom revealed that these disorders carry significant, long-term costs to society (estimated at GBP 8.1 billion per birth cohort) and nearly 72% of these costs were found to be related to the long-term, adverse impact on children (104,114). Although there has been no such investigation in South Africa, it is safe to postulate that with the relatively higher prevalence of CPMD, lower detection rates, greater societal adversity and scarcity of resources for treatment and care, that the economic impact is most likely considerably greater. If this is assumed to be true, then the cost implications of untreated CPMD for South Africa are significant. The cost-effectiveness of interventions for CPMD has been demonstrated by research outcomes which show that even a minimal shift in resources towards addressing the problem yields an improvement in outcomes that justifies the expenditure; and that the cost of not attending to CPMD is five times the cost of improving services (104,114). These results are from the UK, and without similar investigation in South Africa, it is difficult to draw firm conclusions around the cost effectiveness of treating versus not treating CPMD in vastly different LMIC contexts.

In order to improve mental health care for women during the perinatal period, those who are experiencing symptoms of CPMD need to be identified and treated. One way to initiate early detection of CPMD is to develop routine, antenatal, mental health screening protocols. This may be a cost-effective way to detect CPMD before the onset of more serious mental disorders, thereby mitigating the negative impact on women and their infants (101). In low-resource settings there is a need to explore feasible and affordable pathways to scaling up care, in particular how to facilitate detection of depression with non-specialist, frontline health providers (115).

Despite the high burden of disease and need for improved detection rates in LMICs, much of the global evidence around screening for CPMD has been generated in high income countries. This limits the generalizability of study findings to low-income settings. There is thus a need for more research on screening and screening instruments in LMICs, particularly in low resource and primary care settings.

2.5.2 Challenges and approaches to closing the diagnosis and treatment gap in LMICs

Multiple barriers and challenges exist that perpetuate the treatment gap for CPMD in LMICs, where such disorders are more likely to remain undetected (116,117). Here, detection is also hindered by the social and economic disparities affecting the public health system where primary level facilities often operate with minimal resources and experience high patient volumes (118,119). With limited resources and a high prevalence of communicable diseases, such as TB and HIV, mental health is often overlooked (120). Where health care staff are overburdened with large patient loads and required to perform a range of health care tasks, there may be poor detection rates and treatment coverage for mental disorders (116). Coupled with these health system challenges are structural barriers to accessing care faced by

socioeconomically disadvantaged populations (121,122). Poverty and adversity present major challenges in this regard, especially for pregnant and postpartum women who are particularly vulnerable (61,123).

Another challenge to improving detection and treatment of CPMD is that many women are unlikely to actively seek help for emotional distress in the perinatal period (124,125). There are several reasons for this including lack of knowledge about mental health, perceptions of stigma (or self-stigmatisation), fears around contact with the mental health system, unrealistic beliefs about coping with motherhood and associated feelings of failure. Some of the depression and anxiety symptoms, such as low energy levels or difficulty making decisions, may also aggravate non-help-seeking. Somatic symptoms that commonly occur with depression (e.g., fatigue, low energy, disturbances of sleep and appetite) may be undistinguishable from pregnancy or postpartum symptoms, which could also contribute to reduced help-seeking (125).

In South Africa, there is widespread mistreatment of patients by health care providers in primary health care settings, particularly within maternity care. This is exacerbated by power inequalities and providers' disrespectful attitudes towards patients. Harsh, unkind and humiliating treatment of patients has been particularly pronounced in primary-level, obstetric settings, where physical, psychological and even sexual abuse of patients by nurses is a common occurrence (126–129). It may be that the maternity care environment presents a culmination of psychosocial stressors within a highly charged, emotive environment. There is a complex interplay of contextual factors and power dynamics that undermines women's agency and their capacity to make choices that support their health and wellbeing. The broader historical, social and cultural contexts that perpetuate power inequalities along race and gender

may also marginalise women within the public health system. These dynamics may make it particularly difficult for women to access and advocate for respectful maternity care.

In addition, women may feel uncomfortable talking about or revealing mental health difficulties if the health facility staff that attend to them are from their own community, as is the case in many primary level clinics operating in South Africa, especially in rural areas. Under such circumstances, confidentiality and discretion may not be guaranteed and individuals may feel concerned that information they disclose about their mental health, substance use or personal difficulties such as IPV could be used against them (129). There are also persistent, high levels of stigma around mental health in South Africa, both amongst the general public and amongst health care providers (130,131). This presents a significant barrier to those seeking and accessing mental health care.

There is a need for evidence-based approaches to improving detection and treatment of CPMD where resources are minimal and where contextual challenges create barriers to access to and delivery of services. In LMICs, the barriers to accessing, seeking and delivery of mental health care are further exacerbated by low levels of mental health literacy (among health care providers and the general population), the associated stigmatisation and discrimination of those with mental illness, high levels of socioeconomic and psychosocial adversity restricting access for the most vulnerable; persistent inequality and marginalisation experienced by women. These challenges are important to inform approaches to improving detection and treatment of CPMD. For example, it may be necessary to first sensitise primary-level or community-level staff to mental health issues before training them to screen and refer.

2.5.3 Task shifting of mental health care

In response to the increasing treatment gap for CMD in many LMICs, there is a global call to shift certain routine tasks, such as screening and initial management of these disorders, to non-specialist primary-health staff, community or lay health care providerss or peers (132–137). Task-shifting in resource-constrained settings optimises use of health care staff or other cadres, facilitates the integration of resources and services, which in turn generates greater coverage of the population (138–140). Research from LMICs has demonstrated that with adequate training and supervision, non-specialist primary health care providers can effectively deliver basic perinatal mental health interventions, including screening, using a task-sharing/shifting approach (136,137,141). In South Africa, most primary level services operate almost exclusively with general health care providerss who conduct the majority of routine, health care tasks including mental health assessment and treatment (135). However, generalists include lay health care providerss, community health care providerss and primary care (non-specialist) health care providers who may (or may not) have received training in mental health. Such frontline workers provide a critical interface between patients and the health care system, yet there is concern about the burden of care that they bear. Research has revealed that most of these workers are overworked, unsupported, poorly paid, and most of them feel unrecognised, isolated, and overwhelmed by the demands made on them (130). There is a growing recognition of the need for these frontline workers to be empowered and supported on an ongoing basis, especially when their tasks are reliant on empathic skills such as required for the care of depressed and psychosocially deprived women (136).

2.5.4 Integration of mental health care

Task-shifting may also facilitate the integration of mental health services into primary care or community level services (142) or even into non-health settings (143). By providing mental

health care alongside existing reproductive health, maternal and child health programmes, integrated care is another evidence-based strategy to enhance detection and treatment for CPMD (138,139). Integrating services may improve access to mental health care for women, especially for the most vulnerable, which remains a major challenge in many areas (134). This results in a more efficient use of resources, increased accessibility of services and treatment coverage, ultimately improving mental health outcomes for disadvantaged women. In South Africa, there is a high level of antenatal care uptake (93%), and integrating services, for example by providing mental health care as a routine part of primary-level obstetric care, could provide an ideal opportunity for timeous intervention for maternal mental health (144).

2.5.5 South Africa's policy environment

The Sustainable Development Goals (SDGs) call for universal health coverage, and includes mental health as integral to achieving important health and development goals (SDG no.'s 3.4, 3.5 and 3.8) (94). Despite this, recently developed South African policy and plans for the provision of maternal mental health care have not yet been fully implemented (Baron et al., 2016). In the absence of a dedicated, gazetted maternal mental health policy, there is a need to stipulate mental health care as part of general maternal and perinatal policy and guidelines in order to inform protocol. Such documents must be informed by evidence and include guidance on screening, provision of quality and evidenced-based care, clear referral pathways, continuity and accessibility of care, and patient follow up (146).

Progress has been made with South Africa's mental health policy which mandates the integration of mental health care into primary care. This is supported by the National Mental Health Policy Framework and Strategic Plan 2013 – 2020 which states:

> *"Specified mental health interventions will be included in the core package of district health services, embracing a task shifting approach whereby trained non-specialist workers at PHC level deliver evidence-based psychosocial interventions" ... "This should include… routine screening for mental illness during pregnancy, and a stepped approach to management and referral"* (South African National Department of Health, 2013;pg 23).

This strategic plan incorporates maternal mental health into the general health environment and specifically identifies motherhood, infancy and early childhood as lifespan developmental stages with unique psychosocial challenges and vulnerabilities. The plan includes maternal mental health treatment programmes as part of routine perinatal care, as well as programmes to address perinatal alcohol and substance use. Programmes to increase maternal sensitivity and responsiveness and to improve maternal-infant attachment are also stipulated.

Despite these policy stipulations, the current national guidelines on maternal and neonatal care do not directly address CPMD screening which is an essential part of successful policy implementation. Guidelines for Adult Primary Care (APC) 2016/2017 adopted by the National Department of Health indicate an assessment of "mental health" should be made at every antenatal visit and during the postnatal period, and advocate the use of two depression screening questions, but do not adequately include screening for anxiety outside of the context of trauma or phobic disorders.

Mental health is also notably absent from the current Maternal Care Guidelines, with only vague references made. However, these guidelines are currently in the process of being updated and there has been an opportunity to make a substantial contribution on mental health by a task

force of researchers, clinicians, advocates engaged in perinatal mental health in South Africa. Specific guidelines around perinatal mental health screening are crucial for successful policy implementation to integrate screening into primary level obstetric care.

2.6 Strategies to improving detection

There are arguably two types of public health enquiry around the presence or absence of a disease or condition, namely screening tests and diagnostic tests. Whereas diagnostic tests yield more definitive results, screening tests may provide less certainty. Despite this, the use of screening tests over diagnostic tests may be preferable in primary care settings where resources are scarce as they incur lower costs, take less time to administer and screening can be conducted by non-specialist staff. They are also usually less invasive or risky and incur less physical or psychological discomfort than diagnostic testing (148).

2.6.1 Principles of screening

The central concept in screening for early detection and treatment is to find and treat those with a previously undetected condition, while avoiding harm to those not in need of treatment. In general, the criteria that inform the development and implementation of screening include consideration of the following principles:

1) The condition being screened for must be an important public health problem, highly prevalent, and treatable yet under-detected.
2) There should be availability of further diagnostic enquiry and acceptable treatment for individuals who are screened as having the condition.
3) There should be established policy and protocols around treatment and referral.
4) A suitable, valid and reliable screening test should be available. Furthermore, the screening procedure must be well tolerated and have a measurable accuracy.

5) There must also be clinical benefit to screening, resulting in reduced morbidity associated with the condition.

Importantly, screening protocols and procedures must adhere to ethical principles of autonomy, beneficence, nonmaleficence and justice (149–151). The balancing of benefit and harm is an important aspect to inform decision making around screening, and includes whether there is strong enough evidence that the desirable effects outweigh the undesirable ones (152). For example, regarding the potential harm of false positive results and of overdiagnosis, which is defined as the detection of an asymptomatic "abnormality" or "condition" that would ultimately not cause morbidity or mortality. These harms relate to physical and psychological distress, as well as social and ethical issues incurred by unnecessary investigations and treatments, without any benefit to outcomes (153).

2.6.2 Screening as a strategy

Screening is a strategy to improve detection by way of identifying individuals that may have a condition, possibly even prior to obvious display of symptoms. In a clinical setting when diagnostic status of individuals are unknown, screening tests may be useful to identify a subset of the population who should have additional testing to determine the presence or absence of disease or condition (154). Also known as 'secondary detection', screening can be defined as:

> *"the presumptive identification of unrecognized disease or defect by the application of tests, examinations, or other procedures" ...* (e.g., questionnaires) *... "which can be applied rapidly. Screening tests sort out apparently well persons who probably have a disease from those who probably do not. A screening test is not intended to be diagnostic.*

Persons with positive or suspicious findings must be referred to their physicians for diagnosis and necessary treatment." (Wilson & Jungner, 1968; pg11).

Screening approaches can range widely depending on the context. For example, in an epidemiological context, the focus of screening is on the determinants, prevalence, incidence, and control of disease. Whereas clinical contexts focus on the prevention, identification, diagnosis, prognosis, and treatment of disease (155). Different approaches to screening include mass (universal) screening, which is large scale screening of whole population groups; selective (targeted) screening, which is used to screen certain (e.g., high-risk) groups in a population. Multi-phasic screening combines two or more consecutive screening tests administered to large groups of people. Surveillance refers to longer-term, close and continuous observation of individual cases or a population. Case-finding refers to screening with the main objective of identifying new cases (individuals with a condition) and initiating treatment. Epidemiological surveys use screening to *"elucidate the prevalence, incidence and natural progression of a condition"* with detection of individual cases as a by-product (Wilson & Jungner, 1968; Pg 12).

When deciding about implementing screening as part of general health care, it is important to consider the population prevalence of the condition; the appropriateness, meaning-fulness and usefulness of screening; the characteristics of screening instruments; and the availability of resources to conduct screening and manage cases. It may be useful to first discuss the characteristics of screening instruments before expounding on the other contextual factors related to their application.

2.6.3 Characteristics of screening tools

The characteristics of screening tools refers to their ability to adequately detect the presence or absence of a condition, and it may be useful to know more about these so as to ensure appropriate decision-making and implementation (156). There are two important aspects when looking at screening tool characteristics: firstly, how accurate a screening tool is in detecting cases relative to a diagnostic test (also referred to as a "gold" or reference standard), which is indicated by sensitivity and specificity values. Secondly, the clinical usefulness of a screening tool, which is indicated by predictive values (148). Positive predictive value (PPV) indicates the probability that a person with a positive result on a screening tool actually has the condition, and negative predictive value (NPV) indicates the probability that someone with a negative screening result actually does not have the condition (148).

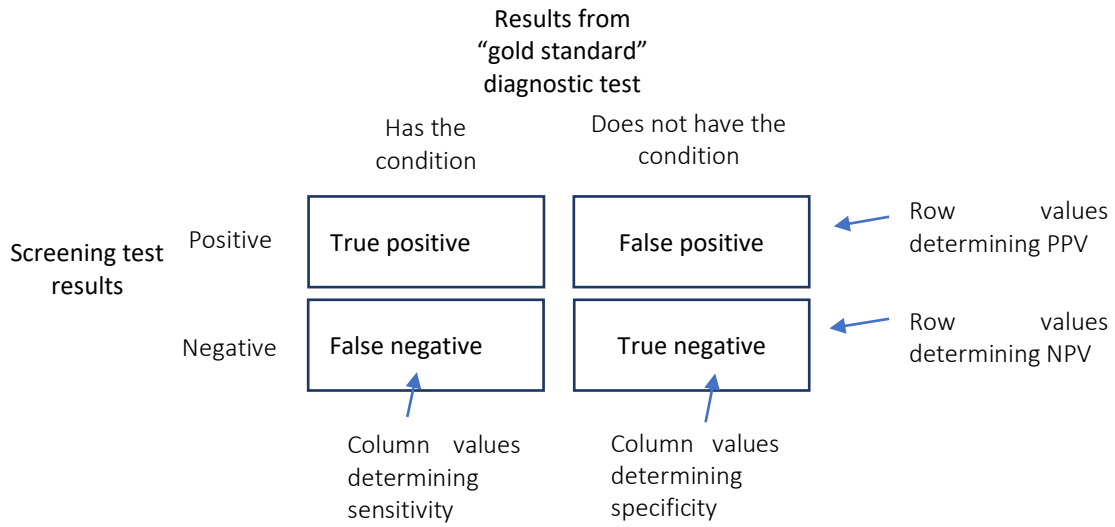
2.6.4 Sensitivity, specificity and predictive values

When a screening test is being developed, a diagnostic, "gold standard" test, regarded as providing authoritative evidence on the presence or absence of a condition, is used as the reference point against which to measure its accuracy. Figure 2 depicts the category of outcomes for screening tests and diagnostic tests: individual cases can be allocated to a category depending on whether they have been diagnosed as having a condition or not, or whether they "appear" to have a condition or not based on results from a screening test. The capability of a screening test to adequately predict the same results as a diagnostic test is then represented through the sensitivity, specificity and predictive values (148).

Sensitivity, specificity and predictive values are important to consider when describing and assessing a screening test's adequacy and usefulness. However, there are distinctions and underlying complexities between these four metrics which, if not well understood, can lead to

misuse and misinterpretation. Although they are interrelated, they have different origins and different purposes and it is not possible to determine the value of one simply from information about any of the others. There are trade-offs between sensitivity and specificity as well as PPV and NPV that need to be considered when making decisions about using a screening test in primary care (148).

Figure 2. Diagram depicting categories for screening and diagnostic outcomes.



Sensitivity and specificity have limited, stand-alone use for screening purposes. These values are not useful in estimating the probability of disease in individual patients nor do they provide a strong basis for informed decision-making around treatment and referral. One way in which these values may be useful is that a test with very high sensitivity can help "rule out" cases whereas a test with very high specificity can be used to "rule in" cases. In other words, a test with extremely high sensitivity is unlikely to produce false negative results, which increases confidence in the accuracy of negative results. Conversely, a test with very high specificity is unlikely to produce false positive results, increasing confidence that an individual has the condition being screened for when they get a positive result. The problem with this however, is that a test with high sensitivity will incur high numbers of false positive results, and a test

with high specificity increases the likelihood of false negatives. Another note of caution regarding high sensitivity and specificity is that any benefit will be eroded when the corresponding values are insufficient. For example, when a highly sensitive test is not specific enough or a highly specific test is not sensitive enough. Or if both sensitivity and specificity are low (148,154).

Predictive values reflect a test's ability to differentiate successfully between cases and non-cases and may be a more useful when making decisions around treatment and referral. Predictive values are also important to consider when it is important to keep false positive and false negative results to a minimum. Too many false positive results can flood the health system, and incur unnecessary costs related to investigations or treatment of non-cases, and add further strain on resources. False positive results may also be psychologically distressing for individuals who are incorrectly told they have a condition or incur physical discomfort when undergoing diagnostic procedures. False negative results have implications around the morbidity and mortality that may be associated with not treating missed cases (148).

The predictive values on a screening test can be adjusted by raising or lowering the cut points for determining cases or by changing the focus of the screening strategy (for example, from a universal to a targeted approach). Regarding this, there is a cost benefit assessment that needs to take place when predictive values are evaluated. These include the immediate and long-term burden on the health care system of false positive and false negative cases; the treatability of the condition; the psychological impact on individuals and their physical health; the availability of diagnostic procedures to confirm cases; the timing of diagnostic procedures and the availability of treatment (148).

The two main considerations when determining desirable predictive values are: 1) the extent to which true positive and true negative results are desired; and 2) the extent to which false positive and false negative results are tolerable or acceptable. Decision-making about acceptable predictive values must be weighed against the burden on resources of treating false positives and the consequences of not treating false negatives. When the costs associated with screening in terms of finances, time, equipment, inconvenience to staff, risk for discomfort and anxiety are high, or when the target condition is not life threatening or progresses slowly, high PPV (fewer false positives) may be appropriate. When follow-up tests are inexpensive, easy and quick to administer and not stressful for clients and providers, moderate PPV (more false positives) may be more acceptable. Another instance where moderate PPV may be tolerable is when standard management practices of cases do not incur harm for false positives (e.g., advice to start an exercise regime or eat healthily is not harmful for those who do not have the condition) (148).

High NPV (fewer false negatives) is appropriate when the condition being screened for is serious, largely asymptomatic or contagious, progresses rapidly or if early treatment is advised and effective. Moderate NPV (more false negatives) may be tolerable if the target condition is not serious or contagious, does not progress quickly nor benefit from early treatment. Moderate NPV may also be acceptable if a condition is able to resolve spontaneously without treatment or if there is time for subsequent screening to occur at relevant intervals (148).

Aside from the psychometric characteristics of screening tools, there are other factors that need to be considered when making decisions about implementing screening as a strategy to improve detection, especially in LMICs or low resource settings. These include the availability of health system resources to conduct the screening and to manage positive cases, the length and scoring

system of screening tools, culture and language factors, individual patient factors and the type of screening approach that is used. Another issue is the heterogeneity and the clinical overlap between CPMD. The measures used in research and in clinical practice may not adequately capture the range of symptoms that are presented if they have a narrow focus (236). These will be discussed further in the context of perinatal mental health screening.

2.7 Perinatal mental health screening

In order to improve detection and treatment of CPMD in LMICs, identification strategies need to be developed, particularly for primary care settings (124). The rationale for screening in the perinatal period is that early identification and treatment alleviates symptoms, prevents the onset of more serious pathology and mitigates the impact of CPMD on maternal and child health outcomes.

2.7.1 Global guidelines on perinatal mental health screening

Early studies on perinatal mental health screening concluded that the overall evidence supported perinatal screening as a way to reduce the risk of persistent CPMD (157). However, subsequent to the initial endorsements of screening, several international agencies have issued contrasting recommendations. These differ on whether screening should be undertaken at all, and amongst proponents of screening there are variations in the strengths of recommendations, as well as on the preferred approach and instruments used. (124,157–163). It may be worth noting, that these recommendations originate almost exclusively from high-income countries, and may not be directly transferrable to LMICs. It may also be worth noting that international guidelines for maternity care, such as the WHO recommendations on antenatal care for a positive pregnancy experience (2016) do not explicitly mention CPMD or mental health care

for perinatal women, other than focusing on alcohol, tobacco and other substance use (234). See Table 3 below.

Table 3. Global screening recommendations for CPMD

	US Preventative Services Task Force (2016)	**American College of Obstetricians and Gynecology (2018)**	**American Academy of Pediatrics (2010)**	**American Psychiatric Association (2018)**	**World Psychiatric Association (2017)**	**UK National Institute for Clinical Excellence (2018)**	**Canadian Task Force on Preventative Care (2013)**	**The Royal Australian and New Zealand College of Obstetricians and Gynaecologists (2017)**
Approach	Routine	Universal, routine	Routine	Routine	Routine	Stepped approach	Routine screening not recommended	Routine
Timing	As clinically indicated	Once in pregnancy; & once postpartum	At 1-, 2- & 4-month postpartum as part of well-child visits	Twice in pregnancy Postpartum: as per AAP	At any time during the perinatal period	At 1st antenatal and/or postnatal contact	Only as indicated	1st antenatal visit; 6-12 weeks postpartum; Repeat in 1st year postpartum
Depression symptoms	✓	✓	✓	✓	✓	✓	✓	✓
Anxiety symptoms	✓	✓		✓	✓	✓	✓	✓
Suicidal ideation / behaviour separate	✗	✓	✗	✗	✗	✗	✗	EPDS Q10
Psychosocial assessment	✗	✓	✗	✓	✓	General enquiry re mental health & wellbeing; for all women.	✗	ANRQ
Recommended screening instruments	EPDS	EPDS	EPDS	Any validated screening tool	Any valid, culturally appropriate instruments	Step 1. Whooley, GAD2 Step 2. EPDS/PHQ9/GAD7	EPDS, GAD7, PHQ9	EPDS for depression and anxiety K10 or DASS for anxiety only
Follow-up with in-depth assessment	✓	Only if suicidal thoughts or history of CPMD	✗	Systematic response	✓	Yes, if history of mental illness	✗	If EPDS>13 or psychosocial risk is high

2.7.2 Screening complexities

Screening has been regarded (and promoted) as an important public health strategy to facilitate early diagnosis and treatment, reduce morbidity, prevent premature mortality and improve quality of life and health outcomes (153). However, screening is not a "one size fits all" approach and there are multiple factors that add to the complexity of decision making around screening as a strategy to improve detection of CPMD. These include contextual factors, prevalence factors, health system factors and patient factors. In LMICs, where there are pronounced contextual disparities it may be important to examine the evidence for various screening approaches and aspects around feasibility and clinical usefulness of screening before deciding on whether to implement screening or which approach to use.

2.7.2.1 Screening approaches

There are two main approaches to screening at the population level, universal or targeted screening. Universal screening refers to a systematic approach to detection whereby all individuals presenting for care are screened unless they choose to opt-out. Targeted screening only considers individuals that have certain characteristics or risk factors associated with the condition being screened for. When screening is routine, it is undertaken as part of regular care in a broad, systematic approach, and may be useful in communities with high prevalence (164,165).

Several studies caution that there is insufficient evidence on the overall effectiveness or harms of universal screening, as well as a lack of RCT's that support the recommendations for such an approach (159,166,167). In order to make decisions about universal or targeted screening approaches, it is important to consider the context as there are contexts where routine, universal screening can potentially cause more harm than good or may not be cost-effective. Other

concerns are centred around the availability of resources to support universal screening programs, or the lack of clearly established referral pathways, especially where health systems are constrained or health care providers are not trained or sensitized towards mental health (168–170).

The disadvantages of a targeted approach include the reliance on the clinical skill and inclination of the individual conducting the screening which may be problematic where supervision of non-specialist workers is poor or where protocols are less clear. With targeted screening the opportunity to normalise emotional wellbeing alongside physical wellbeing and to provide a holistic health care service for all perinatal women is lost. This also includes loss of the opportunity for psychoeducation or referral to resources for women during a time when they are particularly vulnerable and may need additional support. When screening is targeted, the opportunity to monitor and improve outcomes for offspring and foster infant wellbeing during the first 1000 days may also be lost.

Evidence from settings with high prevalence and corresponding low detection rates have demonstrated that universal, routine screening can improve detection of CPMD, especially in LMICs (124). Here, screening also offers an opportunity to increase awareness amongst health care workers and perinatal women that mental health problems during pregnancy and the postpartum are common, can and need to be treated and that effective treatment and support is available (172). As such, routine screening may assist in normalizing mental health difficulties during the perinatal period, which may also help to decrease stigmatisation (173). There is also evidence from LMIC studies that screening can have clinical benefits, with maximum benefit incurred through screening in conjunction with treatment or referral to mental health care providers (124).

Taking into account the complexity and controversies around screening, it may be argued that in LMICs, screening is better than not screening, especially if undertaken in such a manner that recognises and minimises potential risks (124,157). Risks can be minimised if screening tools are used correctly and not for diagnostic purposes; if the healthcare professionals conducting the screening are appropriately trained and supported; if screening happens in stages; if positive cases are referred for adequate treatment; and if resources for support, education and information are made available to those who screen positive.

2.7.3 Psychosocial assessment and screening for risk

Screening for mental health difficulties during the perinatal period most often occurs via administration of a single screening tool that assess mood and anxiety symptomatology in a short time frame, usually the past week or month (174). However, symptom screening tools which have been developed according to psychiatric diagnostic categories may have limitations and may not be valid or reliable in fully describing the complexity and multi-dimensional presentation of mental health issues in perinatal women (175,176). When symptom screening is used on its own, the impact of contextual factors on the onset, severity and chronicity of CPMD may be overlooked. This could mean that traditional screening instruments may not detect a large proportion of women who present with psychological distress, which is indicative of chronic, sub-optimal mental health (177). Women who have an increased risk of developing depression through socioeconomic or sociodemographic vulnerability or those with a history of depression or other mental health problems may also benefit from screening, even in high income countries. Where women are experiencing severe social adversity, including poverty, perinatal women may benefit from screening because these factors are associated with higher prevalence of psychological disorders (178).

Perinatal psychological distress, which has been associated with adverse birth outcomes and poor perinatal care attendance, includes a range of heterogenous symptoms. If not addressed, these can lead to the onset of more serious mental health issues. There is strong argument for psychosocial assessment to be included in routine perinatal care as psychosocial factors play an important role in maternal and infant health.

Psychosocial assessment, which entails enquiry about psychosocial wellbeing (including a history of mental health problems) may be more useful than symptom screening as a first point of perinatal mental health care. The value of psychosocial assessment is that it can be a starting point to open up conversation with perinatal women (and their partners or families) about mental health and psychosocial issues such as intimate partner violence (179). Psychosocial assessment is also seen as a way to normalize pregnant women and new mothers' experiences and guide them to effective, available resources. Such enquiry supports the biopsychosocial and developmental person-centred approach to perinatal mental health rather than the medical model/cross-sectional approach, which tends to consider women as if they had only obstetric-related mental distress.

A number of studies have shifted the focus from symptomatology to psychosocial risk factors, advocating for routine psychosocial assessment during the perinatal period as a means of identifying vulnerable women (124,180). These studies have reported on screening approaches that group antenatal psychosocial risk factors separately from mood symptoms. Examples include the Antenatal Psychosocial Health Assessment (ALPHA) (181), the Pregnancy Risk Questionnaire (182), the Psychosocial Risk Index (183) and the Antenatal Risk Questionnaire (ANRQ) (184).

In resource-poor settings, including assessment of psychosocial risk factors with symptom screening may hold several advantages: it could assist in rationalising decisions around case management; assist to identify appropriate referral pathways and facilitate access to targeted interventions for women based on their risk profile. For example, referring women with food insecurity to apply for social grants, or activating support structures for those experiencing IPV. This approach may help to prevent the onset of postnatal depression by identifying those at risk who can then be more closely monitored. Psychosocial assessment may also be a way to detect women with complicated psychosocial risk factors who are reluctant to endorse symptoms due to poor contextual validity of screening tools or concerns about stigma (7). Such women can benefit from timely referral to care based on assessment of their psychosocial risk factors. A cautionary note on psychosocial assessment is that risk factors may have limited predictive value for cases, so it is not advised to use psychosocial assessment as a predictive tool (7).

2.7.4 Individual level factors in screening

A study by Kingston et al (2015) reported several factors commonly identified by pregnant women as perceived barriers to mental health screening. These included confusion about which emotions in the antenatal period were “normal”; preferring to discuss their emotions with significant others, emotions being normalised by significant others and a desire to handle their mental health problems on their own (185). Sensitivity and interest from a health care provider, reassurance of mental health care as a routine part of perinatal care, normalisation of emotional problems during pregnancy and description of available treatment were the main screening facilitators in the same study (186). In LMICs, pregnant women face additional barriers to accessing care than these described above. On the individual level, education around mental

health and health care in general, influences of family and significant others, cultural norms and taboos may influence health seeking behaviour. There are also data published on the barriers that are formed by negative interactions with, and attitudes of, health care providers (121,187).

2.7.5 Acceptability of screening in the perinatal period

Reviews demonstrate that depression screening and psychosocial assessment is acceptable in the perinatal period, with most women finding the experience acceptable and comfortable (188–190). Embarrassment around talking about mental health issues was cited as the most common discomfort. Some recommendations have been made around providing psychoeducation during the perinatal period or improving population level mental health literacy as part of a multifaceted strategy to enhance awareness of maternal mental health (125). Perinatal mental health screening has also been found to be acceptable to women from diverse cultural and language backgrounds. Qualitative research on the acceptability of CPMD screening with pregnant refugee and migrant women found that women felt a sense of relief to be asked about their emotional wellbeing, and felt supported and comfortable talking about these issues with midwives (191). There is a lack of research in South Africa on the acceptability of mental health screening for perinatal women. However, it may be useful to draw on the body of literature around mental health screening amongst the HIV positive population. Here, screening has been reported to be acceptable and regarded by those who were screened as something that should be a routine part of clinical care (192).

2.7.6 Impact of screening on service utilization

There is a paucity of studies investigating the outcomes of perinatal mental health screening on referral and service utilization. Most of these have been undertaken in HICs and show

conflicting results: whereas some have reported enhanced uptake and/ or rates of treatment, others have reported no difference (193). For those reporting an improvement, the common elements included: health care providers were trained in screening; primary level maternity care providers followed-up and managed cases; at least one routine perinatal visit focused on mental health; women were referred to locally available sources of support and specialist (mental health professional) supervised primary care providers.

2.7.7 Cost effectiveness of screening programmes

There is limited evidence around the cost-effectiveness of routine screening for perinatal depression. Despite the favourable psychometric properties of screening tools such as the Whooley questions, the EPDS and the PHQ-9, their use as single, case-finding instruments has found to be less cost-effective than if they are combined in a two-stage screening strategy. Two-stage screening refers to the organisation of screening into two stages: a first stage that involves a cost-effective procedure which is applied on a mass scale to detect likely positive cases, and a second, more costly but more accurate screening stage, often involving more in-depth or specialised enquiry (194). A recent study found the most effective combination for two-stage screening was initial screening using the Whooley questions, and then second stage screening with the PHQ-9 (195). These results are in agreement with the most recent NICE model (2014) for detecting perinatal depression, which also found 'Whooley questions followed by PHQ-9' to be the most cost-effective strategy (162). In South Africa, two-step mental health screening has fairly recently been integrated into clinical practice guidelines for primary care which use a symptom-based approach to routine care (196). Using a screening algorithm, primary care providers ask two initial questions and based on the outcome, follow up with a more in-depth enquiry. Evaluation of collaborative mental health care using this two-step approach reported improved detection and treatment initiation amongst adult clinic

attendees, with high positive predictive value of nurse-led screening (60). However, the treatment gap remained at 75% cases not detected despite training in screening, which suggests that there are other contextual factors contributing to low detection rates (60). This result suggests that there is a need for further research in South Africa and other LMICs, particularly amongst the perinatal population, for cost-effective screening and associated barriers and facilitators in resource-poor contexts.

2.7.8 Screening for CPMD in resource constrained settings

Most recommendations made for perinatal mental health screening have come from HIC and are primarily designed for these settings. Such recommendations are most likely not directly transferrable for implementation in LMICs, as availability of resources differ vastly. Screening may flood the system with false positives and has the potential to increase stigmatization and even expose vulnerable women to abuse from health providers or family members. Screening instruments, most of which have been developed in HIC settings, may also perform very differently in LMICs. Differences in culture and language, and in understanding of concepts like depression, or of women's emotional experiences and needs must be taken into account (170). Recommendations have been made for the development of local, culturally sensitive screening approaches and the use of different cut-off scores on screening tools according to the availability of resources for referral (170).

In LMICs optimizing scarce resources for screening and intervention is imperative. In settings with insufficient resources, screening must be adapted and validated so that it is can be integrated with local available resources. In busy, primary-level antenatal settings, the assessment needs to be brief and user friendly (171,197). Use of a stepped-care model to "triage" at-risk women who can be monitored or referred to counselling can be useful when

resources are scarce (198,199). Including key risk factors may improve the sensitivity of symptom screening instruments, as well as increasing the applicability to psychosocially diverse and socio-economically deprived populations (184,200).

Although both the EPDS and PHQ-9 have been validated in a range of settings (201), including South Africa (202), they may not be pragmatic to use in busy, low-resource settings, due to their length and complex, Likert-type scoring (203). There is a need for screening tools used by non-specialist health care providers in primary-level health care contexts to be appropriately developed or adapted for their skill level. There are further contextual and cultural factors that need to be considered when approaching mental health screening in LMICs.

2.7.8.1 Mental health literacy as a contextual factor

Mental health literacy, which is defined as "knowledge and beliefs about mental disorders which aid their recognition, management or prevention" (204) is an important consideration for screening programs and tools to be utilised. Poor mental health literacy among the public may affect help-seeking behaviour or reduce access to appropriate health care (204,205). Lower levels of mental health literacy have been associated with a lower level of education and language barriers (204). In South Africa, studies on mental health literacy report that knowledge of mental disorders is poor compared with other settings (205) and CMD are most often conceptualized as stress-related or due to a lack of willpower (205,206). Sorsdahl and Stein (2010) also reported high levels of stigma amongst the general population towards mental health problems, including internalized (self-stigmatization) and public stigma (205). Stigmatization is associated with low levels of mental health literacy in South Africa and serves as a major barrier for individuals to accessing mental health care. The reported low levels of

mental health literacy and stigmatization around mental illness need to be considered when planning programs or interventions for mental health in South Africa.

2.7.8.2 Culture and language as contextual factors

When screening for CPMD it is important to acknowledge cultural and language factors that may influence how women subjectively experience mental distress and how they present or report their symptoms. These and other contextual factors may also influence how women perceive or report their symptoms, which may affect whether or where they seek treatment and how they respond to this treatment (7,207). For example, women may perceive their symptoms to be the result of culture-bound factors such as bewitchment and thus seek treatment through consultation with a traditional healer rather than the health care system (27,208). Language barriers have been cited in research on refugee women

Whereas culture and language factors are important considerations when thinking about interventions for CPMD, recent studies have suggested that the use of standardised methods and diagnostic systems may be accurate in detecting depression universally. A South African study found that psychological symptoms were easily elicited amongst pregnant women in a rural setting (27). Another local study found that women presented with depressive symptoms using similar constructs to biomedical criteria found in Eurocentric contexts (209).

The results of Rochat et al.'s (2011) study found that pregnant women diagnosed with depression presented with clinical symptoms featuring mood disturbances, anhedonia, suicidal ideation and vegetative symptoms (27). The vegetative symptoms of depression such as weight gain and fatigue were also distinct from the somatic symptoms of pregnancy. Women were able to elucidate the effects that depression had on their emotional well-being and their social

and occupational functioning. Patel et al (2001) similarly found that women in Zimbabwe were able to describe their experience of depression using psychological language, distinct from the cultural, metaphorical and idiomatic understanding of their mental health problems, with psychological symptoms being easily elicited (210). These findings support the use of standardised methods of assessment to detect mental distress and symptoms across cultures. It may be pertinent, however, to consider cultural factors in the development or adaptation of treatment approaches in culturally diverse settings.

2.7.9 Application of screening tools in LMICs

In general, screening tools need to be robust and demonstrate adequate psychometric performance in terms of sensitivity, specificity, predictive values and clinically optimal cut points, as discussed in section 5.2 above. Tools that allow for cases to be identified without overburdening fragile health care systems with false positives are preferable (142,195,211). In resource-constrained settings with higher prevalence of psychological disorders, screening tests with higher PPV are preferable. There is also agreement that shorter instruments are as effective as longer ones where population prevalence is high. It is also important to consider optimal cut-point for screening instruments, which may vary across different contexts and cultures. Cut-point values in LMICs are often lower than in the countries where the screening tools were originally developed (212). For example, the most clinically useful cut-point for the Edinburgh Postnatal Depression Scale (EPDS) is 13 in South Africa (213), six or seven in Ethiopia (214) and three in Vietnam (215). Screening tools such as the EPDS, the Patient Health Questionnaire (PHQ-9), the GAD-7 and the Whooley questions are widely used to screen for CPMD (150,216,217). All of these tools have well-established accuracy and adequate psychometric performance in a range of perinatal populations (218,219), however,

there are recommendations that their validity for use in LMICs needs to be further improved by adaptation for the local context (212).

2.7.9.1 Content of screening questions

Some studies have found that women prefer answering questions that are easier to understand and more comfortable to answer (188,195). A recent study comparing the EPDS to the Whooley questions found that women preferred the way that the questions were worded in the EPDS as they were "softer" and less direct. There was a recommendation from this study that asking a general, opening question about feelings or mood when initiating enquire about mental health may be less threatening (195).

Studies report that up to 80% of primary-care patients with CMD initially present with somatic symptoms (220). In some settings, screening tools which include somatic symptoms alongside mood and cognitive symptoms, such as the SRQ-20, have shown preferable performance in relation to symptom-only screening tools (221–223). One study reported that a mixture of somatic and cognitive symptoms best indicated caseness versus non-caseness between the EPDS, SRQ-20 and PHQ-9 (224). The advantages of using screening instruments with a mix of mood, cognitive and somatic items in LMICs is that the somatic items detect universally understood, cross-culturally applicable presentations of CMD. Somatic complaints are well-recognised indicators of affective disorders in sub-Saharan Africa, and when several are reported simultaneously, usually indicate an increased likelihood of caseness (225,226). The main disadvantage is that these screening tools may not clearly distinguish or differentiate the symptoms of depression and anxiety from the physiological or somatic symptoms of pregnancy and the postnatal period: e.g., fatigue, low energy levels and disturbances in appetite. Cultural

factors may also contribute to false negative results on mental health screening instruments when the screening items asked lack cultural or contextual validity (7,227).

2.7.9.2 Length and scoring of screening instruments

In busy clinical settings, with high patient volumes, the length of screening instruments is important so as not to overwhelm the capacity and the resources of those administering them. Shorter screening tools allow for faster screening time thereby increasing coverage and cost effectiveness. Shorter screening tools that are used as an initial, rapid assessment may provide an entry point to care for individuals requiring mental health treatment, while at the same time increasing detection of vulnerable individuals. As an entry point, screening may provide a way to triage patients either for further, in-depth enquiry of their presenting symptoms, for first-line treatment, psychosocial support or monitoring at future antenatal visits. “Short” (between 5 and 14 items) and “ultra-short” (less than five items) versions of screening instruments have demonstrated feasibility for use as first-line screening amongst women who face multiple risk factors and where resources are scarce (31,171,197).

Where resources are limited, the scoring system and cut-off points of screening tools may also make a difference. Binary-type scoring may prove to be more efficient than Likert-type scoring, especially with instruments, such as the EPDS, which use reverse scoring. These require greater attention and mathematical literacy on the part of the administrator, which may be a challenge in busy, primary care settings. Tools that are short, quick to administer and easy to score and interpret may be more feasible and acceptable for use by generalist workers who have a range of competing tasks to perform (211). See Table 4.

Table 4. Key parameters in the development of a mental health screening tool for low-resource settings

	Content and format	***Motivation***
Length	Short (7-10 items; 2-5 minutes to complete); or Ultra-short (3-5 items; less than 2 minutes to complete)	To allow for integration into existing services
Scoring	Binary	To simplify scoring and interpretation
Content	Depression and anxiety symptoms	Both highly prevalent and significantly disabling
	Somatic symptoms	To detect universally understood, cross-culturally applicable presentations of CMD
	Psychosocial risk factors	To identify vulnerable women and/or allocate resources to mitigate psychosocial risk
Psychometric properties	Adequate sensitivity (Positive + negative predictive values)	To ensure adequate detection of positive cases
	High specificity (Positive + negative likelihood ratios)	To keep false positives to a minimum

2.8. Limitations and research needs

Where resources are limited, routine screening may be a low-cost entry point to support women's mental health during the perinatal period. Screening for CPMD symptoms and psychosocial risk factors using a stepped-care approach may provide a means to triage women or streamline the process for management of cases. Previous research has shown that when screening is actively incorporated as part of routine clinical examinations, there is increased responsiveness amongst health care providers for detection. And where screening increases awareness of mental health problems amongst health care providers, appropriate referral of women is more likely (174).

The high prevalence of CMD during the perinatal period contributes significantly to the burden of disease in LMICs. Routine screening may be useful to identify vulnerable women, possibly preventing the onset of more serious pathology and improving maternal and child health outcomes. Importantly, there need to be clear pathways to deliver treatment or to refer women elsewhere for treatment following screening (228).

There is a need for more local, evidence-based research on CPMD in South Africa, and on screening tools that are feasible and acceptable for use in low-resource antenatal settings. Due to the number of psychosocial risk factors associated with CPMD, there is a need for further research around including psychosocial assessment or screening for risks into screening protocols, or to develop tools which include risk items as a way of identifying vulnerable women (170, 229).

In lower income settings, where women may be at higher risk, there are practical challenges that emerge in implementing perinatal screening. In primary care antenatal settings where resources are scarce, there is a need to develop screening tools that are accurate, brief and easy to administer and score. Shorter screens with binary type scoring may be more clinically useful than Likert-type scales with complex scoring, especially in busy antenatal settings where they may be used by non-specialist and primary-level health care providers (230). A brief, dichotomous screening tool may prove more feasible and acceptable to health care providers who are overburdened with patient numbers and have a range of antenatal tasks to complete (199,231).

In order to develop a screening tool that is both accurate and clinically useful, it is important to have more diagnostic data on the prevalence of CPMD in the South African population, and to include diagnosed anxiety disorders along with depression. The research in this PhD will describe the diagnosed prevalence and associated predictors of both Major Depressive Episode and Anxiety disorders in a population of vulnerable perinatal women. This prevalence data will be used to develop a screening tool with optimal psychometric characteristics to enable the detection of CPMD without flooding the system with false positive cases. It will also be useful to compare the performance of the newly developed tool against that of existing tools such as

the EPDS, PHQ-9 and GAD. Importantly, it will be useful to have a tool that is practical to administer and score so that it may be more easily integrated into routine perinatal care.

In response to the public health need for screening and detection of common perinatal mental disorders, this study aims to develop a mental health screening tool that may be used in a range of low resource obstetric settings, whilst taking into consideration the unique psychosocial and socioeconomic risks that render women vulnerable to developing CPMD during the perinatal period. This tool may be used as part of an integrated, stepped care programme to provide mental health care and treatment to women accessing antenatal care at primary level facilities.

2.9. Conclusion

In conclusion, this review has summarised the most recent literature on CPMD, including prevalence and associated risk factors in LMICs. It provides a broad orientation to and overview of screening as a strategy to improving the early detection of CPMD, including global recommendations around screening. It is clear that the recommendations from HIC's cannot simply be transferred for implementation in LMIC settings which are poorly resourced. This includes recommendations around which screening tools to use and the cut-off points that indicate referral. Further research needs to be undertaken to better understand what the most feasible and acceptable approaches and tools are for screening in LMICs.

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Chapter 3. Antenatal depression and adversity in urban South Africa

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Author contributions

TvH conceptualized and conducted the analysis, led the data interpretation and drafted the manuscript. LM and MO assisted with data interpretation. SH and SF conceptualized the study from which these data arise. MT contributed to study design and assisted with data interpretation. All authors read and approved the final manuscript.

3.1 Abstract

Background: In low and middle-income countries (LMIC), common mental disorders affecting pregnant women receive low priority, despite their disabling effect on maternal functioning and negative impact on child health and development. We investigated the prevalence of risk factors for antenatal depression among women living in adversity in a low-resource, urban setting in Cape Town, South Africa.

Methods: The MINI Neuropsychiatric Interview (MINI Plus) was used to measure the diagnostic prevalence of depression amongst women attending their first antenatal visit at a primary-level, community-based clinic. Demographic data were collected followed by administration of questionnaires to measure psychosocial risk. Analysis examined the association between diagnosis of depression and psychosocial risk variables, and logistic regression was used to investigate predictors for major depressive episode (MDE).

Results: Among 376 women participating, the mean age was 26 years. The MINI-defined prevalence of MDE was 22%, with 50% of depressed women also expressing suicidality. MDE diagnosis was significantly associated with multiple socioeconomic and psychosocial risk factors, including a history of depression or anxiety, food insecurity, experience of threatening life events and perceived support from family.

Limitations: The use of self-report measures may have led to recall bias. Retrospective collection of clinical data limited our ability to examine some known risk factors for mental distress.

Conclusion: These findings confirm the high prevalence of MDE among pregnant women in LMIC set-tings. Rates of depression may be increased in settings where women are exposed to multiple risks. These risk factors should be considered when planning maternal mental health interventions.

3.2 Background

Depressive disorders account for almost half of the burden of disease presented by mental disorders, followed by anxiety disorders, and drug and alcohol use disorders (1). Globally, the lifetime prevalence of major depressive disorder is estimated to be between 10% and 15% (2) and in South Africa, it is estimated that 9.8% adults will experience a major depressive episode (MDE) at least once during their lifetime (3). It is difficult to estimate the burden for people living with these disorders (4,5), but it is understood that the symptoms are significantly disabling for those affected (6). Despite this, fewer than half of those affected globally, have access to adequate treatment and health care. In LMIC, where mental disorders receive little attention and few resources, this "treatment gap" is estimated to be between 75% and 80% (7).

Depression during the perinatal period presents a similarly large burden. In high-income countries (HICs), the burden of perinatal depression is approximately 13%-15% (8–10). In LMIC, the burden is estimated to be much higher (11). However, it is difficult to determine how high the burden is, as prevalence estimates vary greatly across countries and regions and many are based on screening data rather than diagnostic data (12–16). In South Africa, there are similar disparities between prevalence estimates from studies based on both screening and diagnostic data. Studies using clinical diagnostic methods report rates of 47% (17–19) and 34.7% (20), which is 2-3 times higher than HIC settings. These prevalence data are, however, based on small sample sizes. Studies using the Edinburgh Postnatal Depression Scale (EPDS) as a screening tool have reported similarly high prevalence rates, ranging between 42% – 46% (21) and 37% – 41% (22–25). A recent study using the Beck Depression Inventory (BDI) with a sample of 726 pregnant women living in an urban, low-resource setting, reported a prevalence rate of 21% (26).

Depression during the perinatal period is of particular concern because of the disabling effect on maternal functioning (23), the suffering caused to women, the high risk for maternal suicide and the negative consequences for the health and development of infants and children (27–32). The impact of maternal depression is greater in contexts of chronic poverty and social adversity, which exacerbate the inter-generational cycle of mental illness and poverty (7). Despite these consequences, approximately 80% of women affected by common perinatal mental disorders (CPMD) are not diagnosed or treated (33).

3.2.1 Multiple risk factors for maternal depression

The relationship between an individual's vulnerability to stress, the experience of a stressful life event, such as pregnancy, and the onset of depression is well established (34). This can be exacerbated when a woman has a history of psychiatric diagnosis (35–37). However, in the majority of cases, the major underlying risk factors for maternal depression are social rather than biological (22,38,39). The stress of pregnancy and birth (40) can be amplified by circumstances where women experience poverty (41–43), lack of social support (24,34,36,41,42,44), intimate partner violence (37,45,46), and when a pregnancy is unintended and unwanted (47). In LMIC, additional psychosocial and socioeconomic risk factors associated with maternal depression include poor education; substance use and low levels of emotional and financial support from a partner (22).

There is growing evidence that food insecurity, which is a proxy measure for poverty, is a risk factor for poor mental health (48–50). In low income settings, food insecurity has been strongly associated with mental health problems such as anxiety and depression (48,51,52). In South Africa, the rate of food insecurity is estimated to be around 25 to 33%, and 38% of households

report food insufficiency[1] (53). Both food insecurity and insufficiency are associated with an increased risk of having a diagnosis of anxiety and substance use disorder (53,54). Food insecurity for women during the perinatal period potentially has several negative consequences. Pregnant and breast-feeding women have increased nutritional needs and lack of sufficient and healthy food not only places a woman at risk of malnutrition, but may also impact foetal and infant nutrition and development (55). In Dewing's study, increased levels of food insecurity (associated with poverty) were associated with hazardous drinking, probability of depression and high-risk suicidality (54).

This study aims to address the variance in reported prevalence rates of antenatal depression in South Africa by providing accurate diagnostic data using a structured clinical interview with a sample of 376 pregnant women. Furthermore, examination of multiple psychosocial and socioeconomic variables simultaneously, seeks to elucidate the core risk factors associated with depression amongst pregnant women living in contexts of poverty and long-standing psychosocial adversity.

3.3 Methods

3.3.1 Setting

This cross-sectional study was undertaken at the Hanover Park Midwife Obstetric Unit (MOU), which provides primary level maternity services in an urban area of Cape Town, South Africa. Hanover Park has a population of about 35 000 people (56), and is a community characterized by high levels of poverty and community-based gang violence. Hanover Park is regarded as

[1] Food insecurity is defined as "limited or uncertain access to food with adequate nutritional value, or the inability to procure food in socially acceptable ways" (Dewing et al, 2013). Food insufficiency is defined as "an extreme form of household food insecurity that refers to a condition in which household members sometimes or often do not have enough to eat" (53).

one of the most violent parts of Cape Town with high rates of alcohol and substance abuse, physical and sexual violence, and child abuse and neglect (57). Rates of violence are amongst the highest in the world. In 2012, per 10 000 people, there were 6 homicides, 87 sexual crimes and 115 cases of assault with grievous bodily harm (58). Ninety eight percent of children are reported to have witnessed violence in the community, with 40% being threatened or assaulted in the community and 58% being threatened or assaulted at home (59). Housing is comprised of run-down public residential units, smaller freestanding formal houses and informal shacks. Unemployment rates are between 40 and 69%, almost two-thirds of adults do not have a regular income and less than 20% of adults have completed high school (57,59).

At the time of data collection, there was no specific mental health service or support for pregnant women. Mental health services were provided for outpatients at the Hanover Park Community Health Centre (CHC), which was staffed by two psychiatric nurses, with weekly consultations by a psychiatrist and an intern clinical psychologist. Psychiatric emergencies were managed by the CHC's casualty unit and referrals made to secondary or tertiary level hospitals.

3.3.2 Sample

Every third woman arriving at the Hanover Park MOU for her first antenatal visit was invited to participate in the study[2]. No prior clinical assessment of the women was performed. Women included in the study were 18 years or older, pregnant, willing to provide informed consent to

[2] This sampling frame (k = 3) was used after taking into account the average number of women who presented daily for antenatal care, and the amount of time that screening would take per woman. This was then used to calculate how many women would need to be screened daily in order to obtain the sample number. This method also allowed for sampling of those women who arrived earlier as well as those women who arrived later in the day for antenatal care.

participate in the study and able to understand the nature of the study, questions, and instructions given by the research assistant.

Ethical approval for the study was granted by the University of Cape Town Department of Health's Human Research and Ethics Committee (HREC REF: 131/2009) and the Provincial Government of the Western Cape's Department of Health Research Committee.

3.3.3 Measures

A demographics questionnaire was administered that included questions on age, education, marital status, socioeconomic status (SES), HIV status as known by the participants themselves[3], obstetric information, whether the pregnancy was intended and wanted, and whether participants had experienced anxiety or depression in the past.

The Expanded Mini-International Neuropsychiatric Interview (MINI Plus) Version 5.0.0 was used as the diagnostic interview (60). The MINI Plus, which contains modules for the major axis I psychiatric disorders in DSM-IV TR, covers a broad range of disorders, yet is relatively quick and easy to administer. The MINI Plus has been validated for use in South Africa (61) and is available for administration in English, Afrikaans and isiXhosa, the languages spoken by the women attending the MOU (62,63).

The Multidimensional Scale of Perceived Social Support (MSPSS) (64) was used to identify perceptions of social support from three possible sources: family, friends and a significant other. The MSPSS has proven to be psychometrically sound in diverse samples and to have

[3] Women participated in this research prior to having their antenatal HIV test conducted as part of routine obstetric care. Some women were already aware of their status,(from prior testing), however these women were not asked to reveal what this status was.

good internal reliability and test-retest reliability, and robust factorial validity The MSPSS has been used in South Africa in diverse populations (62,65,66) . Scores range between 12 and 84 for the whole instrument and between 4 and 28 for the three sub-scales. There are no cut-off points, but higher scores are indicative of higher levels of perceived support.

Intimate partner violence was assessed using the Revised Conflict Tactic Scales (CTS2)(67). The CTS2 is a shortened form of the original Conflict Tactics Scale (CTS) which may be used in low-resource settings to screen for IPV amongst vulnerable women. The CTS2 has demonstrated good cross-cultural reliability and has been used in South Africa (68,69).

Food insecurity was measured using the U.S. Household Food Security Survey Module (HFSSM): Six-Item Short Form. This scale was developed to assess financially based food insecurity and hunger in surveys of households (70). The scale measures, for the prior six months, inadequacy of food each month, frequency of going hungry, and not having money to buy enough food for the individual or their household.

The List of Threatening Experiences (LTE) was used to measure the number of threatening life experiences faced by women in the preceding 6 months (71). The LTE is an evaluation of a stress-score based on 12 categories of life events highly likely to be perceived as threatening. We categorised women into those who had experienced two or more stressful life events and those who had experienced less than two in the past 6 months.

An asset index was used as a measure of socio-economic status of households (72). Asset index measurements are preferred over the use of total household income, since the latter suffers several methodological weaknesses (73–77). Information on ownership of electronic

equipment (e.g., microwave, washing machine, television and fridge), transport (cars), sources of energy (electricity) and bank accounts (including credit card) was pooled together to construct the index. All assets that were owned (or not) by all respondents were dropped from the principal component analysis to ensure that the result was not skewed. In conducting the principal component analysis, the first component factor[4] was used to represent the asset index. On this basis, the study population was classified into 4 quartiles (i.e., least poor, poor, very poor and poorest).

3.3.4 Procedures

3.3.4.1 Training

A research assistant and a mental health officer were appointed to conduct the study[5]. A clinical psychologist, with research experience, trained and supervised both these staff. The research assistant was trained to recruit women, administer the demographics questionnaire and manage the study database. The mental health officer was trained to administer the MINI Plus diagnostic interview as well as to counsel women who received a diagnosis with a common mental disorder and refer those with severe mental disorder. Health care staff at Hanover Park MOU received maternal mental health training, to sensitise them to the mental health needs of their patients. Referral protocols were established with the MOU and CHC for women who required higher-level psychological, psychiatric or social interventions.

[4] The first component factor is defined statistically as a weighted sum of the various assets used to assess household wealth, in order for that component to explain as much as possible of the variance observed in asset ownership between households.

[5] The mental health officer, who administered the MINI Plus, had a 4-year undergraduate psychology degree and was registered as a counsellor with the Health Professions Council of South Africa.

3.3.4.2 Data collection

Data were collected by systematically sampling every third woman presenting for antenatal care at the Hanover Park MOU between 22 November 2011 and 28 August 2012. After the study was verbally explained to potential participants and informed consent was obtained, the research assistant administered the demographics questionnaire and the psychosocial risk screening instruments. The MINI Plus was then administered by the mental health officer. Data collection was supervised by a clinical psychologist. Clinical data on HIV status was collected from women's clinic files retrospectively, following routine antenatal HIV testing.

3.3.4.3 Referral for psychopathology

Women who presented a high risk for suicide on the MINI Plus were referred to specialist care after screening. Women who were diagnosed with a common mental disorder such as MDE on the MINI Plus were offered counselling with the mental health officer.

3.3.5 Data analysis

Data were analysed using Stata v13.1. Internal consistency within assessment tools were assessed using the Cronbach's α Statistics (78). Descriptive measures were used to analyse the socio-demographic data and obtain the sample statistics. Non-parametric tests, the Wilcoxon sum of rank test, the Fisher exact test and the two-sample t-test were used to determine whether there were significant associations between MDE diagnosis on the MINI Plus and psychosocial risk variables. A descriptive analysis was conducted for the assets owned and other factors that were included in the asset index. Adjusted logistic regression was conducted to identify associations between the outcome of interest and key confounding predictor variables, with results presented in the form of an odds ratio (OR). Multi-collinearity was assessed among

independent variables using the variance inflation factor (79). A probability value of $p \leq 0.05$ was selected as the level of significance.

3.4 Results

3.4.1 Description of the sample

A total of 376 women were recruited and completed the screening process (Table 5). The target sample size of 375 women was estimated based on estimating a population prevalence of any mental disorder of 35% with 5% precision. Most women were in their mid-twenties, and in the second trimester of their second pregnancy. Although 90% of women were in an intimate relationship, only 56% were cohabiting with their partner. The average highest level of education achieved was Grade 10. Only 27% of women were employed on a full-time basis, 18% had informal, contract or part time employment and 55% were unemployed. Only 5% were earning over R5000 (US$360) a month. Approximately 42% of women met the criteria for living in food insecure households, with 13% categorised as living with "very low" food security or food insufficiency.

Although 63% of the pregnancies were unintended, the majority (78%) of those women reported feeling pleased to be pregnant. Sixteen percent of women had experienced abuse from their intimate partner during the past 6 months, including verbal or emotional abuse (11% of all women) physical abuse (11%) and sexual abuse (2%). The prevalence of HIV, collected retrospectively from patient records, was 11%, with 51% of the sample reported being unaware of their HIV status at the time of screening. Thirty nine percent of women had experienced two or more threatening life events during the past 6 months. These experiences included becoming unemployed (27%), the death of a close family friend or relative (26%), something of value

being lost or stolen (17%), interpersonal conflict (17%), serious illness, injury or assault of a close relative or significant other (15%) and major financial difficulties (15%).

Table 5. Bivariate analysis of demographic and social factors associated with antenatal MDE

Variable & description		**Total sample N or mean (%)**	**MDE diagnosis n or mean (%)**	**No Diagnosis n or mean (%)**	***p* -value**
		376	81 (22)	295 (78)	
Age**	18-24years	146 (39)	35 (43)	111 (38)	
	25-29 years	114 (30)	22 (27)	92 (31)	
	>29years	116 (31)	24 (30)	92 (31)	0.650
Population group **	Black	133 (35)	21 (26)	112 (38)	
	"Coloured"[6]	224 (60)	56 (69)	168 (57)	
	White and "other"	19 (5)	4 (5)	15 (5)	0.099
Home language **	English	139 (37)	31 (38)	108 (37)	
	Afrikaans	121 (32)	34 (42)	87 (29)	
	isiXhosa	116 (31)	16 (20)	100 (34)	0.025
Obstetric info: Gravidity**	Primigravida	96 (26)	19 (23)	77 (26)	
	Multigravida	280 (74)	62 (77)	218 (74)	0.669
Parity**	Nulliparous	122 (32)	26 (32)	96 (33)	
	Multiparous	254 (68)	55 (68)	199 (67)	1.000
Gestation *	Mean no. of weeks (standard deviation)	17.4 (6.57)	17.8 (6.69)	17.3 (6.55)	0.632
Trimester **	Trimester 1	90 (24)	21 (26)	69 (23)	
	Trimester 2	181 (48)	33 (41)	148 (50)	
	Trimester 3	105 (28)	27 (33)	78 (26)	0.295
Educational attainment*	Mean highest level of education (standard deviation)	10.5 (1.59)	10.3 (1.41)	10.5 (1.63)	0.264
Socioeconomic status**	Least poor	94 (25)	25 (31)	69 (23)	
	Poor	94 (25)	17 (21)	77 (26)	
	Very poor	96 (26)	16 (20)	80 (27)	
	Poorest	91 (24)	23 (28)	68 (23)	0.244
Employment status**	Not working	208 (55)	52 (64)	156 (53)	
	Informal job/hawker	17 (5)	1 (1)	16 (5)	
	Contract	23 (6)	7 (9)	16 (5)	
	Part-time	28 (7)	10 (12)	18 (6)	
	Full-time	100 (27)	11 (14)	89 (30)	0.003
Individual income (monthly) **	R0 ($0)	97 (26)	23 (28)	74 (25)	
	R1 – R1000 (6c – $64)	99 (26)	23 (28)	76 (26)	

[6] The term "Coloured" refers to a heterogeneous group of people of mixed-race ancestry that self-identify as a particular ethnic and cultural grouping in South Africa. This term, and others such as "White"; "Black/African" and "Indian/Asian", remain useful in public health research in South Africa, as a way to identify ethnic disparities, and for monitoring improvements in health and socio- economic disparities.

	R1001 – R2000 ($64 – $129)	64 (17)	17 (21)	47 (16)	
	R2001 – R5000 ($129 – $322)	97 (26)	17 (21)	80 (27)	
	>R5000 ($322)	19 (5)	1 (2)	18 (6)	0.096
Relationship type **	Married	146 (39)	23 (29)	123 (42)	
	Stable partner	192 (51)	46 (58)	146 (50)	
	Casual partner	16 (4)	4 (5)	12 (4)	
	No relationship/partner	20 (5)	7 (9)	13 (4)	0.101
Living with partner **	Lives with partner	209 (56)	36 (44)	173 (59)	
	Lives separately from partner	167 (44)	45 (56)	122 (42)	0.024
Perceived social support*	MSPSS total score (standard deviation)	66.6 (12.50)	59.9	68.4	0.001
	MSPSS score family (standard deviation)	22.54 (5.08)	19.7	23.3	<0.001
	MSPSS score friends (standard deviation)	20.01 (6.81)	17.5	20.7	<0.001
	MSPSS score significant other (standard deviation)	24.0 (3.93)	22.7	24.4	0.001
Intimate partner violence (IPV)**	Experience of IPV in the past 6 months (CTS2 score)	62 (16)	23 (28)	39 (13)	0.002
Threatening life events**	Experience of two or more threatening life events in past 6 months (LTE score)	146 (39)	49 (60)	97 (33)	<0.001
Break up of relationship with partner **	Participant and their partner are no longer together	26 (7)	10 (12)	16 (5)	0.045
Knowledge of HIV status **	Knows their HIV status prior to routine antenatal HIV testing	182 (49)	46 (57)	136 (46)	0.104
Food insecurity**	Household food insecurity over the last 6 months (HFSSM score)	158 (42)	54 (67)	104 (35)	<0.001
Food insufficiency**	Very low food insecurity	50 (13)	23 (28)	27 (9)	<0.001
Pregnancy **	Unintended pregnancy	237 (63)	63 (78)	174 (59)	0.003
	Unwanted pregnancy	81 (22)	25 (31)	56 (19)	0.032
Past psychiatric history **	Prior diagnosis or treatment for depression, anxiety or panic attacks	57 (15)	30 (37)	27 (9)	<0.001

*Statistical tests used to measure association between MDE and non-MDE groups and risk variables: *Two-sample t-test; **Fisher exact test*

3.4.2 Prevalence of MINI diagnosed MDE

Using the MINI Plus, 22% of the women were diagnosed with a current MDE (95% confidence interval (CI) 17-26%). There were 68 women (18% of the total sample) who expressed suicidal ideation, with 45 (12%) classified as high risk, 9 (2%) as medium risk and 14 (4%) as low risk for suicide. Based on this assessment of suicide risk, 14% of women required intervention and/or referral to specialist care. Of those with a current diagnosis of MDE, just over 50% (41 women) expressed suicidal ideation on the MINI Plus. There were 57 women (15%) who reported that they had previously had serious depression, panic attacks or problems with anxiety. The MSPSS (Cronbach's α 0.89), the CTS2 (Cronbach's α 0.85), and the HFSSM (Cronbach's α 0.83) all exhibited good internal consistency and reliability.

3.4.3 Results of the bivariate analysis

The bivariate analysis revealed significant associations between MDE and home language, employment status, living separately from a partner, perceived lack of support from a significant other or family and friends, experience of interpersonal violence or abuse, experience of threatening life events, no longer being in a relationship with their partner, food insecurity and insufficiency, unintended and unwanted pregnancy and past psychiatric history (Table 5).

3.4.4 Results of the multivariable regression model

The multicollinearity test result for the multivariable analysis shows no multicollinearity within the regression model (max VIF = 1.41, Condition Number = 8.43). The results of this analysis revealed a number of risk factors that increased the odds of an MDE diagnosis (Table 6). Lower socioeconomic status increased the odds for MDE diagnosis. Women who were currently working had increased odds of having an MDE episode than those that were unemployed.

Being in a casual relationship also increased the odds for MDE. Higher scores for perceived social support from family appear to be a significant protective factor, reducing the odds of antenatal depression in this study. Conversely, a lower score for perceived support from family is associated with increased risk for MDE diagnosis. Women who reported intimate partner violence had twice the odds of experiencing MDE than those that had not reported any abuse. Recent experience of two or more threatening life events doubled the risk for MDE. Those who knew their HIV status at the time of mental health screening had slightly increased odds to have MDE than those that didn't know their status, irrespective of what their status was. Food insecurity increased the odds of MDE by two and a half times. Women who were not feeling pleased about their pregnancy had increased odds of being diagnosed with MDE, regardless of whether pregnancy was intended or not. Lastly, women who reported having a past psychiatric history, including experiencing depression, panic attacks or anxiety, had a five-fold increased chance of having MDE than those that did not report past mental health problems.

Table 6. Univariate and multivariable analysis of predictors for MDE

	Univariate analysis			**Multivariable analysis**		
Variables	**Crude OR**	**95% Confidence Interval**		**aOdds Ratio**	**95% Confidence Interval**	
Age category: 18 – 24 years	Ref			Ref		
25 – 29 years	0.76	0.42	1.38	0.51	0.23	1.09
>29 years	0.83	0.46	1.49	0.73	0.33	1.59
Education level (above grade 10)	0.70	0.43	1.15	0.68	0.37	1.25
Asset Index: Least poor	Ref			Ref		
Poor	0.61	0.30	1.22	0.58	0.24	1.37
Very poor	0.55	0.27	1.12	0.74	0.32	1.75
Poorest	0.93	0.48	1.80	1.35	0.59	3.04
Working currently	0.66	0.39	1.10	1.35	0.67	2.69

Partner status (has a partner)	0.45	0.18	1.12	0.80	0.23	2.37
Relationship type with partner: Stable relationship	1.68	0.97	2.93	1.32	0.66	2.69
Casual relationship	2.87*	1.03	7.99	2.04	0.44	9.45
Perceived support from partner	0.91*	0.86	0.96	1.03	0.94	1.11
Perceived support from family	0.88*	0.84	0.93	0.88*	0.82	0.94
Perceived support from friends	0.94*	0.91	0.97	0.97	0.93	1.01
Experience of intimate partner violence	2.6*	1.44	4.69	1.75	0.85	3.62
Threatening life events	5.11*	2.46	10.62	2.07*	1.09	3.94
Knowledge of HIV status	1.52	0.92	2.49	1.06	0.59	1.95
Food insecurity	3.67*	2.18	6.18	2.45*	1.32	4.57
Not pleased to be pregnant	1.91*	1.09	3.32	1.57	0.79	3.14
Past psychiatric history	5.84*	3.20	10.64	5.20*	2.57	10.55

*shows significance at ≤0.05

3.5 Discussion

This study used a clinical diagnostic tool to determine the prevalence of antenatal MDE in a low resource urban area. The prevalence of MDE in this sample is 22%, approximately double that of HIC settings but lower than some of the highest rates found in LMIC (11). The wide range of prevalence rates reported in LMIC settings has been attributed to the limited local evidence available compared to HIC settings. According to Fisher and colleagues (2012), only 8% of LMIC have reliable prevalence data on antenatal depression, and there is a large disparity in the quality of studies (11). The use of different methods to assess depression may also contribute to these differences, as there are relatively few studies that have used a structured diagnostic tool to diagnose depression. Previous studies in South Africa, using screening and diagnostic methods, have similarly reported a wide range of prevalence data, ranging between

21% and 47% (19,26). A study using clinical diagnostic methods in an impoverished setting showed a prevalence rage of 47%. However, this result may be skewed by the small sample size and the 45% HIV positive prevalence rate in the study setting (19). Studies using the EPDS also report high rates of antenatal depression ranging from 37% (25) to 46% (21). Interestingly, a recent study (26) using the BDI to screen for antenatal depression in a peri-urban area in the Western Cape reported a 21% prevalence rate, very similar to the rate of our study. Through use of the MINI Plus, a clinical diagnostic interview, and an adequate sample size, the prevalence data in this study may reflect, with greater accuracy, the true rate of antenatal depression in low resource settings.

The high rate of depression in this setting supports the finding that women who live in contexts of social and economic adversity may be at increased risk for depression during the perinatal period (22,25,43). This presents a major public health concern, as the high rate of maternal depression greatly increases the risk for adverse maternal health and child health and development outcomes (40,80). The results from the bivariate and multivariable analyses further confirm that pregnant women living in such settings are exposed to multiple risk factors for antenatal MDE. Furthermore, these risk factors perpetuate the cycle of psychological distress and lead to the loss of developmental potential, both for mothers and their infants (25).

Of these risk factors, a history of depression or anxiety, food insecurity experience of threatening life events and perceived lack of support from family had the highest predictive value for depression in this sample. Past diagnosis with depression, perceived lack of social support and the stress of experiencing difficult life events are well-documented risk factors for depressive symptoms during pregnancy (36,81,82). It is well recognised that stressful life events can trigger depressive symptoms or disorders (81–83) and women living in this context

may be highly likely to experience one or more threatening life events. It is not known whether the previous mental health problems referred to in this sample pertain to an episode within the perinatal period or depressive symptoms at any time. However, consistent evidence from other studies shows that both categories have significant predictive ability (36).

Although it is well known that support from a partner is instrumental in the mental health of pregnant women (82,83), the availability of emotional and practical support provided by the family and social environment also play a crucial protective role (30,82,84). Previous studies found that depressed women reported feeling less supported than they objectively were (36) and that higher scores on depression screening instruments were associated with a higher need for social support (82). There may be a number of factors whereby depressed women in this study perceived lower levels of support from their families. These possibly include living in isolation from family and extended family, domestic conflict and socioeconomic factors contributing to lack of practical support.

Aside from these well-known risk factors, this study also highlights food insecurity as an additional and emerging risk factor for depression in pregnant women living in poverty (51,54). Pregnancy may exacerbate the stress created by poverty, and vice versa. Women in this study were of low socioeconomic status and almost half (42%) were living with food insecurity, which was a significant predictor of MDE. Pregnancy may create an unforeseen expense for individuals and their families, placing additional stress on scarce financial resources. Personal finances are required for transport to antenatal clinic visits and for preparation for the birth of the child. The increased expenditure associated with pregnancy and child rearing may push households, who are on the margin, into food insecurity, as expenses rise and there is less money for food. The association between food insecurity and maternal depression may

exacerbate unfavourable child health and development outcomes. Inadequate nutrition, together with stress and antenatal depression may increase the risk for poor foetal growth in-utero, premature labour and birth, infant malnutrition and stunting, neuro-developmental disorders in infants and psychiatric disorders in offspring (85).

Women living in the context of this study experience high levels of psychosocial and socio-economic adversity (57,59), which may operate to increase the risk for MDE prior to pregnancy. However, becoming pregnant – especially when the pregnancy is unintended or unwanted–may place a further strain on scarce resources and this may be the precipitating event that triggers the onset of MDE.

These findings have important implications for the design of mental health interventions targeting pregnant women. Firstly, integrating mental health services into routine, primary level antenatal services may increase detection of antenatal depression and increase access to mental health care for low-resource women (86–88). Secondly, screening women for risk factors in addition to depressive symptoms may help to identify those who are vulnerable before the onset of MDE (42,89). It may then be feasible to address some of the risks directly to mitigate their effect. For example, providing social or financial assistance in the form of food vouchers for pregnant and post-partum women who are food insecure. For those women in low-income settings who have antenatal MDE, an intervention that can be delivered by primary care workers, such as that described in the Thinking Healthy Programme, may be a useful approach to consider (90–92).

Although experience of IPV was significantly increased the odds of MDE in the univariate analysis, there was no significant association found in the multivariable analysis. This is

unusual because IPV is robustly associated with antenatal depression in the literature. This outcome could be attributed to the measure used to screen for IPV, as the RCTS may not have adequately captured the construct for this setting. It may also be due to discomfort around disclosure or due to over-adjustment within the model with other variables, such as relationship type, for example.

3.5.1 Strengths & limitations of the study

A major strength of this study is that it presents diagnostic data and in so doing, reports more accurately on diagnostic prevalence, thus contributing to knowledge on antenatal depression in LMIC settings. The strength of the data is further enhanced through the supervision of a clinical psychologist during data collection. This paper also presents extensive data on multiple psychosocial and socio-demographic factors associated with antenatal MDE, which contributes to emerging literature on risk factors for pregnant women in LMICs. There are few studies on maternal stress, depression and anxiety during the perinatal period that have identified food insecurity as a major risk factor (51).

There are a number of limitations to this study. The study was designed as a clinic-based study as the level of antenatal uptake in the Western Cape province is 83% (93); however, women with more severe psychopathology may have been missed if they were unwilling or unable to attend the clinic. Although widely used, the MINI Plus has not yet been validated in isiXhosa or Afrikaans, which is another limitation. As a cross-sectional study, we were not able to measure change in mental state over trimesters. The use of self-report measures to collect data such as ownership of assets and income may have yielded data that could not be verified or that was subject to recall bias. Screening women prior to HIV counselling and testing may also be regarded as a limitation, as recent HIV diagnosis may have a significant impact on mental

health and could therefore be an important risk factor to consider for future research. As this is an exploratory study, and there were multiple tests of association, there is a chance that some of the associations occurred by chance. The use of odds ratios may also misrepresent associations between variables by making them appear greater than what they are. Further research is recommended in this regard and also to understand whether there is an exponential increase in risk for women who experience multiple risk factors simultaneously.

3.6 Conclusion

The high prevalence of depression amongst pregnant women in this study was significantly associated with multiple risk factors. Many of these have been cited in previous studies, but some were novel for the setting. The experience of multiple risk factors may elicit a significant stress response in the form of MDE, which has consequences for maternal and child health and well-being (94). An integrated approach is recommended to provide mental health care as part of antenatal care. Early detection may be enhanced by screening for risk factors, such as food insecurity, as an adjunct to screening for clinical symptoms of depression.

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Chapter 4. Prevalence and predictors of anxiety disorders amongst low-income pregnant women in urban South Africa: a cross-sectional study

van Heyningen T, Honikman S, Myer L, Onah MN, Field S, & Tomlinson, M. Prevalence and predictors of anxiety disorders amongst low-income pregnant women in urban South Africa: a cross-sectional study.

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Authors' contributions

SH, SF and TvH designed the study and wrote the protocol. TvH supervised the study, the data collection and managed the literature searches. TvH conceptualized and conducted the analysis, led the data interpretation and drafted the manuscript. LM and MO assisted with data interpretation. MT contributed to study design and assisted with data interpretation. All authors read and approved the final manuscript.

4.1 Abstract:

Purpose*:* Anxiety is highly prevalent in many populations; however, the burden of anxiety disorders among pregnant women in low-resource settings is not well documented. We investigated the prevalence and predictors of antenatal anxiety disorders among low-income women living with psychosocial adversity.

Methods: Pregnant women were recruited from an urban, primary level clinic in Cape Town, South Africa. The MINI Plus diagnostic interview assessed prevalence of anxiety disorders. Four self-report questionnaires measured psychosocial characteristics. Logistic regression models explored demographic and socioeconomic characteristics, psychosocial risk factors and psychiatric comorbidity as predictors for anxiety disorders.

Results*:* Among 376 participants, the prevalence of any anxiety disorder was 23%. Although 11% of all women had post-traumatic stress disorder, 18% of the total sample was diagnosed with other anxiety disorders. Multivariable analysis revealed several predictors for anxiety including: a history of mental health problems (adjusted Odds Ratio [aOR]: 4.11; 95% confidence interval (CI): 2.03-8.32), MDE diagnosis (aOR: 3.83; CI 1.99-7.31), multi-gravidity (aOR: 2.87; CI: 1.17-7.07), food insecurity (aOR: 2.57; CI: 1.48-4.46), unplanned and unwanted pregnancy (aOR: 2.14; CI: 1.11-4.15), pregnancy loss (aOR: 2.10; CI: 1.19-3.75); and experience of threatening life events (aOR: 1.30; CI: 1.04-1.57). Increased perceived social support appeared to reduce the risk for antenatal anxiety (aOR: 0.95; CI: 0.91-0.99).

Conclusion*:* A range of antenatal anxiety disorders are prevalent amongst pregnant women living in low-resource settings. Women who experience psychosocial adversity may be exposed to multiple risk factors, which render them vulnerable to developing antenatal anxiety disorders.

4.2 Introduction

The prevalence of Common Perinatal Mental Disorders (CPMD) may have been underestimated in low- and middle-income countries (LMICs); and although there is substantial comorbidity between depression and anxiety disorders, little is known about antenatal anxiety (1,2). This is especially true in LMICs where most studies that report diagnostic prevalence of CPMD have investigated depression but not anxiety (3).

Global prevalence estimates for antenatal anxiety disorders vary greatly between regions. For studies reporting any anxiety disorder, prevalence rates range between 4% and 39% (2,4). Rates in LMICs, ranging between 15% and 39% are generally higher than those reported in high income countries (HIC's) where reported rates range between 4 and 13% (5–7). Prevalence also varies according to study methodology, whether screening or diagnostic instruments were used (3), and whether a specific anxiety disorder was investigated, rather than the overall prevalence of any anxiety disorder (2).

In South Africa, the diagnostic prevalence of perinatal anxiety disorders range between 3% and 30% for PTSD (8,9), 1.5% for panic disorder, 2.3% for phobia and 0.8% for social phobia (9). Much of the existing research is focused on trauma and stressor-related disorders, and may be specific to the South African context, where there is frequent exposure to community and interpersonal violence or gender-based violence and trauma (10–14). A history of childhood trauma and abuse (8) and exposure to intimate partner violence (IPV) (15) significantly increase the vulnerability for antenatal PTSD, especially in contexts where there are numerous stressors such as poverty, community-based violence and HIV (16,17).

4.2.1 Aetiology and outcomes of antenatal anxiety

There may be a high prevalence of either new onset or worsening of existing anxiety disorders during pregnancy (18). This may be due to the substantial physiological, psychological and social changes that occur during this time. Antenatal anxiety has been associated with a range of adverse perinatal outcomes for women and their offspring including poor pregnancy and birth outcomes as well as compromised physical, psychological and cognitive development from infancy to adulthood (19–30).

Anxiety disorders during the perinatal period are also associated with unhealthy maternal behaviours such as reduced attendance of antenatal care (31), substance use in pregnancy (32–35), lower pregnancy weight gain (36) as well as delayed initiation of breastfeeding and diminished capacity of women to care for and nourish their infants (27). Antenatal anxiety is a significant risk factor for perinatal psychiatric morbidity as it is a strong predictor of perinatal depression (18,37–39). A history of anxiety disorder appears to confer a greater risk for postnatal depression and anxiety than a history of depressive disorder (40).

4.2.2 Risk factors for antenatal anxiety

Few studies have specifically examined the risk factors for antenatal anxiety disorders, with most studies either reporting risk factors for depression or for comorbid depression and anxiety. A systematic review of risk factors for antenatal anxiety and depression reported the most significant predictors for anxiety during pregnancy to be: a previous history of mental illness, particularly a history of depression or anxiety; alcohol and substance use; perceived lack of social support; social conflict or IPV; and poor quality of relationship with a partner (1). In the same review, studies exploring socio-demographic factors such as age, education level, employment status, income and ethnicity, showed equivocal results (1). But there is consensus

that experience of adverse life events can trigger depressive or anxiety symptoms (1,41,42). This is documented for exposure to IPV or emotional, physical or sexual abuse, which has been associated with antenatal anxiety, depression and PTSD symptoms (12,43). Regarding obstetric and pregnancy-related risk factors, unintended or unwanted pregnancy, fear of pregnancy and fear of childbirth (tokophobia) were the most pertinent (1). The roles of gravidity and parity remain unclear, although primi-gravidity has been associated with depression, but not with anxiety. Lastly, women with current or past pregnancy complications or past delivery complications, and with a history of pregnancy loss, pregnancy termination or still-birth have been found to be more likely to experience antenatal and pregnancy-specific anxiety (1).

In settings where women live in extreme poverty and experience high rates of societal stress and violence, the risk factors for CPMD may be intricately connected to their psychosocial and socioeconomic circumstances (4). However, little is known about the diagnostic prevalence of and risk factors for antenatal anxiety disorders in these settings (44). This paper aims to establish the diagnostic prevalence of antenatal anxiety disorders in a low-income, primary care, urban setting, and to describe the associated demographic, socioeconomic and psychosocial risk factors.

4.3 Methods

4.3.1 Study design and setting

This cross-sectional study was conducted at a community-based clinic in Hanover Park, an impoverished, densely populated, urban community in Cape Town, South Africa. Hanover Park has a population of approximately 35 000 people, who identify predominantly as “coloured”, however, the community clinic serves a greater area, which includes black South

African residents (45). The majority of residents live in overcrowded public housing units or informal shacks. Hanover Park experiences high levels of community-based violence, mostly perpetrated by organised gangs active in the area (46). Local crime statistics indicate that there were 74 homicides reported in 2015, which is 6 times higher than that reported in central Cape Town (47). High rates of unemployment (69%) and low levels of education (only 19% have completed high school) contribute to the poverty and lack of opportunity experienced by the majority of residents (46). Alcohol and drug use are rife, as are IPV, physical and sexual abuse (48).

4.3.2 Participants

Pregnant women were recruited from the Midwife Obstetric Unit (MOU) which provides primary care, nurse-driven antenatal services at the Hanover Park Community Health Centre (CHC). Women were included in the study if they were over 18 years of age, willing to give informed consent and able to communicate in any of the three commonly spoken languages of the area (English, Afrikaans or isiXhosa).

4.3.3 Ethics

The study was approved by the Faculty of Health Sciences human research ethics committee at the University of Cape Town (HREC REF: 131/2009), and by the Western Cape Department of Health Provincial Research Committee (ref: 19/18/RP88/2009).

4.3.4 Procedures

Data were collected by systematically sampling every third woman as they arrived for their first antenatal visit, prior to having their physical examination and routine HIV test, between November 2011 and August 2012. Written informed consent was obtained from all participants

following a verbal explanation of the study and procedure. Willing participants were invited to a private consultation room where socio-demographic data were collected.

4.3.5 Measures

Prior to the commencement of the study all measures had been translated and back-translated from English to Afrikaans and isiXhosa. Self-report questionnaires measuring psychosocial risk factors were administered. Perception of social support was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS) (49). The MSPSS has been used previously in South Africa with diverse populations (50), and is psychometrically sound with good validity and reliability. The Revised Conflict Tactics Scales (CTS-2) was used to assess IPV in the current relationship. The CTS-2 has good cross-cultural reliability and has been used in low-resource settings (11,51,52) and in South Africa (53,54). A short form of the U.S. Household Food Security Survey Module (HFSSM) measured inadequacy of food each month, frequency of going hungry, and not having money to buy enough food for the individual or their household in the preceding 6 months (55). The List of Threatening Experiences (LTE) assessed the number of threatening life experiences faced by women in the preceding 6 months (56). It has been used in other low-resource settings, with antenatal populations (27) and has good concurrent validity when compared to longer scales (57).

Subsequently, a registered mental health counsellor, trained and supervised by a clinical psychologist, administered the Mini-International Neuropsychiatric Interview (MINI Plus) (58). The MINI Plus diagnoses the major axis I psychiatric disorders in DSM-IV-TR. It has been validated for use in South Africa (59) and validated translations were used for non-English speaking participants in this study (9,60).

4.3.6 Referral for mental health concerns

Women who received a diagnosis of severe psychopathology on the MINI Plus or who presented a high risk for suicide were referred to the emergency psychiatric services at the CHC. Women who received a diagnosis of a common mental disorder (CMD) on the MINI Plus were offered on-site follow-up counselling with the counsellor at an arranged appointment time.

4.3.7 Data analysis

Data were analysed using Stata 13.1 (StataCorp Inc., College Station, TX, USA). Diagnosed anxiety disorders were allocated to DSM-V-defined categories, namely: anxiety disorders (including generalised anxiety disorder, social phobia, agoraphobia, specific phobia and panic disorder); trauma- and stressor-related disorders (including post-traumatic stress disorder (PTSD)), and obsessive-compulsive and related disorders (including obsessive-compulsive disorder (OCD)). For some of the analyses, we collapsed these three categories into one category to include all/any anxiety disorder diagnoses. The prevalence of MDE, comorbid MDE/anxiety and alcohol and drug use disorders were described.

The MSPSS, CTS-2 and HFSSM were assessed for internal consistency and scale reliability using the Cronbach's alpha (61). Frequency distributions described socio-demographic, psychosocial and psychiatric variables of interest. Composite socioeconomic status scores were calculated from household ownership of assets including bank accounts and developed into an asset index using a principal component analysis (62). The study population was then stratified into four quartiles: least poor, poor, very poor and poorest.

Variables significantly associated with MINI-diagnosed anxiety disorders were identified using Fisher's exact test for categorical variables and the Wilcoxon rank sum test (Mann-Whitney test) for non-normally distributed continuous variables. Logistic regression was used to model which of these risk factors were significant predictors of antenatal anxiety diagnosis. Unadjusted odds ratios (OR) with 95% confidence intervals (CI) were calculated to determine the strength and direction of these associations. To adjust for the potential impact of confounding variables (e.g. MDE diagnosis, psychiatric history), adjusted logistic regression models were specified. Variables included in the adjusted model were those with significant associations in the unadjusted analysis as well as those cited in the literature. Multi-collinearity was assessed among independent variables in the adjusted logistic regression models using the variance inflation factor (63). A probability value of $p \leq 0.05$ was selected as the level of significance. The coefficients from all regression models were reported as OR with a 95% CI.

4.4 Results

4.4.1 Demographic, socioeconomic and clinical characteristics of the sample

A total of 376 women (mean age 27 years; SD 5.8) were recruited. Demographic, socioeconomic and clinical characteristics are presented in Table 7. Almost half (48%) were in their 2nd trimester of pregnancy and the majority (74%) were multigravida. Although 90% were married or in a stable relationship, only 60% were living with their partner in the same household. While most women had received some high school education, more than half were unemployed. The overall socioeconomic status of the study sample was low, with 43% reporting a personal income below the lower bound poverty line[7], 42% reporting food

[7] This was a monthly income of R501 or less, equivalent to approximately 34 US$ per month. According to Statistics South Africa, people earning this amount or less would probably have to sacrifice some food items to be able to afford to buy essential non-food items. Approximately 37% of the South African population live in this income bracket (91).

insecurity and 13% reporting food insufficiency. Almost 30% of women had experienced at least one threatening life event during the past six months, 19% had experienced two and 11% had experienced three such events. The MSPSS (Cronbach's α 0.89), the CTS2 (Cronbach's α 0.85), and the HFSSM (Cronbach's α 0.83) all exhibited good internal consistency and reliability.

Table 7. Characteristics of the sample, descriptive and univariate analysis of MINI-defined antenatal anxiety disorders with demographic and psychosocial factors.

	N or mean (%)	**Bivariate analysis**			**Univariate analysis**		
Participant characteristics N = 376		No anxiety (%)	Diagnosis with any anxiety disorder (%)	p-value	Crude OR	95% CI	p-value
Socio-demographic variables							
⁺Age: 18 – 24 years	146 (39)	118 (41)	28 (33)		1.00	(Reference)	
25 – 29 years	114 (30)	88 (30)	26 (30)		1.25	0.68-2.27	0.475
≥30 years	116 (31)	84 (29)	32 (37)	0.282	1.61	0.89-2.87	0.109
⁺Ethnicity: Black	133 (35)	108 (37)	25 (29)		1.00	(Reference)	
Coloured (mixed race)	224 (60)	169 (58)	55 (64)		1.41	0.83-2.39	0.208
White & "other"	19 (5)	13 (4)	6 (7)	0.340	1.99	0.69-5.76	0.202
⁺Highest level of education: ≤ grade 10	151 (40)	114 (39)	37 (43)		1.00	(Reference)	
> grade 10	225 (60)	176 (61)	49 (57)	0.534	0.86	0.53-1.39	0.538
⁺Employment status: Unemployed	208 (55)	162 (56)	46 (53)		1.00	(Reference)	
Informal/hawker	17 (5)	13 (4)	4 (5)		1.08	0.34-3.48	0.893
Contract	23 (6)	20 (7)	3 (3)		0.53	0.15-1.86	0.320
Part-time	28 (7)	17 (6)	11 (13)		2.28	0.99-5.21	0.051
Full time	100 (27)	78 (27)	22 (26)	0.256	0.99	0.56-1.77	0.982
⁺Socioeconomic status: Least poor	94 (25)	71 (25)	23 (27)		1.00	(Reference)	
Poor	94 (25)	72 (25)	22 (26)		0.94	0.48-1.84	0.846
Very poor	96 (26)	78 (27)	18 (20)		0.71	0.36-1.43	0.339
Poorest	91 (24)	68 (24)	23 (27)	0.710	1.04	0.54-2.03	0.899

[+]Relationship type: Married	146 (39)	110 (38)	36 (42)		1.00	(Reference)	
Stable relationship, unmarried	192 (51)	149 (52)	43 (50)		0.88	0.53-1.46	0.627
Casual relationship	16 (4)	14 (5)	2 (2)		0.44	0.09-2.01	0.288
No relationship / single	22 (6)	15 (5)	5 (6)	0.756	1.02	0.35-2.99	0.844
[+]Lives with partner: No	97 (28)	80 (30)	17 (21)		1.00	(Reference)	
Yes	209 (60)	161 (60)	48 (60)		1.40	0.76-2.59	0.280
Sometimes	44 (12)	29 (10)	15 (19)	0.096	2.43*	1.08-5.49	0.032
Obstetric variables							
[+]Gravidity: Primigravida	96 (26)	87 (30)	9 (10)		1.00	(Reference)	
Multigravida	280 (74)	203 (70)	77 (90)	<0.001	3.67**	1.76-7.64	0.001
[+]Parity: Nulliparous	122 (32)	102 (35)	20 (23)		1.00	(Reference)	
Primiparous	128 (34)	99 (34)	29 (34)		1.49	0.79-2.81	0.214
Multiparous	126 (34)	89 (31)	37 (43)	0.053	2.12*	1.15-3.91	0.016
[+]Past experience of miscarriage/abortion/ stillbirth/ death of a child any time after birth	116 (31)	75 (26)	41 (48)	<0.001	2.61**	1.59-4.29	≤0.001
[+]Trimester: First	90 (24)	67 (23)	23 (27)		1.00	(Reference)	
Second	181 (48)	145 (50)	36 (42)		0.72	0.39-1.32	0.288
Third	105 (28)	78 (27)	27 (31)	0.411	1.00	0.21-0.55	0.980
[+]Unplanned pregnancy	237 (63)	185 (64)	52 (60)	0.526	1.17	0.72-1.93	0.524
[+]Not pleased to be pregnant	81 (22)	57 (20)	24 (28)	0.134	1.58	0.91-2.75	0.104
Psychosocial variables							
[+]Meets criteria for food insecurity	158 (42)	107 (37)	51 (59)	<0.001	2.49**	1.52-4.08	≤0.001
[+]Meets criteria for food insufficiency	50 (13)	29 (10)	21 (24)	0.001	2.91**	1.56-5.43	0.001
[++]Perceived support from significant other mean score (SD)	24 (4)	24 (3.9)	24 (4.1)	0.227	0.97	0.91-1.02	0.229
[++]Perceived support from family mean score (SD)	23 (5)	23 (4.9)	21 (5.3)	0.001	0.93*	0.89-0.97	0.002
[++]Perceived support from friends mean score (SD)	20 (7)	21 (6.5)	18 (7.3)	<0.001	0.94**	0.91-0.97	≤0.001
[+]Experience of IPV (CTS2)	62 (16)	41 (14)	21 (24)	0.031	1.96*	1.08-3.55	0.026
[++]Experience of threatening life events (Mean score (SD))	1.3 (1.4)	1.1 (1.2)	2.2 (1.7)	<0.001	1.62**	1.36-1.92	≤0.001

[+]Self-reported history of mental health problems	57 (15)	25 (9)	32 (37)	<0.001	6.28**	3.45-11.44	≤0.001
[+]Current MDE diagnosis	81 (22)	36 (12)	45 (52)	<0.001	7.74**	4.47-13.40	≤0.001
[+]Current suicidal ideation and behaviour	69 (18)	45 (16)	24 (28)	0.011	2.11*	1.19-3.72	0.010
[+]Current alcohol abuse (MINI)	50 (13)	33 (11)	17 (20)	0.049	1.92*	1.01-3.65	0.047
[+]Current substance abuse (MINI)	23 (6)	13 (4)	10 (12)	0.021	2.80*	1.18-6.64	0.019

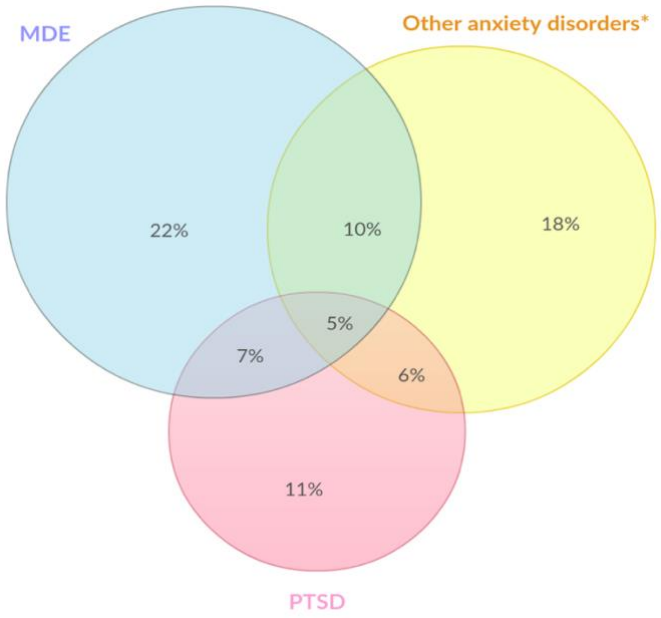
* p <0.05 >0.001; ** p ≤ 0.001; [+] Fisher's exact test; [++]Wilcoxon rank sum test

4.4.2 Prevalence of anxiety disorders and comorbidity

The prevalence of any anxiety disorder was 23%, with 17% of women diagnosed within the group of anxiety disorders that include generalised anxiety disorder (2%), social phobia (7%), agoraphobia (0.3%), specific phobia (6%) and panic disorder (3%); 11% were diagnosed with PTSD and 4% with OCD. The diagnostic prevalence of current MDE was 22%, 18% of women had current suicidal ideation and behaviour (SIB), 13% were using alcohol and 6% were using substances other than alcohol during the current pregnancy. There was a large comorbidity between antenatal anxiety disorders and MDE, with 12% of the total sample having a dual diagnosis. Of those women with a current anxiety diagnosis, 52% also had a diagnosis of current depression (p<0.001). The overlap between PTSD and other anxiety disorders is also lower than expected at 6%.

Figure 3 below shows the distribution of anxiety diagnoses and the comorbidity with MDE.

*Figure 3. Venn diagram illustrating comorbid diagnoses of MDE, PTSD and other anxiety disorders**



Disorder	N	%
Major Depressive Episode (MDE)	81	22
Other anxiety disorders*	67	18
Post-traumatic stress disorder (PTSD)	40	11

** Includes: generalised anxiety disorder, obsessive-compulsive disorder, social phobia, agoraphobia, specific phobia and panic disorder*

A number of antenatal factors were associated with anxiety diagnosis in the bivariate analysis, including: having increased gravidity, pregnancy and/or child loss; food insecurity and insufficiency; experience of IPV; experience of difficult life events, self-reported history of mental health problems; current MDE diagnosis; current suicidality, and current alcohol or substance abuse (see Table 7). Unadjusted odds ratios showed increased odds for anxiety diagnosis amongst women exposed to these factors, and additionally for those "sometimes" living with their partner. Perceived support from family and friends appeared to decrease the odds for anxiety.

Many of these same factors were also significant in the multivariable models (see Tables 8 and 9). In the model controlling for demographic and socioeconomic factors, multigravidity tripled the odds for anxiety diagnosis; unintended and unwanted pregnancies also predicted anxiety as did previous pregnancy loss due to termination, miscarriage or stillbirth or the death of a child at any time. Women that were food insecure were two and a half times more likely to have a

diagnosis of anxiety. However, age, socioeconomic status, trimester and whether a woman was living with her partner were not significant predictors. In the model controlling for psychosocial risk variables and comorbid psychiatric diagnoses, the strongest predictor for antenatal anxiety was a previous history of mental health problems, followed by MDE diagnosis. The experience of threatening life events significantly increased the odds of anxiety diagnosis by 1.3 times for every additional stressful event experienced. IPV was not associated with antenatal anxiety, despite it being a known risk factor in the literature. Higher levels of perceived social support from friends decreased the odds for diagnosis with anxiety, although perceived support from family did not. There was no significant predictive value for alcohol and other substance use.

Table 8. Multiple logistic regression model adjusted for demographic and socioeconomic characteristics

Predictors:	**aOR**	**95% CI**	**p-value**
Age: 18-24	1.00	Reference	
25 – 29	0.85	0.42-1.77	0.677
≥ 30	1.00	0.49-2.05	0.992
SES: Least poor	1.00	Reference	
Poor	1.10	0.51-2.36	0.805
Very poor	0.92	0.43-2.01	0.849
Poorest	1.48	0.69-3.23	0.312
Gravidity: primigravida	1.00	Reference	
Multigravida	2.87*	1.17-7.07	0.022
Trimester: 1st	1.00	Reference	
2nd	0.60	0.31-1.18	0.140
3rd	0.86	0.42-1.81	0.705
Living with partner: No	1.00	Reference	
Yes	1.14	0.57-2.29	0.709
Sometimes	2.29	0.95-5.51	0.064
Food insecure	2.57**	1.48-4.46	0.001
Unplanned and unwanted pregnancy[8]	2.14*	1.11-4.15	0.024
Loss of a previous pregnancy or death of a child	2.10*	1.19-3.75	0.011

* p <0.05 >0.001 ** p ≤ 0.001

[8] The categories for unplanned pregnancy and not pleased to be pregnant were collapsed to create the variable "unplanned and unwanted pregnancy".

Table 9. Multiple logistic regression model adjusted for psychosocial risk factors and psychiatric comorbidity

Predictors:	**aOR**	**95% CI**	**p-value**
Perceived social support from significant other	1.06	0.97-1.15	0.188
Perceived social support from family	0.98	0.92-1.04	0.441
Perceived social support from friends	0.95*	0.91-0.99	0.014
Threatening life events	1.30**	1.06-1.59	0.013
Intimate partner violence	1.05	0.49-2.20	0.906
Self-reported history of mental health problems	4.11**	2.03-8.32	0.000
MDE diagnosis (MINI defined)	3.83**	1.99-7.31	0.000
Current SIB (MINI defined)	1.97	0.99-3.91	0.053
Alcohol abuse (MINI defined)	1.23	0.58-2.81	0.542
Drug abuse (MINI defined)	0.88	0.29-2.59	0.812

* p <0.05 >0.001 ** p ≤ 0.001

4.5 Discussion

Our study contributes new knowledge about the prevalence and distribution of antenatal anxiety disorders in LMIC settings. Most of the existing literature from LMIC settings has focused on anxiety symptoms (as determined by self-reporting scales), with few data on clinically diagnosed disorders. The results of this study provide new evidence on the high prevalence of antenatal anxiety disorders as well as the distribution of these diagnoses within the anxiety disorder spectrum. Although PTSD accounts for the highest prevalence of a single anxiety disorder, 66% of all anxiety diagnoses are accounted for by disorders from the other anxiety disorder categories. This may be pertinent when developing screening protocols or therapeutic interventions for antenatal anxiety disorders in LMIC settings.

In LMIC settings, there are numerous contextual stressors that render women vulnerable to developing mental health problems (64). Experience of adverse or stressful life events is a known predictor of anxiety and depression (1,41) and results from this study show that for every additional stressful event experienced in the preceding 6 months, the risk for anxiety diagnosis increases by 1.3 times. Considering that a large proportion of participants reported experience of at least one or more of these events, women living in this setting seem to be

exposed to high levels of stress, increasing their vulnerability to anxiety. This may also explain the high prevalence of antenatal PTSD in this sample, which is nearly three times higher than in HIC settings (65). The high prevalence of antenatal PTSD in this setting, may also be attributable to contextual risk factors, whereby women living in a context with high levels of violence are highly vulnerable to experiencing interpersonal trauma and gender-based violence (13,66–68). PTSD in the perinatal period is strongly associated with obstetric risk, poor birth outcomes (preterm delivery, preeclampsia; poor neonatal health, compromised infant development) and poor maternal-infant attachment (2,69). Given its high prevalence as a single disorder, it may be important to consider when developing mental health interventions for pregnant women living in contexts with elevated rates of violence and interpersonal trauma.

The results of this study confirm that a history of mental health problems and diagnosis with current MDE are strong risk factors for antenatal anxiety. Numerous studies on CPMD have found that a history of mental health disorders increases the risk for current diagnoses and that depression and anxiety are commonly comorbid in the perinatal period (18,70–74). Where depression and anxiety disorders occur simultaneously, the deleterious effects on maternal and child well-being may be compounded: symptoms may be more severe, duration of episodes of either disorder may be longer and have a chronic course, there may be worse impairment of maternal functioning, a poorer response to treatment and increased suicidality (70). These findings support the necessity to improve detection of both disorders through screening pregnant women living in LMIC settings, as well as to ask about previous mental health problems.

Women living in this context experience adverse social and economic circumstances, which make them more vulnerable to experiencing food insecurity. Food insecurity has been

associated with depression, hazardous drinking, alcohol and other drug use and suicidality amongst pregnant women in South Africa (32,62,75). Both food insecurity and CPMD have documented negative effects on women's health and child health and development outcomes (76–80). In this study, food insecurity predicts antenatal anxiety, which is a novel finding in the South African context. It is not clear whether food insecurity predisposes pregnant women to developing anxiety, whether the reverse is true, or whether a bi-directional relationship exists. What is clear, however, is that women living in adverse settings, where there are high rates of unemployment and socioeconomic stressors, seem to be more likely to experience food insecurity, placing them at higher risk of mental health problems (81–85).

In the presence of stressors such as poverty, food insecurity and adverse life events, perceptions of social support may be a mitigating factor for anxiety diagnosis (86,87). This is confirmed in our study, which finds perceived support from friends proving to be protective. However, contrary to the literature, perceived support from a significant other or from family was not. Interestingly, Reid and Taylor (2015) found that the source of social support, which mitigated the influence of stressful events, differed for married/cohabiting and for single women (86). Here, intimate partner support had a greater impact on married/cohabiting women's mental health than that for single women. However, support from family and friends was protective against depression during the perinatal period for all women, regardless of their relationship status (86). Support from friends has a greater protective influence on antenatal anxiety than support from intimate partner or family, which may reflect the quality and types of relationships that women have with their partner, family and friends and/or as a result of the stressful environment in which they live (86). One can hypothesise that where women have discordant, abusive or unstable relationships with their partner and/or family, that their friends may be

perceived as more supportive and may act to buffer the stressful influence of conflict in the home.

A notable finding is that there is overlap between the psychosocial factors associated with antenatal anxiety disorders and antenatal MDE in this context. These include food insecurity, experience of threatening life events, perceived social support from friends and family and a self-reported history of mental health problems. Antenatal anxiety disorders, however, are also associated with pregnancy specific factors such as prior pregnancy loss, still birth or termination, multigravidity and an unplanned and unwanted pregnancy, which is distinct from MDE. The shared factors may have implications for public health interventions seeking to detect and provide support for pregnant women who are experiencing CPMD, including MDE and anxiety disorders.

4.5.1 Study limitations

There were several limitations to the study. Firstly, this was a cross-sectional study and women were only screened once, which limited the tracking of anxiety symptoms across trimesters. Secondly, as this study was clinic-based, women who were unable or unwilling to attend antenatal services, and may be the most vulnerable to mental health problems, were not included in the study. However, the antenatal service uptake rate for the Cape Town Metro area is 83% and thus, our sample is likely to be reasonably reflective of the majority of women in this area (88). The urban setting may also affect the generalizability of the results to rural communities. Thirdly, anxiety specific to pregnancy and childbirth, such as tokophobia, was not explored, nor were personality factors associated with anxiety. Fourthly, the cross-sectional design of the study doesn't supply information on the causal direction of association between anxiety diagnosis and risk factors. Fifthly, the question about loss of a pregnancy or child is a

very broad question and does not allow differentiation between antenatal loss, perinatal loss and loss of a child outside of the perinatal period. Asking separate questions about these concepts may have been more useful to explore the impact of previous pregnancy loss or stillbirth as distinct experiences to losing a child after birth. Sixth, grouping together all the different anxiety disorder diagnoses into one category could be problematic as it does not allow for the distinction between the mechanisms that lead to specific and distinct anxiety disorders such as PTSD. Lastly, the use of self-report measures may have been subject to recall bias and data could not be verified. Use of biological markers such as urine or blood samples to detect current alcohol and other substance use may have provided more accurate data.

4.5.2 Implications

These findings have important implications for those planning perinatal mental health services in low-income settings. Perinatal screening for depression is increasingly common, but we have shown that there is a need also to screen for anxiety to ensure early detection in primary care antenatal services. As the strongest predictors for antenatal anxiety are concurrent MDE and a history of mental health problems, it may be pertinent to screen for anxiety symptoms in conjunction with depression screening and to ask about mental health history.

Mental health services are needed for low-income women, during pregnancy. Where possible, these services should be integrated into existing antenatal services at primary care level (89). There is little evidence from LMIC's for treatment of non-depressive disorders during pregnancy (44) so there is a need for development and testing of such interventions; or to evaluate whether interventions for depression also impact anxiety. A treatment modality that could address either depression and/or anxiety symptoms may be the most practical and cost-effective approach. The Common Elements Treatment Approach (CETA), which has been

developed to address mood and/or anxiety problems in LMICs, is one such modality that could be adapted for use within the perinatal period (90).

Lastly, in order to address some of the risk factors that are commonly experienced, these services may include targeted interventions, for example counselling for those who have experienced trauma, socio-economic support for women who are food insecure, or psychosocial support for women who have poor support structures (62).

In summary, antenatal anxiety is often neglected in studies on perinatal mental health and given low-priority, especially in LMIC settings. The high prevalence of antenatal anxiety disorders presents a serious public health concern as it presents a significant risk factor for maternal morbidity and poor child health and development. These effects may be separate from, and additional to, the effects of perinatal depression, and may be exacerbated by the large comorbidity between the disorders. Furthermore, antenatal anxiety is a strong, well-known predictor for perinatal depression. Therefore, mental health screening of pregnant women should include investigation of anxiety as well as depression.

4.6 References

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Chapter 5. Comparison of mental health screening tools for detecting antenatal depression and anxiety disorders in South African women

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Author Contributions

SH, SF conceptualised the study. TvH designed the study methods and wrote the protocol. SH and TvH led the investigation. TvH curated the data collection and managed the literature searches. TvH conceptualized and conducted the analysis, led the data interpretation and drafted the manuscript. LM and MO assisted with data interpretation. MT contributed to study design and assisted with data interpretation. All authors read and approved the final manuscript

5.1 Abstract

***Background*:** Antenatal depression and anxiety disorders are highly prevalent in low and middle-income countries. Screening of pregnant women in primary care antenatal settings provides an opportunity for entry to care, but data are needed on the performance of different screening tools. We compared five widely-used questionnaires in a sample of pregnant women in urban South Africa.

***Method*:** Pregnant women attending a primary care antenatal clinic were administered five tools by trained research assistants: the Edinburgh Postnatal Depression Scale (EPDS), the Patient Health Questionnaire (PHQ-9), the Kessler Psychological Distress scale (K10) and a shortened 6-item version (K6), the Whooley questions and the two-item Generalised Anxiety Disorder scale (GAD-2). Following this, a registered mental health counsellor administered the MINI Plus, a structured clinical diagnostic interview. The Area Under the Curve (AUC) from Receiver Operator Characteristic curve analysis was used to summarise screening test performance and Cronbach's α used to assess internal consistency.

Results: Of 376 participants, 32% were diagnosed with either MDE and/or anxiety disorders. All five questionnaires demonstrated moderate to high performance (AUC = 0.78–0.85). The EPDS was the best performing instrument for detecting MDE and the K10 and K6 for anxiety disorder. For MDE and/or anxiety disorders, the EPDS had the highest AUC (0.83). Of the short instruments, the K6 (AUC = 0.85) performed the best, showing good balance between sensitivity (74%) and specificity (85%) and a good positive predictive value (70%). The Whooley questions (AUC = 0.81) were the best performing ultra-short instrument. Internal consistency ranged from good to acceptable (α = 0.89–0.71). However, the PPV of the questionnaires compared with the diagnostic interview, ranged from 54% to 71% at the optimal cut-off scores.

***Conclusions*:** Universal screening for case identification of antenatal depression and anxiety disorders in low-resource settings can be conducted with a number of commonly used screening instruments. Short and ultra-short screening instruments such as the K6 and the Whooley questions may be feasible and acceptable for use in these settings.

5.2 Introduction

Common perinatal mental disorders (CPMD) are highly prevalent and contribute significantly to maternal morbidity and mortality (1–3). Although estimates vary between regions, the prevalence rates reported in low- and middle-income countries (LMIC) are consistently higher than in high income countries (HIC) (3). There is a high comorbidity between perinatal depression and anxiety disorders, with research showing antenatal anxiety disorders are as prevalent as antenatal depression (4). CPMD are disabling for maternal functioning and have well-documented, negative consequences for child health and development (5,6).

Despite this, CPMD in LMIC often remain undetected and untreated, leaving a treatment gap of up to 80% (7). This is partly due to the low levels of recognition by health care workers, especially in poorly-resourced primary-care settings facing high patient volumes (8). In such contexts, routine, primary care tasks are increasingly being shifted to non-specialist health care providers who may have limited training and skills. To address this, the World Health Organisation (WHO) suggests the integration of mental health services into primary care, with increasing advocacy for universal, routine screening at primary care level (9).

Although guidelines have been established in HIC regarding mental health screening for pregnant and post-partum women for depression (10–12), there are no evidence-based guidelines for LMICs. Evidence-based approaches are needed for early identification, treatment and prevention of the negative consequences of CPMD. However, there are concerns about advocating the routine use of screening questionnaires to detect mental disorders in low-resource primary care settings (13,14). The main argument against routine screening cites the extra burden placed on resource-poor, overburdened health care systems by incorrectly identifying cases (i.e., false negatives) (15), and the ethical considerations of screening where

there is no follow-up mental health care (16). Referral and care pathways for mothers experiencing CPMDs are scant in LMICs, including South Africa, and where mental health services are available, these tend to be restricted and focussed on those with severe mental illness, such as psychosis (17). If and when CPMD's are detected, South African women accessing public health services may be referred to a psychiatric nurse, but if mental health care is available, it is usually accessed at a separate site and not integrated with antenatal services (18).

For many women in LMICs, however, antenatal care provision represents a period where there are relatively high levels of contact between vulnerable mothers and the health system. This is particularly true in South Africa which has a national rate for any antenatal contact of 90.7 % (19). Screening at this point can provide a crucial opportunity for contact with mental health services or other appropriate care options available in the area (3,18,20,21). A stepped-care approach, where initial screening is followed by more in-depth screening or assessment may mitigate the burden of false positives by reducing the number of incorrectly diagnosed individuals being referred for treatment (18,22).

A number of mental health screening questionnaires have been created over the last two decades, but notably, these have been designed and developed in HICs. Research has shown that short and ultra-short screening instruments, defined as having between 5 and 14 items, and <5 items respectively are, generally, as accurate as the longer instruments (23,24). These instruments may have an advantage over longer ones since they can be administered in a much shorter time, which is of practical benefit for busy, primary care antenatal environments where health care providers may be overwhelmed with high patient volumes and numerous tasks to perform.

There are concerns, however, about the application of screening tools developed in HICs to LMIC populations and contexts (13). There is a scarcity of cross-culturally validated mental health screening tools, especially for use during pregnancy. There is a paucity of data examining the value of these questionnaires in low-resource, primary care settings in LMICs, and few screening tools have been validated for use in African countries (13).

It is clear that more research is required to develop, refine and rigorously assess the predictive validity and reliability of tools used for assessment of CPMD in LMIC, and to gauge instruments' performance in detecting both depression and anxiety as well as psychological distress (25). Most tools have been developed to detect depression, but anxiety disorders are also highly prevalent, with significant negative impact on maternal health and the health and development of offspring. To address these gaps, we compared the psychometric performance of commonly used screening tools to detect Major Depressive Episode (MDE) and/or anxiety disorders in a sample of low-income women in a resource-poor, primary-level antenatal setting.

5.3 Materials and methods

We conducted a cross-sectional study, within the context of a larger study investigating the development of a screening instrument for CPMD, for use in low resource, primary level antenatal settings by non-specialist health care providers. Details of the study methodology have been previously described (26).

5.3.1 Setting

The study was located at a primary care antenatal clinic within a busy urban Community Health Centre (CHC) in the Cape Town metropole. The clinic serves an area with a population of roughly 35 000 people where the majority face high levels of socioeconomic adversity.

5.3.2 Sample

Every third woman attending their first antenatal visit was invited to participate in the study through systematic sampling. Those who were aged below 18 years or unable to converse in any of the three local languages (English, Afrikaans or isiXhosa) were excluded.

5.3.3 Data collection

All subjects who provided written consent to participate were screened in two stages. The first stage comprised a brief sociodemographic questionnaire, followed by verbal administration of five, commonly-used mental health screening questionnaires in a face-to-face interview. This was conducted by a field-worker with an honour's degree in Psychology and four years of experience as a research assistant in clinical settings. The second stage comprised a structured diagnostic interview carried out by a registered counsellor, with a Bachelor of Psychology (Honours) degree in counselling. Both were trained and supervised by a clinical psychologist. The field worker administered all the English (n=312) and isiXhosa (n=37) screens. The registered counsellor administered the screens in Afrikaans to 27 participants. The field worker provided interpreting during the diagnostic interview for the isiXhosa-speaking participants. Neither the field worker nor the counsellor were masked to the results of the screening or diagnostic outcomes.

5.3.4 Screening instruments

We chose five screening questionnaires for evaluation, based on their widespread use in detecting CPMD and their brevity (the maximum length of the questionnaires was 10 questions) namely: the Edinburgh Postnatal Depression Scale (EPDS), the Patient Health Questionnaire (PHQ-9), the Kessler Psychological Distress scale (K10), the two-item Generalised Anxiety Disorder scale (GAD-2) and the Whooley questions. The questionnaires were consistently administered in the order that they appear above. Further details on the screening instruments can be found in Table 10. Questionnaires that were not available or validated in isiXhosa or Afrikaans were professionally translated and back-translated for this study by translators at Stellenbosch University Language Centre.

Table 10. Depression and anxiety symptom-screening instruments included in the study

Screening instrument	*Measure*	*Scoring system*	*No of items*	*Validated for use in Pregnancy*	*Validated in South Africa (Population) [Languages]*	*Recommended cut-off score**
Edinburgh Postnatal Depression Scale (EPDS)	Depression & anxiety	Likert	10	Yes	Yes (Perinatal) [English, isiXhosa]	Varies between >10 and ≥ 15 depending on the setting and whether antenatal or postnatal population
Kessler (K10)	Depression & anxiety	Likert	10	Yes	Yes (General & perinatal) [English]	> 20
Patient Health Questionnaire (PHQ9)	Depression	Likert	9	Yes	Yes (General) [English, Afrikaans]	Mild: 5-9 Moderate: 10-14 Mod-severe: 15-20 Severe: >20
Two-item Generalised Anxiety Scale (GAD-2)	Anxiety	Likert	2	Yes	Yes (General) [English]	≥ 3
Whooley questions	Depression	Binary	2 with an optional "help" question	Yes	Yes (Antenatal) [English]	≥ 1 without the help question, or ≥ 1 + "yes" with the help question

* As recommended by literature

The EPDS has been found to be a reliable instrument in screening for antenatal and postnatal depression (13,27,28) and has been validated for use in wide range of settings including South Africa (29–31), and for verbal administration by an interviewer in both English and isiXhosa (30). A threshold score of ≥11 on the EPDS has been shown to have a sensitivity of 80% and specificity of 76% for major and minor depression combined, in a South African context (31). Additionally, three EPDS items (items 3, 4, and 5: EPDS-3A) have been found to cluster together to indicate probably anxiety in perinatal women, with an ability to distinguish reliably depression from anxiety in some studies and with an optimum cut-off of 6 or more (possible range: 0–9) (32). Given this evidence from elsewhere, we decided to include examination of the performance of this subscale for anxiety in our sample. There are a number of studies that have investigated the performance of short and ultra-short versions of the EPDS, ranging from 7-item to 2-item versions (23,24,33).

The PHQ-9 was developed from the Primary Care Evaluation of Mental Disorders Procedure (PRIME-MD) for detection of depression in primary care settings (34,35). It has been tested for validity among diverse populations, including in South Africa for use by an interviewer (36,37). It has been validated elsewhere in antenatal and postnatal settings (34,38,39). Scores are interpreted as follows: 0-4 normal, 5-9 mild depressive symptoms, 10-14 moderate depressive symptoms ≥15 moderately severe to severe depressive symptoms. A two-item version, with a cut-off of ≥3, has shown favourable performance in detecting depression, and is advocated for use as an initial screen in busy clinical settings (40,41).

The K10 (42) has been found to have reasonable sensitivity and specificity in detecting depression, PTSD, panic disorder and social phobia and may be a useful screening measure for mood and anxiety disorders in perinatal women (43,44). A score of ≥ 21.5 (sensitivity,

0.73; specificity, 0.54) has been determined as the best screening cut-off for Structured Clinical Interview for DSM-V (SCID)-defined depressive and anxiety disorders amongst pregnant women in South Africa (44). It was validated for use in South Africa, in both English and Afrikaans, and for interviewer administration (43). A six-item version, the K6, is also advocated to screen for common mental disorders in primary care, and has been validated in perinatal populations in low-income settings (8,43,45).

The GAD-2 is a 2-item form of the GAD-7, which asks patients how often over the last two weeks they were 'bothered by (1) feeling nervous, anxious, or on edge and (2) not being able to stop or control worrying' (46). It has not yet been validated for use in South Africa or with antenatal populations, but is regarded as being a clinically useful, ultrashort screening tool for Generalised Anxiety Disorder (GAD) and other anxiety disorders in primary care (46). The GAD-2 uses a Likert scoring system, with scores ranging from 0 to 6. A score of three or more is considered a "positive" screen, with a sensitivity of 65% and specificity of 88% for any anxiety disorder (46). Recently updated NICE guidelines advocate the use of the GAD-2 to screen for anxiety in primary care settings, including the perinatal population (11,47). This tool is administered during an interview (48).

The Whooley questions, are two, binary-scoring questions to screen for depression, which, like the PHQ, were also adapted from the PRIME-MD (48). These offer a relatively quick and convenient way of case-finding for non-specialist health care providers in primary care settings (48). The United Kingdom's National Institute for Clinical Excellence (NICE) guidelines recommend that healthcare professionals ask these two mood symptom questions at a woman's first contact with primary level antenatal or postnatal care (10,49). An answer of "yes" to either of the two Whooley questions is considered a "positive" screen. An

additional “help” question may be asked if the woman responds positively to either of the first two questions (10). The Whooley questions have recently been validated for use in the South African antenatal population, with an optimal score of ≥ 2 yielding a sensitivity of 73% and specificity of 76% (50).

5.3.5 Diagnostic data

The Mini-international Neuropsychiatric Interview plus (MINI Plus) diagnostic interview Version 5.0.0 was used to obtain diagnostic data. The MINI Plus is a short, structured, diagnostic interview which is used to diagnose the major axis I psychiatric disorders in DSM-IV and ICD-10 (51). It has been validated for use in South Africa (52) and validated translations were used for non-English speaking participants in this study (44,53). The MINI Plus was chosen because it has been used extensively in research in LMIC settings and is relatively short and easy to administer (54).

5.3.6 Ethics and referrals

The study was approved by the Faculty of Health Sciences Human Research Ethics Committee at the University of Cape Town (HREC REF: 131/2009), and by the Western Cape Department of Health Provincial Research Committee (ref: 19/18/RP88/2009). Participants who received a diagnosis of MDE or anxiety on the MINI Plus or who met the cut-off on EPDS were referred for counselling. Those who were diagnosed with severe psychopathology, or who expressed suicidal ideas or plans, were referred to the emergency psychiatric services at the CHC.

5.3.7 Data analysis

Data were analysed using Stata version 13.1. Although diagnostic data were collected on several different types of psychopathology, for the purposes of this paper, we selectively

analysed the data for current MDE and current anxiety disorders (including post-traumatic stress disorder (PTSD), generalised anxiety disorder (GAD), obsessive compulsive disorder (OCD), panic disorder, social anxiety disorder and specific phobia). As we were interested in how the screening tools performed in detecting both antenatal anxiety and antenatal depression, the sample was categorised into cases vs. non-cases based on the result of the MINI Plus, whereby any participant with a MINI diagnosis of MDE or any anxiety disorder was classified as being a "case".

We also assessed current suicidal ideation and behaviour (SIB) using the MINI Plus module on suicidality. We used the Statistics South Africa definition of the poverty line as a monthly income of R501 (34 US$) or less per month (55).

The internal consistency of each screening instrument was estimated using Cronbach's α statistic (56). Pearson's correlation matrix was used to assess the strength of correlation between screening instruments. Sensitivity and specificity, positive and negative predictive values and likelihood ratios for various cut-off scores for each screening instrument were analysed using receiver operating characteristic (ROC) curves. The overall predictive value of instruments was assessed by looking at the area under the curve (AUC), and optimal cut-off scores were plotted along the curve. The choice of cut-off scores at which MDE diagnosis could be made were determined by balancing sensitivity, specificity, positive predictive values (PPV) and percentage correctly classified in order to minimise the number of false positives. See Appendix 5. All analyses were conducted against the three diagnostic categories, namely MDE; anxiety; and MDE and/or anxiety, and were disaggregated into sociodemographic categories for age, education level and language.

5.4 Results

5.4.1 Participants

Of 617 women approached, 135 declined participation, 58 were ineligible and 376 participants were included in the study. Logistical barriers to participation were the most frequent reasons provided for non-participation. These included not being able to take time off work, not having childcare for the time needed for the interview and needing to leave with pre-arranged transport. The average age was 26.8 years (SD 5.9 years, range 18 – 48 years). The majority were unmarried but in a stable relationship (51%). More than half of participants (55%) were unemployed, and 43% were living below the poverty line, indicating that they would probably have to sacrifice some food items to be able to afford to buy essential non-food items (55). Three quarters (75%) were in their second or subsequent pregnancy, with 20% of pregnancies being reported as both unplanned and unwanted. Table 11.

Table 11. Description of the sample

	Total sample N (SD)	MDE diagnosis N (%)	Anxiety diagnosis N (%)	MDE and/or Anxiety diagnosis N (%)
Mean age (SD)*	26.8 (5.9)	26.1 (6.3)	27.4 (5.6)	26.7 (5.9)
Highest level of education ≤ Grade 10	151 (40)	38 (47)	37 (43)	56 (46)
> Grade 10**	225 (60)	43 (53)	49 (57)	66 (54)
Relationship status: Married	146 (39)	23 (28)	36 (42)	45 (37)
Stable partner	192 (51)	46 (57)	43 (50)	64 (53)
Casual partner	16 (4)	4 (5)	2 (2)	4 (3)
No partner**	22 (6)	8 (10)	5 (6)	9 (7)
Ethnicity: Black African	133 (35)	21 (26)	25 (29)	35 (29)
"Coloured" §	224 (60)	56 (69)	55 (64)	79 (65)
White & "other"**	18 (5)	4 (5)	6 (7)	8 (6)
Employment type: Unemployed	208 (55)	52 (64)	46 (53)	71 (58)
Informal/hawker	17 (5)	1 (1)	4 (5)	4 (3)
Contract/part-time	51 (14)	17 (21)	14 (16)	21 (17)
Full time**	100 (26)	11 (14)	22 (26)	26 (22)
SES: Below poverty line	162 (43)	42 (52)	35 (41)	55 (45)
Above poverty line**	214 (57)	39 (48)	51 (59)	67 (55)
Housing type: Shack dwelling	60 (16)	11 (14)	13 (15)	18 (15)

Backyard dwelling	85 (23)	23 (28)	27 (31)	36 (30)
Formal house	100 (27)	23 (28)	21 (24)	31 (25)
Council house/flat	121 (32)	22 (27)	22 (26)	33 (27)
Other**	10 (3)	2 (3)	3 (4)	4 (3)
Gravidity: Primigravida	96 (26)	19 (23)	9 (10)	23 (19)
Multigravida**	280 (75)	62 (77)	77 (90)	99 (81)
Parity: Nulliparous	122 (32)	26 (32)	20 (23)	35 (29)
Primiparous	128 (34)	24 (30)	29 (34)	38 (31)
Multiparous**	126 (34)	31 (38)	37 (43)	49 (40)
Gestation 1st Trimester	96 (32)	21 (22)	24 (25)	34 (35)
2nd Trimester	175 (58)	33 (19)	35 (20)	49 (28)
3rd Trimester	29 (10)	7 (24)	11 (38)	13 (45)
Unplanned & unwanted pregnancy**	74 (20)	24 (30)	22 (26)	31 (25)
History of mental health problems**	57 (15)	30 (37)	32 (37)	37 (30)
Suicidal ideation and behaviour**	69 (18)	23 (33)	24 (35)	32 (46)
Current use of Alcohol**	50 (13)	16 (20)	17 (20)	22 (18)
Current use of substance other than alcohol**	23 (6)	12 (15)	10 (12)	13 (11)
Mean EPDS score*	10.8 (5.7 SD)	17.4 (4.1 SD)	15.1 (5.6 SD)	15.4(5.2 SD)
Mean K10 score*	10.4 (8.5 SD)	20.5 (7.8 SD)	16.9 (8.8 SD)	17.8 (8.5 SD)
Mean PHQ9 score*	7.4 (5.7 SD)	14.1 (5.4 SD)	11.7 (5.9 SD)	12.3 (5.8 SD)
Mean Whooley score*	0.8 (0.9 SD)	1.8 (0.6 SD)	1.4 (0.8 SD)	1.5 (0.8 SD)
Mean GAD-2 score*	1.3 (1.7 SD)	3.1 (1.9 SD)	2.5 (2.1 SD)	2.5 (2.1 SD)

* Two-sample t-test ** Fisher's Exact test

§ The term "Coloured" refers to a heterogeneous group of people of mixed-race ancestry that self-identify as a particular ethnic and cultural grouping in South Africa. This term, and others such as "White", "Black/African" and "Indian/Asian" remain useful in public health research in South Africa, as a way to identify ethnic disparities, and for monitoring improvements in health and socio- economic disparities.

Based on the MINI Plus data, 32% of participants were diagnosed with either MDE and/or anxiety disorders. Among these, anxiety disorders were the most frequent diagnosis (23%) followed by MDE (22%). A total of 45 participants (12%) had a comorbid diagnosis of both MDE and anxiety. There were 69 participants (18%) who indicated current SIB on the MINI Plus.

5.4.2 Internal consistency of scales

The K10, K6, PHQ9 and Whooley questions (with the help question) showed good internal consistency (Cronbach's alphas >0.8) while the EPDS, the Whooley questions (without the help question) and the GAD-2 demonstrated slightly lower levels of internal consistency

(Cronbach's alpha <0.8 and >0.7). The EPDS-3, the PHQ2 and the anxiety subscale of the EPDS, the EPDS-3A, had relatively poor internal consistency (Cronbach's α <0.6 and >0.5).

On comparing the performance of the EPDS, K10, PHQ9 and Whooley in detecting MDE and/or anxiety disorders by age, education level and language, the only significant finding was that when conducted in isiXhosa, the EPDS performed poorly (measured by AUC; $p = 0.021$) compared to when conducted in the other two languages. Table 12.

Pearson's correlation coefficient showed moderate to strong correlations between screening instruments, ranging from 0.60 (GAD and EPDS) to 0.73 (K10 and EPDS).

Table 12. Comparative performance of four screening instruments in detecting CPMD by age, education level & language in a sample of 376 pregnant women

	EPDS				K10				PHQ9				Whooley				GAD-2			
N = 376	Mean score	Screening prevalence cut point ≥13 (%)	AUC	*p*-value comparing AUC	Mean score	Screening prevalence cut point >20 (%)	AUC	*p*-value comparing AUC	Mean score	Screening prevalence cut point >5 (%)	AUC	*p*-value comparing AUC	Mean score	Screening prevalence cut point ≥1 (%)	AUC	*p*-value comparing AUC	Mean score	Screening prevalence cut point ≥3 (%)	AUC	*p*-value comparing AUC
Total sample	10.6	147 (39)	0.83		10.5	58 (15)	0.84		7.54	211 (56)	0.83		1.1	193 (51)	0.80		1.3	77 (20)	0.76	
Age 18-24	10.8	61 (42)	0.86		10.8	22 (38)	0.89		7.9	85 (40)	0.89		0.8	77 (40)	0.82		1.3	54 (21)	0.77	
Age 25-29	11.1	46 (31)	0.83		11.1	19 (33)	0.83		7.6	66 (31)	0.79		0.9	66 (34)	0.77		1.2	22 (21)	0.78	
Age ≥30	10.5	40 (27)	0.80	0.541	9.3	17 (29)	0.81	0.227	6.7	60 (29)	0.83	0.176	0.7	50 (26)	0.79	0.713	1.0	1 (10)	0.75	0.866
Education ≤Gr 10	11.6	68 (46)	0.84		11.3	32 (55)	0.86		8.1	87 (41)	0.88		0.8	76 (39)	0.79		1.4	180 (60)	0.77	
Education ≥Gr 10	10.3	79 (54)	0.82	0.766	9.8	26 (45)	0.83	0.598	7.1	124 (59)	0.81	0.094	0.8	117 (61)	0.79	0.981	1.2	45 (58)	0.76	0.893
English	9.9	45 (31)	0.81		9.5	20 (34)	0.84		7.2	80 (38)	0.79		0.8	66 (34)	0.79		1.3	27 (35)	0.76	
Afrikaans	11.7	53 (36)	0.91		12.1	23 (40)	0.85		7.9	69 (33)	0.87		0.8	64 (33)	0.81		1.4	30 (39)	0.78	
isiXhosa	11.0	49 (33)	0.79	0.021*	9.7	15 (26)	0.88	0.813	7.4	62 (29)	0.87	0.263	0.8	63 (33)	0.78	0.926	1.1	20 (26)	0.75	0.862

* Shows significance at $p < 0.05$

5.4.3 Case-detecting properties of screening tools

Screening tool performance in detecting cases of MDE, anxiety or both MDE and anxiety is presented in Table 13. Optimal cut-off scores and corresponding sensitivity and specificity are presented along with predictive values, likelihood ratios and the percentage of women who would screen positive using that specific cut-off score.

Table 13. Comparison of the performance of screening instruments against MINI defined MDE and Anxiety diagnoses

Screening tool	Mini diagnosis	AUC°	Cut point	Correctly classified	Sensitivity	Specificity	LR+°	LR-	PPV□	NPV∞	Screening prevalence (%)
EPDS	MDE	0.91	14	82%	86%	81%	4.6	0.2	56%	96%	125 (33)
3-item EPDS*	MDE	0.85	3	76%	83%	74%	3.1	0.2	46%	94%	145 (39)
K10	MDE	0.89	15	84%	81%	85%	5.5	0.2	60%	94%	110 (29)
K6§	MDE	0.88	10	85%	78%	87%	6.0	0.3	62%	93%	101 (27)
PHQ9	MDE	0.89	10	82%	79%	82%	4.5	0.3	55%	93%	116 (31)
PHQ2	MDE	0.84	3	80%	65%	84%	3.9	0.4	51%	90%	103 (27)
Whooley	MDE	0.86	2	84%	83%	85%	5.5	0.2	60%	95%	112 (30)
Whooley + help	MDE	0.88	2	81%	89%	79%	4.2	0.1	53%	96%	135 (36)
EPDS-3A **	Anxiety	0.69	5	61%	67%	59%	1.6	0.6	33%	86%	178 (47)
K10	Anxiety	0.77	11	72%	76%	70%	2.5	0.3	43%	91%	151 (40)
K6	Anxiety	0.77	8	75%	69%	76%	2.9	0.4	46%	89%	128 (34)
GAD-2	Anxiety	0.73	2	72%	64%	74%	2.5	0.5	43%	87%	129 (34)
EPDS	MDE &/ Anxiety	0.83	13	77%	75%	78%	3.4	0.3	62%	87%	146 (39)
3-item EPDS	MDE &/ Anxiety	0.79	3	75%	70%	77%	3.0	0.4	59%	84%	145 (39)
K10	MDE &/ Anxiety	0.85	11	80%	80%	79%	3.8	0.2	65%	89%	151 (40)
K6	MDE &/ Anxiety	0.85	8	81%	74%	85%	4.9	0.3	70%	87%	128 (34)
PHQ9	MDE &/ Anxiety	0.84	10	80%	66%	76%	4.8	0.4	70%	84%	116 (31)
PHQ2 §§	MDE &/ Anxiety	0.78	2	71%	75%	69%	2.5	0.4	54%	85%	171 (45)
Whooley	MDE &/ Anxiety	0.79	2	80%	66%	87%	5.2	0.4	71%	84%	112 (30)
Whooley + help	MDE &/ Anxiety	0.81	2	79%	73%	82%	4.1	0.3	66%	86%	135 (36)

* The 3-item EPDS is an ultra-brief version of the EPDS, which includes items 2, 9 and 10.
** The EPDS-3A is the anxiety sub-scale of the EPDS and includes items 3, 4 and 5.
§ The K6 is a shorter version of the K10 and includes items 2, 4, 5, 8, 9 and 10.
§§ The PHQ2 is an ultra-brief version of the PHQ9, which includes items 1 and 2.
° AUC: Area under the receiving operating characteristic (ROC) curve.
□ LR+: Positive likelihood ratio, LR-: negative likelihood ratio.
∞ PPV: positive predictive value, NPV: negative predictive value.

5.4.4 Detecting MDE

For detecting MDE, all screening tools performed well with AUC ranging from 0.84 to 0.91. The EPDS had the highest AUC, followed by the K10 and PHQ9. Of the ultra-short screening tools, the K6 and the Whooley questions with the help question included, had the highest AUC's, showing that they are highly accurate instruments. In this setting, the EPDS and K6 were the best performing tools to detect MDE.

For detecting depression, the EPDS performed the best. The ultra-short Whooley questions, with AUC of 0.86 and 84% correctly classified, performed comparably to the longer K10 and K6. Their screening prevalence was lower than EPDS and only marginally higher than K10 and K6. Adding the help item to the two Whooley questions improved overall performance marginally to 0.88 (AUC) and increased sensitivity by 6% but decreased PPV, thereby increasing the number of false positives. The poorest performing tools were the 3-item EPDS and the PHQ2. These had the lowest AUC, sensitivity and percentage correctly classified, as well as the poorest likelihood ratios and the highest screening prevalence's (45%).

5.4.5 Detecting anxiety disorders

For detecting anxiety disorders, the K10 and K6 had the highest AUCs at 0.77, followed by the GAD (AUC=0.73). The K10 had the highest sensitivity, followed by the K6, which had the highest specificity. Both the K10 and GAD-2 had high numbers of false positives (screening prevalence was almost double the actual prevalence of 22%). The K6 appeared to perform best overall. The EPDS anxiety subscale performed worst, with an AUC of 0.69. In this regard, caution should be exercised in using the EPDS to detect anxiety as the instrument was explicitly designed to measure depressive symptomatology.

5.4.6 Detecting MDE and anxiety disorders

For detecting both MDE and anxiety, the EPDS, K10, K6, PHQ9 and Whooley questions with help question added, had AUC=0.81 to 0.85, while the two Whooley questions, PHQ2 and 3-item EPDS had AUC=0.78 and 0.79. The K10 had the highest sensitivity and the Whooley without the help question had the highest specificity. Adding the "help" question enhanced the performance of the Whooley by 0.2 points on the AUC, and increased the sensitivity of the tool. However, it decreased specificity and increased the number of cases screened as positive by 6%, which may add an unnecessary burden of false positives in a clinical setting.

5.5 Discussion

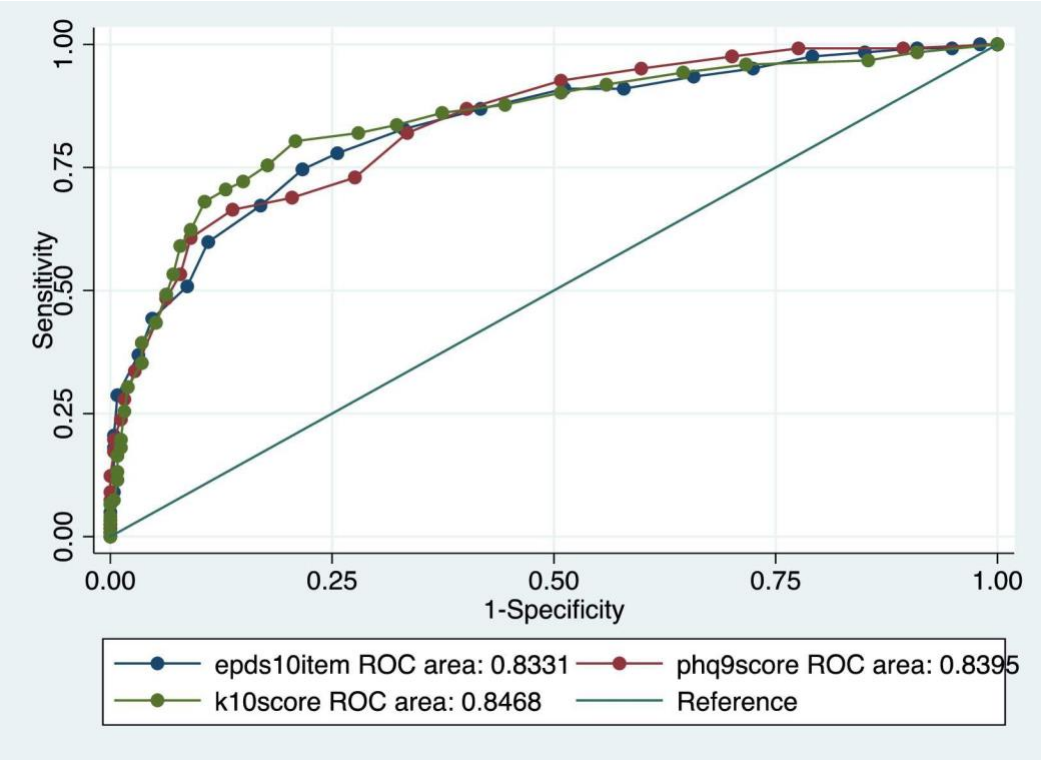
The purpose of the study was to compare the performance of five screening tools in detecting CPMD in a sample of low-income, pregnant women at a primary level antenatal facility. We found few material differences in the performance of depression screening tools in identifying pregnant women with MDE. This finding is in line with previous studies, that analysed the performance of such tools in detecting antenatal depression in LMIC (25) and with another study comparing screening tool performance in a non-pregnant population (8). However, in this setting, the performance of tools in detecting anxiety disorders and in detecting both disorders simultaneously was less optimal.

The EPDS was the best performing instrument for detecting MDE and the K10 and K6 for anxiety disorder. For MDE and/or anxiety disorders, the EPDS had the highest AUC (0.83). Of the short instruments, the K10 (AUC=0.85) and the K6 (AUC=0.85) performed the best, with the K6 showing good balance between sensitivity (74%) and specificity (85%) and a good positive predictive value (70%).

In this context, symptoms of anxiety are as prevalent as symptoms of depression among pregnant women (57). The five commonly used screening tools did not perform well at detecting antenatal anxiety disorders separately from MDE. However, only one out of these five tools, the GAD-2, was specifically designed to measure anxiety. In addition, due to the high prevalence of both MDE and anxiety disorders, it is unlikely that women will be screened for anxiety disorders without also screening for depression. The most feasible and practical tool would be one that performs well in screening for symptoms of both disorders, and identifying effective screening tools for both anxiety and depression remains a challenge for the field.

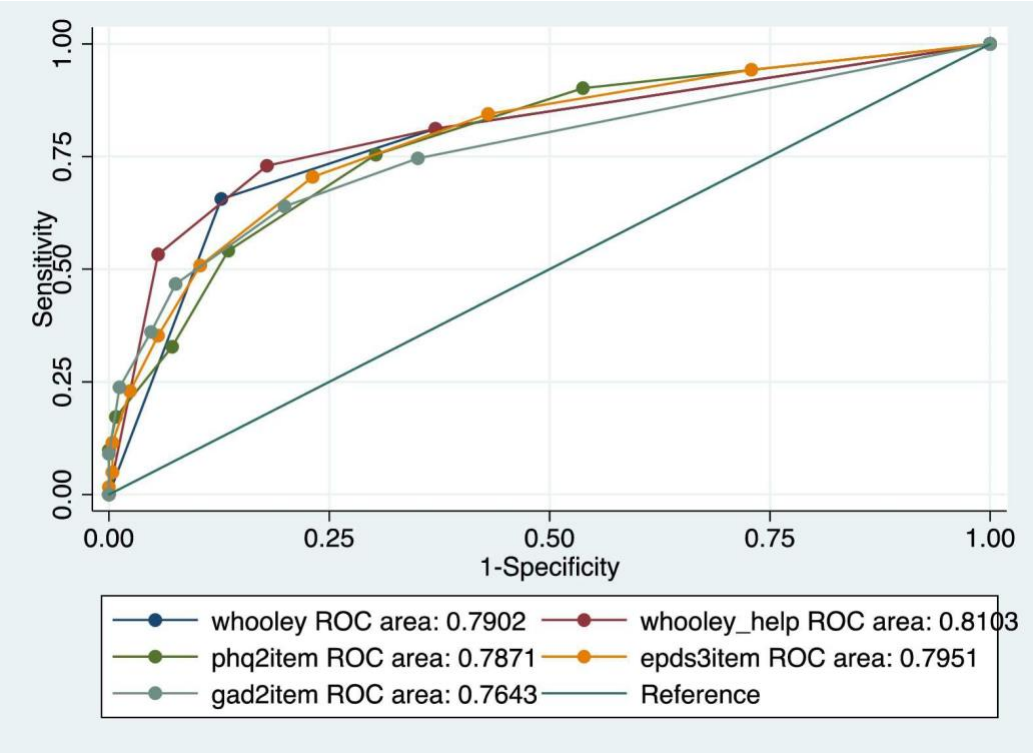
Criteria used for determining the best performing screening tools included the psychometric properties of the individual tools as well as the practical application of these tools in a busy, low resource setting. We considered the ideal characteristics of a screening tool to be one that; had relatively few items, had good sensitivity, had good predictive value and had a good AUC. The tools that met these criteria and produced screening rates that were close to actual diagnostic prevalence were seen as the most feasible and practical tool for this setting. Although the EPDS had the highest AUC, the K6 showed a good balance between sensitivity and had the highest PPV and percentage correctly classified out of all the tools. Finally, the percentage that would screen positive with the K6 was 27%, which was lower than the EPDS (33%), and closest to the actual diagnostic prevalence of 21%. Out of the short instruments examined, the K10 and K6 appear to be the tools that meet most of these criteria, with the best overall performances across the diagnostic categories. Figure 4.

Figure 4. Roc comparison of performance of brief screening tools for detecting MDE and/or anxiety disorders



Out of the ultra-short screening tools, the Whooley questions performed the best. Furthermore, the psychometric performance of the Whooley questions is comparable to the 10-item EPDS, the K10 and the 9-item PHQ9. In addition to being ultra-short, it is a simple binary-scoring instrument that is possibly more feasible and acceptable for busy, low-resource primary care settings for use by non-specialist health care providers than longer, Likert-type tools. Figure 5.

Figure 5. Roc comparison of performance of ultra-brief screening tools for detecting MDE and/or anxiety disorders



Ease of administration of the screening tool is likely to play a critical role in feasibility and implementability of screening (14). Where health care providers have limited time or numeracy skills, as may pertain to many LMICs, longer, Likert-type tools may be inaccurately used or avoided. Thus, although longer, Likert-type tools may perform better psychometrically than shorter, binary-type tools, these advantages may be outweighed by considerable logistical challenges.

In our study, the cut off scores of various instruments are also lower than those specified in other studies and in high-income countries. Research on the use of commonly used mental health screening instruments has found that it is not unusual for cut off scores to be lower in resource-constrained settings (16). There is also variability in the sensitivity of cut-off scores depending on contextual factors which have to be taken into account, and researchers caution against the use of a single cut-off score (58). Low cut-off scores could also yield higher

numbers of false positives, which may be disadvantageous in settings where resources for mental health care are scarce. In addition to potentially creating undue burden on referral sources, programme design should take in to consideration the possible harm of creating unnecessary concern in women with false positive screens. This needs to be balanced with the clinical problem of false negative screening in which treatable psychopathology may go undetected. Caution must therefore be taken when determining whether greater sensitivity or specificity are desired, and researchers are encouraged to present a range of potential cut-off scores for validation of research findings, which may be clinically useful (58).

5.5.1 Strengths and limitations

This is one of the few studies to examine multiple screening tools simultaneously against a clinical diagnostic interview among pregnant women. It is also the first study to assess the performance of these tools in detecting both antenatal MDE and anxiety disorders, prompted by their high prevalence and comorbidity. However, there are several limitations that warrant attention. First, women were only screened once, which limits the comparison of the screening instruments' performance at various points across the perinatal period. Second, we only included one anxiety-symptom screening instrument and did not include commonly used anxiety symptom screening instruments such as the HADS, which may have yielded a better performance in detecting anxiety disorders. Third, the battery of screening instruments was administered in the same order and this may have primed responses to subsequent questions that were similar, though from different screening instruments. Following from this point, no analysis was conducted to examine differences in women's scores based on order of presentation of the questionnaires, nor was inter-rater reliability testing conducted to ascertain the percentage of score variation between administrators of the screening instruments. Related to this, the person conducting the MINI diagnostic interview was not masked to the results of

the screening tests. All of these factors could have affected study outcomes. Fourth, only one screening instrument, the EPDS, was developed to measure symptoms of depression specifically during the perinatal period. Lastly, while this study provides insights into initial screening for antenatal depression and anxiety, it does not address referral pathways and interventions – both of which are challenges in LMIC settings.

5.5.2 Implications and recommendations

The EPDS, K10 and PHQ9 are valid screening instruments to detect antenatal anxiety and depression in low resource settings; however, their feasibility and practicality remains to be examined in non-research settings. Short and ultrashort instruments such as the K6 and the Whooley questions may also be valid when used for initial screening. The choice of optimal cut off scores that yield the best balance between sensitivity and PPV may need to be tailored to individual settings with higher cut-offs being recommended in resource-limited, primary-care settings.

Given that the ultra-brief scales such as the Whooley questions perform similarly to longer scales such as the EPDS, one implication of this study is that ultra-brief scales may be used instead of longer ones – as a first line of screening. Where such ultra-short screening instruments are used, it is advised to follow-up with more in-depth screening or clinical assessment. This is especially important considering the high rate of women expressing suicidal ideation and behaviour (59).

There may be concerns about implementing screening for CPMD in resource-constrained settings in LMICs. Although research shows that women are able to identify with or recognize symptoms when described, there are other factors such as low levels of literacy and low

familiarity with test-taking which may impact self-report screening measures (16,60). This needs to be taken into account when considering the development of screening protocols for such settings.

Where possible, screening needs to be integrated into antenatal care at primary care level and protocols must be put in place for referral for treatment and for follow up care. Effective screening is not only an activity for case identification, but has the potential to catalyse a process of further assessment and referral to treatment and care. Psychosocial assessment, which includes a broader enquiry into mental health and social circumstances, may be added to clinical symptom screening to inform better decisions about overall care (61,62).

More research is needed to validate screening tools or test their feasibility and acceptability and practical application in low resource settings. There also needs to be further research into the capacity of these tools to detect antenatal anxiety disorders in addition to MDE. There may be scope for the development of new screening tools for use in these contexts where they would need to be relatively short, easy to administer and to score.

5.6 Conclusions

Universal screening for case identification of CPMD in low-resource environments may be conducted with a number of commonly used screening instruments. For detection of MDE and/or anxiety disorders, the K6 screening instrument may be the most sensitive, feasible and acceptable tool. The Whooley questions perform almost as well, and have the added benefit of being an ultrashort screen with a binary scoring system, which may improve feasibility and acceptability, where there are high patient volumes and low literacy levels. These questions

may provide a relatively accurate, first-level screen within an integrated, stepped-care model of mental health service provision.

5.8 References

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Chapter 6. The development of an ultra-short, maternal mental health screening tool in South Africa

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Author contributions

SH, SF and TvH designed the study and wrote the protocol. TvH supervised the study, the data collection and managed the literature searches. TvH conceptualized and conducted the analysis, led the data interpretation and drafted the manuscript. SH, LM and MO assisted with data interpretation. MT contributed to study design and assisted with data interpretation. All authors read and approved the final manuscript

6.1 Abstract

Purpose: The burden of common perinatal mental disorders (CPMD) in low-and-middle-income countries is substantially higher than high-income countries, with low levels of detection, service provision and treatment in resource-constrained settings. We describe the development of an ultra-short screening tool to detect antenatal depression, anxiety disorders and maternal suicidal ideation.

Methods: A sample of 376 women was recruited at a primary-level obstetric clinic. Five depression and anxiety symptom-screening questionnaires, demographics and psychosocial risk questionnaires were administered. All participants were assessed with the Mini-International Neuropsychiatric Interview (MINI), a structured, diagnostic interview. Screening tool items were analysed against diagnostic data using multiple logistic regression and Receiver Operating Curve (ROC) analysis.

Results: The prevalence of MINI-defined major depressive episode (MDE) and/or anxiety disorders was 33%. Overall, 18% of participants expressed suicidal ideation and behaviour, 54% of these had no depression or anxiety diagnosis. Multiple logistic regression identified four screening items that were independently predictive of MDE and anxiety disorders, investigating depressed mood, anhedonia, anxiety symptoms and suicidal ideation. ROC analysis of these combined items yielded an area under the curve of 0.83 (95% CI: 0.78 - 0.88). A cut-off score of 2 or more offered a sensitivity of 78% and specificity of 82%.

Conclusion: This novel screening tool is the first measure of CPMD developed in South Africa to include depressed mood, anxiety symptoms and suicidal ideation. While the tool requires further investigation, it may be useful towards the early identification of mental health symptoms and morbidity in the perinatal period.

6.2 Introduction

Globally, approximately 10% of women in high-income countries (HIC) and more than 25% in low-and-middle-income countries (LMIC) are affected by mental disorders in the perinatal period (1–3). Although the focus of perinatal mental health research and intervention has been on depression, particularly postnatal depression, there is growing evidence of the importance of other primary and comorbid disorders, particularly anxiety disorders (2,4–6). In South Africa, diagnostic prevalence rates of antenatal depression range between 22% and 34% and antenatal anxiety disorders between 3% and 30%, which is comparable to other LMIC settings (7–9).

The perinatal period is recognised as a time of increased risk for onset of mental health problems (10,11). The impact of such morbidity includes adverse outcomes for pregnancy, disrupted maternal functioning, disordered mother-infant interactions; impaired growth and development as well as increased psychological, behavioural and cognitive difficulties in offspring (12–18). There are increases in infant mortality (19) and maternal morbidity and mortality through increased risk of maternal substance abuse, heightened vulnerability to domestic violence and accompanying homicide, and comorbid physical illnesses such as HIV (20). Mental disorders during the perinatal period are also associated with higher prevalence of maternal suicidal ideation and behaviour (21,22). These consequences are heightened in contexts of chronic poverty and social adversity, where there are multiple contributing risk factors and stressors (2,7,20).

In LMIC, there are considerable gaps in the detection, treatment and care of CPMD and approximately 80% of cases remain unrecognised and untreated (23). This may be due to resource constraints affecting the health care system, lack of adequate training for health care

providers in detecting and treating mental disorders, high patient volumes in primary health settings which make it difficult for health care providers to spend time on screening and counselling, lack of referral pathways for mental health care and the competing burden of high-prevalence diseases such as TB and HIV (24–29). Poverty acts as a barrier to receiving mental health care for women who have to leave their obligations at home and expend additional resources to access such care, often at a separate site to antenatal or postnatal services (30,31).

In South Africa, social and economic disparities affect the health care system and public sector primary health clinics often operate with minimal resources, while experiencing high patient volumes (30). In such settings, where resources are scarce and with a paucity of specialist mental health care, there has been a call for task shifting of routine activities such as mental health screening to primary health care providers and community health workers (CHW). Task shifting may facilitate the integration of mental health services into primary care and more efficient use of human resources, which could result in greater detection and service coverage of the population (32). However, it is important that screening tools used by non-specialist health care providers and CHW's in primary health care contexts are appropriately developed or adapted for their skill level as there may be literacy and numeracy barriers (32). In particular, Likert scoring systems might not be feasible or acceptable for use in settings where those conducting screening and/or those being screened have limited numeracy (33–35). In order to introduce routine screening into such settings, there is a need for pragmatic screening instruments that are short, quick to administer and easy to score and interpret (32).

One way to address these challenges is to generate from within LMICs, evidence-based screening instruments with adequate psychometric validity (32,36). The tools would need to have high sensitivity and specificity in order not to overburden health care system with false

positive cases. For use in real-world settings, and in order to be clinically useful, these tools would further need to fulfil the criteria of validity, including cultural and cognitive validity (36). These needs were experienced by the Perinatal Mental Health Project (PMHP), which has been operating and supporting integrated mental health services within maternity service settings in Cape Town since 2002 (37). The PMHP hosted this study, which aimed to develop a psychometrically valid, ultra-short screening tool to detect antenatal depression, anxiety and suicidal ideation in South Africa.

6.3 Methodology

6.3.1 Setting

This cross-sectional study was undertaken at the Hanover Park Midwife Obstetric Unit (MOU), Cape Town, South Africa, which provides primary-level maternity services. Hanover Park has a population of about 35 000 people (38), and is a community characterized by high levels of poverty and community-based gang violence. In this community, roughly 61% of adults do not have a regular income and less than 20% of adults have completed high school (39).

General mental health services are provided by two psychiatric nurses to outpatients at the Hanover Park Community Health Clinic (CHC), adjacent to the MOU. A psychiatrist and intern clinical psychologist provide weekly consultations at the CHC. The CHC's casualty unit manages psychiatric emergencies and makes referrals to district or tertiary level hospitals. At the time of data collection, there were no specific mental health screening and support services for pregnant women.

6.3.2 Participants

Pregnant women arriving at the Hanover Park MOU for their first antenatal visit were invited to participate in the study. Women included in the study were 18 years or older, pregnant, willing to provide informed consent to participate and able to understand the nature of the study. Exclusion criteria were diagnosis with a current psychotic disorder or high-risk suicidal ideation or behaviour on the MINI Plus.

Approval for the study was granted by the Provincial Government of the Western Cape Department of Health Research Committee, and the University of Cape Town (UCT) Faculty of Health Sciences Human Research and Ethics Committee (HREC REF: 131/2009).

6.3.3 Instruments used

A demographics questionnaire was administered that included questions on age, language, education level, socioeconomic status, HIV status, gestation, gravidity and parity. Commonly used mental health screening tools were used to screen for antenatal depression and anxiety:

The Edinburgh Postnatal Depression Scale (EPDS) has been found to be a reliable instrument in screening for antenatal depression (40) and has been validated for use in a wide range of settings including South Africa (41). A cut-off score of ≥13 on the EPDS has shown a sensitivity of 80% and specificity of 77 % for major and minor depression combined, in a South African setting (42).

The Patient Health Questionnaire (PHQ-9) was developed for detection of depression in primary care settings and has been tested for validity among diverse populations (43) including

in South Africa (44,45). It has been validated in both antenatal and postnatal populations in various settings (46–48).

The Kessler Psychological Distress Scale (K-10) has agreeable sensitivity and specificity in detecting depression, post-traumatic stress disorder (PTSD), panic disorder and social phobia and is a useful screening measure for antenatal depression and anxiety disorders (49). A score of ≥ 21.5 (sensitivity 73%; specificity 54%) has been determined as the best screening cut-off for diagnosed depressive and anxiety disorders amongst pregnant women in South Africa (50).

The Whooley questions comprise two depressive symptom questions, and an optional "help" question which may be asked if the woman responds positively to either of the first two questions (51). These questions have been advocated by the National Institute of Clinical Excellence (NICE) guidelines for perinatal mental health in the United Kingdom (11). The Whooley questions offer a relatively quick and convenient way of case-finding for non-specialist health care providers in primary care settings and have been validated for use in detecting antenatal depression amongst low-income women in the South African setting (52).

The Generalised Anxiety Scale (revised) (GAD-2) is a 2-item form of the GAD-7. It has not yet been validated for use in South Africa or with antenatal populations, but is regarded as being a clinically useful, short screening tool for Generalised Anxiety Disorder and other anxiety disorders in primary care (53). Recently, these questions have been advocated as an adjunct to screening for depression by UK's NICE guidelines for perinatal mental health (11).

A number of psychosocial risk questionnaires were used to screen for common risk factors associated with CPMD (7,9). These included the Revised Conflict Tactics Scale (CTS-2) (54),

the US Household Food Security Survey Module (HFSSM) (55), the List of Threatening Experiences (LTE), the Multidimensional Scale of Perceived Social Support (MSPSS) (56), as well as the PMHP Risk Factor Analysis (RFA) tool. The RFA measures 11 risk factors including: satisfaction with the current pregnancy, experience of difficult life events, the presence of a partner, perceived emotional support from partner, experience of current domestic violence, perceived emotional and/or practical support from family and friends, prior history of abuse (physical, verbal or sexual), quality of relationship with own mother, past experience of miscarriage, abortion, stillbirth or death of a child, and self-reported history of mental health problems (37).

Inclusion of the abovementioned instruments was based on screening tools meeting as many of the following criteria as possible: prior published evidence of validation against clinical diagnosis, prior use in South Africa or in LMIC and/or low-resource settings, prior use in primary care settings and evidence of validity for use with a perinatal population. All screening tools were professionally translated and back-translated from English into Afrikaans and isiXhosa, which are the three most commonly spoken languages in the Hanover Park community.

The Expanded Mini-International Neuropsychiatric Interview (MINI Plus) Version 5.0.0 was used as the clinical diagnostic interview (57). The MINI Plus, which contains modules for the major axis I psychiatric disorders according to the DSM-IV TR, covers a broad range of disorders yet is relatively quick and easy to administer. The MINI Plus has been validated for use in South Africa (58) and is available for administration in English, Afrikaans and isiXhosa (50,59).

6.3.4 Data collection

A research assistant and mental health officer were appointed to collect data and provide counselling. The research assistant was trained to recruit women, administer the screening battery and manage the study database. The mental health officer was a qualified, registered counsellor and was trained to administer the MINI Plus diagnostic interview as well as to counsel women who met the criteria for CPMD after screening. A clinical psychologist supervised both these staff. Health care staff at Hanover Park MOU received maternal mental health training to sensitise them to the mental health needs of their patients. An initial pilot study was conducted to determine the feasibility and acceptability of recruitment and screening for the staff and patients at the MOU.

Data were collected by sampling every third woman presenting for her first antenatal visit at the Hanover Park MOU between 22 November 2011 and 28 August 2012. The study was verbally explained to potential participants and written or verbal informed consent was obtained. The research assistant administered a demographics questionnaire followed by the battery of symptom and psychosocial risk screens. The mental health officer then administered the MINI Plus. The order of administration of screening tools was not varied. Women were offered refreshments and a place to rest between the screening questionnaires and the MINI assessment. Women were not financially compensated for their participation.

6.3.5 Referral for severe mental illness

Referral protocols were established with the MOU and CHC for women who required psychiatric intervention. Women diagnosed with severe psychopathology, such as schizophrenia, bi-polar mood disorder or psychosis, or who presented a high risk for suicide on the MINI Plus, were excluded from further screening at this point and referred to specialist

care according to standard care protocols for the MOU and CHC. Women diagnosed with a common mental disorder such as MDE or an anxiety disorder on the MINI Plus, or with an EPDS cut-off score of ≥ 13, were offered a counselling appointment with the mental health officer.

6.3.6 Data analysis

Data were analysed using Stata v 13.1. The internal consistency and scale reliability of assessment tools were previously assessed using Cronbach's alpha statistics (60), and were found to range from good to acceptable (61). Descriptive measures were used to describe the sample and analyse socio-demographic variables and their associations with MDE and anxiety diagnoses, using non-parametric tests, the Wilcoxon sum of rank test, the Fisher exact test and the two-sample t-test.

Initially all screening tools in their entirety were analysed against diagnostic data using ROC statistics to analyse their performance in detecting antenatal MDE and anxiety disorders. A detailed comparison of the psychometric performance of these screening tools has been described in detail elsewhere (61). Following this, an item-by-item analysis of individual MDE and anxiety symptom-screening items were conducted using simple multiple logistic regression to determine which items were the best predictors of MDE and anxiety diagnoses. Significant items, those with a *p*-value < 0.05 and which indicated a change in pseudo-r^2 value >0.01, were noted. Significant items were then added to a multiple logistic regression model by systematically adding or subtracting these to determine which items were the best combined predictors for MDE and anxiety diagnosis: i.e., which combined items (2 at first, then 3, then 4 items) improved the model by increasing the value of pseudo r^2 >0.01 while maintaining p<0.05. Once the items were identified, their content was examined and duplicate items were

removed. Two suicidal ideation items (from the EPDS and PHQ9) were examined against MINI criteria for suicidal ideation and behaviour. Best-performing items with Likert-type scoring were binarized to create a uniform scoring system for the potential new tool. The Likert scoring and binarized scoring versions of items were compared against each other using diagnostic data to ensure that their performance in predicting the variables of interest were consistent and comparable.

Finally, the best combinations of items were analysed using ROC analysis of the area under the curve (AUC) to determine which set of items were the best predictors of MDE and anxiety diagnosis. Detailed ROC analysis output was used to evaluate the cut-point of the best-performing combined items that yielded optimal sensitivity and specificity and number of cases correctly classified.

Individual items from psychosocial risk screening questionnaires were also analysed using the same methodology described above. These items were then systematically added (item-by-item) to the combined, best-performing symptom-screening items to see whether they significantly enhanced the predictive value of the new combined screening tool. They were further analysed as a separate, adjunct-screening tool to the symptom-screening tool using multiple logistic regression and ROC analysis.

6.4 Results

6.4.1 Demographic description of the sample

A total of 376 pregnant women participated in the study. The mean age of the sample was 27 years, with a mean education level of Grade 10. Most (90%) of women were married or in a stable relationship, over half were in the second trimester of their second pregnancy and

although 63% of pregnancies were unintended, 78% of the sample was reportedly pleased to be pregnant. The unemployment rate was 55%, with 43% of women living below the Statistics South Africa (SSA) poverty line (62) and 42% reporting food insecurity. See Table 14. Significant associations were found between MDE and anxiety diagnoses with food insecurity, having more than one child, having an unintended and unwanted pregnancy, suicidal ideation and behaviour, current use of substances other than alcohol as reported on the MINI, perceived lack of partner support, current experience of domestic violence or of past physical, sexual or emotional abuse, self-reported history of mental health problems and experience of major, adverse life events in the past year. These associations have been described and discussed in detail elsewhere (7,9,21,63,64).

Table 14. Demographics of the sample according to diagnostic categories

	Total sample	MDE and/or anxiety diagnosis
Mean age (SD)*	26.9 (5.9)	26.7 (5.9)
Level of education (SD)*	11 (1.5)	10 (1.6)
Relationship status:		
Married	146 (39)	45 (37)
Stable partner	192 (51)	64 (53)
Casual partner	16 (4)	4 (3)
No partner**	22 (6)	9 (7)
Ethnicity:		
Black African	133 (35)	35 (29)
"Coloured"[9]	224 (60)	79 (65)
White & "other"**	18 (5)	8 (6)
Employment type:		
Unemployed	208 (55)	71 (58)
Informal/hawker	17 (5)	4 (3)
Contract/part-time	51 (14)	21 (16)
Full time**	100 (26)	26 (21)
SES:		
Below poverty line	162 (43)	55 (45)
Above poverty line**	214 (57)	67 (55)
Food insecure**	158 (42)	72 (59)$^{++}$
Housing type:		
Shack dwelling	60 (16)	18 (15)

9 The term "Coloured" refers to a heterogeneous group of people of mixed-race ancestry that self-identify as a particular ethnic and cultural grouping in South Africa. This term, and others such as "White"; "Black/African" and "Indian/Asian", remain useful in public health research in South Africa, as a way to identify ethnic disparities, and for monitoring improvements in health and socio- economic inequity after the abolishment of Apartheid in 1994.

Backyard dwelling	85 (23)	36 (30)
Formal house	100 (27)	31 (25)
Council house/flat	121 (32)	33 (27)
Other**	10 (3)	4 (3)
Gravidity:		
Primigravida	96 (26)	23 (19)
Multigravida**	280 (75)	99 (81)[+]
Parity:		
Nulliparous	122 (32)	35 (29)
Primiparous	128 (34)	38 (31)
Multiparous**	126 (34)	49 (40)
Unplanned & unwanted pregnancy**	74 (20)	31 (25)
History of mental health problems**	57 (15)	37 (30)[+]
Suicidal ideation and behaviour**	69 (18)	32 (26)[++]
Current use of alcohol**	50 (13)	22 (32)
Current use of substance(s) other than alcohol**	23 (6)	13 (11)[++]
Perceived lack of partner support**	42 (11)	21 (17)[++]
Experience of violence from current intimate partner **	62 (16)	30 (25)[++]
Experience of domestic violence from partner or others in the household (current or past) **	41 (11)	26 (21)[+]
Experience of past abuse**	89 (24)	53 (43)[+]
Major, adverse life event in past year**	150 (40)	74 (61)[+]

* Two-sample t-test
** Fisher's Exact test
[+] Shows significance at $p<0.001$
[++] Shows significance at $p<0.05$

6.4.2 MINI diagnoses and comorbidity

There were 81 women (22%) who were diagnosed with current MDE and 86 (23%) who had diagnosed anxiety disorders (PTSD (11%), social phobia (7%), specific phobia (6%), OCD (4%), panic disorder (3%); generalised anxiety disorder (2%) and agoraphobia (0.3%)) (9). There was substantial comorbidity between diagnoses of MDE and anxiety disorders. Of those with MDE, 56% were also diagnosed with an anxiety disorder. There were 69 women (18%) who expressed suicidal ideation and behaviour, however, 37 (about half of those with expressed SIB) were suicidal without a diagnosis of MDE or anxiety (21). Fifty-seven women (15%) reported current, harmful use of alcohol and/or other substances on the MINI.

6.4.3 Results of logistic regression

Previous analysis comparing the psychometric performance of screening tools found that the two Whooley questions performed as well as the longer EPDS, K10 and PHQ9 in detecting

symptoms of MDE and anxiety (61). We used these results as a starting point to conduct the primary logistic regression to identify screening items that were independently predictive of MDE and anxiety diagnoses. See Table 15.

Table 15. Top performing symptom-screening questions that were independently predictive of MDE and/or anxiety diagnosis

Item	Content	Construct measured	Recall period	Scoring type
Whooley item 1	During the past month, have you often been bothered by feeling down, depressed or hopeless?	Depressed mood	30 days	Binary
GAD-2 item 2	Over the last 2 weeks, how often have you been bothered by not being able to stop or control worrying?	Anxiety	2 weeks	Likert and binarized
EPDS Item 9	I have been so unhappy that I have been crying	Depressed mood	7 days	Likert and binarized
K10 Item 10	During the last 30 days, about how often did you feel worthless?	Depressed mood	30 days	Likert
K10 Item 9	During the last 30 days, about how often did you feel so sad that nothing could cheer you up?	Depressed mood	30 days	Likert
Whooley Item 2	During the past month, have you often been bothered by having little interest or pleasure in doing things?	Anhedonia	30 days	Binary
K10 Item 7	During the last 30 days, about how often did you feel depressed?	Depressed mood	30 days	Binarized
K10 Item 4	During the last 30 days, about how often did you feel hopeless?	Depressed mood	30 days	Binarized

Different combinations of the best-performing individual items yielded various iterations of a potential new screening tool. See Table 16.

Table 16. Analysis of screening items against separated diagnostic categories

Diagnostic category	Screening items	No of items	AUC	Cut-off score	Sensitivity	Specificity	Correctly classified
MDE	Whooley01 Whooley02 GAD02*	3	0.88	>1 >2	95% 88%	58% 81%	66% 82%
Anxiety	Whooley01 Whooley02 GAD02*	3	0.76	>1 >2	80% 72%	54% 77%	60% 76%
MDE and/or anxiety	Whooley01 Whooley02 GAD02*	3	0.81	≥ 1 ≥ 2	84% 74%	61% 85%	68% 81%

Suicidal ideation and behaviour (SIB)	EPDS10* PHQ9	1 1	0.60 0.50	1 1	37% 28%	82% 72%	74% 64%
MDE and/or anxiety and/or SIB	Whooley01 Whooley02 GAD02* EPDS10*	4	0.76	≥ 1 ≥ 2	77% 65%	57% 82%	65% 75%

*Binarized version

There were five variations of this potential new tool in the final analysis. Results from the ROC analysis of these variations against MDE and anxiety diagnosis are displayed in Table 17.

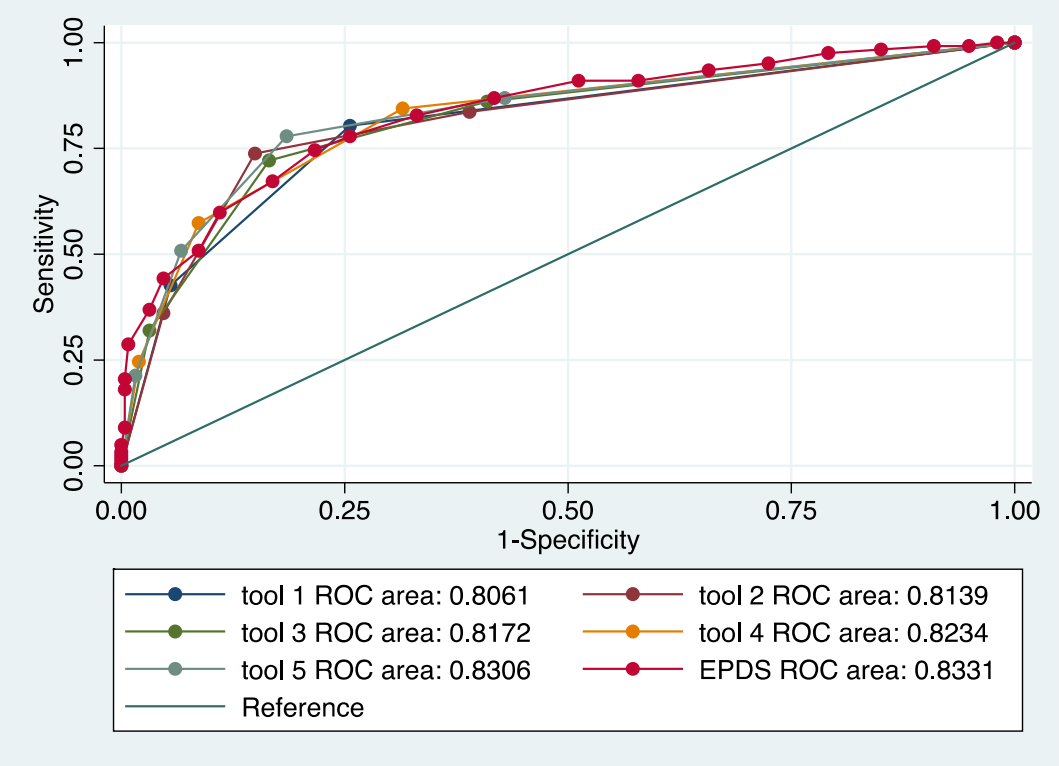
Table 17. ROC analysis comparing the performance of variations of the proposed screening tool, with the EPDS, against MINI diagnosis of MDE and/or anxiety disorders

	Screening items	No of items	AUC	Cut-off score	Sensitivity	Specificity	Correctly classified
Tool 1	Whooley01 GAD02*	2	0.81	≥ 1	80%	74%	76%
Tool 2	Whooley01 Whooley02 GAD02*	3	0.81	≥ 2	74%	85%	81%
Tool 3	Whooley01 Whooley02 EPDS10*	3	0.82	≥ 2	72%	83%	80%
Tool 4	Whooley01 GAD02* EPDS10*	3	0.82	≥ 2	57%	91%	80%
Tool 5	Whooley01 Whooley02 GAD02* EPDS10*	4	0.83	≥ 2	78%	82%	80%
EPDS	EPDS items 1 - 10	10	0.83	≥ 13	75%	78%	77%

* Binarized version

All versions of the potential new tool had AUC's over 0.80. The sensitivity of the tools varied between 57% and 80%, and specificity between 74% and 91%, and the four-item version of the new screening tool performed with greater sensitivity (78%) and specificity (82%) than the EPDS (sensitivity 75%; specificity 78%). See Figure 6.

Figure 6. Performance of various iterations of the new screening tool compared to the EPDS in detection of MDE and anxiety disorder diagnoses



6.4.4 Risk factor items

There were five psychosocial risk factor items that were strongly associated with MDE and anxiety diagnosis. These were, in order of significance: a self-reported history of mental health problems; experience of difficult life events in the past year; experience of abuse (physical, emotional, sexual or rape) in the past; experience of current domestic violence from a partner or someone else in the household; and lack of perceived support and comfort from a "special person".

Although individual risk factor items had significant predictive value, adding these to the combined, symptom-screening items did not significantly enhance the psychometric performance of the model. There was no significant improvement in the outcome of the multiple logistic regression model, nor the AUC of the ROC analysis when risk factor items were added to symptom screening items. However, when the best-performing psychosocial

risk screening items were combined as a separate, “risk screening tool” associated with MDE and anxiety diagnosis, the combined items yielded a fair AUC of 0.73 with a sensitivity of 77% and specificity of 64% at a cut-point of ≥ 2 risk factors.

6.5 Discussion

The main finding of this study is that symptoms of MDE and anxiety and suicidal ideation in low-resource settings can be detected using an ultra-short, binary-scoring screening tool. The performance of this tool is comparable to longer screening tools and has several advantages.

Firstly, the brevity and ease of scoring of the tool may be beneficial for use in busy, low-resource settings with high volumes of service users. In these settings, the time taken to administer and score mental health screening instruments is critical and an ultra-short tool with a binary scoring system is likely to be more feasible and acceptable, especially for those with limited numeracy (32).

The screening items of the tool, which included an item about depressed mood, one about anhedonia, one about anxiety symptoms and one asking about suicidal ideation were highly effective at predicting CPMD. A second advantage of this tool is that it includes an item asking about symptoms of anxiety. Anxiety during pregnancy has increasingly been shown to be of concern as it is highly prevalent, is a strong predictor for postnatal psychiatric disorders and has a significant deleterious effect on maternal functioning and on child health and development (4,9,65). Screening for symptoms of anxiety during pregnancy may be as important as screening for symptoms of depression, especially when the diagnostic prevalence of these disorders is equally high (7,9,66).

Thirdly, although the initial aim in developing our screening tool was to detect CPMD, we made the decision to include an item on suicidal ideation, a leading cause of maternal mortality (59). Also, analysis of the dataset showed that a large proportion of women with suicidal thoughts and/or behaviour had neither depression nor anxiety diagnoses (21). That SIB could occur outside of the context of depression and anxiety diagnosis is an important public health issue, and has been described in greater detail in another paper arising from the same dataset (21). The inclusion of SIB item in our ultra-short tool offers an opportunity to provide care for these high-risk women who may otherwise remain undetected. Furthermore, we made the decision to include the SIB item because it was independently predictive of MDE and anxiety diagnosis. This also follows on from recommendations made by other researchers in South Africa who examined ultra-short versions of the EPDS to screen for depression amongst high-risk pregnant women and similarly found high rates of suicidal ideation. They also recommended inclusion of item 10 of the EPDS on the basis of its performance in predicting perinatal depression (68).

The psychometric properties of our new screening tool for CPMDs are comparable to longer screening tools such as the EPDS, PHQ9 and K10, all of which demonstrate moderate to high performance (AUC 0.78–0.85) (61). However, the fourth advantage of our tool over existing tools is its sensitivity and reliability. Such properties may facilitate widespread screening especially where there are resource barriers to screening, as mentioned previously. A high level of sensitivity in a screening tool is important for first level screening purposes, however in resource-constrained areas this needs to be balanced with adequate specificity so as not to flood the system with false positives. The sensitivity (78%) and specificity (82%) of our tool in detecting MDE and anxiety disorders seems favourable compared to the EPDS (75%; 78%)

and the PHQ9 (66%; 76%), as well as ultra-short versions of these: the 3-item EPDS (70%; 77%), the PHQ2 (75%; 69%) and the Whooley questions (66%; 87%) (61).

This screening tool may be most suitable for application as an initial screen, forming the first part of a staged assessment. Where resources are available, more qualified care workers may thereafter conduct further in-depth screening with other more complex tools and initiate appropriate referrals. There is also potential to adapt and test the tool for mobile technology platforms, where it can be self- administered, thereby providing assessment of mental health problems outside of clinical settings.

6.5.1 Limitations of the study

Although the findings of this study show promise, there are several limitations. The screening tools were administered in the same order, which may have influenced women's answers. Screening items relied on self-report and therefore may have been subject to recall bias. As this was a cross sectional study, we were not able to measure the tools' performance over time or in different pregnancy trimesters. The screening tools had different recall periods, which may have caused the participants some confusion. In order to standardise the scoring system, certain Likert-type scoring items were adapted to be binary scoring. Although this was done for ease of use in clinical application, this may have affected the accuracy of the scoring. Lastly, the cut-off score of 2 or more may have implications for women who present with symptoms of only one disorder as they would not qualify for further screening or assessment based on their screening score. This means that some women who require treatment may be missed.

At the time of writing, our proposed new symptom-screening tool appears to be one of the most suitable ultra-short screening tools to detect CPMD in low-resource settings in South Africa.

Its psychometric performance compares to other ultra-short screening tools and to longer tools and it shows promise for clinical application as an initial screen.

6.5.2 General recommendations

The proposed new screening tool is depicted in Table 18. It has two distinct sections: Section A screens for MDE and anxiety symptoms and/or suicidal ideation and an optional Section B which screens for psychosocial risk. The screening tool depicted in this table includes modifications to certain items: to standardise the screening items, those with Likert-type scoring have been binarized (see psychometric data above) and recall periods have been standardised for the past month (requiring item 3 to change from two weeks and item 4 to change from the past seven days). On the recommendation of experienced, local, mental health practitioners, the EPDS question asking about suicide (question 10) has been re-worded from its original format to improve face validity.

Before this tool may be incorporated into maternity care or other screening protocols, further research is required to adapt and validate the tool with a standardised recall period as well as for culturally congruent language usage using cognitive interviewing techniques or other appropriate methods. Secondly, the tool should be field-tested for feasibility and acceptability in a range of settings and across sectors, where pregnant and post-partum women access care for themselves and/or their infants, including but not limited to the antenatal, postnatal and infant care settings and the social development sector. Third, the tool could be evaluated for other vulnerable populations such as adolescents or migrant/refugee women; and through different modes of administration, including digital platforms. Lastly, there is scope for further research on the feasibility and acceptability of the psychosocial risk-factor component as an adjunct to the symptom-screening tool in a range of resource-constrained settings.

Table 18. Proposed new screening tool for CPMD

PMHP screening tool for mental distress during pregnancy		
ONLY to be conducted if resources are available for referral, e.g., mental health nurse, social worker, NGO, medical officer, counsellor, psychiatrists or other services. Instructions: Step 1. Complete section A first. Step 2. Complete section B (optional).		
Section A: Symptoms of depressed mood and/or anxiety and suicidality		
1. During the past month, have you often been bothered by feeling down, depressed or hopeless?	YES	NO
2. During the past month, have you often been bothered by having little interest or pleasure in doing things?	YES	NO
3. During the past month, have you often been bothered by not being able to stop or control worrying?	YES	NO
4. During the past month, has the thought of committing suicide often occurred to you? **	YES	NO
Count the number of YES answers above: A score of 2 or more requires further assessment and referral for mental distress, ** **YES** on question 4 requires immediate referral for psychiatric assessment.		

Section B. Risk factors		
ONLY to be conducted if resources are available for referral, e.g., mental health nurse, social worker, NGO, or other services. If the woman has a risk factor, this may help you to refer her to the best type of support she needs. It will also help the providers who next see her to understand her better and plan for her care. It is worthwhile to make a detailed list of local resources (and their contact details), easily available for these referrals. These resources could be in the community or the facility and may change over time. This resource map will make it quicker for staff to do the screening and for mothers to access the referrals.		
Answers in the shaded area indicate a stressor that may increase the risk of mental distress.		
1. You have had problems with depression and or anxiety in the past.	YES	NO
2. You have had some very difficult things happen to you in the last year.*	YES	NO
3. Your husband/boyfriend or someone else at home is sometimes violent towards you.	YES	NO
4. You have experienced some kind of abuse in the past (e.g., physical, emotional, sexual abuse or rape).	YES	NO
5. You have a special person who is a real source of comfort to you.	YES	NO

* (E.g., Death of a close relative; serious injury/illness/assault of a close relative; major financial crisis; something valuable lost/stolen; serious problem with a close friend/neighbour/relative; problems with police/court appearance)

6.5.3 Recommendation on the SIB item

Previous studies have cautioned that item 10 of the EPDS, asking about suicidal ideation, is rarely used in settings where resources to respond are limited (69). Potential pitfalls regarding the inclusion of this screening item in a population with high SIB include flooding a poorly-resourced system with false positive cases as well as the associated stigma and discrimination for women labelled with SIB. It may therefore be useful to investigate the inclusion of the SIB item by conducting further research and potentially expanding the item to ask about intent, plans for self-harm, and history of SIB. This may serve to increase the specificity of the item and mitigate the potential pitfalls described above. It is usually recommended that screening with ultra-short tools be followed with more detailed, in-depth screening in order to ensure more specific detection and targeted management of SIB cases (67,69).

6.5.4 Recommendations on risk factor screening

Recent recommendations by global experts for perinatal mental health advise that interventions in LMICs should include screening for and addressing risk factors and associated problems (70,71). Risk factor screening may be conducted after symptom screening has occurred, or may be included in the development of screening tools which assess both symptoms and risk (72,73). Although adding psychosocial risk factors does not enhance the predictability of our tool, adding risk factors as an adjunct to symptom screening, may be a useful way to identify women experiencing psychosocial stressors that increase risk for CPMD (71,74). Screening for risks may help to identify women who require specific interventions and facilitate or rationalize the allocation of resources for particular problems (e.g., partner violence, food insecurity or improper nutrition, substance use). Lastly, risk screening as an adjunct to symptom screening may assist within mental health counselling as a form of assessment and facilitating initial engagement work (70,75). Linked to this, any form of screening – whether for risk or symptoms

or both, must take place as part of a well-articulated referral protocol with defined pathways to care. In this way, high-risk populations may efficiently be triaged to care, e.g., as part of a stepped care approach (32,37).

6.6 Conclusion

In LMIC, where resources are scarce, using an ultra-short, binary-scoring screening tool may be a feasible and valid means to provide universal screening of pregnant women for CPMD. The inclusion of a question asking about suicidal thoughts appears to enhance the detection of women with CPMD and the detection of pregnant women who are suicidal without symptoms of CPMD. Using risk screening as an adjunct to symptom screening may be a useful way to allocate resources for early intervention or for preventing the development of mental disorders.

6.7 References

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Chapter 7. Discussion

This thesis sought to investigate the diagnostic prevalence of antenatal depression and anxiety disorders in a population of pregnant women living in a highly adverse context. It also sought to describe the psychosocial and sociodemographic risk factors that are associated with common perinatal mental disorders (CPMD), and to compare the performance of commonly-used screening tools in detecting CPMD in this (and similar) populations. These data were used to develop an accurate, clinically useful, ultra-short screening tool that can be used in low-resource settings for case detection purposes. The outcomes of this research confirm that CPMD are highly prevalent, with approximately one in three pregnant women meeting the diagnostic criteria for either a major depressive episode or an anxiety disorder. High rates of suicidal ideation and behaviour in the sample further indicate the distress and vulnerability of the perinatal population, as do the multiple contextual stressors that women face.

This chapter provides a synopsis of findings in relation to the objectives of the thesis, followed by a discussion of the key findings and then of the strengths and limitations of the work. Finally, this chapter presents recommendations for clinical practice, research and policy based on the combined results of the thesis.

7.1 Synopsis of the research

As a background to the research, this thesis presented a review of literature in Chapter 2 to review and summarise the existing body of knowledge on the prevalence and determinants of CPMD in low-and-middle-income countries (LMICs), and on screening for these disorders in such settings.

Chapter 3, which examined the diagnostic prevalence of antenatal depression and associated psychosocial risk factors, found that the point prevalence of a major depressive episode (MDE) amongst pregnant women living in highly adverse circumstances was 22%. This is almost twice that of HICs, which is a noteworthy finding. In addition, the psychosocial risk factors predictive of antenatal MDE included a history of depression or anxiety, food insecurity, experience of threatening life events and perceived support from family. A important outcome from this analysis was the high prevalence (42%) of food insecurity amongst the total sample of pregnant women, which increased the likelihood of MDE by almost two and a half times.

Chapter 4 reported on the diagnostic prevalence of anxiety disorders amongst pregnant women attending primary-level, antenatal services and found that the prevalence of antenatal anxiety (23%) was on a par with the prevalence of antenatal depression identified in chapter 3. This finding contributes valuable evidence around the diagnostic prevalence of antenatal anxiety disorders in LMICs, as not much is known in this regard. Importantly, there was a high comorbidity between antenatal MDE and anxiety disorders in this sample. Of those women with a current anxiety diagnosis, 52% also had a diagnosis of current depression This chapter also included a description of the psychosocial predictors of antenatal anxiety disorders, which correlate with the predictors for antenatal depression. The findings of Chapters 3 and 4 formed the foundation for Chapters 5 and 6, where anxiety disorders were included with MDE to form a diagnostic category that was then used to:

1. Compare the performance of existing screening tools in detecting CPMD; and
2. Develop a novel, ultra-short screening tool for CPMD for application in low-resource maternity and child care settings in South Africa.

Chapter 5 compared the psychometric performance of five commonly used screening tools against MINI diagnosis of CPMD. This was undertaken to ascertain how accurate these screening tools are in detecting CPMD in an under-resourced, perinatal population in South Africa. This formed the first part of the analysis towards the development of the novel, ultra-short screening tool. Of the five screening tools, the EPDS demonstrated the best overall performance for detecting both depression and anxiety symptoms simultaneously. The Whooley questions were the best performing ultra-short instrument in this regard, and were recommended for application as a case-finding screening tool in busy settings due to their brevity and ease of administration.

Chapter 6 then described the development of a novel, ultra-short screening tool for CPMD in South Africa. It also examined the psychometric implications of screening for psychosocial risk factors as an adjunct to screening for CPMD symptoms. The risk factors, which included a history of mental health problems, experience of difficult life events, experience of IPV or domestic violence, and perceived social support, were chosen based on their strength of association with CPMD diagnosis based on univariate analysis of risk factors. To the best of my knowledge, this novel screening tool is the first measure for CPMD developed in South Africa. It is also appears to be the first to include questions about depressed mood, anxiety symptoms and suicidal ideation simultaneously. Although further validation research is recommended, it shows promise for clinical application as an initial screening instrument to identify women who are experiencing psychological distress, and its psychometric properties are on a par with the EPDS. Another important finding was that adding psychosocial risk items to mood screening items did not enhance the accuracy of the ultra-short screening tool in detecting probable CPMD cases.

7.2 Discussion of key findings

This section discusses the key findings around the following broad underlying themes: (i) the high prevalence of CPMD which presents a significant public health concern; (ii) the multiple psychosocial risk factors associated with CPMD; iii) improving detection of CPMD amongst perinatal women in LMIC; iv) maternal mental health screening and screening instruments in low resource contexts; v) psychosocial risk screening for CPMD in LMIC; and vi) strengthening the public health system to address CPMD in South Africa.

7.2.1 High CPMD prevalence

The reported prevalence of both antenatal depression and antenatal anxiety disorders in this research is high, with close to one in three (32%) women having a diagnosis of either condition and 12% having a dual diagnosis. These findings are important because the high prevalence of both depression and anxiety has implications for the health and welfare of perinatal women and their children. Historically, anxiety disorders have been neglected in perinatal public mental health, despite their notable negative effects on foetal development and their deleterious effects on maternal and child health (MCH) (1). These effects are separate and additional to the effects of depression, and the findings around the high prevalence of anxiety disorders in this thesis indicate that antenatal anxiety disorders need to be considered alongside antenatal depression as an equally important public health concern. This point is further emphasised by the high comorbidity found between antenatal depression and anxiety disorders, as this is known to compound the risk for poor maternal and child outcomes (2). The high rate of maternal suicidal ideation and behaviour (SIB) (18%) is also a notable finding, especially as a significant proportion of women with SIB (54%) had no concurrent CPMD diagnosis. Maternal suicide is a significant and growing contributor to maternal mortality in LMIC and an important

public health issue (3-5). The high prevalence of SIB in this study confirms the need to include questions about maternal SIB when asking about symptoms of depression and anxiety.

The CPMD prevalence rates reported in Chapters 3 and 4, confirm that many pregnant women in LMIC experience symptoms of psychological distress. These are associated with significant, negative impacts on maternal and child health, with long-term costs. The high prevalence of diagnosed CPMD found in this study strengthen the case for all perinatal women to be provided with some form of public mental health intervention as a routine part of maternity care. A comprehensive approach to improving perinatal mental health would require interdisciplinary collaboration between various directorates in the health care system (e.g., public health, mental health/psychiatry, obstetrics and gynaecology and paediatrics) and the social welfare system (6). However, this will be determined by multiple factors including systems resources and accessibility, availability and acceptability of sources of referral for treatment and care.

7.2.2 Multiple psychosocial risk factors associated with CPMD

Psychosocial and socioeconomic stressors play a significant role in determining maternal mental health and are known to perpetuate the cycle of psychological distress, to increase the risk for more serious mental disorders and to detract from the developmental potential of children (25). The results from the bivariate and multivariable analyses in Chapters 3 and 4 confirm that pregnant women living in under-resourced settings are exposed to multiple risk factors for antenatal CPMD. Furthermore, certain risk factors were found to be significantly associated with, and predictive of, CPMD. These findings are important because they confirm the important role that social and economic factors play in determining maternal mental disorders in LMIC. The structural barriers that women face in LMIC, such as poverty, cultural and religious beliefs and practices, poor mental health literacy, mental health stigma and

discrimination, and gender inequality and marginalisation, compound the risk factors and act as barriers to care (1, 7). Lower antenatal care uptake is, in turn, associated with poorer obstetric and infant health outcomes, and reduced adherence and response to perinatal care and treatment for medical complications such as HIV or TB (8). The risk factors associated with CPMD in this study, which include a self-reported history of mental health problems, food insecurity, experience of stressful life events, experience of intimate partner violence and a perceived lack of social support, are more likely to be experienced by women living in adverse circumstances than in contexts where there is a greater availability of resources (9).

In South Africa, women are at heightened risk for adverse mental health during the perinatal period due to the complex interplay of contextual risk factors to which they are exposed (10). A growing body of evidence around life course health research validates the interconnectedness and compounding nature of these risk factors when two or more are experienced simultaneously. For example, food insecurity, gender-based violence and substance abuse commonly co-occur and have a significant impact on mental health (11-13). Studies from South Africa reporting on the trajectory of CPMD symptoms amongst perinatal women up to 18 months postpartum have identified that those at highest risk for persistent and severe CPMD have a higher number of simultaneous psychosocial risk factors. These include stressful life events that occur during pregnancy, antenatal substance use and recent IPV (14, 15). These findings emphasise the need to support perinatal women who are experiencing such risk factors and for focused, integrated interventions in settings where women are exposed to greater psychosocial and socioeconomic adversity and have fewer resources.

There is a growing realisation of the need to consider the social determinants underlying mental health when planning and providing public health services. Interventions that address

psychosocial risk factors, such as reduction of gender-based violence, facilitating basic income grants and enhancing social capital, can confer benefit for mental health (2, 16). For example, a collaborative stepped-care (CSC) intervention for treating depression showed significantly greater success with food secure participants (17). Interventions that address psychosocial risk factors as part of treatment for CPMD may improve outcomes, as has been demonstrated by the Thinking Healthy Programme (adapted for various settings and cultures), The Perinatal Mental Health Project (South Africa) and the Maternal Mental Health Project (Uganda) (2, 18-20).

7.2.3 Improving detection and treatment of CPMD in LMIC

Pregnancy presents an ideal opportunity for early intervention for CPMD when there is increased contact with the health system (21-23). In South Africa there is a high uptake of antenatal, child health and social welfare services which offer points of contact with vulnerable women and children (24, 25). There is growing evidence that cost-effective, low-intensity interventions for CPMD that are delivered during pregnancy can diminish the onset of postpartum mental disorders and improve outcomes for child health and development (9, 26). However, the gap in detection and treatment of CPMD during this period persists due to a combination of factors, including the hidden nature of such disorders, enduring mental health stigma and the scarcity of health system resources (7, 27-30). Another factor is that non-specialist workers in primary care maternity settings may lack awareness about mental health, or sensitivity to these kinds of difficulties and the complexity of psychosocial problems, or experience their own mental health problems which act as barriers to detection. They may lack the training, technical skills and supervisory support to detect and address maternal mental disorders (31-33). Practical constraints include a lack of time needed to enquire about mental health during routine antenatal visits, especially when there are high patient numbers with

multiple antenatal healthcare tasks that need to be conducted; the availability a screening tool that is quick and straightforward to administer; the availability of a confidential space to conduct screening and discuss the results; and lack of guidelines on the timing of screening during the antenatal visit (27, 34). Primary health care providers that feel overwhelmed and overburdened are less likely to expend additional time to enquire about mental health, especially when there are no visible symptoms and the task is not mandatory (35). The absence of readily available and accessible treatment, clear referral protocols and pathways to mental health services or resources for psychosocial support further contribute to the treatment gap (21, 27).

7.2.4 Screening in low resource contexts

Screening is a public-health strategy to enhance case-detection and facilitate early intervention to mitigate the progression of symptoms and associated negative outcomes (21). Screening is not as accurate a process as diagnostic assessment and, depending on the accuracy of the screening tool, incurs additional health system costs as more people will be found to need management (36, 37). These costs may be lessened by timely treatment of mild cases with low-cost, low-intensity interventions, which can be managed by generalist or frontline health workers (2). In addition, the intergenerational effects of untreated CPMD may be averted, potentially reducing the associated long-term costs (37).

The use of a robust screening tool with reliable predictive properties is an essential prerequisite if screening is to form part of routine perinatal mental health care (38-40). Aside from accuracy, instruments that are easy to administer, score, and interpret are more feasible and acceptable for integration into routine care in busy settings. The results of Chapter 5 revealed that the performances of five, commonly-used screening tools for simultaneously detecting antenatal

depression and anxiety disorders were sub-optimal. A range of potential cut-off scores may enhance the clinically utility of such screening tools, but this strategy needs to be approached with caution due to the variations in numbers of positively screened women and false-positive cases which will be generated. High numbers of positively screened cases will flood the under-resourced, primary care system, or lead to unnecessary expenditure of scarce resources.

Aside from accuracy, however, there are practical constraints to these screening tools, as they have between nine and 10 items and use Likert-type scoring. These properties mean that they may take longer to administer and score and may therefore be less acceptable for use in busy, low-resource settings. In addition, where literacy and numeracy rates amongst workers are low, Likert-type scoring may also may increase the likelihood of errors in administration and scoring. An interesting finding was that the ultra-short Whooley questions performed on par with the 10-item EPDS in detecting cases of CPMD, as did the novel, ultra-short screening tool that emerged from the analysis in Chapter 6 (41, 42). Similar findings were reported from another study around the excellent properties (100% NPV) of two case-finding questions for "ruling out" depression in antenatal and postnatal women (43). This is notable because of the logistical and practical advantages that ultra-short screening tools have over longer screening tools for integration into primary level antenatal services in busy, low-resource settings.

As seen in the results of Chapter five, 39% of women screened positive and required referral for further intervention based on the standard EPDS cut-off score of ≥13. Similarly, the PHQ9, the K10 and the Whooley questions yielded screening prevalence's between 30% and 40% based on standard cut-points for referral. In Chapter 6, analysis of the ultra-short screening tool revealed a 32% screening prevalence. These findings are important because in a busy, low-resource setting, it would add a significant burden on resources if every third woman (or more)

required further care based on these screening outcomes. Although increasing the cut-off scores of screening tools could be a relatively straightforward way to reduce the screening prevalence, this could result in several women who require treatment being missed (higher number of false negatives).

It is particularly important in scarcely resourced areas for a screening instrument to have high specificity in order to reduce the number of false positive cases that screening might generate, which would further burden a fragile health system. The caveat for advocating the use of ultra-short tools for case-detection purposes is that the sensitivity must be balanced by specificity and PPV to avoid flooding a resource-poor system with false-positives, or causing possible harm to women by over-pathologizing their symptoms (44-46). A retrospective calculation of the positive and negative predictive values of the new ultra-short screening tool (developed in Chapter 6) was comparable with those of the EPDS. See Appendix 6 for the results of this calculation. Both the novel screen and the EPDS have high NPV but low PPV, demonstrating a lower probability of predicting caseness but a higher probability of predicting non-caseness. If either of these instruments are to be used in primary care, it would be important to conduct further investigation with positively screened cases in order not to over-pathologize the presence of CPMD symptoms, as this could cause harm to the individual screened as well as incurring unnecessary costs to the system.

My research has shown that an ultra-short screening tool is as accurate as the EPDS and may be clinically useful for application as an initial case-detection tool (47-52). However, due to the high prevalence generated by screening the general antenatal population, which might overwhelm the system, if this tool is to be deployed in a primary care setting, it would have to be used in conjunction with a more in-depth assessment for women who initially screen

positive. Used as the first step in a triage system this stepped, double-screening approach could improve the specificity of the screening process and potentially reduce the number of women requiring further assessment by up to 60% (43). Aside from length, another advantage of this ultra-short screening tool is its binary scoring system, which simplifies administration and scoring making it easier for screening to be undertaken by community health workers or integrated into busy service settings (53, 54).

7.2.5 Psychosocial risk screening for CPMD in LMIC

Enquiry into psychosocial risk factors has been advocated as an adjunct to CPMD symptom screening in the literature from HIC, as it provides insight into psychological and social circumstances, which can inform individual care options (55-57). The rationale is that identifying psychosocial risk factors, including those associated with poor antenatal attendance and nutrition, has the potential to impact both the physical and the mental health of pregnant women which may improve obstetric and child health outcomes (14, 55). Psychosocial risk screening may also be a way to identify women who have sub-threshold symptoms and those with non-psychiatric psychosocial problems. As part of objective four of my PhD research, I explored whether adding psychosocial risk questions would enhance the psychometric performance of a symptom screening items in detecting CPMD. (see Chapter 6). The results from Chapters 3 and 4 reported multiple stressors experienced by the women in the sample. There were five that were consistently associated with, and predictive of, CPMD including (in order of strength of association) a self-reported history of mental health problems, food insecurity, experience of difficult life events, experience of IPV and perceived lack of support from family, friends or significant other. To the best of my knowledge, this study is the first in South Africa to explore whether adding questions about psychosocial risk enhances the psychometric performance of a symptom screening tool. The analysis in Chapter 6 did not yield

significant results and asking about psychosocial risk does not appear to enhance detection of probable CPMD cases. A second analysis was conducted whereby the best-performing psychosocial risk items were combined as a separate, "risk screening tool" and analysed against MINI-defined MDE and anxiety diagnosis. This analysis also did not produce any significant results.

Aside from psychosocial risk screening, formal enquiry about psychosocial stressors as part of maternal mental health care has been advocated as a way to identify women who are vulnerable to developing CPMD and refer them to resources for support (57). This is an important point to consider, especially with the association between CPMD and contextual stressors in LMIC. However, the timing of enquiry about maternal psychosocial stressors in settings where resources are scarce and where the burden of psychosocial risk and associated mental health problems are high. In this study almost all women reported experience of at least one, if not multiple, concurrent risk factors. Therefore, if psychosocial risk screening formed the basis for referral, the number of women who would screen positive and require referral would overwhelm available resources. At this stage, without further analysis, it is difficult to recommend psychosocial risk screening as an adjunct to symptom screening at primary care level, especially in contexts where women are living in adverse circumstances and where resources are scarce.

A more feasible method of enquiry into psychosocial risk factors may be to integrate this at a later stage, perhaps as part of mental health care and treatment for women who have been referred post-screening. For example, evidence-based, low-intensity interventions, such as the Thinking Healthy Programme, include assessment of psychosocial stressors and enquiry around access to social welfare grants, and nutritional support. The Perinatal Mental Health

Project (PMHP) is another example of an evidence-based intervention that takes psychosocial stressors into account when delivering maternal mental health care. The PMHP engages in training to sensitise staff working in primary level maternity services around maternal mental health and psychosocial determinants, with a specific focus on building empathic engagement skills (2). With this approach, staff are trained to be aware of and enquire about psychosocial stressors when working with perinatal women.

Psychosocial assessment may also provide an opportunity to start a conversation with women about their mental health, and to normalize emotional health assessment by making it routine to ask questions about feelings as well as other psychosocial stressors and risk factors (58, 59). Primary-level maternity workers can initiate a conversation to enquire about risk factors and refer women to appropriate referral and support resources (57). However, due to the sensitive nature certain kinds of risk factors (such as enquiry about IPV or substance use) and fear of repercussions around disclosure, such assessment must be conducted in a non-judgemental, sensitive manner and within a confidential, private space (14).

7.2.6 Practical considerations

Global evidence supports the need for multilevel interventions, such as CSC, and that mental health care should be integrated into routine maternal and child health services in community and primary level settings (60). In South Africa, the core of the maternal, neonatal, and infant health continuum of care comprises of antenatal care (ANC), labour and birthing with a skilled birth attendant, postnatal care (PNC) and infant vaccinations (61-64). Pregnant women in South Africa average approximately three antenatal visits, with around 69% achieving at least one visit prior to 20 weeks' gestation (65) and approximately 80% of mothers and infants achieve the first PNC visit within six days post-partum (61, 65, 66). Child immunisation and growth

monitoring visits provide the most frequent and regular contact points for postpartum women in the first year after delivery. These visits are mainly focused on infant health, with delivery of immunizations, dissemination of health messages and information on appropriate feeding practices and recognition of danger signs (67). However, CPMD screening can be seen as an integral part of infant risk assessment during these visits, considering the evidence that maternal mental disorders may have adverse health consequences for children (24).

The contact points on the maternity continuum of care provide an idea opportunity for detection, referral and monitoring of maternal mental health. Frontline maternity and child care workers are well-positioned to conduct routine maternal mental health care, especially if equipped with the right screening tools, skills and protocols, and with regular support and supervision. Ultra-short screening tools that are valid and accurate can be more easily integrated into routine maternal and child care tasks in busy, low-resource settings, with minimal disruption to the performance of duties and patient flow (36, 68).

7.2.7 Strengthening the SA health system to address CPMD

There is a growing advocacy from academia and civil society driving the call to integrate maternal mental health into maternity, child health and early childhood development (ECD) services within the sectors that encounter perinatal women, such as health and social development (24, 25, 64). Offering mental health care as a routine part of perinatal care improves access to care for resource-poor women. But this advantage can only be maintained if maternal mental health care is integrated into existing services and if those providing the services are trained, equipped and supported (2, 28, 69).

Perinatal mental health services that are integrated into MCH services may also serve to strengthen health systems in resource-constrained settings (2). In LMIC, a CSC approach implemented by trained, non-professional health workers has been shown to be highly effective in detecting and treating depression (40, 70, 71).(2). There is also evidence that routine mental health screening can be effectively conducted by community health workers as part of maternal and child health services (53, 54). CSC care usually involves a combined approach to providing care in a multi-disciplinary team (MDT), whereby community-based workers provide the initial, low-cost intervention (such as screening) in consultation with first primary-level and then tertiary-level or specialist health care providers. Cases may be referred to other members of the MDT, to access resources and further care, e.g., social welfare or counselling. As cases require more specialised intervention or treatment, workers with tertiary-level or specialist qualifications become involved. CSC usually starts with screening and, based on outcomes, graded interventions starting with, 1) lowest cost intervention for all positively screened cases (e.g. psychoeducation or basic counselling); 2) more resource intensive intervention for moderate cases or those that do not improve with level one intervention (e.g. antidepressant medication or psychological therapies); 3) highest level intervention for severe cases or those that are unresponsive to previous levels, or are high risk or have complications (e.g. psychiatric services) (23, 24).

Positively screened EPDS cases can be referred for early intervention and counselling, or for specialist care, depending on the outcome of the screening and the available resources. Antidepressant medication may also be prescribed by primary care medical officers or psychiatric nurses as indicated. Women who are suicidal or who do not respond to interventions and treatments can be referred to psychiatric services if available.

Training and supporting frontline health care providers to use a brief, simple and sensitive mental health screening tool for initial, case-detection purposes may be a feasible, cost-effective first step in a CSC model for South African primary care settings.

7.3 Strengths and limitations of the study

Limitations pertaining to each part of the research analysis were included in the four publication chapters (three to six), but there are overarching limitations that must be considered prior to making recommendations.

One limitation is that the study setting was facility-based, and the most resource-deprived women or those with more severe mental health problems may not have been capable of attending antenatal care at the facility. As such, important data on the nature of CPMD amongst such women may have been missed. This would not however have significant impact on the development of the screening tool and there is potential for future research to evaluate the performance of the screening tool in a community setting if community health workers administer the screening as part of household visits.

As this was a cross-sectional study, the findings were limited in that it was not possible to measure change in mental health symptoms over time. Thus there is no information on the trajectory of CPMD nor the progression and/or resolution of symptoms. It was also not possible to ascertain causation between risk factor variables and diagnostic data. However, the cross-sectional design produced important diagnostic data on the burden of CPMD and generated a description of the associated sociodemographic and psychosocial risk factors as well as strength of this association.

One potential source of bias in this study is the use of self-report measures to collect data, which yielded data that could not be verified, and may have been inaccurate or subject to recall bias, or social desirability bias. Data was collected retrospectively and participants may not have been able to recall information on risk factors or mental health history accurately. Women may also have been reluctant to disclose sensitive information, for example around alcohol or substance use, or IPV for fear of negative repercussions for themselves or their children or partner. This would have led to inaccurate data or an underreporting on certain risk factors. We know from prior research that behaviour around alcohol and substance use is underreported (72), but to verify these data through biological sampling would have been highly resource intensive and potentially cause physical and emotional distress for participants. As the Western Cape has the highest global prevalence of FASD, it can be assumed that alcohol use amongst pregnant women was higher than reported, and that the true association between alcohol and CPMD in this study was underestimated (72, 73). The diagnostic clinical interview, the MINI Plus, has good internal validity and it is unlikely that the self-reporting, measurement bias would have affected the diagnostic prevalence data for the variable of interest, CPMD.

An important limitation to discuss pertains to the generalisability of the findings. Firstly, these data arise from a single site, the Hanover Park MOU in Cape Town, South Africa. Most of the women who access this facility are from the surrounding area, which is characterised by high levels of socioeconomic and psychosocial adversity, and ongoing community-based violence. These contextual factors are associated with CPMD prevalence found in this study but due to the cross-sectional nature of the study, it is not possible to ascertain causality. It is highly likely, though, that comparably high prevalence rates of CPMD will be found in other under-resourced settlements in South Africa, where women face similar adverse circumstances. This would therefore not have a significant impact on the findings around the case-finding capability of

screening tools, and they would be expected to have similar case-detection properties in settings with comparable prevalence rates of CPMD.

Another aspect regarding the generalisability of the findings on the perinatal screening are that the individuals who conducted the screening in this study, namely the mental health counsellor and research assistant, were highly skilled, educated at postgraduate level and trained and supervised by a clinical psychologist. These factors which would have had an impact on the integrity of the screening process. It is unlikely that staff conducting screening in low-resource, primary-level clinical settings would have these levels of qualification and skill, nor the same rigorous training and frequency of supervision from a mental health specialist. Thus, the findings on performance of screening instruments and the novel ultra-short screening tool need to be interpreted cautiously. Further research is also needed on feasibility and acceptability of screening before this can be recommended for implementation by primary level health workers. Thirdly, the findings of the study are based on the resources and volume of antenatal patients at the Hanover Park MOU and CHC. Other settings will have different capacity in terms of resources and patient load, which may require a different approach to addressing CPMD.

The use of measures that were developed in countries and contexts different to the one in this study may also be regarded as a limitation. Similarly, data on diagnostic prevalence was measured with an instrument that was developed in a HIC context. There are limitations on the cross-cultural application and validity of measures developed in HIC, for use in LMIC settings. This was acknowledged at the beginning of the research, efforts were made to address this problem as far as possible by selecting screening measures that had previously been validated and used in LMIC, in South Africa and with perinatal women. Lastly, items that contained idiomatic expressions (for example, “being bothered”) may have been poorly understood by

participants. There was also inconsistent recall period between different measures ranging from the past seven days to the past month which may have been confusing for participants.

In recognition of these last two limitations, a subsequent study was conducted to validate the novel tool using a cognitive interviewing approach (74). The research found, for example, that item two that pertains to anhedonia, i.e., 'having little interest or pleasure in doing things' was understood to have meaning unrelated to anhedonia *per se*. Women across all three language groups (English, Afrikaans and isiXhosa) associated the stated expression with the fatigue commonly experienced in the first trimester of pregnancy (74). A two-week recall period performed better than a four-week recall in this same study. The cognitive interviewing approach, which generated different iterations of the tool for testing, resulted in an amended version of the novel, ultra-short tool which precludes the item on anhedonia. This revised screening tool, with attended advisory for staff, has now been incorporated into the standard maternity stationery used nationally, the Maternity Case Record.

Despite the limitations mentioned above, this thesis extends the literature in several areas, including the contribution it makes to literature on the diagnostic prevalence of both MDE and antenatal anxiety disorders in LMIC. The latter is notable because there are few data on the diagnostic prevalence of antenatal anxiety disorders in LMIC including South Africa. There is a fast-growing body of literature which reports prevalence of CPMD in LMICs based on screening data, commonly using screening tools that have not undergone adequate cultural adaptation or cognitive interviewing processes. These may result in substantial misinterpretation of true prevalence which could lead to under-allocation or misallocation of scarce resources. The use of diagnostic instruments or processes is thus likely to provide more accurate epidemiologic data that can more precisely inform rational policy and guideline

development and resource allocation. This research has also contributed to what is known about the predictors of such disorders for women living in highly adverse circumstances. A novel finding was the strength of association of food insecurity as a predictor for both antenatal depression and antenatal anxiety disorders.

There are relatively few studies that simultaneously compare the performance of screening tools to detect both antenatal depression and anxiety disorders, and these findings also add to the evidence base in this regard.

7.4 Recommendations

The findings from this research lead to several recommendations. Although alluded to in various parts of this body of work, they are summarised here in order to provide overarching recommendations for practice, for policy and for research.

7.4.1 Recommendations for practice

If screening is to be implemented, it needs to be done in such a way that most cases are detected without flooding the system with false positives, nor causing unnecessary expenditure of resources, further strain to health care providers or distress to vulnerable women.

In clinical settings, the utility of a screening process is greatly influenced by use of a screening tool that can accurately identify a high prevalence sub-population, who can then be investigated further, offered intervention or support, depending on the available resources. The novel, ultra-short screening tool developed in this PhD performs with comparable accuracy to the EPDS and PHQ9, which are the most commonly used tools in detecting antenatal depression and anxiety symptoms. This tool may be useful for clinical application as an initial case-finding

instrument in busy, low-resource settings and its length and binary scoring system make it easier to use for all levels of staff. Brevity is also an advantage in busy settings where workers have substantive time constraints due to competing task requirements and high volumes of perinatal service attendees.

An alternate approach that may be feasible in this kind of setting is the provision of universal, basic mental health care whereby all perinatal women are offered low-intensity mental health support as part of routine perinatal care. This would apply whether they have a diagnosed mental health condition or not, with further assessment and referral to higher level intervention as the need arises. A universal intervention approach may be beneficial where there is a high prevalence of psychological distress as stigmatisation and over-pathologizing of psychological distress is avoided. Universal, basic mental health care can replace screening as the first part of a stepped-care approach, also facilitating the rationalisation of resources (18, 19).

If screening is to be advocated to enhance detection of CPMD, the outcomes of this study show that it would be advisable for this to occur as part of CSC to avoid a flooding the system. CSC with a two-stepped screening approach may also improve the specificity of the screening process by reducing the number of false positives generated. This would reduce the burden on primary care services, and facilitate more efficient use of resources and more accurate referral for treatment (44, 75). With such an approach, the first step would be to use the novel, ultra-short screening tool to routinely screen every woman presenting for antenatal or postnatal care, or as part of infant health visits. Women who screen positive can then be further screened using the EPDS or PHQ9, either by the same provider or by a higher-level staff member depending on context. Advantages of having non-professional cadre conducting the ultra-brief screen and a higher qualified cadre conducting follow-up screening with a longer, Likert-type tool such as

the EPDS are the greater accuracy of screening and the rationalisation of human resources. However, it may be counter-therapeutic for women to have to engage with two different health care providers for initial screening. This two-step screening process can then be repeated at intervals (either at every antenatal visit or once a trimester and at postpartum and infant health visits) in order to ensure ongoing coverage and that women with different symptom trajectories are not missed (15, 76). See Figure 7.

Figure 7. Proposed screening protocol for CPMD in low-resource, primary care settings

Step	Target group	Content	Staff	Timing
Step 1 Screening with novel ultra-short tool	All perinatal women (pregnancy to 12 months postpartum)	Screen for symptoms of depression and/or anxiety and/or suicidality	Frontline health care providers: Health facility staff and community health care providers providing primary level antenatal care, postnatal care and child health services	At every contact
Step 2. Comprehensive enquiry into symptoms and risk	Women who screen positive on Step 1	Use EPDS or PHQ9 to screen positively screened women from step 1a; Sensitive enquiry about specific psychosocial wellbeing and risk factors	Frontline health care providers: Health facility staff and community health care providers providing primary level antenatal care, postnatal care and child health services	When an individual screens positive from step 1
Step 3. Referral	Women who screen positive on Step 2	Facilitate access to: psychoeducation, low cost, psychosocial interventions and social welfare services as required.	Screening staff make the referral	When an individual screens positive from step 2
Step 4. Collaborative, stepped care	Women who screen positive on Step 3	Refer to MDT to provide and manage treatment and follow up care: 1. Psychoeducation and basic counselling 2. Social welfare services 3. Antidepressant or psychological therapies 4. Psychiatric services	1. Maternity or child health staff conducting primary level activities 2. Social work staff 3. Psychiatric nurse, medical officer or counselling staff 4. Psychiatric nurse or psychiatrist	Once referral is made, integrated with ANC, PNC or child health care

7.4.2 Recommendations for strengthening capacity in the workforce

A recent study examined three, low-cost, evidence-based interventions for CPMD in LMIC that demonstrate good practice, not only in addressing perinatal mental health but also in strengthening the health systems in which they are located (2). The common elements of these multi-component, CSC models included task-sharing for cost-effective use of human resources and staff training and supervision processes that built capacity in the workforce and strengthened the service-delivery platform (2).

Frontline workers may be able to conduct non-specialist tasks such as mental health promotion, first level screening and primary-level interventions. However, a key concern in LMIC, is about availability of resources to support perinatal depression screening programmes (55). The insufficient number of antenatal and mental health providers in South Africa is a significant barrier to the provision of essential levels of perinatal mental health care. Most PHC facilities are understaffed, and the resultant heavy workload, where the priority focus is on physical health, leaves little time for mental health care.

If existing primary care resources are to be used to deliver perinatal mental health care, it is crucial that they are properly trained, supported and supervised, with a context-specific focus. Importantly, their own mental health issues and stresses need to be addressed for them to provide effective and quality care (16, 43, 77). If not, potential harms include the mistaken use of screening tools as diagnostic tools leading to false positive results and the over-pathologizing of women (44, 78). Screening results not managed in a sensitive manner could also increase distress in women who may feel guilt and self-blame which could worsen

outcomes (38, 79, 80). Small qualitative studies on primary care screening report that some women feel a sense of personal intrusion, stigmatization and concerns about the consequences of disclosure (81). However, other studies have reported an improvement in women's psychological distress after screening was conducted, prior to receiving any treatment. If conducted in a sensitive manner, perinatal mental health screening may have a beneficial therapeutic effect which may further strengthen the case for routine screening in perinatal care (51, 82)

A recent South African study amongst the general population found that despite training and good positive predictive value of nurse-led screening, a large (75%) treatment gap for depression remained, which was attributed to individual health care provider factors including mental health stigma and unresolved personal problems (17). These findings reiterate the importance of addressing mental health stigma amongst health care providers, as well as training and sensitising primary health care providers to perinatal mental health, and CPMD screening. They also highlight the importance of stress management and debriefing for primary care workers if perinatal mental health care is to be effectively delivered, not only to achieve coverage but also for quality of care (17).

The value of screening is dependent on the availability and quality of the full screening pathway to a subsequent follow-up based on the screening result (37). It is thus imperative to have an integrated management plan for women who are identified with possible CPMD after screening, including availability of referral resources and pathways to care (83). Some studies have cited the lack of clear and functional referral pathways as a deterrent to providers conducting CPMD screening, and this is particularly the case in lower-resource locations where

there are fewer options for referral (16). Furthermore, the quality and strength of these referral networks are essential for ensuring that women connect with resources and further support.

Several key elements emerge from reviews examining evidence-based interventions for CPMD that can enhance acceptability and minimize discomfort or stress for both health care providers and clients, whilst maintaining quality and effectiveness:

1) All frontline health care providers must be familiar with screening and referral protocols, and be willing to undertake the screening, referral and provision of emotional care and support where appropriate.

2) All staff engaging with perinatal women must receive regular in-service training including:
    a) Improving knowledge and sensitisation to perinatal mental health including respectful care and empathic engagement approaches.
    b) Sensitivity to women who are particularly vulnerable with respect to mental health and socio-economic challenges, for example, those with disabilities, those experiencing IPV, adolescents, and undocumented migrants or refugees.
    c) Anti-stigma interventions to address and eliminate mental health stigma amongst health care providers.
    d) Technical skills to administer, score and interpret screening tools and basic counselling skills, including interpersonal skills. The development of the novel, ultra-short screening tool in this PhD study may help to facilitate this.
    e) Knowledge of referral resources and strategies, that consider barriers to uptake that mothers may experience, with feedback loops for referrals.

3) Staff providing screening and interventions must be monitored, supervised and supported, including emotionally supported alongside practical and technical or administrative support. Employee wellness amongst providers must be actively promoted and staff should have access to their own mental health care services.

4) Staff engaging in CSC for perinatal mental health must provide women with a clear explanation of what they are doing and provide sensitive and helpful feedback in relation to screening responses given. Screening that has a patient-centred approach offers an opportunity to increase awareness and normalise enquiry about mental health during pregnancy (84, 85). If conducted in a sensitive, compassionate manner, psychosocial risk screening may also facilitate disclosure of contributing problems such as IPV or substance abuse which can then be addressed. Screening can reduce stigma by normalising discussion of mental health and symptoms, and it may also be helpful for women to realise there is a reason for their symptoms and distress if the screening and ensuing discussion is done without allocating blame or shaming. For psychosocial assessment there must be sufficient time for discussion and feedback (8).

5) To ensure effective referral uptake and follow-up it is important for resource mapping to take place continuously and for active engagement/liaison to take place between the providers doing the referral and those receiving the referral.

7.4.3 Recommendations for policy

Various recommendations arising from this PhD research can be made for perinatal mental health policy development in South Africa and similar LMIC settings. Firstly, the evidence from this study on the diagnostic prevalence and risk factors of CPMD can strengthen the case

for the integration of maternal mental health care into existing MCH services (86, 87). Integration of mental health care into primary care is a strategy which has been endorsed by several recent WHO guidance documents and the Lancet Commission on global mental health (88-90). Presenting data that shows an estimated investment of US$ 0.10 - 0.20 per person per year is sufficient for scaling up MHC services may further strengthen this case (91).

The findings of this research around the performance of a novel, ultrashort screening tool may strengthen the case for including mental health screening as a standard and audited component within the continuum of maternity care. The novel, ultra-short screening tool can be included in the MHC stationary (e.g., the Maternity Case Record, the National 1st 1000 Days Roadmap and the National Road to Health Book).

7.4.4 Recommendations for further research

It may be useful to conduct further research on how the developed ultrashort screening tool performs in different settings, in terms of its acceptability to service providers, its feasibility and ease of administration, and what intervention, support and referrals options are in place (22, 38). Additional research is needed to compare the ability of the screening tool to identify symptoms of depression, anxiety or suicidality in different stages of the perinatal period. This could also include how and whether the tool can be integrated into the continuum of maternal and infant care services. It will also be important to examine the performance of the novel, ultra-short screening tool as part of a stepped-care protocol with a longer screening tool such as the EPDS, to determine the positive and negative predictive values of the combined screening process.

The tool should be field-tested for feasibility and acceptability in a range of settings and across sectors, where pregnant and post-partum women access care for themselves and/or their infants, including but not limited to the antenatal, postnatal and infant care settings or in the social development sector. As this research was facility based, it would be useful to test the feasibility, acceptability and validity of applying the screening tool to other settings such as community-health, home-based services or other sectors (e.g., social development services). It may also be useful to explore the various cut-points of the screening tool in order to adjust the case-load generated by screening. Leaving symptomatic women without care or treatment would ultimately be counterproductive, so it may be useful to explore the cut point at which the screening process identifies symptomatic women and those who are at high risk for CPMD (92).

Although the novel, ultra-short screening tool has been validated for the population of women in Hanover Park in this study, there is scope for further research on the feasibility, acceptability and validity of the screening tool with different populations. This may include adolescents or refugee/migrant women, or as part of research on paternal mental health in LMIC (93). It may also be tested using different modes of administration, such as digital platforms. Lastly, there is scope for further research on the feasibility and acceptability of adding a psychosocial risk-factor component as an adjunct to the symptom-screening tool in a range of resource-constrained settings.

7.5 Conclusion

This thesis sought to contribute to the body of knowledge on CPMD in LMIC by providing data on the diagnostic prevalence of antenatal depression and antenatal anxiety disorders in South Africa, as well as the psychosocial predictors that are associated with these disorders for

women living in adversity. Importantly, these findings present evidence of the high prevalence and comorbidity of these disorders, and that pregnant women in this context face multiple, co-occurring psychosocial risk factors that contribute to their mental distress.

Although there are many challenges and potential risks to implementing maternal mental health care in the South African public health system, there is evidence to support a collaborative, stepped care approach, whereby these services are integrated into routine, primary-level maternity services. However, these approaches must be adapted for poorly-resourced contexts where patient numbers are high, and resources scarce.

A novel, ultra-short, binary-scoring screening tool performs as well as longer screening tools such as the EPDS and PHQ9 in detecting cases of CPMD, and shows promise as an initial, case-finding screen. Screening with this novel tool can be a simple and feasible way to provide the first step in a CSC model that is integrated into primary level maternal and paediatric services. Identified cases can be followed by screening with a more comprehensive tool to improve specificity. Screening can act as an interface between health care provider and patient. Discussion around the results of mental health screening and subsequent enquiry about psychosocial risk factors may assist in linking women to support and in accessing appropriate resources. Screening at regular intervals may be a way to monitor maternal mental wellbeing over the duration of the pregnancy and postpartum period.

Maternal mental health screening can act as the first point for delivery of person-centred, mental health care and support for those who are most vulnerable (61, 66, 94). Providing basic maternal mental health care, such as improved detection and referral to first-line, low-cost support, for women who live with CPMD symptoms, can have lifelong benefits for women and their children. By providing the necessary mental health support, women can be empowered to

identify resources, build their capability and enhance their resilience to overcome difficult life circumstances (25, 40). And a mother who has positive mental health, and is supported to negotiate challenges and hardship in her life will be better able to care for herself and to nurture her children's optimal development.

7.6. References

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Appendix 1. Ethics Approval Letter from UCT HREC

Appendix 2. Informed Consent form

Perinatal Mental Health Project

Caring for Mothers

Caring for the Future

Centre for
Public Mental Health

INFORMED CONSENT FORM

The Perinatal Mental Health Project is concerned about women's **emotional** well-being as well as their **physical** health during pregnancy. We are looking at ways in which women may be helped to be mentally healthy around the time of their pregnancies. We are asking about 380 women to help us with this research. There is no reason why particular women have been chosen. Participants are chosen at random.

This research aims to help to improve current services and develop other new services. Information from this study will be collected for **research purposes**. Names and medical records of individuals will **NOT** be connected to any of the information gathered. All notes and records regarding screening and management for possible mental health problems will be kept **confidential** and **secure**. Your confidential information will not be given to any members of your household.

Your right as a research participant gives you the **freedom to choose not to participate** in the study. If you choose to help with the research now, you can also decide not to continue later on. If you choose not to participate, this will **not** affect the quality of the routine care that you receive during your pregnancy.

During the study, we may ask questions about how you are feeling and about your circumstances. You will be asked about your mood, any alcohol and drug use as well as your HIV status. We will also access information from your medical records/patient folder. The interview will take about 2 hours of your time. You will not lose your place in the queue for your antenatal check-up if you choose to participate in this study.

After your interview, if you are identified as needing further care, you will be offered the **option** of seeing the **counsellor** for a counselling appointment. This counselling is **free** of charge and you do not have to accept the offer, unless it is an emergency.

If you have any **questions** about the study, they may be answered by Counsellor, Liesl Hermanus or Research Officer Shirley Ndwayana at the Hanover Park MOU, or you can phone the Perinatal Mental Health Project on 021 685 8290. The University of Cape Town Health Science Faculty Human Research Ethics Committee may be contacted in writing at E53 Room 44.1, Old Main Building, Groote Schuur Hospital, Observatory, 7925 or by telephone on 021 406 6338.

I_____(NAME IN FULL), a client of the Hanover Park Midwife Obstetric Unit, have read this consent form (or had it explained to me) and all my questions have been answered. I agree to participate in the Perinatal Mental Health Project study.

Signed _____Date_____

Witness:_____Signed:_____
Date:_____

The Edinburgh Postnatal Depression Scale (EPDS)

EPDS -1	I have been able to laugh and see the funny side of things	As much as I always could	Not quite so much now.	Definitely not so much now.	Not at all.
EPDS -2	I have looked forward with enjoyment to things	As much as I ever did.	A little less than I used to.	Much less than I used to.	Hardly at all.
EPDS -3	I have blamed myself unnecessarily when things went wrong	Yes, most of the time.	Yes, some of the time.	Not very much.	No, never
EPDS -4	I have been anxious or worried for no good reason	No, not at all.	Hardly ever.	Yes, sometimes.	Yes, very much.
EPDS -5	I have felt scared or panicky for no very good reason.	Yes, quite a lot.	Yes, sometimes.	No, not much.	No, not at all
EPDS -6	Things have been getting on top of me.	Yes, most of the times I haven't been managing at all.	Yes, sometimes I haven't been managing as well as usual.	No, most of the time I have managed quite well.	No, I have been managing as well as ever.
EPDS -7	I have been so unhappy that I have had difficulty sleeping.	Yes, most of the time.	Yes, sometimes.	Not very much.	No, not at all.
EPDS -8	I have felt sad or miserable	Yes, most of the time.	Yes, quite a lot.	Not very much.	No, not at all
EPDS -9	I have been so unhappy that I have been crying	Yes, most of the time.	Yes, quite a lot.	Only sometimes.	No, never
EPDS -10	The thought of harming myself has occurred to me	Yes, quite a lot	Sometimes	Hardly ever	Never

The Patient Health Questionnaire (PHQ-9)

Item	Question content	Not at all	Several days	More than half the days	Nearly every day
PHQ9 -1	Over the past two weeks, how often have you been bothered by little interest or pleasure in doing things?				
PHQ9 -2	Over the past two weeks, how often have you been bothered by feeling down, depressed or hopeless?				
PHQ9 -3	Over the past two weeks, how often have you been bothered by trouble falling asleep, staying asleep or sleeping too much?				
PHQ9 -4	Over the past two weeks, how often have you been bothered by feeling tired or having little energy?				
PHQ9 -5	Over the past two weeks, how often have you been bothered by poor appetite or overeating?				
PHQ9 -6	Over the past two weeks, how often have you been bothered by feeling bad about yourself - or that you're a failure or have let yourself or your family down?				
PHQ9 -7	Over the past two weeks, how often have you been bothered by trouble concentrating on things, such as reading the newspaper or watching television?				
PHQ9 -8	Over the past two weeks, how often have you been bothered by moving or speaking so slowly that other people could have noticed. Or, the opposite - being so fidgety or restless that you have been moving around a lot more than usual?				
PHQ9 -9	Over the past two weeks, how often have you been bothered by thoughts that you would be better off dead or of hurting yourself in some way?				

The Kessler Psychological Distress Scale (K-10)

Item	Question content	None of the time	A little of the time	Some of the time	Most of the time	All of the time
K10 -1	During the last 30 days, about how often did you feel tired out for no good reason?					
K10 -2	During the last 30 days, about how often did you feel nervous?					
K10 -3	During the last 30 days, about how often did you feel so nervous that nothing could calm you down?					
K10 -4	During the last 30 days, about how often did you feel hopeless?					
K10 -5	During the last 30 days, about how often did you feel restless or fidgety?					
K10 -6	During the last 30 days, about how often did you feel so restless you could not sit still?					
K10 -7	During the last 30 days, about how often did you feel depressed?					
K10 -8	During the last 30 days, about how often did you feel that everything was an effort?					
K10 -9	During the last 30 days, about how often did you feel so sad that nothing could cheer you up?					
K10 -10	During the last 30 days, about how often did you feel worthless?					

The Whooley questions

Whooley -1	During the past month, have you been bothered by feeling down, depressed or hopeless?	Yes	No
Whooley -2	During the past month, have you often been bothered by having little interest or pleasure in doing things?	Yes	No
Whooley-3	Is this something you feel you need or want help with?	Yes	No

The Generalised Anxiety Scale (revised) (GAD-2):

Over the last 2 weeks, how often have you been bothered by the following problems?		Not at all sure	Several days	Over half the days	Nearly every day
GAD -1	Feeling nervous, anxious, or on edge	0	1	2	3
GAD -2	Not being able to stop or control worrying	0	1	2	3

The PMHP Psychosocial Risk Factor Assessment (RFA)

Item	Question content	Yes	No
RFA -1	I feel pleased about being pregnant/now that I have had my baby.	0	1
RFA -2	I have had some very difficult things happen to me in the last year (eg. losing someone close to me, losing my job, moving home etc.)	1	0
RFA -3	My husband/boyfriend and I are still together	0	1
RFA -4	I feel my husband/boyfriend cares about me (say no if you are not with him anymore).	0	1
RFA -5	My husband/boyfriend or someone else in the household is sometimes violent towards me	1	0
RFA -6	My family and friends care about how I feel	0	1
RFA -7	I have experienced some kind of abuse in the past (e.g. physical, emotional, sexual, rape).	1	0
RFA -8	My family and friends help me in practical ways.	0	1
RFA -9	On the whole, I have a good relationship with my own mother (indicate “no” if your mother has passed away).	0	1
RFA -10	I have experienced one of the following in the past: miscarriage, abortion, stillbirth, or the death of a child any time after birth.	1	0
RFA -11	I have had serious depression, panic attacks or problems with anxiety before.	1	0

The Alcohol Use Disorders Test AUDIT

AUDIT -1	How often do you have a drink containing alcohol?	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week
AUDIT -2	How many standard drinks containing alcohol do you have on a typical day when drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more
AUDIT -3	How often do you have six or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -4	During the past year, how often have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -5	During the past year, how often have you failed to do what was normally expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -6	During the past year, how often have you needed a drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -7	During the past year, how often have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -8	During the past year, have you been unable to remember what happened the night before because you had been drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -9	Have you or someone else been injured as a result of your drinking?	No	Yes, but not in the past year	Yes, during the past year		
AUDIT -10	Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested you cut down?	No	Yes, but not in the past year	Yes, during the past year		

The Drug Use Disorders Identification Test (DUDIT)

DUDIT-1	How often do you use drugs other than alcohol?	Never	2-4 times a month	Once a month or less often	2-3 times a week	4 times a week or more often
DUDIT-2	Do you use more than one type of drug on the same occasion?	Never	2-4 times a month	Once a month or less often	2-3 times a week	5 times a week or more often
DUDIT-3	How many times do you take drugs on a typical day when you use drugs?	0	1-2	3-4	5-6	7 or more
DUDIT-4	How often are you influenced heavily by drugs?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-5	Over the past year, have you felt that your longing for drugs was so strong that you could not resist it?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-6	Has it happened, over the past year, that you have not been able to stop taking drugs once you started?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-7	How often over the past year have you taken drugs and then neglected to do something you should have done?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-8	How often over the past year have you needed to take a drug the morning after heavy drug use the day before?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-9	How often over the past year have you had guilt feelings or a bad conscience because you used drugs?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-10	Have you or anyone else been hurt (mentally or physically) because you used drugs?	No	Yes, but not in the past year	Yes, during the past year		
DUDIT-11	Has a relative or a friend, a doctor or a nurse, or anyone else, been worried about your drug use or said to you that you should stop using drugs?	No	Yes, but not in the past year	Yes, during the past year		

The Multidimensional Scale of Perceived Social Support (MSPSS)

Item	Question content	Very strongly disagree	Strongly disagree	Mildly disagree	Neutral	Mildly agree	Strongly agree	Very strongly agree
MSPSS-1	There is a special person who is around when I am in need.							
MSPSS-2	There is a special person with whom I can share my joys and sorrows.							
MSPSS-3	My family really tries to help me.							
MSPSS-4	I get the emotional help and support I need from my family							
MSPSS-5	I have a special person who is a real source of comfort to me.							
MSPSS-6	My friends really try to help me							
MSPSS-7	I can count on my friends when things go wrong							
MSPSS-8	I can talk about my problems with my family							
MSPSS-9	I have friends with whom I can share my joys and sorrows.							
MSPSS-10	There is a special person in my life who cares about my feelings.							
MSPSS-11	My family is willing to help me make decisions							
MSPSS-12	I can talk about my problems with my friends							

The Revised Conflict Tactic Scales (RCTS)

RCTS -1	Have you experienced physical abuse by your partner/husband in the past 6 months? (By physical abuse we mean whether you were hit, slapped, kicked, bit, pushed, shoved, or physically hurt in another way by your partner.)	Yes	No
RCTS -2	Has your partner twisted your arm or hair, or threw something at you that could hurt? Has your partner pushed, grabbed, or slapped you?	Yes	No
RCTS -3	Has your partner kicked you or slammed you against a wall, punched or hit you with something that could hurt you?	Yes	No
RCTS -4	Has your partner beat you up, or burned or scalded you on purpose?	Yes	No
RCTS -5	Has your partner choked you, or used a knife or gun on you?	Yes	No
RCTS -6	Has your partner used force, like hitting, holding you down, or using a weapon, to make you have sex?	Yes	No
RCTS -7	Has your partner put you down with words, emotionally hurt or made you feel afraid?	Yes	No

The Household Food Insecurity Access Scale (HFIAS).

Food Security I'm going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement was often true, sometimes true, or never true for (you/your household) in the last 6 months					
FS-1	The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more	Often true	Sometimes true	Never true	DK or Refused
FS-2	(I/we) couldn't afford to eat balanced meals	Often true	Sometimes true	Never true	DK or Refused
FS-3	Did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?	Yes	No (Skip FS-4)	DK (Skip FS-4)	
FS-4	[IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?	Almost every month	Some months but not every month	Only 1 or 2 months	DK or Refused
FS-5	In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?	Yes	No	DK	
FS-6	In the last 12 months, were you every hungry but didn't eat because there wasn't enough money for food?	Yes	No	DK	

List of Threatening Experiences

Item	Question content	< 6 months ago	Impact?	> 6 months ago	Impact?
LEQ -1	In the last 6 months, you yourself suffered a serious illness, injury or an assault.		o None o Some o Significant		o None o Some o Significant
LEQ -2	In the last 6 months, a serious illness, injury or assault happened to a close relative.		o None o Some o Significant		o None o Some o Significant
LEQ -3	In the last 6 months, your parent, child or spouse died.		o None o Some o Significant		o None o Some o Significant
LEQ -4	A close family friend or another relative (aunt, cousin, Grandparent) died.		o None o Some o Significant		o None o Some o Significant
LEQ -5	In the last 6 months, you had a separation due to marital difficulties.		o None o Some o Significant		o None o Some o Significant
LEQ -6	You broke off a steady relationship.		o None o Some o Significant		o None o Some o Significant
LEQ -7	You had a serious problem with a close friend, neighbor or relative.		o None o Some o Significant		o None o Some o Significant
LEQ -8	You became unemployed or you were seeking work unsuccessfully for more than one month.		o None o Some o Significant		o None o Some o Significant
LEQ -9	You were fired from your job.		o None o Some o Significant		o None o Some o Significant
LEQ -10	You had a major financial crisis.		o None o Some o Significant		o None o Some o Significant
LEQ -11	You had problems with the police and a court appearance.		o None o Some o Significant		o None o Some o Significant
LEQ -12	Something you valued was lost or stolen.		o None o Some o Significant		o None o Some o Significant

The Trauma Symptom Questionnaire

Below is a list of problems and complaints that people sometimes have in response to stressful life experiences (severe emotional shock and pain caused by an extremely upsetting experience such as an accident, a rape, violence against you, against someone close to you, or in your neighbourhood, the sudden death of someone close to you, Which of the following has bothered you in the last month.			
TSQ -1	Upsetting thoughts or memories about the event that have come into your mind against your will	Yes	No
TSQ -2	Upsetting dreams about the event	Yes	No
TSQ -3	Acting or feeling as though the event were happening again	Yes	No
TSQ -4	Feeling upset by reminders of the event	Yes	No
TSQ -5	Bodily reactions (such as fast heartbeat, stomach churning, sweatiness, dizziness) when reminded of the event	Yes	No
TSQ -6	Difficulty falling or staying asleep	Yes	No
TSQ -7	Irritability or outbursts of anger	Yes	No
TSQ -8	Difficulty concentrating	Yes	No
TSQ -9	Heightened awareness of potential dangers to yourself and others	Yes	No
TSQ -10	Being jumpy or being startled at something unexpected	Yes	No

Appendix 4. Sensitivity analysis of ROC output and cut-points against CPMD diagnosis

Screening tool	Cutpoint	Sensitivity	Specificity	Correctly classified
EPDS	>=10	87%	58%	66%
	>=12	78%	74%	76%
	>=13	75%	78%	77%
	>=14	67%	83%	78%
	>=15	59%	89%	79%
3-item EPDS	>=2	84%	57%	66%
	>=3	70%	77%	75%
	>=4	51%	89%	77%
K10	>=9	84%	68%	73%
	>=10	82%	72%	75%
	>=11	80%	79%	80%
	>=12	75%	82%	80%
	>=13	72%	85%	81%
	>=14	70%	87%	82%
K6	>=6	80%	72%	74%
	>=7	75%	80%	79%
	>=8	74%	85%	81%
	>=9	69%	88%	82%
	>=10	63%	91%	82%
PHQ9	>=7	82%	67%	72%
	>=8	73%	72%	73%
	>=9	69%	80%	76%
	>=10	66%	86%	80%
	>=11	61%	86%	81%
	>=12	53%	92%	80%
	>=13	48%	94%	79%
PHQ2	>=1	90%	46%	60%
	>=2	75%	69%	71%
	>=3	54%	86%	76%
Whooley questions	>=1	81%	63%	69%
	>=2	66%	87%	80%
Whooley + help question	>=1	81%	63%	69%
	>=2	73%	82%	79%
	>=3	53%	94%	81%

Appendix 5. Calculation of the predictive value of new screening tool compared to EPDS

Novel screening tool with cut-off of ≥ 2		**95% Conf. Inter**
Sensitivity	77.87%	69.46% - 84.88%
Specificity	81.50%	76.16% - 86.08%
Positive predictive value	66.90%	58.52% - 74.56%
Negative predictive value	88.46%	83.66% - 92.26%
Prevalence	*32.45%*	*27.74% - 37.44%*
EPDS with cut-off of ≥13		**95% Conf. Inter**
Sensitivity	74.59%	65.91% - 82.04%
Specificity	78.35%	72.77% - 83.25%
Positive predictive value	62.33%	53.94% - 70.21%
Negative predictive value	86.52%	81.42% - 90.66%
Prevalence	*32.45%*	*27.74% - 37.44%*

A retrospective calculation of the positive and negative predictive values of the new ultra-short screening tool revealed that the probability of a positive screening result predicting caseness was 67% and a negative screening result predicting non-caseness was 88%, indicating a 33% false positive rate and a 22% false negative rate. In comparison, the EPDS with a cut-off point of 13 or higher, had a PPV of 62% and NPV of 87%, translating as 38% false positive and 23% false negative rates.

UNIVERSITY OF CAPE TOWN
IYUNIVESITHI YASEKAPA • UNIVERSITEIT VAN KAAPSTAD

FACULTY OF HEALTH SCIENCES
Human Research Ethics Committee

Annual Progress Report

Date	25 September 2011
HREC REF Number	324/2004
Protocol number (if applicable) & Protocol title	Validation Study of a Maternal Mental Health Screen in the context of HIV and low-resource settings
Principal Investigator	Prof Sue Fawcus
Department / Office Internal Mail Address	Perinatal Mental Health Project, Building B, 46 Sawkins Road, Rondebosch, Cape Town 7700

List of documentation

Attached documentation includes:

- Protocol Amendment Form
- Original Protocol
- New Protocol
- Protocol showing track changes
- Supporting documentation
  - Original consent form
  - Consent form with track changes
  - Amended consent form
  - Screening battery and demographics questionnaire

HREC office use only (FWA00001637; IRB00001938)

☐ Approved ✓	This serves as notification of annual approval, including all documentation described above.		
☐ Not approved	See attached comments.		
Type of review	☑ Expedited	☐ Full committee	
Expiry date	30.09.2012.		
Signature Chairperson of the HREC		Date	3.10.11

pp

Verwysing
Reference
Isalathiso 19/18/RP88/2009

Navrae
Enquiries
Imibuzo Dr G Bernhardt

Telefoon
Telephone
Ifowuni 021 483 9292

Departement van Gesondheid
Department of Health
iSebe lezeMpilo

Professor Sue Fawcus
Department of Psychiatry
University of Cape Town
Building B, 46 Sawkins Road
Rondebosch
Cape Town
7000

FAX: 0866 482 844

Dear Professor Fawcus

Validation Study of a Maternal Mental Health Screen in the context of HIV and low-resource settings.

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research. Please contact the following member of staff to assist you with obtaining approval to erect a structure to house the study at Hanover Park Midwife Obstetric Unit:

Dr James Claassen: jclaassen@pgwc.gov.za Tel: 021 370 5000

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final report within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (healthres@pgwc.gov.za).
3. The reference number above should be quoted in all future correspondence.

We look forward to hearing from you.

Dorpstraat 4
Posbus 2060
KAAPSTAD
8000

4 Dorp Street
PO Box 2060
CAPE TOWN
8000

Yours sincerely

DR J CUPIDO
DEPUTY-DIRECTOR GENERAL
DISTRICT HEALTH SERVICES AND PROGRAMMES
DATE: 14-12-2009

CC: DR J CLAASSEN D: KLIPFONTEIN & MITCHELL'S PLAIN SUB-STRUCTURE

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room E52-24 Old Main Building
Groote Schuur Hospital
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Telephone [021] 406 6338 • **Facsimile** [021] 406 6411
Email: sumayah.ariefdien@uct.ac.za
Website: www.health.uct.ac.za/fhs/research/humanethics/forms

03 November 2015

HREC REF: 507/2015

Prof L Myer
Public Health & Family Medicine
Level 5, Room 5.51
Falmouth Building-FHS

Dear Prof Myer

PROJECT TITLE: COMMON PERINATAL MENTAL DISORDERS IN SOUTH AFRICA: DEVELOPMENT OF A MENTAL HEALTH SCREENING INSTRUMENT FOR LOW-RESOURCE, PRIMARY-CARE ANTENATAL SETTINGS (PhD Candidate - Ms T van Heyningen) Sub-study linked to 131/2009

Thank you for your response letter, addressing the issues raised by the Human Research Ethics Committee (HREC).

It is a pleasure to inform you that the HREC has formally approved the above-mentioned study.

Approval is granted for one year until the 30th November 2016.

Please submit a progress form, using the standardised Annual Report Form if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

We acknowledge that the following student:-Thandi van Heyningen is also involved in this project.

Please quote the HREC reference no in all your correspondence.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Yours sincerely

PROFESSOR M BLOCKMAN
CHAIRPERSON, FHS HUMAN RESEARCH ETHICS COMMITTEE
Federal Wide Assurance Number: FWA00001637.
Institutional Review Board (IRB) number: IRB00001938

This serves to confirm that the University of Cape Town Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Convention on Harmonisation Good Clinical Practice (ICH GCP) and Declaration of Helsinki guidelines.

The Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

Appendix 2: Informed Consent form

Perinatal Mental Health Project

Caring for Mothers
Caring for the Future

Centre for
Public Mental Health

INFORMED CONSENT FORM
Screening Tool Validation Study

The Perinatal Mental Health Project is concerned about women's **emotional** well-being as well as their **physical** health during pregnancy. We are looking at ways in which women may be helped to be mentally healthy around the time of their pregnancies. We are asking about 380 women to help us with this research. There is no reason why particular women have been chosen. Participants are chosen at random.

This research aims to help to improve current services and develop other new services. Information from this study will be collected for **research purposes**. Names and medical records of individuals will **NOT** be connected to any of the information gathered. All notes and records regarding screening and management for possible mental health problems will be kept **confidential** and **secure**. Your confidential information will not be given to any members of your household.

Your right as a research participant gives you the **freedom to choose not to participate** in the study. If you choose to help with the research now, you can also decide not to continue later on. If you choose not to participate, this will **not** affect the quality of the routine care that you receive during your pregnancy.

During the study, we may ask questions about how you are feeling and about your circumstances. You will be asked about your mood, any alcohol and drug use as well as your HIV status. We will also access information from your medical records/patient folder. The interview will take about 2 hours of your time. You will not lose your place in the queue for your antenatal check-up if you choose to participate in this study.

After your interview, if you are identified as needing further care, you will be offered the **option** of seeing the **counsellor** for a counselling appointment. This counselling is **free** of charge and you do not have to accept the offer, unless it is an emergency.

If you have any **questions** about the study, they may be answered by Counselor, Liesl Hermanus or Research Officer Shirley Ndwayana at the Hanover Park MOU, or you can phone the Perinatal Mental Health Project on 021 685 8290. The University of Cape Town Health Science Faculty Human Research Ethics Committee may be contacted in writing at E53 Room 44.1, Old Main Building, Groote Schuur Hospital, Observatory, 7925 or by telephone on 021 406 6338.

I _____

(NAME IN FULL)

Folder number _____**a client of the** _____ **Midwife Obstetric Unit, have read this consent form (or had it explained to me) and all my questions have been answered. I agree to participate in the Perinatal Mental Health Project study.**

Signed _____ **Date** _____

Witness _____

Signed _____ **Date** _____

Appendix 3 All screening instruments

The Edinburgh Postnatal Depression Scale (EPDS) 2

The Patient Health Questionnaire (PHQ-9) 3

The Kessler Psychological Distress Scale (K-10) 4

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The Generalised Anxiety Scale (revised) (GAD-2): 5

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The Edinburgh Postnatal Depression Scale (EPDS)

EPDS -1	I have been able to laugh and see the funny side of things	As much as I always could	Not quite so much now.	Definitely not so much now.	Not at all.
EPDS -2	I have looked forward with enjoyment to things	As much as I ever did.	A little less than I used to.	Much less than I used to.	Hardly at all.
EPDS -3	I have blamed myself unnecessarily when things went wrong	Yes, most of the time.	Yes, some of the time.	Not very much.	No, never
EPDS -4	I have been anxious or worried for no good reason	No, not at all.	Hardly ever.	Yes, sometimes.	Yes, very much.
EPDS -5	I have felt scared or panicky for no very good reason.	Yes, quite a lot.	Yes, sometimes.	No, not much.	No, not at all
EPDS -6	Things have been getting on top of me.	Yes, most of the times I haven't been managing at all.	Yes, sometimes I haven't been managing as well as usual.	No, most of the time I have managed quite well.	No, I have been managing as well as ever.
EPDS -7	I have been so unhappy that I have had difficulty sleeping.	Yes, most of the time.	Yes, sometimes.	Not very much.	No, not at all.
EPDS -8	I have felt sad or miserable	Yes, most of the time.	Yes, quite a lot.	Not very much.	No, not at all
EPDS -9	I have been so unhappy that I have been crying	Yes, most of the time.	Yes, quite a lot.	Only sometimes.	No, never
EPDS -10	The thought of harming myself has occurred to me	Yes, quite a lot	Sometimes	Hardly ever	Never

The Patient Health Questionnaire (PHQ-9)

Item	Question content	Not at all	Several days	More than half the days	Nearly every day
PHQ9 -1	Over the past two weeks, how often have you been bothered by little interest or pleasure in doing things?				
PHQ9 -2	Over the past two weeks, how often have you been bothered by feeling down, depressed or hopeless?				
PHQ9 -3	Over the past two weeks, how often have you been bothered by trouble falling asleep, staying asleep or sleeping too much?				
PHQ9 -4	Over the past two weeks, how often have you been bothered by feeling tired or having little energy?				
PHQ9 -5	Over the past two weeks, how often have you been bothered by poor appetite or overeating?				
PHQ9 -6	Over the past two weeks, how often have you been bothered by feeling bad about yourself - or that you're a failure or have let yourself or your family down?				
PHQ9 -7	Over the past two weeks, how often have you been bothered by trouble concentrating on things, such as reading the newspaper or watching television?				
PHQ9 -8	Over the past two weeks, how often have you been bothered by moving or speaking so slowly that other people could have noticed. Or, the opposite - being so fidgety or restless that you have been moving around a lot more than usual?				
PHQ9 -9	Over the past two weeks, how often have you been bothered by thoughts that you would be better off dead or of hurting yourself in some way?				

The Kessler Psychological Distress Scale (K-10)

Item	Question content	None of the time	A little of the time	Some of the time	Most of the time	All of the time
K10 -1	During the last 30 days, about how often did you feel tired out for no good reason?					
K10 -2	During the last 30 days, about how often did you feel nervous?					
K10 -3	During the last 30 days, about how often did you feel so nervous that nothing could calm you down?					
K10 -4	During the last 30 days, about how often did you feel hopeless?					
K10 -5	During the last 30 days, about how often did you feel restless or fidgety?					
K10 -6	During the last 30 days, about how often did you feel so restless you could not sit still?					
K10 -7	During the last 30 days, about how often did you feel depressed?					
K10 -8	During the last 30 days, about how often did you feel that everything was an effort?					
K10 -9	During the last 30 days, about how often did you feel so sad that nothing could cheer you up?					
K10 -10	During the last 30 days, about how often did you feel worthless?					

The Whooley questions

Whooley -1	During the past month, have you been bothered by feeling down, depressed or hopeless?	Yes	No
Whooley -2	During the past month, have you often been bothered by having little interest or pleasure in doing things?	Yes	No
Whooley-3	Is this something you feel you need or want help with?	Yes	No

The Generalised Anxiety Scale (revised) (GAD-2):

Over the last 2 weeks, how often have you been bothered by the following problems?		Not at all sure	Several days	Over half the days	Nearly every day
GAD -1	Feeling nervous, anxious, or on edge	0	1	2	3
GAD -2	Not being able to stop or control worrying	0	1	2	3

The PMHP Psychosocial Risk Factor Assessment (RFA)

Item	Question content	Yes	No
RFA -1	I feel pleased about being pregnant/now that I have had my baby.	0	1
RFA -2	I have had some very difficult things happen to me in the last year (eg. losing someone close to me, losing my job, moving home etc.)	1	0
RFA -3	My husband/boyfriend and I are still together	0	1
RFA -4	I feel my husband/boyfriend cares about me (say no if you are not with him anymore).	0	1
RFA -5	My husband/boyfriend or someone else in the household is sometimes violent towards me	1	0
RFA -6	My family and friends care about how I feel	0	1
RFA -7	I have experienced some kind of abuse in the past (e.g. physical, emotional, sexual, rape).	1	0
RFA -8	My family and friends help me in practical ways.	0	1
RFA -9	On the whole, I have a good relationship with my own mother (indicate “no” if your mother has passed away).	0	1
RFA -10	I have experienced one of the following in the past: miscarriage, abortion, stillbirth, or the death of a child any time after birth.	1	0
RFA -11	I have had serious depression, panic attacks or problems with anxiety before.	1	0

The Alcohol Use Disorders Test AUDIT

AUDIT -1	How often do you have a drink containing alcohol?	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week
AUDIT -2	How many standard drinks containing alcohol do you have on a typical day when drinking?	1 or 2	3 or 4	5 or 6	7 to 9	10 or more
AUDIT -3	How often do you have six or more drinks on one occasion?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -4	During the past year, how often have you found that you were not able to stop drinking once you had started?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -5	During the past year, how often have you failed to do what was normally expected of you because of drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -6	During the past year, how often have you needed a drink in the morning to get yourself going after a heavy drinking session?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -7	During the past year, how often have you had a feeling of guilt or remorse after drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -8	During the past year, have you been unable to remember what happened the night before because you had been drinking?	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
AUDIT -9	Have you or someone else been injured as a result of your drinking?	No	Yes, but not in the past year	Yes, during the past year		
AUDIT -10	Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested you cut down?	No	Yes, but not in the past year	Yes, during the past year		

The Drug Use Disorders Identification Test (DUDIT)

DUDIT-1	How often do you use drugs other than alcohol?	Never	2-4 times a month	Once a month or less often	2-3 times a week	4 times a week or more often
DUDIT-2	Do you use more than one type of drug on the same occasion?	Never	2-4 times a month	Once a month or less often	2-3 times a week	5 times a week or more often
DUDIT-3	How many times do you take drugs on a typical day when you use drugs?	0	1-2	3-4	5-6	7 or more
DUDIT-4	How often are you influenced heavily by drugs?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-5	Over the past year, have you felt that your longing for drugs was so strong that you could not resist it?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-6	Has it happened, over the past year, that you have not been able to stop taking drugs once you started?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-7	How often over the past year have you taken drugs and then neglected to do something you should have done?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-8	How often over the past year have you needed to take a drug the morning after heavy drug use the day before?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-9	How often over the past year have you had guilt feelings or a bad conscience because you used drugs?	Never	Less often than once a month	Every month	Every week	Daily or almost every day
DUDIT-10	Have you or anyone else been hurt (mentally or physically) because you used drugs?	No	Yes, but not in the past year	Yes, during the past year		
DUDIT-11	Has a relative or a friend, a doctor or a nurse, or anyone else, been worried about your drug use or said to you that you should stop using drugs?	No	Yes, but not in the past year	Yes, during the past year		

The Multidimensional Scale of Perceived Social Support (MSPSS)

Item	Question content	Very strongly disagree	Strongly disagree	Mildly disagree	Neutral	Mildly agree	Strongly agree	Very strongly agree
MSPSS-1	There is a special person who is around when I am in need.							
MSPSS-2	There is a special person with whom I can share my joys and sorrows.							
MSPSS-3	My family really tries to help me.							
MSPSS-4	I get the emotional help and support I need from my family							
MSPSS-5	I have a special person who is a real source of comfort to me.							
MSPSS-6	My friends really try to help me							
MSPSS-7	I can count on my friends when things go wrong							
MSPSS-8	I can talk about my problems with my family							
MSPSS-9	I have friends with whom I can share my joys and sorrows.							
MSPSS-10	There is a special person in my life who cares about my feelings.							
MSPSS-11	My family is willing to help me make decisions							
MSPSS-12	I can talk about my problems with my friends							

The Revised Conflict Tactic Scales (RCTS)

RCTS -1	Have you experienced physical abuse by your partner/husband in the past 6 months? (By physical abuse we mean whether you were hit, slapped, kicked, bit, pushed, shoved, or physically hurt in another way by your partner.)	Yes	No
RCTS -2	Has your partner twisted your arm or hair, or threw something at you that could hurt? Has your partner pushed, grabbed, or slapped you?	Yes	No
RCTS -3	Has your partner kicked you or slammed you against a wall, punched or hit you with something that could hurt you?	Yes	No
RCTS -4	Has your partner beat you up, or burned or scalded you on purpose?	Yes	No
RCTS -5	Has your partner choked you, or used a knife or gun on you?	Yes	No
RCTS -6	Has your partner used force, like hitting, holding you down, or using a weapon, to make you have sex?	Yes	No
RCTS -7	Has your partner put you down with words, emotionally hurt or made you feel afraid?	Yes	No

The Household Food Insecurity Access Scale (HFIAS).

Food Security I'm going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement was often true, sometimes true, or never true for (you/your household) in the last 6 months					
FS-1	The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more	Often true	Sometimes true	Never true	DK or Refused
FS-2	(I/we) couldn't afford to eat balanced meals	Often true	Sometimes true	Never true	DK or Refused
FS-3	Did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?	Yes	No (Skip FS-4)	DK (Skip FS-4)	
FS-4	[IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?	Almost every month	Some months but not every month	Only 1 or 2 months	DK or Refused
FS-5	In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?	Yes	No	DK	
FS-6	In the last 12 months, were you every hungry but didn't eat because there wasn't enough money for food?	Yes	No	DK	

List of Threatening Experiences

Item	Question content	< 6 months ago	Impact?	> 6 months ago	Impact?
LEQ - 1	In the last 6 months, you yourself suffered a serious illness, injury or an assault.		o None o Some o Significant		o None o Some o Significant
LEQ - 2	In the last 6 months, a serious illness, injury or assault happened to a close relative.		o None o Some o Significant		o None o Some o Significant
LEQ - 3	In the last 6 months, your parent, child or spouse died.		o None o Some o Significant		o None o Some o Significant
LEQ - 4	A close family friend or another relative (aunt, cousin, Grandparent) died.		o None o Some o Significant		o None o Some o Significant
LEQ - 5	In the last 6 months, you had a separation due to marital difficulties.		o None o Some o Significant		o None o Some o Significant
LEQ - 6	You broke off a steady relationship.		o None o Some o Significant		o None o Some o Significant
LEQ - 7	You had a serious problem with a close friend, neighbor or relative.		o None o Some o Significant		o None o Some o Significant
LEQ - 8	You became unemployed or you were seeking work unsuccessfully for more than one month.		o None o Some o Significant		o None o Some o Significant
LEQ - 9	You were fired from your job.		o None o Some o Significant		o None o Some o Significant
LEQ - 10	You had a major financial crisis.		o None o Some o Significant		o None o Some o Significant
LEQ - 11	You had problems with the police and a court appearance.		o None o Some o Significant		o None o Some o Significant
LEQ - 12	Something you valued was lost or stolen.		o None o Some o Significant		o None o Some o Significant

The Trauma Symptom Questionnaire

Below is a list of problems and complaints that people sometimes have in response to stressful life experiences (severe emotional shock and pain caused by an extremely upsetting experience such as an accident, a rape, violence against you, against someone close to you, or in your neighbourhood, the sudden death of someone close to you, Which of the following has bothered you in the last month.			
TSQ -1	Upsetting thoughts or memories about the event that have come into your mind against your will	Yes	No
TSQ -2	Upsetting dreams about the event	Yes	No
TSQ -3	Acting or feeling as though the event were happening again	Yes	No
TSQ -4	Feeling upset by reminders of the event	Yes	No
TSQ -5	Bodily reactions (such as fast heartbeat, stomach churning, sweatiness, dizziness) when reminded of the event	Yes	No
TSQ -6	Difficulty falling or staying asleep	Yes	No
TSQ -7	Irritability or outbursts of anger	Yes	No
TSQ -8	Difficulty concentrating	Yes	No
TSQ -9	Heightened awareness of potential dangers to yourself and others	Yes	No
TSQ -10	Being jumpy or being startled at something unexpected	Yes	No

M.I.N.I. PLUS

MINI INTERNATIONAL NEUROPSYCHIATRIC INTERVIEW

English Version 5.0.0

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M.I.N.I. Plus 5.0.0 (July 1, 2006)

Patient Name:		***Patient Number:***	
Date of Birth:		***Time Interview Began:***	
Interviewer's Name:		***Time Interview Ended:***	
Date of Interview:		***Total Time:***	

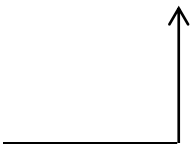
	MODULES	TIME FRAME	MEETS CRITERIA	DSM-IV	ICD-10	
A	MAJOR DEPRESSIVE EPISODE	Current (2 weeks)	o	296.20-296.26 Single	F32.x	π
		Recurrent	o	296.30-296.36 Recurrent	F33.x	π
	MOOD DISORDER DUE TO A GENERAL MEDICAL CONDITION	Current	o	293.83	F06.xx	π
		Past	o	293.83	F06.xx	π
	SUBSTANCE INDUCED MOOD DISORDER	Current	o	29x.xx	none	π
		Past	π	29x.xx	none	π
	MDE WITH MELANCHOLIC FEATURES	Current (2 weeks)	o	296.20-296.26 Single	F32.x	π
				296.30-296.36 Recurrent	F33.x	π
B	DYSTHYMIA	Current (Past 2 years)	o	300.4	F34.1	π
		Past	o	300.4	F34.1	π
C	SUICIDALITY	Current (Past Month)	o	none	none	π
		Risk: o Low o Medium o High				
D	MANIC EPISODE	Current	o	296.00-296.06	F30.x-F31.9	π
		Past	o	296.00-296.06	F30.x-F31.9	π
	HYPOMANIC EPISODE	Current	o	296.80-296.89	F31.8-F31.9/F34.0	
		Past	o	296.80-296.89	F31.8-F31.9/F34.0	
	BIPOLAR I DISORDER	Current	o	296.0x-296.6x	F30.x-F31.9	π
		Past	o	296.0x-296.6x	F30.x-F31.9	π
	BIPOLAR II DISORDER	Current	o	296.89	F31.8	π
		Past	o	296.89	F31.8	π
	MANIC EPISODE DUE TO A GENERAL MEDICAL CONDITION	Current	o	293.83	F06.30	π
		Past	o	293.83	F06.30	π
	HYPOMANIC EPISODE DUE TO A GENERAL MEDICAL CONDITION	Current	o	293.83	none	π
		Past	o	293.83	none	π
	SUBSTANCE INDUCED MANIC EPISODE	Current	o	291.8-292.84	none	π
		Past	o	291.8-292.84	none	π
	SUBSTANCE INDUCED HYPOMANIC EPISODE	Current	o	291.8-292.84	none	π
		Past	o	291.8-292.84	none	π
E	PANIC DISORDER	Current (Past Month)	o	300.01/300.21	F40.01-F41.0	π
		Lifetime	o	300.01/300.21	F40.01-F41.0	π
	ANXIETY DISORDER WITH PANIC ATTACKS DUE TO A GENERAL MEDICAL CONDITION	Current	o	293.89	F06.4	π
	SUBSTANCE INDUCED ANXIETY DISORDER WITH PANIC ATTACKS	Current	o	291.8-292.89	none	π
G	SOCIAL PHOBIA (Social Anxiety Disorder)	Current (Past Month)	o	300.23	F40.1	π
H	SPECIFIC PHOBIA	Current	o	300.29	F40.2	π
I	OBSESSIVE-COMPULSIVE DISORDER	Current (Past Month)	o	300.3	F42.8	π
	OCD DUE TO A GENERAL MEDICAL CONDITION	Current	o	293.89	F06.4	π

	SUBSTANCE INDUCED OCD	Current	o	291.8-292.89	none	π
J	POSTTRAUMATIC STRESS DISORDER	Current (Past Month)	o	309.81	F43.1	π
K	ALCOHOL DEPENDENCE	Past 12 Months	o	303.9	F10.2x	π
	ALCOHOL DEPENDENCE	Lifetime	o	303.9	F10.2x	π
	ALCOHOL ABUSE	Past 12 Months	o	305.00	F10.1	π
	ALCOHOL ABUSE	Lifetime	o	305.00	F10.1	π
L	SUBSTANCE DEPENDENCE (Non-alcohol)	Past 12 Months	o	304.00-.90/305.20-.90	F11.0-F19.1	π
	SUBSTANCE DEPENDENCE (Non-alcohol)	Lifetime	o	304.00-.90/305.20-.90	F11.0-F19.1	π
	SUBSTANCE ABUSE (Non-alcohol)	Past 12 Months	o	304.00-.90/305.20-.90	F11.0-F19.1	π
M	PSYCHOTIC DISORDERS	Lifetime	o	295.10-295.90/297.1/	F20.xx-F29	π
		Current	o	297.3/293.81/293.82/ 293.89/298.8/298.9		π
	MOOD DISORDER WITH PSYCHOTIC FEATURES	Current	o	296.24	F32.3/F33.3	π
	SCHIZOPHRENIA	Current	o	295.10-295.60	F20.xx	π
		Lifetime	o	295.10-295.60	F20.xx	π
	SCHIZOAFFECTIVE DISORDER	Current	o	295.70	F25.x	π
		Lifetime	o	295.70	F25.x	π
	SCHIZOPHRENIFORM DISORDER	Current	o	295.40	F20.8	π
		Lifetime	o	295.40	F20.8	π
	BRIEF PSYCHOTIC DISORDER	Current	o	298.8	F23.80-F23.81	π
		Lifetime	o	298.8	F23.80-F23.81	π
	DELUSIONAL DISORDER	Current	o	297.1	F22.0	π
		Lifetime	o	297.1	F22.0	π
	PSYCHOTIC DISORDER DUE TO A GENERAL MEDICAL CONDITION	Current	o	293.xx	F06.0-F06.2	π
		Lifetime	o	293.xx	F06.0-F06.2	π
	SUBSTANCE INDUCED PSYCHOTIC DISORDER	Current	o	291.5-292.12	none	π
		Lifetime	o	291.5-292.12	none	π
	PSYCHOTIC DISORDER NOS	Current	o	298.9	F29	π
		Lifetime	o	298.9 296.24	F29	π
	MOOD DISORDER WITH PSYCHOTIC FEATURES	Lifetime	o		F31.3/F31.2/F31.5	π
	MOOD DISORDER NOS	Lifetime	o	296.90	F39	π
	MAJOR DEPRESSIVE DISORDER WITH PSYCHOTIC FEATURES	Current	o	296.24	F33.X3	π
		Past	o	296.24	F33.X3	π
	BIPOLAR I DISORDER WITH PSYCHOTIC FEATURES	Current	o	296.04-296.64	F31.X2/F31.X5	π
		Past	o	296.04-296.64	F31.X2/F31.X5	π
P	GENERALIZED ANXIETY DISORDER	Current (Past 6 Months)	o	300.02	F41.1	π
	GENERALIZED ANXIETY DISORDER DUE TO A GENERAL MEDICAL CONDITION	Current	o	293.89	F06.4	π
	SUBSTANCE INDUCED GAD	Current	o	291.8-292.89	none	π
Q	ANTISOCIAL PERSONALITY DISORDER	Lifetime	o	301.7	F60.2	π
R	SOMATIZATION DISORDER	Lifetime	o	330.81	F45.0	π
		Current	o			
S	HYPOCHONDRIASIS	Current	o	300.7	F45.2	π
	ATTENTION DEFICIT/HYPERACTIVITY	Lifetime	o	314.00/314.01	F90.0/F98.8	π

	DISORDER (Adults)	Current	o			
X	ADJUSTMENT DISORDERS	Current	o	309.xx	F43.xx	π
Z	MIXED ANXIETY-DEPRESSIVE DISORDER	Current	o			π

PRIMARY DISORDER

Which problem troubles you the most? Indicate your response by checking the appropriate check box(es).



WARNING

EVEN IF A PATIENT HAS A CLEAR LIFE STRESS AGGRAVATING THEIR SYMPTOMS FIRST EXPLORE THE OTHER DIAGNOSES ABOVE. NEVER USE AN ADJUSTMENT DISORDER DIAGNOSIS IF THE DISTURBANCE MEETS CRITERIA FOR ANY OF THE ABOVE DISORDERS.

DISCLAIMER

Our aim is to assist in the assessment and tracking of patients with greater efficiency and accuracy. Before action is taken on any data collected and processed by this program, it should be reviewed and interpreted by a licensed clinician.

This program is not designed or intended to be used in the place of a full medical and psychiatric evaluation by a qualified licensed physician – psychiatrist. It is intended only as a tool to facilitate accurate data collection and processing of symptoms elicited by trained personnel.

GENERAL INSTRUCTIONS

The M.I.N.I. was designed as a brief structured interview for the major Axis I psychiatric disorders in DSM-IV and ICD-10. Validation and reliability studies have been done comparing the M.I.N.I. to the SCID-P for DSM-III-R and the CIDI (a structured interview developed by the World Health Organization for lay interviewers for ICD-10). The results of these studies show that the M.I.N.I. has acceptably high validation and reliability scores, but can be administered in a much shorter period of time (mean 18.7 ± 11.6 minutes, median 15 minutes) than the above referenced instruments. It can be used by clinicians, after a brief training session. Lay interviewers require more extensive training. The M.I.N.I. Plus is a more detailed edition of the M.I.N.I. Symptoms better accounted for by an organic cause or by the use of alcohol or drugs should not be coded positive in the M.I.N.I. The M.I.N.I. Plus has questions that investigate these issues.

INTERVIEW:

In order to keep the interview as brief as possible, inform the patient that you will conduct a clinical interview that is more structured than usual, with very precise questions about psychological problems which require a yes or no answer.

GENERAL FORMAT:

The M.I.N.I. Plus is divided into **modules** identified by letters, each corresponding to a diagnostic category.

•At the beginning of each diagnostic module (except for psychotic disorders module), screening question(s) corresponding to the main criteria of the disorder are presented in a **gray box**.

•At the end of each module, diagnostic box(es) permit the clinician to indicate whether diagnostic criteria are met.

CONVENTIONS:

Sentences written in « normal font » should be read exactly as written to the patient in order to standardize the assessment of diagnostic criteria.

Sentences written in « CAPITALS » should not be read to the patient. They are instructions for the interviewer to assist in the scoring of the diagnostic algorithms.

Sentences written in « **bold** » indicate the time frame being investigated. The interviewer should read them as often as necessary. Only symptoms occurring during the time frame indicated should be considered in scoring the responses.

Answers with an arrow above them (□) indicate that one of the criteria necessary for the diagnosis(es) is not met. In this case, the interviewer should go to the end of the module and circle « **NO** » in all the diagnostic boxes and move to the next module.

When terms are separated by a *slash (/)* the interviewer should read only those symptoms known to be present in the patient (for example, questions M20-M23).

Phrases in (parentheses) are clinical examples of the symptom. These may be read to the patient to clarify the question.

RATING INSTRUCTIONS:

All questions must be rated. The rating is done at the right of each question by circling either Yes or No. Clinical judgment by the rater should be used in coding the responses. The rater should ask for examples when necessary, to ensure accurate coding. The patient should be encouraged to ask for clarification on any question that is not absolutely clear.

The clinician should be sure that <u>each dimension</u> of the question is taken into account by the patient (for example, time frame, frequency, severity, and/or alternatives).

<u>Symptoms better accounted for by an organic cause or by the use of alcohol or drugs should not be coded positive in the M.I.N.I.</u> The M.I.N.I. Plus has questions that investigate these issues.

For any questions, suggestions, need for a training session, or information about updates of the M.I.N.I., please contact :

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A. MAJOR DEPRESSIVE EPISODE

(□ MEANS : GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

FOR PATIENTS WHO APPEAR PSYCHOTIC BEFORE STARTING THE INTERVIEW, OR WHO ARE SUSPECTED TO HAVE SCHIZOPHRENIA, PLEASE ADOPT THE FOLLOWING ORDER OF ADMINISTRATION OF MODULES:

1) PART 1 OF MODULE M (PSYCHOTIC DISORDERS M1-M18).
2) SECTIONS A-D (DEPRESSION TO (HYPO)MANIC EPISODE).
3) PART 2 OF MODULE M (PSYCHOTIC DISORDERS M19-M23).
4) OTHER MODULES IN THEIR USUAL SEQUENCE.

IF MODULE M HAS ALREADY BEEN EXPLORED AND PSYCHOTIC SYMPTOMS HAVE BEEN IDENTIFIED (M1 TO M10b), EXAMINE FOR EACH POSITIVE RESPONSE TO THE FOLLOWING QUESTIONS IF THE DEPRESSIVE SYMPTOMS ARE NOT BETTER EXPLAINED BY THE PRESENCE OF A PSYCHOTIC DISORDER AND CODE ACCORDINGLY.

A1	a	Have you **ever** been consistently depressed or down, most of the day, nearly every day, for at least two weeks?	NO	YES
		IF **A1a** = **YES**:		
	b	Have you been consistently depressed or down, most of the day, nearly every day, for the past 2 weeks?	NO	YES
A2	a	Have you **ever** been much less interested in most things or much less able to enjoy the things you used to enjoy most of the time over at least 2 weeks?	NO	YES
		IF **A2a** = **YES**:		
	b	In the past 2 weeks, have you been much less interested in most things or much less able to enjoy the things you used to enjoy most of the time.	NO	YES
			□	
		IS **A1a** OR **A2a** CODED **YES?**	NO	YES

IF CURRENTLY DEPRESSED (**A1b** OR **A2b** = **YES**), EXPLORE THE CURRENT EPISODE AND THE MOST SYMPTOMATIC PAST EPISODE. OTHERWISE EXPLORE THE MOST SYMPTOMATIC PAST EPISODE.

A3 **Over the two week period when you felt depressed or uninterested,**

		Current Episode		Past Episode	
a	Was your appetite decreased or increased nearly every day? Did your weight decrease or increase without trying intentionally (I.E., BY ±5% OF BODY WEIGHT OR ±8 LBS. OR ±3.5 KGS. FOR A 160 LB./70 KGS. PERSON IN A MONTH)? IF **YES** TO EITHER, CODE **YES**.	NO	YES	NO	YES
b	Did you have trouble sleeping nearly every night (difficulty falling asleep, waking up in the middle of the night, early morning wakening or sleeping excessively)?	NO	YES	NO	YES
c	Did you talk or move more slowly than normal or were you fidgety, restless or having trouble sitting still almost every day?	NO	YES	NO	YES
d	Did you feel tired or without energy almost every day?	NO	YES	NO	YES
e	Did you feel worthless or guilty almost every day?	NO	YES	NO	YES

IF **A3e** = **YES**: ASK FOR AN EXAMPLE.
THE EXAMPLE IS CONSISTENT WITH A DELUSIONAL IDEA. o NO o YES

	f	Did you have difficulty concentrating or making decisions almost every day?	NO	YES	NO	YES
	g	Did you repeatedly consider hurting yourself, feel suicidal, or wish that you were dead?	NO	YES	NO	YES
A4		ARE **3** OR MORE **A3** ANSWERS CODED **YES** (OR **4 A3** ANSWERS, IF **A1a** OR **A2a** ARE CODED **NO** FOR PAST EPISODE OR IF **A1b** OR **A2b** ARE CODED **NO** FOR CURRENT EPISODE)?	NO	YES	NO	YES

VERIFY IF THE POSITIVE SYMPTOMS OCCURRED DURING THE SAME 2 WEEK TIME FRAME.

IF **A4** IS CODED **NO** FOR CURRENT EPISODE THEN EXPLORE **A3a - A3g** FOR MOST SYMPTOMATIC PAST EPISODE.

A5 Did the symptoms of depression cause you significant distress or impair your ability to function at work, socially, or in some other important way? NO YES

A6 Are the symptoms due entirely to the loss of a loved one (bereavement) and are they similar in severity, level of impairment, and duration to what most others would suffer under similar circumstances? If so, this is uncomplicated bereavement.

HAS UNCOMPLICATED BEREAVEMENT BEEN RULED OUT? NO YES

A7 a Were you taking any drugs or medicines just before these symptoms began?
π No π Yes

b Did you have any medical illness just before these symptoms began?
π No π Yes

IN THE CLINICIAN'S JUDGMENT: ARE EITHER OF THESE LIKELY TO BE DIRECT CAUSES OF THE PATIENT'S DEPRESSION? IF NECESSARY ASK ADDITIONAL OPEN-ENDED QUESTIONS.

A7 (SUMMARY): HAS AN ORGANIC CAUSE BEEN RULED OUT? NO YES UNCERTAIN

	NO	YES
	Major Depressive Episode	
A8 CODE **YES** IF **A7(SUMMARY)** = **YES** OR **UNCERTAIN**. SPECIFY IF THE EPISODE IS CURRENT AND/ OR PAST OR BOTH (RECURRENT).		
Current	o	
Past	o	

	NO	YES
	Mood Disorder Due to a General Medical Condition	
A9 CODE **YES** IF **A7b** = **YES** AND **A7 (SUMMARY)** = **NO**. SPECIFY IF THE EPISODE IS CURRENT AND/ OR PAST OR BOTH (RECURRENT).		
Current	o	
Past	o	

	NO	YES
	Substance Induced Mood Disorder	
A10 CODE **YES** IF **A7a** = **YES** AND **A7 (SUMMARY)** = **NO**. SPECIFY IF THE EPISODE IS CURRENT AND/ OR PAST OR BOTH (RECURRENT).		
Current	o	
Past	o	

CHRONOLOGY

A11 How old were you when you first began having symptoms of depression? ☐ age

A12 During your lifetime, how many distinct times did you have these symptoms of depression (daily for at least 2 weeks)? ☐

A13 Is there any family history of bipolar disorder or any relative ever treated with a mood stabilizer? Yes No

MAJOR DEPRESSIVE EPISODE WITH MELANCHOLIC FEATURES (optional)

(☐ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO, AND MOVE TO THE NEXT MODULE)

IF THE PATIENT CODES POSITIVE FOR A CURRENT MAJOR DEPRESSIVE EPISODE (**A8** = **YES**, **CURRENT**), EXPLORE THE FOLLOWING:

A13 a During the most severe period of the current depressive episode, did you lose almost completely your ability to enjoy nearly everything ? NO YES

b During the most severe period of the current depressive episode, did you lose your ability to respond to things that previously gave you pleasure, or cheered you up?
IF NO, DOUBLE CHECK ANSWER BY ASKING:
When something good happens, does it fail to make you feel better, even temporarily? NO YES

☐

IS EITHER **A13a** OR **A13b** CODED **YES**? NO YES

A14 **Over the past two week period, when you felt depressed and uninterested:**

a Did you feel depressed in a way that is different from the kind of feeling you experience when someone close to you dies? NO YES

b Did you feel regularly worse in the morning, almost every day? NO YES

c Did you wake up at least 2 hours before the usual time of awakening and have difficulty getting back to sleep, almost every day? NO YES

d IS **A3c** CODED **YES** (PSYCHOMOTOR RETARDATION OR AGITATION)? NO YES

e IS **A3a** CODED **YES** FOR ANOREXIA OR WEIGHT LOSS? NO YES

f Did you feel excessive guilt or guilt out of proportion to the reality of the situation? NO YES

ARE **3** OR MORE **A14** ANSWERS CODED **YES**?

NO	**YES**
Major Depressive Episode **with** ***Melancholic Features, Current***	

SUBTYPES OF MAJOR DEPRESSIVE EPISODE **Mark all that apply.**

Mild o 296.21/296.31

Moderate	o	296.22/296.32
Severe without psychotic features	o	296.23
Severe with psychotic features	o	296.24
In partial remission	o	296.25
In full remission	o	296.26
Chronic	o	
With catatonic features	o	
With melancholic features	o	
With atypical features	o	
With postpartum onset	o	
With seasonal pattern	o	
With full interepisode recovery	o	
Without full interepisode recovery	o	

IF **A8** OR **A9** OR **A10** = **YES**, SKIP TO SUICIDALITY □

B. DYSTHYMIA

(□ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE **NO**, AND MOVE TO THE NEXT MODULE)

If patient's symptoms <u>currently</u> meet criteria for major depressive episode, do NOT explore <u>current</u> dysthymia, but do explore PAST dysthymia. Make sure that the past dysthymia explored is not one of the past major depressive episodes, and that it was separated from any prior major depressive episode by at least 2 months of full remission. [APPLY THIS RULE ONLY IF YOU ARE INTERESTED IN EXPLORING DOUBLE DEPRESSION.]

SPECIFY WHICH TIME FRAME IS EXPLORED BELOW: o Current o Past

		□	
B1	Have you felt sad, low or depressed most of the time for the last two years? (OR IF EXPLORING PAST DYSTHYMIA: "In the past, did you ever feel sad, low or depressed for 2 years continuously?")	NO	YES
			□
B2	Was this period interrupted by your feeling OK for two months or more?	NO	YES

B3	**During this period of feeling depressed most of the time:**		
a	Did your appetite change significantly?	NO	YES
b	Did you have trouble sleeping or sleep excessively?	NO	YES
c	Did you feel tired or without energy?	NO	YES
d	Did you lose your self-confidence?	NO	YES
e	Did you have trouble concentrating or making decisions?	NO	YES
f	Did you feel hopeless?	NO	YES
		□	
	ARE **2** OR MORE **B3** ANSWERS CODED **YES**?	NO	YES
		□	
B4	Did the symptoms of depression cause you significant distress or impair your ability to function at work, socially, or in some other important way?	NO	YES

B5 Were you taking any drugs or medicines just before these symptoms began?
Did you have any medical illness just before these symptoms began?
IN THE CLINICIAN'S JUDGMENT: ARE EITHER OF THESE LIKELY TO BE DIRECT

CAUSES OF THE PATIENT'S DEPRESSION?

HAS AN ORGANIC CAUSE BEEN RULED OUT? NO YES

IS **B5** CODED **YES**?

NO	**YES**
DYSTHYMIA	
Current	o
Past	o

CHRONOLOGY

B6 How old were you when you first began having symptoms of 2 years of continuous depression? ☐ age

---

C. SUICIDALITY

In the past month did you:

				Points
C1	Suffer any accident?	NO	YES	0
	IF NO TO C1, SKIP TO C2; IF YES, ASK C1a,:			
C1a	Plan or intend to hurt yourself in that accident either passively or actively?	NO	YES	0
	IF NO TO C1a, SKIP TO C2: IF YES, ASK C1b,:			
C1b	Did you intend to die as a result of this accident?	NO	YES	0
C2	Think that you would be better off dead or wish you were dead?	NO	YES	1

C3	Want to harm yourself or to hurt or to injure yourself?	NO	YES	2
C4	Think about suicide?	NO	YES	6

IF YES, ASK ABOUT THE INTENSITY AND FREQUENCY OF THE SUICIDAL IDEATION:

Frequency		Intensity	
Occasionally	π	Mild	π
Often	π	Moderate	π
Very often	π	Severe	π

→ Can you control these impulses and state that you will not act on them while in this program? Only score 8 if the response is NO. NO YES 8

C5	Have a suicide plan?	NO	YES	8
C6	Take any active steps to prepare to injure yourself or to prepare for a suicide attempt in which you expected or intended to die?	NO	YES	9
C7	Deliberately injure yourself without intending to kill yourself?	NO	YES	4
C8	Attempt suicide?	NO	YES	10

Hoped to be rescued / survive π

Expected / intended to die π

In your lifetime:

C9	Did you ever make a suicide attempt?	NO	YES	4

IS AT LEAST **1** OF THE ABOVE (EXCEPT C1) CODED **YES**?

IF YES, ADD THE TOTAL NUMBER OF POINTS FOR THE ANSWERS (C1-C9) CHECKED 'YES' AND SPECIFY THE LEVEL OF SUICIDE RISK AS INDICATED IN THE DIAGNOSTIC BOX:

MAKE ANY ADDITIONAL COMMENTS ABOUT YOUR ASSESSMENT OF THIS PATIENT'S CURRENT AND NEAR FUTURE SUICIDE RISK IN THE SPACE BELOW:

NO **YES**

SUICIDE RISK CURRENT

1-8 points	Low	π
9-16 points	Moderate	π
≥ 17 points	High	π

D. (HYPO) MANIC EPISODE

(□ MEANS : GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

FOR PATIENTS WHO APPEAR PSYCHOTIC BEFORE STARTING THE INTERVIEW OR WHO ARE SUSPECTED TO HAVE SCHIZOPHRENIA, PLEASE ADOPT THE FOLLOWING ORDER OF ADMINISTRATION OF MODULES:

1) PART 1 OF MODULE M (PSYCHOTIC DISORDERS M1-M18).
2) SECTIONS A-D (DEPRESSION TO (HYPO)MANIC EPISODE).
3) PART 2 OF MODULE M (PSYCHOTIC DISORDERS M19-M23).
4) OTHER MODULES IN THEIR USUAL SEQUENCE.

IF MODULE M HAS ALREADY BEEN EXPLORED AND PSYCHOTIC SYMPTOMS HAVE BEEN IDENTIFIED (**M1** TO **M10b**), EXAMINE FOR EACH POSITIVE RESPONSE TO THE FOLLOWING QUESTIONS IF THE (HYPO)MANIC SYMPTOMS ARE NOT BETTER EXPLAINED BY THE PRESENCE OF A PSYCHOTIC DISORDER AND CODE ACCORDINGLY.

D1 a Have you **ever** had a period of time when you were feeling 'up' or 'high' or 'hyper' or so full of energy or full of yourself that you got into trouble, or that other people thought you were not your usual self? (Do not consider times when you were intoxicated on drugs or alcohol.) NO YES

IF NO, CODE NO TO **D1b**: IF **YES** ASK:

b Are you **currently** feeling 'up' or 'high' or 'hyper' or full of energy? NO YES

IF PATIENT IS PUZZLED OR UNCLEAR ABOUT WHAT YOU MEAN BY 'UP' OR 'HIGH',
CLARIFY AS FOLLOWS: BY 'UP' OR 'HIGH' OR 'HYPER' I MEAN: HAVING ELATED MOOD; INCREASED ENERGY; NEEDING LESS SLEEP; HAVING RAPID THOUGHTS; BEING FULL OF IDEAS; HAVING AN INCREASE IN PRODUCTIVITY, MOTIVATION , CREATIVITY, OR IMPULSIVE BEHAVIOR.

D2 a Have you **ever** been persistently irritable, for several days, so that you had arguments or verbal or physical fights, or shouted at people outside your family? Have you or others noticed that you have been more irritable or over reacted, compared to other people, even in situations that you felt were justified? NO YES

IF NO, CODE NO TO **D2b**: IF **YES** ASK:

b Are you **currently** feeling persistently irritable? NO YES

☐

IS **D1a** OR **D2a** CODED **YES**? NO YES

D3 IF **D1b** OR **D2b** = **YES**: EXPLORE **CURRENT** AND MOST SYMPTOMATIC **PAST** EPISODE, OTHERWISE
IF **D1b** AND **D2b** = **NO**: EXPLORE THE MOST SYMPTOMATIC **PAST** EPISODE

During the times when you felt high, full of energy, or irritable did you:

		Current Episode		Past Episode	
a	Feel that you could do things others couldn't do, or that you were an especially important person? IF **YES**, ASK FOR EXAMPLES. THE EXAMPLES ARE CONSISTENT WITH A DELUSIONAL IDEA. π No π Yes	NO	YES	NO	YES
b	Need less sleep (for example, feel rested after only a few hours sleep)?	NO	YES	NO	YES
c	Talk too much without stopping, or so fast that people had difficulty understanding?	NO	YES	NO	YES
d	Have racing thoughts?	NO	YES	NO	YES
e	Become easily distracted so that any little interruption could distract you?	NO	YES	NO	YES
f	Become so active or physically restless that others were worried about you?	NO	YES	NO	YES
g	Want so much to engage in pleasurable activities that you ignored the risks or consequences (for example, spending sprees, reckless driving, or sexual indiscretions)?	NO	YES	NO	YES

☐

D3(SUMMARY): ARE **3** OR MORE **D3** ANSWERS CODED **YES** (OR **4** OR MORE IF **D1a** IS **NO** (IN RATING PAST EPISODE) AND **D1b** IS **NO** (IN RATING CURRENT EPISODE)? NO YES NO YES
RULE: ELATION/EXPANSIVENESS REQUIRES ONLY THREE D3 SYMPTOMS WHILE IRRITABLE MOOD ALONE REQUIRES **4** OF THE **D3** SYMPTOMS.

VERIFY IF THE SYMPTOMS OCCURRED DURING THE SAME TIME PERIOD.

D4 a Were you taking any drugs or medicines just before these symptoms began?

π No π Yes

b Did you have any medical illness just before these symptoms began?
π No π Yes

IN THE CLINICIAN'S JUDGMENT: ARE EITHER OF THESE LIKELY TO BE DIRECT CAUSES OF THE PATIENT'S (HYPO)MANIA? IF NECESSARY, ASK ADDITIONAL OPEN ENDED QUESTIONS.

D4 (SUMMARY): HAS AN ORGANIC CAUSE BEEN RULED OUT? NO YES UNCERTAIN

D5	Did these symptoms last at least a week and cause problems beyond your control at home, work, school, or were you hospitalized for these problems? IF **YES** TO ANY, CODE **YES**	NO ↓	YES ↓	NO ↓	YES ↓	
	THE EPISODE EXPLORED WAS A:	π	π	π	π	
	IF **D5** IS CODED **NO** FOR CURRENT EPISODE, THEN EXPLORE **D3, D4** AND **D5** FOR THE MOST SYMPTOMATIC PAST EPISODE.	***CURRENT HYPOMANIC EPISODE***	***CURRENT MANIC EPISODE***	***PAST HYPOMANIC EPISODE***	***PAST MANIC EPISODE***	

TYPICAL LENGTH OF (HYPO) MANIC PHASE _____

TYPICAL LENGTH OF DEPRESSED PHASE _____

ARE THE SWITCHES FROM (HYPO) MANIA TO DEPRESSION SUDDEN OR GRADUAL? _____

ARE THE SWITCHES FROM DEPRESSION TO (HYPO) MANIA SUDDEN OR GRADUAL? _____

D6

IF **D3** (SUMMARY) = **YES** AND **D4 (SUMMARY)** = **YES** OR **UNCERTAIN** AND **D5** = **NO**, AND NO DELUSIONAL IDEA WAS DESCRIBED IN **D3a**, CODE **YES** FOR HYPOMANIC EPISODE.

SPECIFY IF THE EPISODE IDENTIFIED IS CURRENT OR PAST.

NO	**YES**
HYPOMANIC EPISODE	
Current	o
Past	o

D7 IF **D3 (SUMMARY)** = **YES** AND **D4 (SUMMARY)** = **YES** OR **UNCERTAIN** AND EITHER **D5** = **YES** OR A DELUSIONAL IDEA WAS DESCRIBED IN **D3a**, CODE **YES** FOR MANIC EPISODE.

SPECIFY IF THE EPISODE IDENTIFIED IS CURRENT OR PAST.

NO	**YES**
MANIC EPISODE	
Current	o
Past	o

D8 IF **D3 (SUMMARY)** AND **D4b** AND **D5** = **YES** AND **D4 (SUMMARY)** = **NO**, CODE **YES**?

SPECIFY IF THE EPISODE IDENTIFIED IS CURRENT OR PAST.

NO	**YES**
(Hypo) Manic Episode Due to a General Medical Condition	
Current	o
Past	o

D9 IF **D3 (SUMMARY)** AND **D4a** AND **D5** = **YES** AND **D4 (SUMMARY)** = **NO**, CODE **YES**?

SPECIFY IF THE EPISODE IDENTIFIED IS CURRENT OR PAST.

NO	YES
Substance Induced (Hypo) Manic Episode	
Current	o
Past	o

IF **D8** OR **D9** = **YES,** GO TO NEXT MODULE.

SUBTYPES

Rapid Cycling

Have you had four or more episodes of mood disturbance in 12 months?

NO	YES
Rapid Cycling	

Mixed Episode

PATIENT MEETS CRITERIA FOR BOTH MANIC EPISODE AND MAJOR DEPRESSIVE EPISODE NEARLY EVERY DAY DURING AT LEAST A ONE WEEK PERIOD.

NO	YES
Mixed Episode	

Seasonal Pattern

THE ONSET AND REMISSIONS OR SWITCHES FROM DEPRESSION TO MANIA OR HYPOMANIA CONSISTENTLY OCCUR AT A PARTICULAR TIME OF YEAR.

NO	YES
Seasonal Pattern	

With Full Inter-episode Recovery

Between the two most recent mood episodes did you fully recover?

NO	N/A	YES
With Full Inter-episode Recovery		

MOST RECENT EPISODE WAS A **MANIC** / **HYPOMANIC** / **MIXED** / **DEPRESSED** EPISODE **(CIRCLE ONE)**

SEVERITY

X1	Mild	o
X2	Moderate	o
X3	Severe without psychotic features	o
X4	Severe with psychotic features	o
X5	In partial remission	o
X6	In full remission	o

CHRONOLOGY

D10 How old were you when you first began having symptoms of manic/hypomanic episodes? ☐ age

D11	Since the first onset how many distinct times did you have significant symptoms of mania/ hypomania?	☐	
D12	Is there any family history of bipolar disorder or any relative ever treated with a mood stabilizer?	Yes	No

E. PANIC DISORDER

(□ MEANS: GO TO **E6** AND **E7** AND **E8** AND **E9** AND **E10**, CIRCLE **NO** TO ALL AND MOVE TO NEXT MODULE – MODULE **F**)

E1	a	Have you, on more than one occasion, had spells or attacks when you suddenly felt anxious, frightened, uncomfortable or uneasy, even in situations where most people would not feel that way?	□ NO	YES
	b	Did the spells surge to a peak within 10 minutes of starting?	□ NO	YES
E2		At any time in the past, did any of those spells or attacks come on unexpectedly or spontaneously, or occur in an unpredictable or unprovoked manner?	□ NO	YES
E3		Have you ever had one such attack followed by a month or more of persistent concern about having another attack, or worries about the consequences of the attack? or did you make a significant change in your behavior because of the attacks (e.g., shopping only with a companion, not wanting to leave your house, visiting the emergency room repeatedly, or seeing your doctor more frequently because of the symptoms?	NO	YES
E4		During the worst spell that you can remember:		
	a	Did you have skipping, racing or pounding of your heart?	NO	YES
	b	Did you have sweating or clammy hands?	NO	YES
	c	Were you trembling or shaking?	NO	YES
	d	Did you have shortness of breath or difficulty breathing?	NO	YES
	e	Did you have a choking sensation or a lump in your throat?	NO	YES
	f	Did you have chest pain, pressure or discomfort?	NO	YES
	g	Did you have nausea, stomach problems or sudden diarrhea?	NO	YES
	h	Did you feel dizzy, unsteady, lightheaded or faint?	NO	YES
	i	Did things around you feel strange, unreal, detached or unfamiliar, or did you feel outside of or detached from part or all of your body?	NO	YES
	j	Did you fear that you were losing control or going crazy?	NO	YES
	k	Did you fear that you were dying?	NO	YES
	l	Did you have tingling or numbness in parts of your body?	NO	YES
	m	Did you have hot flushes or chills?	NO	YES
		E4 (SUMMARY): ARE **4** OR MORE **E4** ANSWERS CODED **YES**?	NO	YES
E5	a	Were you taking any drugs or medicines just before these symptoms began? π No π Yes		
	b	Did you have any medical illness just before these symptoms began? π No π Yes		

IN THE CLINICIAN'S JUDGMENT: ARE EITHER OF THESE LIKELY TO BE DIRECT CAUSES OF THE PATIENT'S PANIC DISORDER?

E5 (SUMMARY): HAS AN ORGANIC CAUSE BEEN RULED OUT? NO YES
IF **E5 (SUMMARY**) IS CODED **NO**, SKIP TO **E9**.

E6 DOES **E3** AND **E4 (SUMMARY)** AND **E5 (SUMMARY)** = **YES**? NO YES
PANIC DISORDER
LIFETIME

IF **E6** = **YES**, SKIP TO E8.

E7 IF **E6** = **NO**, ARE ANY E4 ANSWERS CODED **YES**? NO YES
LIMITED SYMPTOM ATTACKS
LIFETIME

THEN SKIP TO **F1**.

E8 In the past month, did you have such attacks repeatedly (2 or more), followed by persistent concern about having another attack? NO YES
PANIC DISORDER
CURRENT

(IF THIS IS DENIED BY THE PATIENT—CHALLENGE BY REVIEWING THE SYMPTOMS ENDORSED IN **E4).**

E9 ARE **E3** AND **E4 (SUMMARY)** AND **E5b** ALL CODED **YES** AND **E5 (SUMMARY)** CODED **NO**?

NO **YES**

Anxiety Disorder with Panic Attacks Due to a General Medical Condition
CURRENT

E10 ARE **E3** AND **E4 (SUMMARY)** AND **E5a** ALL CODED **YES** AND **E5 (SUMMARY)** CODED **NO**?

NO **YES**

Substance Induced Anxiety Disorder with Panic Attacks
CURRENT

CHRONOLOGY

E11 How old were you when you first began having symptoms of panic attacks? ☐ age

E12 During the past year, for how many months did you have significant symptoms of panic attacks or worries about having an attack? ☐

G. SOCIAL PHOBIA (Social Anxiety Disorder)

(□ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO, AND MOVE TO THE NEXT MODULE)

G1	In the past month, were you fearful or embarrassed being watched, being the focus of attention, or fearful of being humiliated? This includes situations like speaking in public, eating in public or with others, writing while someone watches, or being in social situations.	□ NO	YES
G2	Is this social fear excessive or unreasonable?	□ NO	YES
G3	Do you fear these social situations so much that you avoid them or suffer through them?	□ NO	YES

G4 Do these social fears disrupt your normal work or social functioning or cause you significant distress?

NO **YES**

SOCIAL PHOBIA
(Social Anxiety Disorder)
CURRENT

SUBTYPES

Do you fear and avoid 4 or more social situations?

If YES Generalized social phobia (social anxiety disorder) — GENERALIZED π

If NO Non-generalized social phobia (social anxiety disorder) — NON-GENERALIZED π

NOTE TO INTERVIEWER: PLEASE ASSESS WHETHER THE SUBJECT'S FEARS ARE RESTRICTED TO NON-GENERALIZED ("ONLY 1 OR SEVERAL") SOCIAL SITUATIONS OR EXTEND TO GENERALIZED ("MOST") SOCIAL SITUATIONS. "MOST" SOCIAL SITUATIONS IS USUALLY OPERATIONALIZED TO MEAN 4 OR MORE SOCIAL SITUATIONS, ALTHOUGH THE DSM-IV DOES NOT EXPLICITLY STATE THIS.

EXAMPLES OF SUCH SOCIAL SITUATIONSTYPICALLY INCLUDE INITIATING OR MAINTAINING A CONVERSATION, PARTICIPATING IN SMALL GROUPS, DATING, SPEAKING TO AUTHORITY FIGURES, ATTENDING PARTIES, PUBLIC SPEAKING, EATING IN FRONT OF OTHERS, URINATING IN A PUBLIC WASHROOM, ETC.

CHRONOLOGY

G5 How old were you when you first began to fear social situations? ☐ age

G6 During the past year, for how many months did have you have significant fear of social situations? ☐

H. SPECIFIC PHOBIA

(□ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO, AND MOVE TO THE NEXT MODULE)

H1	In the past month, have you been excessively afraid of things like: flying, driving, heights, storms, animals, insects, or seeing blood or needles?	□ NO	YES
H2	Is this fear excessive or unreasonable?	□ NO	YES
H3	Do you fear these situations so much that you avoid them or suffer through them?	□ NO	YES
H4	Does this fear disrupt your normal work or social functioning or cause you significant distress?	**NO**	**YES**

SPECIFIC PHOBIA
CURRENT

CHRONOLOGY

H5	How old were you when you first began to fear or avoid this situation?	☐ age
H6	During the past year, how many times have you had significant fear of this situation?	☐

I. OBSESSIVE-COMPULSIVE DISORDER

(□ ABOVE A NO MEANS : GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

I1	In the past month, have you been bothered by recurrent thoughts, impulses, or images that were unwanted, distasteful, inappropriate, intrusive, or distressing? (For example, the idea that you were dirty, contaminated or had germs, **or** fear of contaminating others, **or** fear of harming someone even though you didn't want to, **or** fearing you would act on some impulse, **or** fear or superstitions that you would be responsible for things going wrong, **or** obsessions with sexual thoughts, images or impulses, **or** hoarding, collecting, **or** religious obsessions.) (DO NOT INCLUDE SIMPLY EXCESSIVE WORRIES ABOUT REAL LIFE PROBLEMS. DO NOT INCLUDE OBSESSIONS DIRECTLY RELATED TO EATING DISORDERS, SEXUAL DEVIATIONS, PATHOLOGICAL GAMBLING, OR ALCOHOL OR DRUG ABUSE BECAUSE THE PATIENT MAY DERIVE PLEASURE FROM THE ACTIVITY AND MAY WANT TO RESIST IT ONLY BECAUSE OF ITS NEGATIVE CONSEQUENCES.)	NO □ to **I4**	YES
I2	Did they keep coming back into your mind even when you tried to ignore or get rid of them?	NO □ to **I4**	YES
I3	Do you think that these obsessions are the product of your own mind and that they are not imposed from the outside?	NO	YES **obsessions**
I4	In the past month, did you do something repeatedly without being able to resist doing it, like	NO	YES

washing or cleaning excessively, counting or checking things over and over, or repeating, collecting, arranging things, or other superstitious rituals? **compulsions**

IS **I3** OR **I4** CODED **YES**? ☐ NO YES

I5 Did you recognize that either these obsessional thoughts or compulsive behaviors were excessive or unreasonable? ☐ NO YES

I6 Did these obsessive thoughts and/or compulsive behaviors significantly interfere with your normal routine, your work or school, your usual social activities, or relationships, or did they take more than one hour a day? NO YES

I7 a Were you taking any drugs or medicines just before these symptoms began?
π No π Yes

b Did you have any medical illness just before these symptoms began?
π No π Yes

IN THE CLINICIAN'S JUDGMENT: ARE EITHER OF THESE LIKELY TO BE DIRECT CAUSES OF THE PATIENT'S OBSESSIVE COMPULSIVE DISORDER***?***

I7 (SUMMARY): HAS AN ORGANIC CAUSE BEEN RULED OUT? NO YES

ARE **I6** AND **I7 (SUMMARY**) CODED **YES?**

NO **YES**

O.C.D.
CURRENT

I8 ARE **I6** AND **I7b** CODED **YES**

AND **I7 (SUMMARY)** CODED **NO**?

NO **YES**

O.C.D.
CURRENT
Due to a General Medical Condition

I9 ARE **I6** AND **I7a** CODED **YES**

AND **I7 (SUMMARY)** CODED **NO**?

NO **YES**

Current Substance Induced
O.C.D.

CHRONOLOGY

I10 How old were you when you first began having symptoms of OCD? ☐ age

I11 During the past year, for how many months did you have significant symptoms of OCD? ☐

J. POSTTRAUMATIC STRESS DISORDER (optional)

(□ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE **NO**, AND MOVE TO THE NEXT MODULE)

J1	Have you ever experienced or witnessed or had to deal with an extremely traumatic event that included actual or threatened death or serious injury to you or someone else? EXAMPLES OF TRAUMATIC EVENTS INCLUDE: SERIOUS ACCIDENTS, SEXUAL OR PHYSICAL ASSAULT, A TERROIST ATTACK, BEING HELD HOSTAGE, KIDNAPPING, FIRE, DISCOVERING A BODY, SUDDEN DEATH OF SOMEONE CLOSE TO YOU, WAR, OR NATURAL DISASTER.	□ NO	YES
J2	Did you respond with intense fear, helplessness or horror?	□ NO	YES
J3	During the past month, have you re-experienced the event in a distressing way (such as, dreams, intense recollections, flashbacks or physical reactions)?	□ NO	YES

J4	**In the past month:**			
	a	Have you avoided thinking about or talking about the event ?	NO	YES
	b	Have you avoided activities, places or people that remind you of the event?	NO	YES
	c	Have you had trouble recalling some important part of what happened?	NO	YES
	d	Have you become much less interested in hobbies or social activities?	NO	YES
	e	Have you felt detached or estranged from others?	NO	YES
	f	Have you noticed that your feelings are numbed?	NO	YES
	g	Have you felt that your life will be shortened or that you will die sooner than other people?	NO	YES
		J4 (SUMMARY): ARE **3** OR MORE **J4** ANSWERS CODED **YES**?	□ NO	YES
J5	**In the past month:**			
	a	Have you had difficulty sleeping?	NO	YES
	b	Were you especially irritable or did you have outbursts of anger?	NO	YES
	c	Have you had difficulty concentrating?	NO	YES
	d	Were you nervous or constantly on your guard?	NO	YES
	e	Were you easily startled?	NO	YES
		J5 (SUMMARY): ARE **2** OR MORE **J5** ANSWERS CODED **YES**?	□ NO	YES
J6		During the past month, have these problems significantly interfered with your work or social activities, or caused significant distress?	NO	YES

IS **J6** CODED **YES**?

NO	**YES**
Posttraumatic Stress Disorder **CURRENT**	

CHRONOLOGY OF PTSD

J7 How old were you when you first began having symptoms of PTSD? ☐ age

J8 Since the first onset how many illness periods of PTSD did you have? ☐

J9 During the past year, for how many months did you have significant symptoms of PTSD? ☐

K. ALCOHOL ABUSE AND DEPENDENCE

(□ MEANS: GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN BOTH AND MOVE TO THE NEXT OPTIONAL K. MODULE)

		□ NO	YES
K1	**In the past 12 months**, have you had 3 or more alcoholic drinks within a 3 hour period on 3 or more occasions?		

K2 **In the past 12 months**:

a	Did you need to drink more in order to get the same effect that you got when you first started drinking?	NO	YES
b	When you cut down on drinking, did your hands shake, did you sweat or feel agitated? Did you drink to avoid these symptoms or to avoid being hungover, for example, "the shakes", sweating or agitation? If **YES** to either question, code **YES**.	NO	YES
c	During the times when you drank alcohol, did you end up drinking more than you planned when you started?	NO	YES
d	Have you tried to reduce or stop drinking alcohol but failed?	NO	YES
e	On the days that you drank, did you spend substantial time in obtaining alcohol, drinking, or in recovering from the effects of alcohol?	NO	YES
f	Did you spend less time working, enjoying hobbies, or being with others because of your drinking?	NO	YES
g	Have you continued to drink even though you knew that the drinking caused you health or mental problems?	NO	YES

ARE **3** OR MORE **K2** ANSWERS CODED **YES**?

NO **YES***

* IF YES, SKIP K3 QUESTIONS, CIRCLE N/A IN THE ABUSE BOX AND MOVE TO THE NEXT DISORDER. DEPENDENCE PREEMPTS ABUSE.

ALCOHOL DEPENDENCE
CURRENT

K3 **In the past 12 months:**

a	Have you been intoxicated, high, or hungover more than once when you had other responsibilities at school, at work, or at home? Did this cause any problems? (CODE **YES** ONLY IF THIS CAUSED PROBLEMS.)	NO	YES
b	Were you intoxicated more than once in any situation where you were physically at risk, for example, driving a car, riding a motorbike, using machinery, boating, etc.?	NO	YES
c	Did you have legal problems more than once because of your drinking, for example, an arrest or disorderly conduct?	NO	YES
d	Did you continue to drink even though your drinking caused problems with your family or other people?	NO	YES

ARE **1** OR MORE **K3** ANSWERS CODED **YES?**

NO **N/A** **YES**

ALCOHOL ABUSE
CURRENT

K. LIFETIME ALCOHOL ABUSE AND DEPENDENCE

(□ MEANS : GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN BOTH, AND MOVE TO THE NEXT MODULE)

		□	
K4	**Did you ever** have 3 or more alcoholic drinks within a 3 hour period on 3 or more occasions?	NO	YES

K5 **In your lifetime**:

a	Did you need to drink more in order to get the same effect that you did when you first started drinking?	NO	YES
b	When you cut down on drinking did your hands shake, did you sweat or feel agitated? Did you drink to avoid these symptoms or to avoid being hungover, for example, "the shakes", sweating or agitation? IF **YES** TO EITHER QUESTION, CODE **YES**.	NO	YES
c	During the times when you drank alcohol, did you end up drinking more than you planned when you started?	NO	YES
d	Have you tried to reduce or stop drinking alcohol but failed?	NO	YES
e	On the days that you drank, did you spend substantial time in obtaining alcohol, drinking, or in recovering from the effects of alcohol?	NO	YES
f	Did you spend less time working, enjoying hobbies, or being with others because of your drinking?	NO	YES
g	Have you continued to drink even though you knew that the drinking caused you health or mental problems?	NO	YES

ARE **3** OR MORE **K5** ANSWERS CODED **YES?**

NO **YES***

* IF YES, SKIP K6 QUESTIONS, CIRCLE N/A IN THE ABUSE BOX AND MOVE TO THE NEXT DISORDER. DEPENDENCE PREEMPTS ABUSE.

ALCOHOL DEPENDENCE
LIFETIME

In your lifetime:

K6	a	Have you been intoxicated, high, or hungover more than once when you had other responsibilities at school, at work, or at home? Did this cause any problems? (CODE **YES** ONLY IF THIS CAUSED PROBLEMS.)	NO	YES
	b	Were you intoxicated in any situation where you were physically at risk, for example, driving a car, riding a motorbike, using machinery, boating, etc.?	NO	YES
	c	Have you had any legal problems because of your drinking, for example, an arrest or disorderly conduct?	NO	YES
	d	Have you continued to drink even though your drinking caused problems with your family or other people?	NO	YES

ARE **1** OR MORE **K6** ANSWERS CODED **YES?**

NO **N/A** **YES**

ALCOHOL ABUSE
LIFETIME

L. NON-ALCOHOL PSYCHOACTIVE SUBSTANCE USE DISORDERS

(□ MEANS : GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

Now I am going to show you/read to you a list of street drugs or medicines.

			□	
L1	a	**Have you ever taken** any of these drugs more than once to get high, to feel better, or to change your mood?	NO	YES

CIRCLE EACH DRUG TAKEN:

Stimulants: amphetamines, "speed", crystal meth, "crank","rush", Dexedrine, Ritalin, diet pills.

Cocaine: snorting, IV, freebase, crack, "speedball".

Narcotics: heroin, morphine, Dilaudid, opium, Demerol, methadone, codeine, Percodan, Darvon, OxyContin.

Hallucinogens: LSD ("acid"), mescaline, peyote, PCP ("Angel Dust", "peace pill"), psilocybin, STP, "mushrooms", "ecstasy", MDA, MDMA or ketamine ("special K").

Inhalants: "glue", ethyl chloride, "rush", nitrous oxide ("laughing gas"), amyl or butyl nitrate ("poppers").

Marijuana: hashish ("hash"), THC, "pot", "grass", "weed", "reefer".

Tranquilizers: Quaalude, Seconal ("reds"), Valium, Xanax, Librium, Ativan, Dalmane, Halcion, barbiturates, Miltown, GHB, Roofinol, "Roofies".

Miscellaneous: steroids, nonprescription sleep or diet pills. Any others?

Specify MOST USED Drug(s): _____

CHECK ONE BOX

ONLY ONE DRUG / DRUG CLASS HAS BEEN USED □

ONLY THE MOST USED DRUG CLASS IS INVESTIGATED. □

EACH DRUG CLASS USED IS EXAMINED SEPARATELY (PHOTOCOPY L2 AND L3 AS NEEDED) □

b SPECIFY WHICH DRUG/DRUG CLASS WILL BE EXPLORED IN THE INTERVIEW BELOW IF THERE IS CONCURRENT OR SEQUENTIAL POLYSUBSTANCE USE:_____

L2 **Considering the (name of drug / drug class selected), in your lifetime:**

	a	Have you found that you needed to use more (name of drug / drug class selected) to get the same effect that you did when you first started taking it?	NO	YES
	b	When you reduced or stopped using (name of drug / drug class selected), did you have withdrawal symptoms (aches, shaking, fever, weakness, diarrhea, nausea, sweating, heart pounding, difficulty sleeping, or feeling agitated, anxious, irritable, or depressed)? Did you use any drug(s) to keep yourself from getting sick (withdrawal symptoms) or so that you would feel better? IF **YES** TO EITHER QUESTION, CODE **YES**.	NO	YES
	c	Have you often found that when you used (name of drug / drug class selected), you ended up taking more than you thought you would?	NO	YES
	d	Have you tried to reduce or stop taking (name of drug / drug class selected), but failed?	NO	YES
	e	On the days that you used (name of drug / drug class selected), did you spend substantial time (> 2 hours) in obtaining, using or in recovering from drug(s), or thinking about drug(s)?	NO	YES
	f	Did you spend less time working, enjoying hobbies, or being with family or friends	NO	YES

because of your drug use?

g Have you continued to use (name of drug / drug class selected) even though it caused you health or mental problems? NO YES

ARE **3** OR MORE **L2** ANSWERS CODED **YES**?

SPECIFY DRUG(S): _____

NO YES

SUBSTANCE DEPENDENCE

LIFETIME

L3 a Have you used (most used drug, any drug) in the past 12 months? NO YES

b ARE **3** OR MORE **L2** ANSWERS CODED **YES** WITHIN THE PAST 12 MONTHS? NO YES

ARE **L3a** AND **b** CODED **YES**?

SPECIFY DRUG(S): _____

* IF YES, SKIP L4 QUESTIONS, CIRCLE N/A IN THE ABUSE BOX FOR THIS SUBSTANCE AND MOVE TO THE NEXT DISORDER. DEPENDENCE PREEMPTS ABUSE.

NO YES*

SUBSTANCE DEPENDENCE
CURRENT

Considering your use of (name the drug / drug class selected), in the past 12 months:

L4 a Have you been intoxicated, high, or hungover from (name of drug / drug class selected) more than once, when you had other responsibilities at school, at work, or at home? Did this cause any problem? (CODE **YES** ONLY IF THIS CAUSED PROBLEMS.) NO YES

b Have you been high or intoxicated from (name of drug / drug class selected) more than once, in any situation where you were physically at risk, (for example, driving a car, riding a motorbike, using machinery, boating, etc.)? NO YES

c Did you have legal problems more than once, because of your drug use, for example,an arrest or disorderly conduct? NO YES

d Did you continue to use (name of drug / drug class selected) even though it caused problems with your family or other people? NO YES

ARE **1** OR MORE **L4** ANSWERS CODED **YES**?

SPECIFY DRUG(S): _____

NO N/A YES

SUBSTANCE ABUSE
CURRENT

CHRONOLOGY

L5 How old were you when you first began having problems with drug abuse? ☐ age

M. PSYCHOTIC DISORDERS - Part 1

ASK FOR AN EXAMPLE OF EACH QUESTION ANSWERED POSITIVELY. CODE YES ONLY IF THE EXAMPLES CLEARLY SHOW A DISTORTION OF THOUGHT OR OF PERCEPTION OR IF THEY ARE NOT CULTURALLY APPROPRIATE. BEFORE CODING, INVESTIGATE WHETHER DELUSIONS QUALIFY AS "BIZARRE".

DELUSIONS ARE "BIZARRE" IF: CLEARLY IMPLAUSIBLE, ABSURD, NOT UNDERSTANDABLE, AND CANNOT DERIVE FROM ORDINARY LIFE EXPERIENCE.

HALLUCINATIONS ARE SCORED "BIZARRE" IF: A VOICE COMMENTS ON THE PERSON'S THOUGHTS OR BEHAVIOR, OR WHEN TWO OR MORE VOICES ARE CONVERSING WITH EACH OTHER.

ALL OF THE PATIENT'S RESPONSES TO THE QUESTIONS SHOULD BE CODED IN COLUMN A. USE THE CLINICIAN JUDGMENT COLUMN (COLUMN B) ONLY IF THE CLINICIAN KNOWS FROM OTHER OUTSIDE EVIDENCE (FOR EXAMPLE, FAMILY INPUT) THAT THE SYMPTOM IS PRESENT BUT IS BEING DENIED BY THE PATIENT.

Now I am going to ask you about unusual experiences that some people have.

			COLUMN A Patient Response			COLUMN B Clinician Judgment (if necessary)	
					BIZARRE		BIZARRE
M1	a	Have you ever believed that people were spying on you, or that someone was plotting against you, or trying to hurt you?	NO	YES	YES	YES	YES
	b	IF **YES / YES BIZARRE**: Do you currently believe these things? **NOTE**: ASK FOR EXAMPLES, TO RULE OUT ACTUAL STALKING.	NO	YES	YES ⟨**M6**	YES	YES ⟨**M6**
M2	a	Have you ever believed that someone was reading your mind or could hear your thoughts or that you could actually read someone's mind or hear what another person was thinking?	NO		YES		YES
	b	IF **YES / YES BIZARRE**: Do you currently believe these things?	NO		YES ⟨**M6**		YES ⟨**M6**
M3	a	Have you ever believed that someone or some force outside of yourself put thoughts in your mind that were not your own, or made you act in a way that was not your usual self? Have you ever felt that you were possessed? CLINICIAN**:** ASK FOR EXAMPLES AND DISCOUNT ANY THAT ARE NOT PSYCHOTIC.	NO		YES		YES
	b	IF **YES / YES BIZARRE**: Do you currently believe these things?	NO		YES ⟨**M6**		YES ⟨**M6**
M4	a	Have you ever believed that you were being sent special messages through the TV, radio, or newspaper, or that a person you did not personally know was particularly interested in you?	NO	YES	YES	YES	YES
	b	IF **YES / YES BIZARRE**: Do you currently believe these things?	NO	YES	YES ⟨**M6**	YES	YES ⟨**M6**
M5	a	Have your relatives or friends ever considered any of your beliefs strange or unusual? **INTERVIEWER:** ASK FOR EXAMPLES. CODE **YES** ONLY IF THE EXAMPLES ARE **CLEARLY** DELUSIONAL IDEAS (FOR EXAMPLE, SOMATIC OR RELIGIOUS DELUSIONS OR DELUSIONS OF GRANDIOSITY, JEALOUSY, GUILT, RUIN OR DESTITUTION OR OTHERS NOT EXPLORED IN **M1** TO **M4**).	NO	YES	YES	YES	YES
	b	IF **YES / YES BIZARRE**: Do they currently consider your beliefs strange?	NO	YES	YES	YES	YES

					BIZARRE			BIZARRE
M6	a	Have you ever heard things other people couldn't hear, such as voices? HALLUCINATIONS ARE SCORED "BIZARRE" ONLY IF PATIENT ANSWERS YES TO THE FOLLOWING:	NO	YES			YES	YES
		IF **YES OR YES BIZARRE:** Did you hear a voice commenting on your thoughts or behavior,or did you hear two or more voices talking to each other?	NO		YES		NO	YES
	b	IF **YES**: Have you heard these things in the past month? SCORE AS "YES BIZARRE" IF PATIENT HEARD A VOICE COMMENTING ON THEIR THOUGHTS OR BEHAVIOR OR HEARD TWO OR MORE VOICES TALKING TO EACH OTHER.	NO	YES	YES **⟨M8**		YES	YES **⟨M8**
M7	a	Have you ever had visions when you were awake or have you ever seen things other people couldn't see? CLINICIAN: CHECK TO SEE IF THESE ARE CULTURALLY INAPPROPRIATE.	NO	YES			YES	
	b	IF **YES**: Have you seen these things in the past month?	NO	YES			YES	

CLINICIAN'S JUDGMENT

M8	b	Is the patient currently exhibiting incoherence, disorganized speech, or marked loosening of associations?	NO	YES
M9	b	Is the patient currently exhibiting disorganized or catatonic behavior?	NO	YES
M10	b	Are negative symptoms of schizophrenia, for example, significant affective flattening, poverty of speech (alogia) or an inability to initiate or persist in goal-directed activities (avolition) prominent during the interview?	NO	YES
M11	a	IS THERE AT LEAST ONE "**YES**" FROM **M1** TO **M10b**?	NO	YES

M11 b

ARE THE ONLY SYMPTOMS PRESENT THOSE IDENTIFIED BY THE CLINICIAN FROM **M1** TO **M7** (COLUMN B) AND FROM **M8b** OR **M9b** OR **M10b**?

IF **YES**, SPECIFY IF THE LAST EPISODE IS CURRENT (AT LEAST ONE "b" QUESTION IS CODED "**YES**" FROM **M1** TO **M10b**) AND/OR LIFETIME (ANY QUESTION CODED **YES** FROM **M1** TO **M10b**) AND PASS TO THE NEXT DIAGNOSTIC SECTION.

IF **NO**, CONTINUE.

NO **YES**

PSYCHOTIC DISORDER NOT OTHERWISE SPECIFIED*

Current o
Lifetime o

***Provisional diagnosis due to insufficient information available at this time.**

WARNING: IF AT LEAST ONE "b" QUESTION IS CODED **YES**, CODE **M11c** AND **M11d**.
IF ALL "b" QUESTIONS ARE CODED NO, CODE ONLY **M11d**.

M11c

FROM **M1** TO **M10b**: ARE ONE OR MORE "b" ITEMS CODED "**YES BIZARRE**"?

OR

ARE TWO OR MORE "b" ITEMS CODED "**YES**" BUT NOT "**YES BIZARRE**"?

AND DID AT LEAST TWO OF THE PSYCHOTIC SYMPTOMS OCCUR DURING THE SAME 1 MONTH PERIOD?

NO

Then Criterion "A" of Schizophrenia is not currently met

YES
Then Criterion "A" of Schizophrenia is currently met

M11d FROM **M1** TO **M10b**: ARE ONE OR MORE "a" ITEMS CODED "**YES BIZARRE**"

OR

ARE TWO OR MORE "a" ITEMS CODED "**YES**" BUT NOT "**YES BIZARRE**"? (CHECK THAT AT LEAST 2 ITEMS OCCURRED DURING THE SAME 1 MONTH PERIOD.)

NO
Then Criterion "A" of Schizophrenia is not met Lifetime

OR IS **M11c** CODED **"YES"**

YES
Then Criterion "A" of Schizophrenia is met Lifetime

M12 a Were you taking any drugs or medicines just before these symptoms began?
π No π Yes

b Did you have any medical illness just before these symptoms began?
π No π Yes

c IN THE CLINICIAN'S JUDGMENT, ARE EITHER OF THESE LIKELY TO BE DIRECT CAUSES OF THE PATIENT'S PSYCHOSIS?
(IF NECESSARY, ASK OTHER OPEN-ENDED QUESTIONS.)
π No π Yes

d HAS AN ORGANIC CAUSE BEEN RULED OUT? NO YES UNCERTAIN

IF **M12d** = **NO**: SCORE **M13 (a, b)** AND GO TO THE NEXT DISORDER
IF **M12d** = **YES**: CODE **NO** IN **M13 (a, b)** AND GO TO **M14**
IF **M12d** = **UNCERTAIN**: CODE **UNCERTAIN** IN **M13 (a, b)** AND GO TO **M14**

M13a IS **M12d** CODED **NO** BECAUSE OF A GENERAL MEDICAL CONDITION?

IF **YES**, SPECIFY IF THE LAST EPISODE IS

CURRENT (AT LEAST ONE "b" QUESTION IS CODED **YES** FROM **M1** TO **M10b**) AND/OR LIFETIME ("a" OR "b") QUESTION IS CODED **YES** FROM **M1** TO **M10b**.

NO **YES**

PSYCHOTIC DISORDER
Due to a General Medical Condition
Current o
Lifetime o
Uncertain, code later o

M13 b IS **M12d** CODED **NO** BECAUSE OF A DRUG?

IF **YES**, SPECIFY IF THE LAST EPISODE IS

CURRENT (AT LEAST ONE QUESTION "b" IS CODED **YES** FROM **M1** TO **M10b**) AND/OR LIFETIME (ANY "a" OR "b" QUESTION CODED **YES** FROM **M1** TO **M10b**).

NO **YES**

Substance Induced
PSYCHOTIC DISORDER
Current o
Lifetime o
Uncertain, code later o

M14 How long was the longest period during which you had those beliefs or experiences? _____
IF <1 DAY, GO TO THE NEXT SECTION.

M15 a During or after a period when you had these beliefs or experiences, did you have difficulty working, or difficulty in your relationships with others, or in taking care of yourself? NO YES

b IF **YES**, how long did these difficulties last? _____
IF ≥6 MONTHS, GO TO **M16.**

c Have you been treated with medications or were you hospitalized because of these beliefs or experiences, or the difficulties caused by these problems? NO YES

d IF **YES**, what was the longest time you were treated with medication or were hospitalized for these problems? _____

M16 a THE PATIENT REPORTED DISABILITY (**M15a CODED YES**) OR WAS TREATED OR HOSPITALIZED FOR PSYCHOSIS (**M15c = YES**). NO YES

b CLINICIAN'S JUDGMENT: CONSIDERING YOUR EXPERIENCE, RATE THE PATIENT'S **LIFETIME** DISABILITY CAUSED BY THE PSYCHOSIS.

absent	o	1
mild	o	2
moderate	o	3
severe	o	4

M17 WHAT WAS THE TOTAL DURATION OF THE PSYCHOSIS, TAKING INTO ACCOUNT THE ACTIVE PHASE (**M14**) AND THE ASSOCIATED DIFFICULTIES (**M15b**) AND PSYCHIATRIC TREATMENT (**M15d**).

1 o ≥1 day to <1 month
2 o ≥1 month to <6 months
3 o ≥>6 months

CHRONOLOGY

M18 a How old were you when you first began having these unusual beliefs or experiences? ☐ age

b Since the first onset how many distinct times did you have significant episodes of these unusual beliefs or experiences? ☐

PSYCHOTIC DISORDERS - PART 2

DIFFERENTIAL DIAGNOSIS BETWEEN PSYCHOTIC AND MOOD DISORDERS

CODE THE QUESTIONS **M19** TO **M23** ONLY IF THE PATIENT DESCRIBED AT LEAST 1 PSYCHOTIC SYMPTOM (**M11a = YES** AND **M11b = NO**), NOT EXPLAINED BY AN ORGANIC CAUSE (**M12d = YES** OR **UNCERTAIN**).

M19 a DOES THE PATIENT CODE POSITIVE FOR CURRENT AND/OR PAST MAJOR DEPRESSIVE EPISODE (QUESTION **A8** CODED **YES**)? NO YES

b IF **YES**: IS **A1** (DEPRESSED MOOD) CODED **YES**? NO YES

c DOES THE PATIENT CODE POSITIVE FOR CURRENT AND/OR PAST MANIC EPISODE (QUESTION **D7** IS CODED **YES**)? NO YES

d IS **M19a** OR **M19c** CODED **YES**? NO YES

↓

STOP.

Skip to M24

NOTE: VERIFY THAT THE RESPONSES TO THE QUESTIONS **M20** TO **M23** REFER TO THE PSYCHOTIC, DEPRESSIVE (**A8**) AND MANIC EPISODES (**D7**), ALREADY IDENTIFIED IN **M11c** AND **M11d, A8 AND D7**. IN CASE OF DISCREPANCIES, REEXPLORE THE SEQUENCE OF DISORDERS, TAKING INTO ACCOUNT IMPORTANT LIFE ANCHOR POINTS/MILESTONES AND CODE **M20** TO **M23** ACCORDINGLY.

M20 When you were having the beliefs and experiences you just described (GIVE EXAMPLES TO PATIENT), were you also feeling depressed/high/irritable at the same time?

NO YES
↓
STOP.
Skip to M24

M21 Were the beliefs or experiences you just described (GIVE EXAMPLES TO PATIENT) restricted exclusively to times you were feeling depressed/high/irritable?

NO YES

M22 Have you ever had a period of two weeks or more of having these beliefs or experiences when you were not feeling depressed/high/irritable?

NO YES
↓
STOP.
Skip to M24

M23 Which lasted longer: these beliefs or experiences or the periods of feeling depressed/high/irritable?

1 o mood
2 o beliefs, experiences
3 o same

M24 AT THE END OF THE INTERVIEW, GO TO THE DIAGNOSTIC ALGORITHMS FOR PSYCHOTIC DISORDERS.

CONSULT ITEMS **M11a** AND **M11b**:

IF THE CRITERION "A" OF SCHIZOPHRENIA IS MET (**M11c** AND/OR **M11d** = **YES**) GO TO DIAGNOSTIC ALGORITHMS I

IF THE CRITERION "A" OF SCHIZOPHRENIA IS NOT MET (**M11c** AND/OR **M11d** = **NO**) GO TO DIAGNOSTIC ALGORITHMS II

FOR MOOD DISORDERS GO TO DIAGNOSTIC ALGORITHM III.

P. GENERALIZED ANXIETY DISORDER

(□ MEANS : GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

P1	a	Have you worried excessively or been anxious about several things over the past 6 months?	□ NO	YES
	b	Are these worries present most days?	□ NO	YES
		IS THE PATIENT'S ANXIETY RESTRICTED EXCLUSIVELY TO, OR BETTER EXPLAINED BY, ANY DISORDER PRIOR TO THIS POINT?	NO	□ YES
P2		Do you find it difficult to control the worries or do they interfere with your ability to focus on what you are doing?	□ NO	YES
P3		FOR THE FOLLOWING, CODE **NO**, IF THE SYMPTOMS ARE CONFINED TO FEATURES OF ANY DISORDER EXPLORED PRIOR TO THIS POINT. (E.G. PRIMARILY IN SOCIAL SITUATIONS, TRIGGEREDPRIMARILY BY MEMORIES OF A TRAUMATIC EVENT OR PRIMARILY TO FEARS OF HAVING A PANIC ATTACK)		
		When you were anxious over the past 6 months, most of the time did you:		
	a	Feel restless, keyed up or on edge?	NO	YES
	b	Feel tense?	NO	YES
	c	Feel tired, weak or exhausted easily?	NO	YES
	d	Have difficulty concentrating or find your mind going blank?	NO	YES
	e	Feel irritable?	NO	YES
	f	Have difficulty sleeping (difficulty falling asleep, waking up in the middle of the night, early morning wakening, or sleeping excessively)?	NO	YES
		SUMMARY OF P3: ARE **3** OR MORE **P3** ANSWERS CODED **YES**?	□ NO	YES
P4		Did these symptoms of anxiety cause you significant distress or impair your ability to function at work, socially, or in some other important way?	□ NO	YES
P5	a	Were you taking any drugs or medicines just before these symptoms began? π No π Yes		
	b	Did you have any medical illness just before these symptoms began? π No π Yes		
		IN THE CLINICIAN'S JUDGMENT: ARE EITHER OF THESE LIKELY TO BE DIRECT CAUSES OF THE PATIENT'S GENERALIZED ANXIETY DISORDER?		
		P5 (SUMMARY): HAS AN ORGANIC CAUSE BEEN RULED OUT?	NO	YES

IS **P5 (SUMMARY)** CODED **YES**?

NO **YES**

Generalized Anxiety Disorder
CURRENT

P6 IS **P5 (SUMMARY)** CODED **NO** AND **P5b** CODED **YES**?

NO **YES**

Current
Generalized Anxiety Disorder.
Due to a General
Medical Condition

P7 IS **P5 (SUMMARY)** CODED **NO** AND **P5a** CODED **YES**?

NO **YES**

Current
Substance Induced
Generalized Anxiety Disorder

CHRONOLOGY

P8 How old were you when you first began having symptoms of generalized anxiety? ☐ age

P9 During the past year, for how many months did you have significant symptoms of generalized anxiety? ☐

Q. ANTISOCIAL PERSONALITY DISORDER (optional)

(□ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO, AND MOVE TO THE NEXT MODULE)

Q1 **Before you were 15 years old, did you:**

a	repeatedly skip school or run away from home overnight?	NO	YES
b	repeatedly lie, cheat, "con" others, or steal?	NO	YES
c	start fights or bully, threaten, or intimidate others?	NO	YES
d	deliberately destroy things or start fires?	NO	YES
e	deliberately hurt animals or people?	NO	YES
f	force someone to have sex with you?	NO	YES

□

ARE **2** OR MORE **Q1** ANSWERS CODED **YES?** NO YES

DO NOT CODE **YES** TO THE BEHAVIORS BELOW IF THEY ARE EXCLUSIVELY POLITICALLY OR RELIGIOUSLY MOTIVATED**.**

Q2 **Since you were 15 years old, have you:**

a	repeatedly behaved in a way that others would consider irresponsible, like failing to pay for things you owed, deliberately being impulsive or deliberately not working to support yourself?	NO	YES
b	done things that are illegal even if you didn't get caught (for example, destroying property, shoplifting, stealing, selling drugs, or committing a felony)?	NO	YES
c	been in physical fights repeatedly (including physical fights with your spouse or children)?	NO	YES
d	often lied or "conned" other people to get money or pleasure, or lied just for fun?	NO	YES
e	exposed others to danger without caring?	NO	YES
f	felt no guilt after hurting, mistreating, lying to, or stealing from others, or after damaging property?	NO	YES

ARE **3** OR MORE **Q2** QUESTIONS CODED **YES**?

NO	**YES**
ANTISOCIAL PERSONALITY DISORDER **LIFETIME**	

R. SOMATIZATION DISORDER (optional)

(□ MEANS : GO TO THE DIAGNOSTIC BOXES, CIRCLE NO IN ALL DIAGNOSTIC BOXES, AND MOVE TO THE NEXT MODULE)

R1	a	Have you had **many** physical complaints not clearly related to a specific disease beginning before age 30?		□ NO	YES
	b	Did these physical complaints occur over several years?		□ NO	YES
	c	Did these complaints lead you to seek treatment?		□ NO	YES
	d	Did these complaints cause significant problems at school, at work, socially, or in other important areas?		□ NO	YES
R2		Did you have pain in your:	head	NO	YES
			abdomen	NO	YES
			back	NO	YES
			joints, extremities, chest, rectum	NO	YES
			during menstruation	NO	YES
			sexual intercourse	NO	YES
			urination	NO	YES
		ARE **2** OR MORE **R2** ANSWERS CODED **YES?**		□ NO	YES
R3		Did you have any of the following abdominal symptoms:			
			nausea	NO	YES
			bloating	NO	YES
			vomiting	NO	YES
			diarrhea	NO	YES
			intolerance of several different foods	NO	YES
		ARE **2** OR MORE **R3** ANSWERS CODED **YES?**		□ NO	YES
R4		Did you have any of the following sexual symptoms:			
			loss of sexual interest	NO	YES
			erection or ejaculation problems	NO	YES
			irregular menstrual periods	NO	YES
			excessive menstrual bleeding	NO	YES
			vomiting throughout pregnancy	NO	YES
		ARE **2** OR MORE **R4** ANSWERS CODED **YES?**		□ NO	YES
R5		Did you have any of the following symptoms:			
			paralysis or weakness in parts of your body	NO	YES
			impaired coordination or imbalance	NO	YES
			difficulty swallowing or lump in throat	NO	YES
			difficulty speaking	NO	YES
			difficulty emptying your bladder	NO	YES
			loss of touch or pain sensation	NO	YES
			double vision or blindness	NO	YES
			deafness, seizures, loss of consciousness	NO	YES
			significant episodes of forgetfulness	NO	YES
			unexplained sensations in your body	NO	YES
			(CLINICIAN: PLEASE EVALUATE IF THESE ARE SOMATIC HALLUCINATIONS)		
				□	

ARE **2** OR MORE **R5** ANSWERS CODED **YES?** NO YES

R6 Were the symptoms investigated by your physician? NO YES

R7 Was any medical illness found, or were you using any drug or medication that could explain these symptoms?
π No π Yes

R6 AND R7 (SUMMARY): CLINICIAN: HAS AN ORGANIC CAUSE BEEN RULED OUT? NO YES

R8 Were the complaints or disability out of proportion to the patient's physical illness? NO YES

IS **R7 (SUMMARY)** OR **R8** CODED **YES**? NO YES

R9 Were the symptoms a pretense or intentionally produced (as in factitious disorder)? NO YES

IS **R9** CODED **NO?**

NO **YES**

SOMATIZATION DISORDER
LIFETIME

R10 Are you currently suffering from these symptoms?

NO **YES**

SOMATIZATION DISORDER
CURRENT

S. HYPOCHONDRIASIS

(□ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO, AND MOVE TO THE NEXT MODULE)

S1 In the past six months, have you worried a lot about having a serious physical illness? NO YES
DO NOT CODE **YES** IF ANY PHYSICAL DISORDER CAN ACCOUNT FOR THE PHYSICAL SENSATIONS OR SIGNS THE PATIENT DESCRIBES.

S2 Have you had this worry for 6 months or more? NO YES

S3 Have you ever been examined by a doctor for these symptoms? NO YES

S4 Have your illness fears persisted in spite of the doctor's reassurance? NO YES

S5 Does this worry cause you significant distress, or does it interfere with your ability to function at work, socially, or in other important ways? NO YES

S6 IS **S5** CODED **YES?**

NO **YES**

HYPOCHONDRIASIS
CURRENT

X. ADJUSTMENT DISORDERS

(□ MEANS : GO TO THE DIAGNOSTIC BOX, CIRCLE NO, AND MOVE TO THE NEXT MODULE)

EVEN IF A LIFE STRESS IS PRESENT OR A STRESS PRECIPITATED THE PATIENT'S DISORDER, DO NOT USE AN ADJUSTMENT DISORDER DIAGNOSIS IF ANY OTHER PSYCHIATRIC DISORDER IS PRESENT. SKIP THE ADJUSTMENT DISORDER SECTION IF THE PATIENT'S SYMPTOMS MEET CRITERIA FOR ANOTHER SPECIFIC AXIS I DISORDER OR ARE MERELY AN EXACERBATION OF A PREEXISTING AXIS I OR II DISORDER.

ONLY ASK THESE QUESTIONS IF PATIENT CODES NO TO ALL OTHER DISORDERS.

X1		Are you having emotional or behavioral symptoms as a result of a life of stress? [Examples include anxiety/depression/misbehavior/physical complaints (examples of misbehavior include fighting, driving recklessly, skipping school, vandalism, violating the rights of others, or doing illegal things)].	□ NO	YES
X2		Did these emotional/behavioral symptoms start within 3 months of the onset of the stressor?	□ NO	YES
X3	a	Are these emotional/behavioral symptoms causing marked distress beyond what would be expected?	□ NO	YES
	b	Are these emotional/behavioral symptoms causing significant impairment in your ability to function socially, at work, or at school?	□ NO	YES
X4		Are these emotional/behavioral symptoms due entirely to the loss of a loved one (bereavement) and are they similar in severity, level of impairment and duration to what most others would suffer under similar circumstances? (If so this is uncomplicated bereavement.)		
		HAS UNCOMPLICATED BEREAVEMENT BEEN RULED OUT?	□ NO	YES
X5		Have these emotional/behavioral symptoms continued for more than 6 months after the stress stopped?	NO	□ YES

WHICH OF THESE EMOTIONAL / BEHAVIORAL SUBTYPES ARE PRESENT? MARK ALL THAT APPLY.

A	Depression, tearfulness or hopelessness.	o
B	Anxiety, nervousness, jitteriness, worry.	o
C	Misbehavior (for example, fighting, driving recklessly, skipping school, vandalism, violating other's rights, doing illegal things).	o
D	Work problems, school problems, physical complaints or social withdrawal.	o

IF MARKED:

- A only, then code as Adjustment disorder **with depressed mood**. 309.0
- B only, then code as Adjustment disorder **with anxious mood**. 309.24
- C only, then code as Adjustment disorder **of conduct**. 309.3
- A and B only, then code as Adjustment disorder **with mixed anxiety and depressed mood**. 309.28
- C and (A or B), then code as Adjustment disorder **of emotions and conduct**. 309.4
- D only, then code as Adjustment Disorder **unspecified**. 309.9

IF **X5** IS CODED **NO,** THEN CODE DISORDER **YES** WITH SUBTYPE**.**

NO	YES
Adjustment Disorder with_____	
(see above for subtypes)	

Z. MIXED ANXIETY-DEPRESSIVE DISORDER

DO NOT USE THIS MODULE ALONE WITHOUT FIRST COMPLETING ALL THE ANXIETY AND MOOD DISORDERS.

(□ MEANS : GO TO THE DIAGNOSTIC BOX AND CIRCLE NO.

[SKIP THIS DISORDER IF PATIENT 'S SYMPTOMS HAVE ALREADY MET CRITERIA FOR ANY OTHER DISORDER AND CODE **NO** IN THE DIAGNOSTIC BOX.]

Z1	Have you been depressed or down consistently for at least a **month**?	□ NO	YES	
Z2	When you felt depressed did you have any of the following symptoms for at least **one month**:			
	a. Did you have difficulty concentrating or find your mind going blank?	NO	YES	
	b. Did you have trouble sleeping (difficulty falling asleep, waking up in the middle of the night, early morning wakening, or sleeping excessively)?	NO	YES	
	c. Did you feel tired or low in energy?	NO	YES	
	d. Did you feel irritable?	NO	YES	
	e. Did you worry too persistently for at least a month?	NO	YES	
	f. Did you cry easily?	NO	YES	
	g. Were you always on the lookout for possible dangers?	NO	YES	
	h. Did you fear the worst?	NO	YES	
	i. Did you feel hopeless about the future?	NO	YES	
	j. Was your self-confidence low, or did you feel worthless?	NO	YES	
	Summary of Z2: ARE **4** OR MORE **Z2** ANSWERS CODED **YES**?	□ NO	YES	
Z3	Do these symptoms cause you significant distress or impair your ability to function at work, socially, or in some other important way?	□ NO	YES	
Z4	a Were you taking any drugs or medicines just before these symptoms began?			
	b Did you have any medical illness just before these symptoms began?			
	IN THE CLINICIAN'S JUDGMENT are either of these likely to be direct causes of the patient's symptoms?			
	HAS AN ORGANIC CAUSE BEEN RULED OUT?	□ NO	YES	UNCERTAIN
Z5	a. The patient's symptoms meet criteria for: Major Depression **LIFETIME**	□ NO	YES	

	Dysthymia **LIFETIME**	☐ NO	YES
	Panic Disorder **LIFETIME**	☐ NO	YES
	Generalized Anxiety Disorder **LIFETIME**	☐ NO	YES
b. The patient's symptoms **CURRENTLY** meet criteria for:	any other anxiety disorder	☐ NO	YES
	any other mood disorder	☐ NO	YES
c. The patient's symptoms are better accounted for by another psychiatric disorder.		☐ NO	YES

Z6 IS **Z5c** CODED **YES?**

NO **YES**

MIXED ANXIETY - DEPRESSIVE DISORDER **CURRENT**

THIS CONCLUDES THE INTERVIEW

Appendix 5: Sensitivity analysis of ROC output and cut-points against CPMD diagnosis.

Screening tool	Cutpoint	Sensitivity	Specificity	Correctly classified
EPDS	>=10	87%	58%	66%
	>=12	78%	74%	76%
	>=13	75%	78%	77%
	>=14	67%	83%	78%
	>=15	59%	89%	79%
3-item EPDS	>=2	84%	57%	66%
	>=3	70%	77%	75%
	>=4	51%	89%	77%
K10	>=9	84%	68%	73%
	>=10	82%	72%	75%
	>=11	80%	79%	80%
	>=12	75%	82%	80%
	>=13	72%	85%	81%
	>=14	70%	87%	82%
K6	>=6	80%	72%	74%
	>=7	75%	80%	79%
	>=8	74%	85%	81%
	>=9	69%	88%	82%
	>=10	63%	91%	82%
PHQ9	>=7	82%	67%	72%
	>=8	73%	72%	73%
	>=9	69%	80%	76%
	>=10	66%	86%	80%
	>=11	61%	86%	81%
	>=12	53%	92%	80%
	>=13	48%	94%	79%
PHQ2	>=1	90%	46%	60%
	>=2	75%	69%	71%
	>=3	54%	86%	76%
Whooley questions	>=1	81%	63%	69%
	>=2	66%	87%	80%
Whooley + help question	>=1	81%	63%	69%
	>=2	73%	82%	79%
	>=3	53%	94%	81%