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ANTENATAL DEPRESSION SCREENING AND PERINATAL DEPRESSION AMONG WOMEN AT RAHIMA MOOSA HOSPITAL

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A thesis submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in fulfillment of the requirements for the degree of Doctor of Philosophy.

Johannesburg 2018

Declaration

I, Carina Marsay declare that this thesis is my own work. It is being submitted for the degree of Doctor of Philosophy in the University of the Witwatersand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

Signed

……22……day of ……June……2018……in……Parktown……

Publications and presentations arising from this study

Publications arising from this study

1. Marsay C, Manderson L, Subramaney U. Validation of the Whooley questions for antenatal depression and anxiety among low-income women in urban South Africa. South African Journal of Psychiatry. 2017;23:1-7.
2. Marsay, C., Manderson, L. and Subramaney, U. In press. Changes in mood, after screening for anxiety and depression. *Journal of Reproductive and Infant Psychology*
3. Marsay, C., Manderson, L. and Subramaney, U. Accepted subject to revisions. Postnatal mood and socioeconomic context among low-income women in Johannesburg, South Africa. *Health Care for Women International*

Presentations arising from this study

2016: International Marcé Society Conference: 'Frontiers in Perinatal Mental Health – looking to the future". The first paper entitled "Validation of the Whooley questions for antenatal depression and anxiety among low-income women in urban South Africa" was presented at the 2016 International Marcé Society Conference in Melbourne, Australia.

2017: Maternal Health Summit: 'Celebrating Milestones in Women's Mental Health'. An overview of the PhD findings and recommendations were presented at the Maternal Health Summit in Johannesburg.

Policy Brief

As a result of the subject of my PhD, I was invited to be a co-author on a Policy Brief, with a team of researchers from the Perinatal Mental Health Project in Cape Town. The policy brief was presented to the National Committee on Confidential Enquiry into Maternal Deaths in November 2017. We are currently in the process of adapting this policy brief for publication.

McKeena, A., Abrahams, Z., Marsay, C. and Honikman, S. "Screening for common perinatal mental disorders in South Africa. The need, the research, the tool. Let's do it" *Perinatal Mental Health Project*. 42pp. Available at https://pmhp.za.org/wp-content/uploads/SouthAfricanScreeningAdvisory_PMHP.pdf

Abstract

In South Africa, 30-40% of women suffer from perinatal depression. This has devastating consequences for both mother and infant, as depressed mothers are at higher obstetric risk and have diminished capacity to care for the physical and emotional needs of their infants. Without adequate screening, approximately 75% of women with perinatal depression will remain undiagnosed and only 10% of these women will receive treatment. Studies conducted in low, middle and high income settings have shown that it is feasible and acceptable to incorporate mental health screening and depression assessment, with referral, into antenatal clinics.

The study reported in this dissertation aimed to investigate whether women attending the antenatal clinic at Rahima Moosa Hospital would benefit from antenatal screening for perinatal depression. This would be achieved by determining whether antenatal screening for depression lead to reduced symptoms of depression. In addition, the study was designed to compare the specificity and sensitivity of the Whooley screening questions with the Edinburgh Postnatal Depression Scale (EPDS) in detecting major depression during pregnancy. Lastly, the study aimed to explore the lived experiences, and barriers to care, of women identified as suffering from perinatal depression who were referred for further management. A mixed-method, explanatory design, involving three phases, was used. In the first phase, data were collected using quantitative measures, including a standardised biographical interview, the EPDS, the Whooley screening questions and the Structured Clinical Interview of DSM5. During the second and third phases, quantitative measures were used again to identify changes from phase one. Data were also collected using qualitative in-depth interviews to explain results in greater depth.

Perinatal depression is a significant public health problem that needs to be addressed in order to improve maternal and child health. Only by listening to the needs of women experiencing perinatal depression can mental health care be improved within obstetric services. Well-designed research studies which use an explanatory, transformative design can be used to guide effective screening programmes, improve treatment and inform national policy.

Acknowledgements

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My supervisors, Lenore Manderson and Ugash Subramaney; without them I would not have been able to complete this thesis.

The staff at Rahima Moosa Hospital who helped to accommodate me during the data collection phase of the study.

This thesis follows the format of a "thesis by published works," with the three empirical publications comprising Chapters 3, 4 and 5 of the thesis. Although I include a full literature review (Chapter 1), the relevant literature is covered in each of the results chapters. Tables in these chapters are numbered from Table 1 onwards, as in the manuscripts, and in each case referencing follows the journal style. References included in the bibliography are for works cited in Chapters 1, 2 and 6.

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CHAPTER 1: THE CHALLENGES OF PERINATAL DEPRESSION

INTRODUCTION/BACKGROUND

Perinatal depression can be defined as depression occurring any time from conception, including during pregnancy and into the first postpartum year. Rates of perinatal depression in high income countries (HIC) are reported at about 13% of all perinatal women, but there is a significantly higher rate of perinatal depression in low and middle income countries (LMIC), ranging from approximately 15 to 20% (1, 2). As I describe below, studies conducted in LMIC report higher prevalence rates as socially and economically disadvantaged women are more vulnerable to perinatal depression (1, 3). Maternal depression has serious consequences, resulting in significant morbidity and even mortality for both mothers and infants. Particularly in LMIC, mothers face physical and logistical challenges, including caring for an infant in contexts of poor sanitation, overcrowding, food insecurity, and poor social support. These difficulties are compounded for women with depression, in whom the symptoms − including anhedonia, impaired cognition, low mood and energy levels − impact on their ability to care for their infants' physical and emotional needs (4). The daily demands of early infant care are more difficult to negotiate when functioning is suboptimal as a result of depression (5). As a result, infants and children of depressed mothers have poorer physical, cognitive and emotional outcomes. In these settings, poor maternal mental health during the antenatal period is a risk factor for low birth weight and preterm delivery (6, 7). Postnatally, malnutrition, poor infant growth, and increased frequency of infant diarrheal illness are prevalent, which may be related to the early cessation of breastfeeding in depressed mothers living in poverty (8). This can lead to an increase in child mortality (9). The emotional development of infants is compromised because of a disturbed mother-infant relationship, where mothers are less sensitive towards their infants and infants are less responsive towards mothers (10). This in turn leads to poorer quality attachment, resulting in behavioural and psychological difficulties that can last into adolescence and adulthood (11). Compromised cognitive functioning and delayed development also affect infants and children of depressed mothers, impacting on their scholastic achievement (12). In the context of chronic social and economic adversity, as experienced by poor women in both high and low to middle income countries, poor quality parenting as a result of maternal depression is especially harmful (11). These adverse outcomes further perpetuate social and economic inequality.

Poverty and low-socioeconomic status affect more women numerically and as a proportion of a given population in low and middle income countries as compared to women in high income countries, making them vulnerable to depression. This is very clear in South Africa, where approximately 40% of women living in relative poverty will experience perinatal depression -- three times the rate documented in high income countries (13-15). Historically significant racial and wealth disparities in South Africa existed as a result of Apartheid, but these have yet to be redressed. The country still faces many social, political and economic challenges and is one of the most economically unequal countries in the world, with a Gini co-efficient of 0.7. The top 10% of the population contribute (and benefit from) 58% of the income and the bottom 10% only 0.5%. This is relevant as economic and social factors contribute to health equity and the general health of a society. This is significant as social injustice impacts negatively on health and health equality (16). The high rates of perinatal depression may be related to the compounding nature of multiple economic, social and psychosocial stressors. These including poverty and unemployment, intimate partner violence, lack of partner support, unplanned pregnancy, and the high prevalence of HIV in pregnant women (39-45%), including diagnosis of HIV infection in the course of antenatal care (13, 14, 17-20). Similar associations have been found in other low and middle income countries. A systematic review conducted in 2012, including various countries from both Asia and Africa, found that socioeconomic disadvantage comprising of food insecurity, financial difficulties, unemployed partner and low income were associated with perinatal depression. In addition, social disadvantage comprising of poor emotional support and lack of empathy from partners, having hostile in-laws and having insufficient practical and emotional support, contributed to the risk of perinatal depression (1). From this, it is clear that maternal depression has multiple etiologies, and cannot be solely explained by women's biological and psychological vulnerability. Rather, social and environmental factors are important contributing factors and determinants of risk and sociocultural context impacts both prevalence and presentation of perinatal depression. (21, 22).

Recently there has been an increased awareness that mental health is a vital part of public health in South Africa. About 16.5% of South Africans suffer from common mental disorders (23). In responding to this, most provincial health services support the integration of mental health in primary health care, run by primary health care nurses who have undergraduate training in mental health. These nurses are able to continue prescriptions while primary health care doctors initiate prescriptions with drugs available on the essential medicines list. Mental illness cannot be viewed in isolation, however, as many social, political and economic factors,

including those elucidated above, play a role in epidemiology of the illness. In South Africa, the country's high rate of mental health disorders, including perinatal depression, is exacerbated by high levels of violence, social and economic exclusion and racial discrimination, as existed under colonialism and apartheid, and as a result of apartheid's continued legacy.

One of the key objectives of South Africa's Mental Health Care Act 2002 (No. 17 of 2002) is to *integrate the provision of mental health care services into the general health services environment* (24). This is further supported by the subsequent National Mental Health Policy Framework and Strategic Plan 2013-2020 (25), in which maternal mental health is incorporated into the general mental health environment, including through the treatment of perinatal depression and anxiety at antenatal and postnatal clinics. The policy states:

- *Specified micro and community level mental health promotion and prevention intervention packages will be included in the core services provided, across a range of sectors, to address the particular psychosocial challenges and vulnerabilities associated with different lifespan developmental stages. These will include:* ***Motherhood****: treatment programmes for maternal mental health as part of the routine antenatal and postnatal care package; and programmes to reduce alcohol and substance use during and after pregnancy.* ***Infancy and Early childhood****: programmes to increase maternal sensitivity and infant-mother attachment.*

- *Introduce routine indicated assessment and management of common mental disorders in priority programmes at PHC level, among others, antenatal mothers and postnatal care.*

In addition, the South African National Development Plan 2030 (2012) (26) makes specific reference to early childhood development by emphasizing the importance of the first 1000 days of life, describing how pregnant women need access to both emotional and material support, and explaining that empowered mothers lay a solid foundation for healthy children. However, despite these policies, the establishment and provision of integrated mental health services into antenatal and postnatal clinics is non-existent in most areas.

South Africa has an unacceptably high maternal mortality rate of 269 per 100 000 live births; of these 60% are avoidable if early antenatal care is sought (27). Antenatal care is free in South Africa's public health system and 91% of all pregnant women attend an antenatal clinic

at least once during their pregnancy (27). Antenatal care is an opportunity to provide vital health information to women on lifestyle risks and to offer social support and counseling. Given this, antenatal care may provide a good opportunity for health workers to intervene and offer screening and treatment for antenatal depression. This would be in line with the move to incorporate mental health services into primary health care. Preliminary evidence from a public obstetric facility in Cape Town suggests that it is feasible and acceptable to incorporate mental health screening and depression assessment, with referral, into antenatal clinics using a task-sharing approach (28).

Health equity should be our aim in South Africa in an attempt to address historical inequality. This can be achieved through principles such as; measurement; evaluation and action. This PhD proposes to measure and evaluate the problem, so expanding the knowledge base, and to potentially raise awareness through the dissemination of research findings. The aim was to see whether short case finding questions are an option as a quick and easy screening tool that could be implemented in busy antenatal clinics as well as to find out how women perceived being screened for antenatal anxiety and depression and if the screening process with referral to community psychiatry clinics impacted on women's moods after the birth of their infants. The goal was the development of a simple, practical policy that will help protect women and their families against the adverse effects of perinatal depression and anxiety. In order to provide a starting point or base to build the research on, a literature review of the relevant background information follows.

LITERATURE REVIEW

Process

The literature review began with a broad approach, guided by identified interests of the *Marcé Society,* an international society established in 1980 at a conference in the UK for the understanding, prevention and treatment of perinatal mental health problems (29). In taking this approach, I followed conversations on the Marcé Society listserv forum (http://lsrv.marcesociety.com), then identified and read articles to clarify key issues and debates on the acceptability and effectiveness of screening for perinatal depression. An electronic search for relevant peer-reviewed literature, using the search engines Web of Sciences, PubMed, and Google Scholar, was conducted using key words including perinatal, postnatal, antenatal, and depression screening. Sources were not restricted by date, study design or country, but were restricted to those written in English; in addition, the focus was on

studies conducted in the last 10 years. In this process, recent systematic reviews were identified and examined. Reference lists were used to identify further relevant literature. Other sources included websites, conference proceedings, and unpublished theses. Details of the references were managed using EndNote software.

Definitions

The term perinatal depression is used to refer to both major and minor depression occurring at any time between conception and the baby's first birthday. Much of the focus until recently has been on postnatal depression, but the prevalence of antenatal depression, and its importance of antenatal depression as the greatest predictor of postnatal depression, is being increasingly recognised (30, 31). Researchers now consider perinatal depression a broader more accurate term. Most research conducted on perinatal depression includes cases with subsyndromal symptoms − that is, symptoms that are not severe enough for diagnosis as a clinically recognised syndrome. This is important as subsyndromal symptoms of depression and anxiety can cause similar levels of distress and impairment as occur in women with clearly diagnosed disorders. Many cases of postpartum depression begin antenatally with features of anxiety (32, 33). A systematic review of the literature conducted in 2006 suggests that postnatal anxiety is as common as postnatal depression (34), and that antenatal depression is as common as postnatal depression (30) This has led to the emergence of a definition of perinatal depression that includes both depression and anxiety symptoms in the perinatal period (35, 36).

Two classification systems are traditionally used for the diagnosis of mental disorders. These are the Diagnostic and Statistical Manual of Mental Disorders, with the Fifth Edition (DSM-5) (2013) now used, as developed by the American Psychiatric Association, and the International Classification of Disease 10th Revision (1994), developed by the World Health Organization. These classification systems provide researchers and clinicians with criteria to make diagnoses that have good validity. However, they can also be too rigid and do not adequately capture the full range of clinical presentations and experiences. Neither of these classification systems categorise perinatal mental disorders separately. It has been postulated that having a pregnancy specifier would benefit mothers and babies, as it would encourage assessment and early detection of perinatal mental health problems. Treatment recommendations are also often determined by classifications.

The DSM-5 is considered to be the gold standard reference manual and classification and diagnostic tool, and remains the best available method for assessing mental disorders. This is despite a number of limitations. For any condition, the DSM-5 offers a semi-structured interview tool that relies to an extent on patient self-report, and can be open to clinician bias, especially when the clinician is not from the same ethnic group, age, gender or socioeconomic status as the woman being assessed. Although the tool has excellent inter-rater reliability, some concerns have been raised about the lack of empirical evidence for some disorders. Depression is defined as per the DSM-5 as a period of more than two weeks of low mood and/or anhedonia, and four or more of the following: significant weight changes; insomnia or hypersomnia; psychomotor agitation or retardation; fatigue; feelings of guilt or worthlessness; decreased concentration; and recurrent thoughts of death or suicide (37). DSM-5 has introduced a specifier for major depressive disorder with peripartum onset. Peripartum onset is defined as the period during pregnancy or in the four weeks post delivery. This is not aligned with clinically accepted definitions, which describe the period as from conception to the infant's first birthday. DSM-5 has introduced the categories of 'other specified' and 'unspecified' anxiety or depression, which can be used to categorise subsyndromal yet clinically significant symptoms. DSM-5 appears to be lacking when it comes to anxiety disorders in the perinatal period. There is no perinatal specifier for anxiety disorders, despite high rates of anxiety in pregnancy (34, 38). There is also no consideration for the high comorbidity of anxiety and depression that occurs in the perinatal period. The fact that anxiety symptoms are more common in postpartum depression than in non-postpartum depression may point to perinatal depression being distinct from major depression (39). This may affect the recognition of perinatal depression as well as non-pharmacological treatment options, which could possibly include interventions targeting both anxiety and depression.

Severe Mental Illness (SMI) and psychopathology can occur in the period spanning pregnancy and the first postnatal year. However, there is reduced vulnerability for SMI during pregnancy, but women face increased risk of relapse after childbirth (40). This may be because oestrogen levels are protective for women with SMI and they tend to relapse post delivery when oestrogen levels drop (41). This explains why the focus has previously been on postnatal depression, with the neglect of antenatal depression. Severe Mental Illness includes postpartum psychosis, severe depression, schizophrenia and bipolar disorder. Postpartum psychosis is relatively rare, with an incidence of 1.1 – 4 per 1000 deliveries (36, 42), and usually occurs in women with a personal or family history of bipolar or schizoaffective disorder (43). These important disorders often have severe consequences for both mother and

child. Suicide, accounting for 28% of all maternal deaths (40, 44), is a leading cause of death for women during pregnancy and in the year after giving birth. For the purpose of this literature review and the research project, however, postpartum psychosis and other severe mental illness in the perinatal period are not discussed. The focus will rather be on perinatal depression and anxiety.

Whether perinatal depression is a distinct illness or no different for non-perinatal depression, and whether there are differences in prevalence, have long been debated. Many early studies report there to be no significant difference in the prevalence of depression among pregnant or postpartum women and women at other times during their childbearing years (36, 45-48). However, one relatively early study, conducted in 1993 by Cox and colleagues, suggested that after the emotional and physical stress of labor and delivery, the risk of a new depressive episode was higher than in a similar, less stressed group of women (48). More recently a large cohort study conducted in Denmark reported that there was an increased risk of new onset psychiatric illness, mostly postnatal depression, in the first three months after delivery in primiparous mothers (49). This finding is supported by a large epidemiological study conducted in the United States in 2008, where 43,093 women were interviewed face-to-face, of whom approximately 14,000 had given birth in the last year. The authors found that women had a higher risk of developing a major depressive disorder in the postpartum period (50). Although there has been conflicting evidence on whether depression rates are higher in women postnatally, the more recent and robust evidence confirms this is the case. However both these large cohort studies were conducted in high-income countries, leaving questions about this phenomenon unanswered in low and middle-income countries.

Clinical presentation

Perinatal depression and anxiety occur on a continuum and therefore there are a wide range of clinical presentations. Not all women meet the diagnostic criteria for a mood or anxiety disorder, but their levels of distress are significant and clinically relevant. Commonly reported symptoms include:

- Sadness, weepiness, low mood, irritability, impaired concentration and feeling overwhelmed (51)
- Anxiety and agitation, ruminating or obsessional thoughts about the pregnancy or baby (52, 53)

- Severe hypervigilance of the baby, including inability to sleep at night when the baby is sleeping (54, 55)
- Feeling detached from the infant
- Lack of interest in holding or caring for the baby
- Guilt that they are not able to enjoy the baby (56, 57).

The studies that describe these symptoms are conducted in high income countries, where potentially social adversity is not a significant contributing factor. Many of these symptoms could be attributed to difficulties in transition to motherhood and perceived difficulties caring for an infant. However in low and middle income countries, where social adversity is more prominent many of these symptoms could be related to other factors like economic concerns, specifically food and accommodation insecurity and intimate partner violence.

Anxiety and depression can be conceptualised as interconnected illnesses. In exploring this, Clark and Watson have suggested the tripartite theory for understanding the relationship between anxiety and depression. This theory proposes that anxiety and depression have core symptoms which differentiate them, although both conditions result in a shared general negative effect (58). These concerns are important in the context of perinatal depression, as preoccupation with postpartum depression may limit clinical practice and research by neglecting to consider the etiology of the illness, and neglecting early identification that might allow for timely intervention and care.

Prevalence

The reported prevalence of perinatal depression varies due to the context in which it is studied, the timing and differing assessment methods and instruments used, and the systems in place for reporting and maintaining clinical information systems. Rates based on clinical interview and/or a diagnosis of major depressive episode are likely to be lower than screening methods which identify cases using a threshold (36). There are many high quality reviews reporting estimates for the prevalence of perinatal depression in HIC (35, 36, 59, 60), but less is known about the condition in LMIC (61).

Prevalence in High Income Countries

Estimates of perinatal depression in high-income countries can be summarized by the work presented in four meta-analyses. These high-income countries included European and North American countries as well as like Japan, Taiwan and Australasia, giving a global view. In

1996, a meta-analysis of 59 studies conducted in highly industrialized countries in found the prevalence to be 13% in the first few months postpartum, with a peak incidence at 4-6 weeks postpartum (59). Following that, in 2004, a systematic review found that rates of depression were equal when assessed with a clinical interview and a 10-item self-assessment tool, the Edinburgh Postnatal Depression Scale (EPDS), and that rates of depression during pregnancy were similar to postpartum rates. The prevalence of antenatal depression was: 7.4% in the first trimester; 12.8% in the second trimester; and 12% in the third trimester (60). In 2005, a meta-analysis of 28 studies reported a prevalence of 19.2% for postnatal depression in the first three months postpartum (35). Another study in 2005 analyzed 30 studies and reported rates of depression in pregnancy to be 8.5%-11% and postpartum rates 6.5%-12.9%.

Table 1: Rates of perinatal depression in HIC

Author(s), date	**Number of studies in review**	**Results**
O'Hara, Swain. 1996	59	13% postnatal depression
Bennett et al. 2004	21	Approx. 12% antenatal depression in 2nd and 3rd trimesters
Gaynes et al. 2005	30	8.5%- 11% antenatal depression 6.5%-12.9% postnatal depression
Gavin et al. 2005	28	19.2% postnatal depression

Prevalence in low and middle income countries

In a meta-analysis drawing from 13 papers covering 17 LMIC, the prevalence of antenatal depression was 15.6% and postnatal depression 19.8% (1). The authors provide no explanation of the higher rates in these poorer countries specifically in Asia, the Middle East and Africa, and this points to the need for further investigation. Of note in this meta-analysis did not include any studies conducted in South America. A systematic review of 35 studies from eight African countries including Nigeria, Morocco, The Gambia, Uganda, Zimbabwe,

Ethiopia, Malawi and South Africa reported the prevalence of antenatal depression to be 11.3% and 18.3% for postnatal depression (62).

Prevalence in South Africa

As with other LMIC, there is limited epidemiological data regarding perinatal depression for South Africa. A study conducted at a primary health care facility in rural KwaZulu Natal, where HIV rates are high, reported 47% of women were diagnosed with antenatal depression using a clinical interview (15). In Durban, at King Edward Hospital (a tertiary hospital), antenatal clinic of the rate of depression in pregnancy as measured by the Edinburgh Postnatal Depression Scale (EPDS) was 38.5% (14). In Cape Town rates of antenatal depression, also measured by the EPDS, were 39% in community samples from informal settlements (10, 13, 14). Rates of postnatal depression, diagnosed by a clinical interview, were 24.5% in a tertiary hospital in Johannesburg (63). Among these antenatal studies there is no consistency as to what gestation of pregnancy women were assessed. These prevalence rates are much higher than those documented in HIC studies. This may relate to specific risk factors, or a combination of them, including HIV, low socio-economic status, and poor social support that are especially salient for women living in South Africa. These will be discussed later. To date, there are no studies documenting the prevalence of antenatal depression in Gauteng, the most densely populated province in South Africa.

Table 2: Rates of perinatal depression in South Africa

Author, date	Population	Sample size	Method of assessment	Results
Rochat et al. 2011	Rural, primary health care setting	109	Clinical interview	47% antenatal depression
Manikkam and Burns. 2012	Urban, tertiary health care setting	387	EPDS	38.5% antenatal depression
Hartley et al. 2011	Peri-urban, community sample	1062	EPDS	39% antenatal depression

Cooper et al. 1999	Peri-urban, community sample	147	Clinical interview	34.7% postnatal depression
Lawrie et al. 1998	Urban, tertiary health care setting	103	Clinical interview	24.5% postnatal depression

Prevalence of perinatal anxiety

The prevalence of perinatal anxiety has not been well documented in any setting. Estimating the prevalence of anxiety disorders is difficult due to the range of disorders, which include generalized anxiety disorder, panic disorder and obsessive-compulsive disorder and trauma-related disorders. DSM 5 has again separated these disorders and has categorized obsessive-compulsive disorders (including: obsessive-compulsive disorder, body dysmorphic disorders, hording, trichotillomania and excoriation disorder) and trauma and stress related disorders (including: reactive attachment disorder, disinhibited social engagement, post traumatic stress disorder acute stress disorder and adjustment disorder) in separate categories to the other anxiety disorders (37). This separation of disorders will have implications for future research. There are also few validated screening tools for perinatal anxiety. A large systematic review conducted in 2006 reported that postnatal anxiety is as common as postnatal depression (34). There are high rates of comorbid anxiety in women with perinatal depression. A large-scale postpartum screening study, conducted in Pittsburgh, USA in 2013, reported that 66% of women with major depression have comorbid anxiety disorders (64). Another recent study, 2011, the prevalence of antenatal anxiety was reported at 9.5% in a US cohort (38). The common occurrence of the two clinical syndromes may explain the reason for the paucity of studies on perinatal anxiety alone.

A recent study in South Africa, published in 2017, recruited pregnant women from an urban, primary level clinic in Cape Town. The Mini International Neuropsychiatric Interview, a diagnostic interview, was used to assess the prevalence of anxiety disorders. Amongst 376 participants, the prevalence of an anxiety disorder was 23%, and of those, 11% had post traumatic stress disorder (65). Although post traumatic stress disorder has been moved out of the anxiety disorder category is remains relevant due to the prominence of anxiety as a core

symptoms as well as the high prevalence of this disorder, especially among women in South Africa (23, 66).

Causes of perinatal depression

The etiology of perinatal depression is multi-factorial and includes biological, psychological and social factors.

Biological factors

Previous depression

Women with a history of first episode depression occurring postpartum have a higher risk of developing subsequent postnatal depression (39). Similarly a history of non-postpartum depression is a significant risk factor for postnatal depression in women living in HIC (59, 67, 68). This finding, that a past history of depression was a risk factor for postnatal depression, was confirmed in 2008 during a large cross sectional study undertaken in a community sample, recruited from antenatal clinic in all six states in Australia (30). A large review of the literature from 17 LMIC also reported that a history of depression was a risk factor for postnatal depression (1). More recently, in 2010, a large metanalysis of 57 studies, conducted over a period of 20 years in English-speaking HIC, reported a history of depression as a risk factor for antenatal depression. In South Africa, a study conducted in a tertiary hospital also reported a history of depression as a risk factor for antenatal depression (14). It therefore seems that a history of depression, regardless of whether it was treated or untreated, is a significant risk factor for both antenatal and postnatal depression. Therefore this is an important question to ask when screening women for perinatal depression.

Hormonal factors

The hypothesis that reproductive hormones are involved in postnatal depression stems from the relationship between the rapid, marked changes in hormone levels that occur at delivery and the onset of postnatal depression. In addition to this, reproductive hormones play a role in regulating emotion processing, arousal, cognition and motivation (69). Women with a previous episode of postnatal depression can experience mood symptoms after the addition and removal of high doses of estradiol and progesterone, as is the case in pregnancy and childbirth (70). This finding is supported by two other studies that showed that depressed

postpartum women with a history of previous postpartum depression improved when administered estradiol in the postpartum period. (71, 72). This evidence suggests that fluctuations in reproductive hormones may precipitate affective dysregulation in a subgroup of vulnerable or sensitive women, potentially demonstrating a 'hormone-sensitive' subtype for postnatal depression.

Reproductive hormones have also been shown to modulate other biological systems implicated in postnatal depression such as thyroid function, lactogenic function, the hypothalamic-pituitary-adrenal (HPA) axis and the immune system. Thyroid dysfunction has been associated with depression and with pregnancy, although estrogen effects on thyroid functioning studies have failed to find a clear association between thyroid dysregulation and postnatal depression (42, 73). Oxytocin and prolactin regulate breastmilk production and secretion as well as maternal mood and behavior. Low oxytocin levels have been associated with depression in pregnancy and the postnatal period (74, 75). Although oxytocin has been scrutinized as a potential treatment, findings have been inconsistent (76, 77).

HPA axis dysfunction has also been implicated in postnatal depression. Pregnancy impacts on HPA axis functioning potentially through the effect of estrogen on corticosteroids (78, 79). Raised cortisol levels in pregnancy have also been associated with depressive symptoms (80). However, it remains unclear whether HPA dysregulation causes postnatal depression or if it is a secondary effect of the depression (69). HPA axis dysfunction is also relevant in prenatal anxiety. Maternal cortisol levels are raised in times of stress and anxiety, for example during intimate partner violence, and this raised cortisol appears to cross the placenta thus affecting the fetus (81). Specifically the development of the HPA-axis, limbic system, and the prefrontal cortex are likely to be affected (82, 83). Prenatal stress also has long-term effects on cortisol response to stress (84). There is a direct relationship between stress hormones and foetal development, again highlighting the point that social experiences directly shape biological outcomes.

Pregnancy is a state of relative immunosuppression as anti-inflammatory cytokines are elevated in order to maintain the pregnancy. After delivery the immune systems shift rapidly into a pro-inflammatory state. Although estrogen has a role in the modulation of cytokines, the association between postnatal depression and the immune axis is uncertain (85, 86).

There are many unanswered questions still, and more work is needed with regard to investigating the complex interplay between these biological systems and both postnatal and antenatal depression.

Psychological factors

Personality styles

Pregnancy and the unfolding of different life roles can also trigger unresolved issues in women who have experienced early childhood trauma (87). A history of abuse can influence vulnerability to mental health problems by molding coping skills and relational styles, and certain personality traits such as neuroticism, obsessive and perfectionist traits, and interpersonal sensitivity (88, 89). Traits like neuroticism (90-92), avoidant personality style and perfectionism (93) have also been identified as risk factors for perinatal depression. Although a lot of work has been conducted in this area, most published studies are from high-income countries and little is known about how personality style affects perinatal women in low and middle-income countries or if it is as relevant in the context of immediate external stressors such as poverty.

Perinatal loss or trauma

Women who have experienced a previous traumatic birth may present with heightened anxiety during subsequent pregnancies, and they may also have pre-existing post-traumatic stress disorder (94). This places them at high risk of perinatal depression in subsequent pregnancies. Perinatal loss in a previous pregnancy can also lead to increased anxiety in subsequent pregnancies, with the resurgence of grief for the deceased baby. This can impact on both antenatal and postnatal attachment. Without support through their grief, these women may have increased susceptibility to perinatal depression (94, 95). This is important to consider given that the number of perinatal deaths was constantly increasing − from 13,020 in 1997 to as high as 25,287 in 2009. In 2014 and 2015 there were 22 948 and 21 378 perinatal deaths respectively, which is still unacceptably high (96).

Psychosocial factors

Substantial evidence points to the stress vulnerability model (97), which suggests that women inherit a genetic predisposition to mental illness, as well as to the role of psychosocial factors

in the etiology of affective disorders (98-100). The stress vulnerability model has been investigated and displayed in the perinatal period (59, 67, 68, 101). This model continues to be useful for identifying and treating relapses in a variety of mental disorders, although "vulnerability" in itself is not sufficient to manifest the disorder and requires interaction with biological and psychosocial stressors (97). Low socioeconomic status, exposure to violence, trauma and loss, and lack of social support, are all risk factors that contribute to allostatic load and consequently increase the risk of poor obstetric outcome (80). Allostatic load refers to the cumulative effect of exposure to physical and emotional stress. This 'wear and tear' on the body leads to dysfunction in the body's physiological response to chronic stress over time. Pre-existing psychosocial problems such as poverty, unemployment, inadequate housing and lack of social support may all be compounded by pregnancy (80, 102, 103). Some risk factors, expanded on below, may be especially salient for poor women in South Africa, and so help explain the elevated prevalence rates reported for this country.

Unintended pregnancy

Globally the rate of unintended pregnancy in 2012 was 53 per 1000 women aged 15-44 years; this indicates that about 40% of all pregnancies are unintended. Rates of unintended pregnancy in less developed regions, that is, LMIC, are generally higher (54 per 1000 women) than in developed regions (54 per 1000). The highest rate was in Africa (80 per 1000) and the lowest rates were in Europe and Oceania (43 per 1000) (104). South Africa has an especially high incidence of unintended pregnancy (105, 106).

Unintended pregnancy has been associated with perinatal depression for various reasons. Firstly it is associated with other variables that also contribute to risk of perinatal depression, for example, low educational level, being single, unemployed, intimate partner violence, and multigravida (107, 108). These factors are particularly salient for socially disadvantaged women and an unintended pregnancy can create added stress for these women. Not surprisingly, women with an unintended pregnancy have a higher likelihood of developing both antenatal and postpartum depression (109, 110). Targeting socioeconomically disadvantaged women for the prevention of unplanned pregnancies is a valuable strategy for improving women's mental heath.

Socioeconomic status

The term 'socioeconomic' includes many aspects in a women's life that are linked to poverty or its absence, but refers also to the social context in which women live. Socioeconomic status depends on a combination of variables including occupation, education, income, wealth and place of residence.

Socioeconomic disadvantage has been well documented, in two large meta-analyses using studies in HIC, as a contributing factor for common perinatal mental disorders including perinatal depression (59, 101). A study conducted in a relatively poor suburb in Sydney, Australia reported that a self-reported 'difficult financial situation' was associated with a higher EPDS score postnatally (111). A large French cohort study, of 15,143 nationally representative mothers who participated in the Etude Longitudinale Francaise depuis l'Enfance (ELFE) study, found that 12.6% reported prenatal psychological distress, and that this prenatal distress was associated with low economic status (112). A large study of 116, 457 women in the UK illustrated that socioeconomic deprivation increased the risk of mental illness including anxiety, depression and severe mental illness in pregnancy and postpartum. This association was stronger among older women (35-45 years). In this study women's socioeconomic status was presumed, based on census data from the areas in which the women lived (113).

Although many researchers talk about low socioeconomic status, this term is not always clearly defined. Low socioeconomic status may be very different in HIC and in LMIC. Poverty and low socioeconomic status affect more women numerically and as a proportion of a given population in LMIC. A systematic review conducted in 2012, including eight Asian and African countries (Nigeria, Morocco, India, Vietnam, Ethiopia, Uganda, Pakistan and China), reported that socioeconomic disadvantage comprising of food insecurity, financial difficulties, unemployed partner and low income was associated with an increased risk of perinatal depression (1). A study conducted in two economically different areas in Brazil, published in 2012, similarly reported an increased risk of postnatal depression in lower socioeconomic classes C and D – (in Brazil socioeconomic class are categoriesed from A-E and are based on household's monthly income), as well as in women with an absent partner (114). In a study of women in India, antenatal depression that persisted into the first postnatal year was associated with the lack of a confidant, as well as a level of poverty rated low on a 5-point-likert scale (115). Amongst women living in rural Malawi, postnatal depression was significantly associated with a lower wealth index as measured by the WHO-designed asset

questionnaire, but was also associated with not being able to confide in a partner (116). In Indonesia, a robust qualitative study was conducted with 40 postpartum women, who participated in in-depth interviews designed to explore sociocultural factors that contributed to their well-being in early motherhood. These women attributed their low mood to insufficient family income due to giving up their own paid work, and lack of emotional and material support from partners or family networks (117).

A number of studies conducted in South Africa provide a picture of complex factors related to the social context in which women live. In the North West province, 20 postpartum women with depression, diagnosed on the Structured Clinical Interview of DSM-IV, attending a community clinic, were interviewed using a semi-structured interview. These women attributed aspects of their depression to compounding factors such as poverty, food insecurity and accommodation insecurity (19).

Similarly, a study reporting on predictors of depression in 1062 pregnant women, recruited from the community and living in poverty in townships in Cape Town, found that one of the strongest predictors of antenatal depression was having an income of less than R2000 per month. Another study, conducted in Cape Town among 376 women attending their first antenatal visit at a primary-level, community-based clinic, investigated psychosocial factors associated with depression as diagnosed on the Mini International Neuropsychiatric Interview (MINI). They found that a diagnosis of a major depressive episode was significantly associated with food insecurity as measured on the U.S. Household Food Security Survey Module (HFSSM). Food insecurity is a proxy for poverty, and poverty is a risk factor for mental illness, especially anxiety and depression (118). In South Africa postpartum women living in poverty and experiencing food insecurity and insufficiency are at high risk of anxiety and substance abuse disorders (119).

Lack of social support

Poor social support is a well-documented risk factor for perinatal depression (31, 59, 68, 101, 120). The most recent literature review was published in 2010; it included articles from English-speaking HIC spanning from 1980 to 2008 that reported on risk factors for antenatal depression. In total, 57 articles were assessed. The authors concluded that poor social support, being single and poor relationship quality were associated with an increased risk of antenatal depression on bivariate analysis of the data (101). This pattern has been sustained. In a recent study conducted in Italy 567 women were recruited from antenatal courses. The study found

that having little or no psychological support from friends, family and partner during pregnancy was associated with postnatal depression (OR 4.4-6.5) (121). In the United States, the Fragile Families and Child Wellbeing Study, a national longitudinal panel study of nearly 5000 births across 20 cities with populations of 200,000 or more, was conducted. Secondary analysis of the data collected (n=3675) revealed that 15% of the sample of low-income, urban women had a probable diagnosis of major depression as assessed on the Composite International Diagnostic Interview (CIDI-SF). On bivariate comparison of depressed and non-depressed women, depressed women had less material and psychological support from their partners (122). In Hong Kong, Ngai and colleagues in 2015 illustrated that low levels of family sense of coherence – the degree to which a family perceives the environment as meaningful, comprehensible and manageable – was significantly associated with an increase in depressive symptoms for both mothers and fathers at five months postpartum. A lack of social support was significantly associated with increased risk of depressive symptoms in women, but not men (123).

If lack of social support is a risk factor for perinatal depression, then is the converse – good social support – protective for perinatal depression? A study in Geneva, Switzerland assessed 235 primiparous women at six weeks post delivery. Women were screened for depression using the EPDS, anxiety using the State-Trait Anxiety Inventory (124), self-efficacy using the Parenting Expectations Survey (PES), and a satisfaction scale for social support administered. The satisfaction scale for social support illustrated five sources of support − from the spouse, young woman's mother, family, friends, professionals − each associated with different types of support (emotional, esteem, material, and informative). This scale showed good internal consistency for each factor. The results revealed a relationship between satisfaction with social support and the mental health of mothers, in particular in the post-natal period for depressive symptoms, anxiety, and self-efficacy (125). In 2007, a study was conducted in a socially disadvantaged part of north London, with qualitative methods in the form of semi-structured interviews with postpartum women who reported symptoms of depression. These women mentioned that partner support was crucial to their wellbeing in pregnancy, and that peer support from other women was extremely valuable and necessary to maintain wellness (126). A study including 322 low-income Mexican-American women reported on cortisol levels of these women during mildly challenging mother-infant interactions tasks at 12 weeks postpartum. Women who experienced higher economic stresses in their lives had significant cortisol levels only when reporting low levels of family support (127). This suggests that even in the context of poverty, social support can buffer adverse mental health outcomes.

Women living in LMIC are more susceptible to poverty, as described above, and subsequently common mental health disorders. Social support also plays an important role in these women. In 2012 a systematic review was published which summarized the evidence surrounding the nature, prevalence and determinants of common perinatal mental disorders among women living in LMIC. This review included 13 papers and both antenatal and postnatal studies were included. The review reported that being unmarried, having a partner who lacked empathy and support, having hostile in-laws, and having insufficient emotional and practical support were all social risk factors for perinatal anxiety and depression (1). Similar findings have been reported on in other LMIC settings. Women living in urban Indonesia (n=41) who participated in in depth interviews described how their moods were negatively affected by marital problems and lack of support from partners or family networks (117). In Malawi, 501 postnatal women undertook a Chichewa version of the Self-reporting questionnaire (SRQ). On multivariate analysis, there was a significant association between SRQ score and lack of a confiding relationship with partner or relative (116). And in India, using a Hindi version of the EPDS; among peripartum women (n=506), a poor martial relationship and nuclear family structure (a family consisting two parents and their children only) were found to statistically correlate with peripartum depression (128). These studies suggest that both partner and family support are important factors moderating mood for women in LMIC.

In South Africa similar results have been found. A study conducted in a township in Cape Town among black women living in extreme poverty initially made an association between poor partner support and maternal postnatal depression. In this study, 147 black women recruited in the community were assessed at two months postpartum (10, 129). The researchers found that poor emotional and practical support from the partner was associated with maternal depression (10). In another article reporting on the same data set, logistic regression was conducted and established significant associations with maternal depression at two months post partum: a lack of financial support from the father; the father being negative towards the infant; the mother describing herself as receiving no support or help; the pregnancy being unplanned; and the infant being unwanted. Women who lived with a partner who had a negative attitude toward their unplanned infant had a higher risk of depression than those living separately from an unsupportive partner (130). The relationship between unwanted or unplanned infants and their fathers is complex and not adequately investigated in this study.

Other studies reinforce the relevance of partner to maternal mental health. A qualitative study of 20 postnatal women living in the North West Provence and attending a community clinic described unwanted pregnancy; interpersonal conflict − particularly partner rejection, infidelity and general lack of support from family − were the causes of postnatal depression (19). A study in 2011 reported on predictors of depression in 1062 pregnant women recruited from the community. The data analysed was from the Philani Mentor Mothers Project (PMMP), a community-based, cluster-randomized controlled trial conducted in Khayelitsha and Mfuleni in Cape Town. This study found that one of the strongest predictors of antenatal depression was lack of partner support (13).

As the above indicates, lack of partner support compounded by an unplanned or unwanted pregnancy is a significant contributing factor to perinatal depression especially in South Africa where poverty, unemployment and HIV have undermined men's ability to meet the social roles of manhood and fatherhood (131, 132). These challenges faced by men may help to explain why many women in South Africa are single parents and have little financial or emotional support from their partners.

Another study conducted in Cape Town among 376 women attending their first antenatal visit at a primary-level, community-based clinic investigated psychosocial factors associated with depression as diagnosed on the Mini International Neuropsychiatric Interview (MINI). A diagnosis of a major depressive episode, as per the MINI, was significantly associated with lack of perceived family support, as measured using the Multidimensional Scale of Perceived Social Support (MSPSS); but not with partner support (133). This demonstrates that supportive family can buffer the effects of an unsupportive partner. These findings suggest that social interventions have a place in the management and prevention of perinatal depression.

HIV

South Africa has been severely affected by the pandemic of HIV. Young women of childbearing age are among those who are affected the most. Prevalence rates in antenatal populations range from 39-45% (134). All women attending antenatal clinic are required to receive HIV testing and counseling, and consequently many women are diagnosed with HIV for the first time in pregnancy. Being diagnosed with HIV causes women much distress, and raises questions of whether these women are at higher risk of common mental disorders in pregnancy and postpartum. Even so, researchers are equivocal as to whether there is an

association between being HIV positive and perinatal anxiety and depression. Most studies that have recently been published again focus on depression and not anxiety. Even in high-income countries, where HIV is not as prevalent, there is ambivalence as to whether the virus impacts on perinatal mood. In the US, a study conducted with African-American HIV positive women and HIV negative matched controls found that perinatal mood symptoms measured using the Centre for Epidemiology Studies-Depression (CES-D) were the same in each group (135). However another study, that included 273 women over a 10 year period at a specialized perinatal HIV clinic in Los Angeles, reported that rates of perinatal depression among HIV-infected women were substantial (30.8%) and much greater than among women who were negative (136). Both these studies evaluated symptoms during both pregnancy and postpartum.

A systematic review published in 2015 looked at prevalence rates of antenatal and postnatal depression in HIV positive women living in various countries in Africa. They reported the prevalence of antenatal depression to be 23.4% and suspected antenatal depression to be 43.5%. The prevalence of postnatal depression was 22.5% and suspected postnatal depression was 31.1% (137). These rates are comparable with rates of perinatal depression in LMIC in general, suggesting that this subset of women are not necessarily at higher risk. This is supported by a South Africas study conducted at a primary health care facility in a rural area among 109 isiZulu speaking antenatal women. The study reported counter intuitively that antenatal depression, as measured on clinical interview, was not related to HIV, even when HIV was diagnosed in pregnancy (138). Another article by the author of this study, using the same sample, reported the prevalence of antenatal depression in rural South Africa to be 47% and argued that both HIV positive and HIV negative women are equally affected by other factors that place them at high risk for depression (15). Contrary to this, a study at a tertiary hospital's antenatal clinic among 387 urban women reported that HIV was a risk factor for antenatal depression (14).

Issues around stigma, social support and access to prevention of mother-to-child transmission (PMTCT) also play a role in this association. For instance, a study conducted at primary care level in rural Mpumalanga among HIV positive postnatal women reported a significant association between internalized stigma, discrimination and postnatal depression (139). This finding was supported by another study in the Western Cape among HIV positive pregnancy women who initiated antiretroviral treatment. The authors reported that high levels of stigma were associated with depression in pregnancy (measured using the EPDS). Stigma moderated

the association between social support and depression, so that even with good social support, if stigma was high then women were more likely to have antenatal depression (140). Stigma is a substantial factor in the association between living with HIV and developing perinatal depression. Unfortunately, stigma is also associated with intimate partner violence, which is an independent risk factor for perinatal depression (141) This is discussed in detail later in this chapter.

Similar findings have been reported in other African countries. For example, a study conducted at a hospital level, PMTCT clinic in Nairobi, Kenya among urban postnatal women, reported that HIV positive women had a nine times higher risk of developing postnatal depression in the presence of stigma (142). Another study, this time in rural Kenya, confirmed that access to HIV care itself helped to decrease internalized stigma and symptoms of depression in perinatal depression. Women in the study who did not link to HIV care after testing positive at their first antenatal clinic visit had higher levels of depression, and women who had linked to HIV care and initiated antiretroviral treatment reported the lowest levels of depressive symptoms (143). In another study, this time in the Democratic Republic of Congo, perinatal women with HIV and depression had the same uptake and loss to follow-up rates with regard to Prevention of Mother-To-Child Transmission (PMTCT) as non-depressed HIV positive women (144). Interestingly, being depressed did not affect these women's compliance with HIV care and treatment as conventionally thought (145, 146). Perhaps their motivation to protect their babies was a key factor in driving their compliance.

Although HIV plays a role in the mental health of perinatal women, there is not a linear association and, as illustrated above, mental health can be moderated by other social factors, including stigma, social support, poverty and access to HIV care. From the above literature, it appears that the reduction of stigma may improve mental health outcomes for HIV positive perinatal women.

Intimate partner violence

Depression and intimate partner violence can be considered a deadly comorbidity, considering the risk of homicide and suicide in both conditions (147). The global lifetime prevalence of intimate partner violence is estimated to be 30%, with the highest prevalence in Africa (36.6%) and the lowest prevalence (23.2%) in high-income countries (148). The association between IPV and depression, both during pregnancy and the postpartum period, is well-established in high income countries (149, 150). For example, in Canada, a population-based

study of 6421 postpartum women reported that the prevalence of postpartum depression was significantly higher among women who reported intimate partner violence in the past two years, than among woman who did not report intimate partner violence (18% compared with 7% respectively) (151). In this study the prevalence of intimate partner violence was 5.7%. In the United States, a study reported on IPV among 1037 young women (14-25 years) from low socioeconomic backgrounds, who were attending a university affiliated obstetric and gynaecology clinic. Of these women 33% reported some form of IPV between 6 and 12 months postpartum, and this was significantly associated with higher depression scores (CES-D) (149). Likewise in Nigeria, 373 women attending antenatal clinic were assessed for intimate partner violence as well as depression and anxiety. Results showed that 36.7% of women reported intimate partner violence within the past year. Women in this sample were ten times more likely to have depression and 17 times more likely to have anxiety if they were in a violent relationship (152).

In South Africa, violence against women is particularly prevalent as gender disparities are the norm. The rate for intimate female homicide is 8.8 per 100 000, equating to four deaths per day (20). Interpersonal violence contributes significantly to the burden of disease in South Africa, with a lifetime prevalence of physical and sexual abuse being 49% among women and 62% of violent acts being intimate partner violence (153). Not surprisingly, women's mental health is adversely affected by intimate partner violence, resulting in common mental health disorders including depression, anxiety and post traumatic stress disorder (152, 154).

Pregnant and postpartum women are at high risk of intimate partner violence especially in the context of being diagnosed with HIV and/or having an unwanted pregnancy (155). A recent study conducted in rural Mpumalanga in South Africa aimed to determine the prevalence of intimate partner violence in 673 HIV positive women recruited from primary health care antenatal clinics. Overall a staggering 56.3% of women reported having experienced psychological or physical intimate partner violence, and 19.6% reported experiencing physical violence (141). A study in peri-urban townships in Cape Town cited intimate partner violence as a strong predictor for antenatal depression (13). This finding was supported by another qualitative study where women reported that abuse, unwanted and unplanned pregnancies and HIV all contributed to their experience of perinatal depression (18). Intimate partner violence can impact on various aspects of perinatal health, firstly by contributing to mental health problems like perinatal depression, suicidal ideation and anxiety disorders and substance abuse (156, 157). Intimate partner violence can also affect neonatal outcomes as

some studies suggest a link to poor fetal growth (158-160). Lastly intimate partner violence is a major contributor to women's vulnerablity to HIV (124, 161). In the context of HIV, intimate partner violence can also adversely affect compliance of HIV treatment for the prevention of mother-to-child transmission (162, 163).

IPV and HIV have a bidirectional relationship and are both highly prevalent in SA; however little attention is given to the impact of these epidemics on mental health, especially as related to perinatal depression (162). Due to the significant association between intimate partner violence and perinatal depression, routine screening for intimate partner violence in the antenatal setting in South Africa is recommended (160).

Consequences of perinatal depression

There are adverse consequences to perinatal depression for the mother as well as across the lifespan of the child. Perinatal mental disorders have been shown to increase the risk of psychological and developmental disturbances in children (164). However, these disturbances are not inevitable, highlighting the role of effective parental care and the resilience of childhood development. The effects of maternal mental disorders are much more likely to be buffered in financially secure families in HIC, leaving women of low socioeconomic status in LMIC, like South Africa, at higher risk of adverse consequences of perinatal depression (11).

Epigenetics

Offspring of parents with mental health problems may inherit a genotype that can play a role in their development. This role is difficult to study as there are many variables at play within the genome and within the environment. Most genetic information currently available is based on animal studies and therefore only theoretical conclusions can be drawn. However, we can draw out some relevant facts. DNA methylation, a well established mechanism for embedding cell-type identity in response to intrinsic developmental signals, is involved in programming genome function in response to signals from environmental (165). The early life period is important, and social and physical environmental triggers at this stage will result in programming of the genome in anticipation of life-long environmental exposures. These environmental triggers can affect immunity, cardiovascular and mental health, and it is therefore hypothesized that early life adversity alters DNA methylation in multiple physiological systems including the brain and other peripheral systems (165).

Fetal programming is thought to be mediated by the impact of prenatal stress on the developing Hypothalamic Pituitary Adrenal (HPA) axis and has been studied in humans. This impact on the HPA axis of the fetus can confer lifelong behavioural disturbances in childhood and beyond. The methylation status of human NR3C1 gene in newborns is sensitive to prenatal maternal mood and may offer a potential epigenetic process that links antenatal maternal mood to altered HPA axis stress reactivity during infancy (166). Simply, high antenatal stress leads to increased glucocorticoid receptor methylation in offspring (166).

Poor postnatal maternal care can also affect methylation, as proven in animal studies (167). The stress of chronic and unpredictable early life maternal separation in offspring (in rats) has been shown to alter the profile of DNA methylation in the promoter of several candidate genes in the offspring (167). Another study showed that poor maternal care directly increased methylation in the promoter region of the glucocorticoid receptor gene, effectively reducing the number of receptors and resulting in heightened response to stress (168).

The ability to detect DNA methylation differences in peripheral tissues in offspring exposed to adversity may have important practical implications for the understanding of both antenatal and postnatal depression in the future (165). However, currently the consequences of these subtle changes in the genome are poorly understood.

Obstetric consequences

Women who experience depression may display impaired self-care, including poor nutrition, smoking, substance abuse and poor attendance at antenatal care, all of which impacts on their obstetric outcome (164, 169, 170). Those with perinatal depression are also more likely to have obstetric complications such as preterm births and low birth weight infants, with increased admissions of the newborn to neonatal intensive care units as a result of these complications (6, 7). In addition a history of obstetric complications can be a risk factor for depression, making this association bidirectional (171).

Preterm labour

Maternal-placental-fetal interactions play important functional roles during the development of the fetus. Maternal stress in early pregnancy causes cortisol to cross the placenta and inhibit fetal pituitary function. Hobel (80) describes biological mechanisms by which stress leads to preterm birth and poorer obstetric outcome. Corticotrophin-releasing hormone (CRH)

is the regulating hormone of the hypothalamic-pituitary-adrenal axis (HPA). When the brain perceives an acute stress, the release of CRH stimulates the pituitary to release adreno-corticotropin hormone (ACTH). This enters the blood stream and travels to the adrenal gland where it stimulates the release of the stress hormone cortisol, which acts on other regulatory mechanisms. Cortisol is then responsible for turning off the stress response by suppressing the release of ACTH at the pituitary and CRH at the hypothalamus. Under conditions of chronic stress, the above negative feedback loop fails, leading to chronically elevated levels of cortisol. During pregnancy glucocorticoids (cortisol) stimulate CRH gene expression in the placenta results in a positive feedback loop that causes a 20 x times increase in CRH levels produced by the placenta. At the same time CRH-binding proteins also increase limiting the bioavailability of CRH. Women at risk for preterm labour have decreased CRH-binding proteins resulting in a mid pregnancy increase in free CRH. High maternal cortisol levels as early as 15 weeks can predict preterm labour, providing an explanation for how stress hormones may be involved in preterm delivery. The enzyme 11B-Hydroxysteroid (11B-HSD) in the placenta converts glucocorticoids to their 11-keto metabolites, protecting the fetus from high cortisol levels. However, the fetus can still be exposed to excessive cortisol when the levels of cortisol are greatly elevated before 20 weeks gestation, before the 11B-HSD is functional. Placental CRH enters the fetal circulation and stimulates fetal adrenal production of dehydroepiandrosterone, which in turn increases oestrogen production, which is important in initiating labour.

Low birth weight

The physiological mechanisms by which maternal stress increases the risk of LBW is less clear. Increased cortisol can affect fetal growth as well as excessive catecholamine production in the mother's adrenal gland, which can affect blood flow to the fetus, resulting in poorer fetal growth. Another pathway by which fetal growth is effected is that of maternal nutritional status. Appetite may be effected by prenatal depression, and food insecurity, a risk factor for perinatal depression, directly impacts on maternal diet and therefore fetal growth.

These findings have been supported by clinical studies. A meta-analysis in 2010 consisting of 29 studies showed the association of depression in pregnancy and greater risk of preterm birth and low birth weight infants (6). This association was however higher in LMIC than HIC (88). In fact, Grigoriadis in 2013 (172) found that there was no association between LBW infants and depression, but this analysis did not include studies from LMIC. The facts above

may have implications for prenatal care especially prenatal interventions for maternal depression and anxiety. I return to these in the discussion (Chapter 6) of this thesis.

Mortality

Generally, completed suicide rates are lower during the postpartum period compared to other times. However, a study on maternal deaths in the UK from 1997-1999 reported that suicide was the leading cause of death in perinatal women and was responsible for 10% of all deaths. Rates were highest in women with substance abuse and psychiatric disorders, and deaths were more likely to be violent in nature. At least 86% of perinatal women who committed suicide had a psychiatric diagnosis (44). A more recent study in the UK reported on data from the UK Confidential Inquiry into Suicides and Homicides by People with Mental Illness between 1997 and 2012. Of women aged 20-35 years, 4% of the deaths from suicide occurred in the perinatal period. Compared with non-perinatal women, perinatal women were more likely to have a diagnosis of depression and less likely to be receiving treatment at the time of death. The authors concluded that active follow-up of at risk women was imperative to reduce the suicide risk (173). Suicide is also a leading cause of maternal death in Australia. A study conducted in New South Wales reported 173 maternal deaths between 1994-200. Of the 76 late maternal deaths in the sample, 23 of the deaths were due to suicide (174). More recently, in 2013, a study reported that 62% of maternal deaths in New South Wales were related to suicide or accidental injury. Of these deaths 67% of deceased women had a mental health diagnosis (175). In Sweden a register-based study reported a maternal suicide ratio of 3.7 per 100 000 live births from 1980 to 2007 and women born in low-income countries, who had migrated to Sweden, were at higher risk of suicide than native-born women (176).

Similar findings are reported in LMIC although the data are extremely limited. A review of 2882 deaths of women during pregnancy or up to 42 days postpartum, conducted across three provinces in Vietnam, found that 29% of these deaths were due to non-natural causes with 14% being as a result of suicide (177). This was confirmed by another study conducted by the World Health Organization in seven provinces in Vietnam, which established that the suicide rate in perinatal women ranged between 8-16.5% of all maternal deaths (178). In Mozambique, a retrospective study conducted by the Department of Forensic Medicine at Maputo Central Hospital evaluated perinatal death over a 5 year period from 1991-1995. Of the 27 perinatal deaths, nine (33%) were as a result of suicide (179).

There are no studies in South Africa assessing perinatal suicides. However a few recent studies report on the prevalence of suicidality in postnatal and pregnant women. A study conducted in an urban township outside Cape Town among 249 food insecure women, three months post partum, reported that 7.6% of women had significant suicidality (assessed using the MINI). The authors concluded that food insecurity was associated with suicidality in these women (119). Another study conduct in rural Mpumalanga among HIV positive postnatal women found that 41.2% of women reported suicidal ideation using item 10 of the EPDS. Further analysis revealed that financial insecurity, poor social support and having a sexually transmitted disease (other than HIV) were associated with suicidality (180). In pregnant women attending a tertiary hospital in Durban, who were assessed using the EPDS, 38.3% had thoughts of harming themselves in the previous 7 days (14). Clearly suicidality is prevalent and inclusion of suicide risk needs to be part of screening protocols.

Infanticide can occur in the context of severe postnatal depression, caused by neglect or abuse (181). The United States has the highest rate of infanticide in the developed world with a prevalence of 8 per 100 000 (182). The rate of infanticide in South Africa is 28.4 per 100 000 live births, with most of those in the early neonatal period 19.6 per 100 000. Some 71% of mothers were identified as the perpetrator and 84.9% of these deaths were the result of abandonment (183). This highlights major failures in reproductive health, mental health and social services that are currently unable to identify and help vulnerable mothers. Multi-level interventions are needed to address this problem.

Consequences for the Child

Neurochemical effects

Neurological and biochemical changes in the newborn have been described in the context of perinatal depression. In one study, depressed mothers had higher prenatal cortisol and catecholamine levels, which predicted higher levels of cortisol and catecholamine in the newborns, as well as inferior performance on the Brazelton Neonatal Behaviour Assessment Scale. Newborns scored poorly on the orientation, reflex, excitability and withdrawal clusters (184). These findings were confirmed in another study where newborns of depressed mothers were shown to have less optimal neurological performance on the Brazelton Neonatal Behaviour Assessment Scale. These newborns display less optimal habituation, orientation, motor skills, range of state and autonomic stability, as measured by the scales subcatergories. (185). It has also been demonstrated that newborns of depressed mothers have greater relative

right frontal EEG activation (185-187) Relative right frontal EEG activation has previously been noted as a marker of chronic depression in adults (188). The sympathetically aroused state, brought on by elevated cortisol and catecholamines with suboptimal neurobehavioural functioning, is concerning given that these newborns are already at risk of cognitive and behavioural problems related to parenting by a depressed mother. The elevated cortisol levels also seem to be associated with other problems affecting the fetus such as preterm labour and low birth weight. These affected newborns have higher cortisol levels even into adolescence, which may explain the increased vulnerability to psychopathology in children whose mothers suffer from perinatal depression (164). This emphasizes the need for a life course approach to this illness, and for early identification and early intervention prenatally and prevention especially in disadvantaged populations.

Effects on growth and nutrition

Poor perinatal mental health has been linked to poor infant growth in women from low socioeconomic status in low and middle-income countries. However, this has not been found in high-income countries (8, 189-191).

One reason for the association appears to relate to feeding practice and the protection provided to breastfed infants. Women with perinatal depression in both high-income countries and low and middle-income countries are less likely to initiate or maintain breastfeeding (192-194). However, poor hygiene, poverty that translates into lack of ability to buy sufficient and quality milk formula, and poor water supplies means that artificially fed infants are more vulnerable to infection in poorer settings. As a result, lack of breastfeeding among poor women living in low and middle-income countries is more likely to cause poor infant growth and malnutrition and increased frequency of infant diarrheal illness, leading to increased mortality and morbidity (8). This makes it an important issue in these settings.

In a longitudinal cohort study conducted in Soweto, South Africa, maternal depression was measured using the Pitt depression inventory at six months postpartum, and was compared to child growth. Maternal postnatal depression was associated with child behavioural problems and stunted growth at age two. The association between postnatal depression and child behavioural problems was mediated by stunted growth in the child. There is a strong association between concurrent undernutrition and behaviour problems in children, independent of socioeconomic status. The authors concluded that both the physical and mental health of children need to be considered if good health is to be achieved.

Poor child growth is a major public health problem in poor countries, and in empoverished households everywhere. It has been proposed that interventions for poor infant growth in developing countries should include interventions to address maternal mental health (191). In South Africa 21.6 percent of children between the ages of one and six are stunted or chronically malnourished which is a direct reflection on social inequality. This makes malnutrition, which can be associated with poor maternal mental health, an important issue needing to be addressed at political, social and clinical levels.

Cognitive effects

Perinatal depression is linked to poorer cognitive functioning in infants and children. Most of the studies reporting this finding have been conducted in the UK and report that boys are at greater risk than girls of cognitive delays associated with maternal depression. One study found that the speech of depressed mothers with male infants was less infant focused, and that this was strongly associated with a higher score on the Bayley scales of mental development at 18 months (195). Another longitudinal study conducted in a socioeconomically disadvantaged sample in London found that boys of depressed mothers in the first postpartum year scored significantly lower on perceptual, motor and verbal scales than girls of depressed mothers or children with non-depressed mothers (196). However, another longitudinal study in children from economically disadvantaged backgrounds found that children, both male and female, whose mothers were depressed in the first postpartum year, had lower scores on the General Cognitive Index at four years, than those whose mothers were not depressed in the first year (197).

Although there is limited data on cognitive effects of perinatal depression in low and middle income countries, the available studies show similar findings. In India, six month old infants whose mothers were assessed as being depressed at six weeks postpartum had lower mental quotient scores than infants of non-depressed mothers. However their motor functioning was not affected (198). In Ethiopia, maternal depression impacted negatively on the overall development of children (3-24 months), including gross and fine motor co-ordination and social functioning. However in this study, language was unaffected (199).

Emotional effects

Attachment theory describes how maternal-infant attachment lays the foundation for all relationships throughout the lifespan of the offspring (200). Infants and children who show secure attachments generally have better developmental outcomes than those with insecure

attachment (201). Mary Ainsworth in her Strange Situation procedure, classified attachment as either secure or insecure (202). However there were some children who were 'hard to classify' and subsequently another category, disorganized attachment was described (203, 204). Women who experience postnatal depression have decreased maternal sensitivity, causing them to be unresponsive, inconsistent and unavailable to their infants' needs, leading to poorer quality attachment and resulting in behavioural and psychological difficulties that can last into adolescence and adulthood (11, 164). Antenatal depression in women has been associated with disorganised attachment (a form of insecure attachment) in their infants at 12 months (205). This disorganized attachment is closely associated with traumatic experiences in infancy, which frequently relates to traumatic experiences in the mother (206). Two other meta-analyses, one of seven studies and one of 35 studies, conducted in high income countries, reported an increased risk of insecure attachment among infants of women who experienced postnatal depression (207, 208).

This has also been demonstrated in a landmark study conducted in Khayelitsha, South Africa. The quality of engagement between mother and infants was observed at two months postpartum. Mothers were asked to play with their infants for a five minute period. These interactions were rated using a variety of scales. A diagnosis of depression in mothers was found to be associated with disturbed mother-infant relationships, whereby depressed mothers were significantly less sensitive to their infants in early face-to-face interactions, and the infants were less positively engaged with their mothers. The emotional development of infants is compromised where mothers are less sensitive towards infants and infants are less responsive towards mothers (10). These mother-infant dyads were followed up at 18 months and their interactions observed again in a structured play situation. Infant attachment was assessed using the strange situation procedure, developed by Mary Ainsworth (202). In this procedure a child is observed playing for 20 minutes while caregivers and strangers enter and leave the room, recreating the movement of the familiar and unfamiliar people in the child's life. The child's responses are then observed. The authors concluded that early parenting difficulties, especially maternal insensitivity, were associated with insecure infant attachment at 18 months (129).

The ability of mothers to provide the type of care that promotes secure attachment may be compromised in the context of poverty and is compounded by postnatal depression, making these infants more vulnerable to attachment difficulties, which will impact on their future emotional wellbeing.

Economic consequences

A recent study in the UK looked at the effects of perinatal depression on child development outcomes of children 11 and 16 years of age, using data from the South London Child Development study (209). Economic consequences were assigned to adverse child outcomes using simple decision-analytic techniques, building on evidence from studies of epidemiology, health-related quality of life, public sector costs and employment from a life-course perspective. The authors propose that for each child exposed to perinatal depression, the public sector cost is £3030, costs due to reduced future earnings were £1400, and health-related quality of life loss was £3760. The cost of perinatal mental health problems, including depression and anxiety per year's births in the UK, was determined using a pathway modeling approach, and was reported to be to £6.6 billion. This is the equivalent to a cost of about £8500 per live birth in the country. Most of this cost (72%) relates to the adverse impact on the child rather than the mother, and a fifth of the cost was born by the national health system (NHS) and social services (210).

In the US, a recent economic study investigated the link between postnatal depression and health service expenditures, working with 817 women recruited from community hospitals at the time of birth and followed up to 11 weeks postpartum. Women were interviewed and asked about their use of health services, with depression measured using the EPDS at 5 weeks postpartum. A price weighted volume of service was created for each participant based on their self-reported health visits They reported that depressed women incurred 87% more health expenditure than non depressed women. (211)

Unfortunately all these studies are limited to high-income countries. However, it is clear that not only does perinatal depression and anxiety cause morbidity and in extreme cases mortality, it is also results in high health expenditure and can be expensive. Other economic costs include women's loss of work productivity as a result of anxiety and depression and the transmission of transgenerational economic disadvantage, impacting on child's ability to effectively enter the labour market as an adult. This illustrates the wide variety of longstanding consequences for women, families and society. Given that there is some evidence of cost-effective interventions, it makes sense to intervene early in order to prevent costly adverse effects later on.

Prevention

Preventative medicine is concerned with measures that prevent disease or prevent severe sequelae of disease. Secondary prevention consists of early identification and treatment of a disease to prevent potential future complications and disabilities from the disease. Traditionally, screening programs are a good example of secondary prevention in medicine.

Screening for perinatal depression

Perinatal depression meets most of the criteria for the implementation of a screening program as stipulated by the UK National Screening Committee who advise ministers and the National Health Service (NHS) in the UK about all aspects of screening and supports implementation of screening programs. The condition is serious, prevalent, treatable and an acceptable test of known accuracy is available (212, 213). The NSC defines a screening test as: a test used on people who do not have or have not recognized the signs and symptoms of the condition being tested for. It divides people into low and high-risk groups. Screening programs are designed for a specific purpose, which is to prevent perinatal depression and mitigate adverse effect and improve outcomes of the illness through early identification and treatment.

Evidence for screening

In 2013, the Agency for Healthcare and Research in the US reviewed 40 studies to determine the efficacy and safety of screening for postnatal depression. The authors concluded that the potential effectiveness of screening for postnatal depression relates to the availability of systems to ensure adequate follow-up of women who had a positive score at screening (214).

This study was followed by a second one, conducted in 2016, which presented evidence in the form of a report to the US Preventative Service Task Force (215). The report included one good quality and five fair quality trials (n=11869). Screening programs showed a 18%-59% reduction in relative risk of depression and a 2.1%-9.1% reduction in absolute risk of depression at 3-5 month follow-up. The authors concluded that screening for pregnant and postpartum women for depression may reduce depressive symptoms in women with depression and reduce the prevalence of depression in a given population. The authors comment that there was less evidence for pregnant women, although results were still consistent with evidence for postpartum women (215).

Included in the report to the US Preventative Service Task Force, was a study by Yawn and colleagues (216). This study was a cluster randomised controlled trial, including 2343 postpartum women. Women in the intervention were screened using EPDS and Patient Health

Questionnaire 9 (PHQ-9), while women in the control group underwent treatment as usual, which may or may not have identified postnatal depression. Women in the treatment group who screened positive saw their primary health care physician who initiated medication and follow-up telephone calls conducted by nurses, that dealt with adherence and side effects of medication as well as an explanation of cognitive behavioural therapy. These women were followed up at 6 and 12 months. The major limitations of this study are that the follow-up only included patient self-report of depressive symptoms using the PHQ-9. No clinical assessment was done. Also after 12 months, it wasn't clear how many women were still compliant on treatment. It was difficult for the nurses to reach everyone telephonically and this become more difficult as time went by and women returned to work. In the end 38% of women were lost to telephonic follow-up.

MacArthur and colleagues (217, 218) conducted a cluster randomized control trial in the UK with a redesigned intervention that focused on identification and management of perinatal health problems run by midwives during home visits, with general practitioner care only if needed. Follow-ups were done at 4 and 12 months postpartum. In both follow-up groups there was a significant improvement in the EPDS score as compared to the control group. These women also had less general practitioner health visits in the 12 months suggesting that this intervention was cost effective.

In 2009, Morrell and colleagues (219) designed a randomised control trial study in the UK with an intervention based on postnatal health visits. The health visit (consisting of the assessment of postnatal women, combined with providing either the cognitive behavioural approach or the person-centred approach, sessions for women eligible for them, plus the option of a SSRI if indicated) was more effective in reducing EPDS score at six months as compared to usual care health visits. Eligible women in the intervention group received one hour counseling sessions once a week for eight weeks by trained health care workers. However there was a wide confidence interval for the estimated intervention effect, suggesting that the true treatment effect may be small despite the statistical significance. The authors commented that further studies are needed to investigate the, non-specific effect of the health visit intervention on all women. This would arguably be best assessed using qualitative methods.

Glavin and colleagues (220) in Norway designed a cluster randomized control trial where 1806 postnatal women were screened at different intervals by nurses using the EPDS and 441

women had care as usual. In the intervention group nurses also provided supportive counseling if EPDS score were ≥ 10. The intervention group showed significantly lower difference in EPDS score up to six months postpartum. The authors conclude that nurses are well positioned to identify and treat postnatal depression in mothers and provide referrals when needed. A small investment in training of these nurses may be cost effective in the long term.

Where women receive counseling also appears significant. A cohort study by Yonkers and colleagues in the United States (221) concluded that screening did not improve referral to specialist mental health care. The authors postulate that this may be because off-site referral is a barrier as women are not able or willing to attend an extra health visit at a different site to their usual antenatal clinic. Hence a general view in the literature that counseling needs to be provided for women onsite.

These recent studies, all conducted in high income countries provide some evidence that screening seems to have the biggest effect when it is implemented as a well-resourced, integrated program with clearly defined pathways to care that include a policy of acting on all positive screening results by offering a confirmatory follow-up procedure and treatment of indicated. Many of the recommendations and interventions in these studies are unrealistic for implementation in resource constrained settings, however, raising questions about the need to develop alternative strategies in low and middle income countries. These strategies could include using a task-sharing approach among primary care health workers and a transdiagnostic treatment approach, which would simplify diagnosis and treatment. This is discussed in further detail in the final chapter (Discussion and Conclusion).

In South Africa, there has been some work on appropriate and affordable interventions. The Perinatal Mental Health Project (PMHP) based in Cape Town developed an intervention to deliver mental health care to pregnant women in a collaborative, step-wise manner, making use of existing resources in primary care. The project team used a stepped care system of screening, counseling and psychiatric services. In this model, nurses conduct a mental health screening at the first antenatal visit and administer the EPDS and a Risk Factor Assessment (RFA). This Risk Factor Assessment, was developed by PMHP staff, and it reflects an understanding of context and environment as relevant in South Africa. It consists of 11 risk factors for mental illness, which are answered with a yes/no answer. The Risk Factor Assessment is to designed to enhance the sensitivity of the EPDS by taking into account the

local context (222). Women who meet a cut-off of >13 on EPDS and/or >3 on the RFA are referred for counseling. Appointments are made to coincide with antenatal appointments. Counseling was provided by social workers or psychologists. Identified patients may be referred for psychiatric assessment if the counselors deem it necessary. Women are contacted telephonically at 6-10 weeks postpartum with a follow-up interview in order to assess outcomes. Preliminary data suggest that women self-reported an improvement in mood and coping, and most women viewed the antenatal maternal mental health care as a positive experience (222). However, formal assessment of mental state using a screening tool or clinical interview was not conducted. There was also no comment in the study about how many women were lost to telephonic follow up.

Overall there is convincing evidence that screening is an appropriate strategy in the management and prevention of perinatal mental disorders. However there are some barriers to this process that need to be considered.

Barriers

Although women find the process of screening acceptable, many are not screened even when routine screening is implemented (223), and many do not have a follow-up assessment and treatment when receiving high scores (224, 225). In order to understand the ways in which women interact with health services, it is important to look at the factors that prevent or limit appropriate health seeking behavior.

A recent literature review of studies conducted in the US and Canada looked at treatment for postpartum depression in low-income women who had been identified with the condition (201). Themes that emerged as barriers to care included fear of the stigma associated with postnatal depression as a major barrier to seeking help. Lack of awareness and knowledge of where and how to access help was also a barrier. These women were more likely to address their condition using self-help and self-reliance rather than resorting to care through professional channels. Other barriers mentioned were lack of transportation, lack of childcare and financial difficulties, and all of these were more common among women in low-income groups. In this review, undocumented immigration status, language difficulties, and insensitive health care providers also emerged as barriers to care among immigrate women (226).

These findings are supported by other studies in high-income countries that looked at the care seeking experiences of women with postnatal depression. Women mentioned that not being

able to identify or distinguish between normal emotional and psychological adjustment associated with parenthood, and atypical responses indicting 'depression', was a major barrier to seeking assistance (227, 228).

Other barriers described in the literature include prohibitive cost of care (when treatment is not covered by medical insurance), transportation problems, lack of child care, social stigma, fear of losing custody of their children, and access to acceptable treatment (227, 229, 230). The main barriers for screening in well baby clinics are less well studied but cite resistance from paediatric staff as a factor. Lack of knowledge and training as well as concerns around scope of practice issues that the child is the patient not the mother are cited as barriers as well as time constraints (231, 232) . Understanding these barriers to care is essential in the process of creating a screening and treatment programs that are culturally sensitive, effective and acceptable to women. This is especially important in ensuring access to and uptake of services for poor women living in low and middle income countries.

Acceptability of screening

One of the pre-requisites of a screening test is that it is acceptable to the population being screened. This is discussed below in relation to the literature in the context of perinatal depression.

In 2003, a study in the UK conducted 39 face-to-face interviews on a purposive sample of postnatal women. Women were asked whether they remembered filling out a questionnaire about postnatal depression and how they experienced it. Screening was judged to be 'acceptable' if there was a positive or neutral response to these open-ended questions or previous discourse and 'unacceptable' if there was a spontaneous negative response. More than half (54%) found the EPDS unacceptable with reasons cited as fear of stigma, perceived inappropriateness and intrusion of privacy. They felt unprepared and anxious about the implications of the results and felt rushed by the health care worker. Most of these women felt that they would have preferred to talk about how they felt rather than fill out a questionnaire, and they would prefer to be screened in the privacy of their home (233).

A telephonic interview study of 407 women, previously screened by midwives for antenatal depression at antenatal visits, was conducted using the EPDS. On follow-up telephonic interview, 100% of women reported that they found the process acceptable. Half of these women also reported that the process raised their awareness of perinatal depression and that getting immediate feedback from the midwife conducting the screening was reassuring (234).

In Australia in 2006, 860 postnatal women participated in a large survey. Women were asked to respond to a survey three years after their initial screening for postnatal depression. Of the women who responded to the survey, 85% felt no discomfort while undergoing postnatal screening using the EPDS (235). However, the number of women who refused screening at the initial screening point, and so not included in the follow-up, was not reported. It is also unclear how many women who were felt uncomfortable answering the EPDS failed to respond to the follow-up survey.

In a similar study, 920 postnatal women who had been through a screening program were invited to take part in a survey. Of these 497 women, both depressed and non-depressed women responded. Of these, 97% thought it was a good idea to screen, using the EPDS in both depressed and non-depressed women, even if a small percentage had slight discomfort during the process. Furthermore women reflected that the screening raised their awareness of depression, helped them reflect on how they were coping and their current mood (236).

In summary, evidence suggests that screening for perinatal depression is acceptable to women, especially during pregnancy and screening also has a secondary effect of raising awareness of the illness. Again these studies were conducted in high-income countries, where presumably women have more opportunity to access health care services as needed. The acceptability and experience of being screened for depression had not been studied among pregnant women living in relative poverty in South Africa, providing an important motivation for this study.

To the present, the research and associated published literature indicate the following:

- Screening should be conducted in order to increase identification of cases which subsequently should improve outcomes.
- Screening should be implemented by any group with the ability to provide adequate on-site services for women.
- Short, simple screening tools with high sensitivity should be used and followed-up with tools with high specificity.
- Screening should take place in settings that are acceptable to women, for example antenatal (237) and postnatal clinics (238), at home visits (239), and at well-baby clinics (220, 240, 241).
- These settings should have facilities to deal with or refer psychiatric emergencies i.e. suicidal ideation.

- Screening can occur anytime pre- or postnatally. Recommendations are that postnatal screening be conducted between 4 and 12 weeks postnatally (242). The recommended timing for prenatal screening is still unclear (36).
- Once screening is implemented it is vital to have a plan and resource for diagnosis, management and follow-up that does not require referral to off-site facilities.

Having discussed the importance of depression and anxiety on women and their infants, I now focus on how depression and anxiety may be effectively identified in perinatal women.

Screening tools

As reflected in the discussion above, the need for screening has been well identified, and the use and availability of accurate, practical screening tools has been widely debated. There are multiple tools for use including generic self-report tools for depression screening and perinatal-specific self-report tools. Other measures include clinician-rated scales and case-finding questions. Factors to take into consideration when choosing a screening tool include who will be administered, who will score and interpret the test, the time it takes to administer the test, the sensitivity of the test, which cut off values to use, and the cultural sensitivity of the tool. The sensitivity of the test (that is, the ability to correctly detect patients who do have the condition and so are true positives) is probably more important than the specificity (the ability of the test to correctly identify those without the disease -- true negatives). Neglecting to identify a woman suffering from depression may, in the context of perinatal depression, be worse than falsely identifying one. Health care workers need to feel confident that the screen is usually positive if the women has perinatal depression, and that a negative screen most likely rules out perinatal depression. The length of the screening tool becomes very important in the context of busy antenatal and postnatal clinics, and time efficient screens are more likely to be adopted. There also needs to be a clear action plan and referral pathway for positive screens. This will be discussed later.

It has been suggested by Gaynes and colleages (36) that further research needs to be done taking into account the following. The validity of tools in the target population need to take into account the representative ethic mix and cultural factors; socioeconomic status should be specifically included because this impacts the illness; screening tools should be assessed and directly compared with multiple screening tools; and the diagnosis should target major depression in the perinatal period and not minor depression. Commonly used screening tools

and their utility will be discussed below, as well as the findings of two different systematic literature reviews (35, 36, 242, 243) comparing different screening tools for the use in postnatal depression.

Screening tools for depression

Beck Depression Inventory (BDI)

The Beck Depression Inventory (BDI) (244) is a generic self-report, 4 point Likert rating scale with scores from 0-63. The time frame considers symptoms 'over one week, including today'. The BDI II (245) includes additional symptoms relating to worthlessness, poor concentration, agitation and loss of energy with a time frame of 'over two weeks, including today.' Both BDI and BDI II have been validated in the perinatal period against gold standard criteria (246) with a pooled sensitivity and specificity of 72 and 91% respectively (247). It has been recommended that higher cut offs should be used in perinatal populations (248) as the somatic symptoms impact on the accuracy of the tool (249).

General Health Questionnaire (GHQ)

This is a generic self-report questionnaire with different subscales, with 12-, 28-, 30- and 60-item versions. Items measure four subscales: depression; somatic symptoms; anxiety/insomnia; and social dysfunction. The GHQ has been validated against gold-standard diagnostic criteria in perinatal populations in both HIC and LMIC (250-255). The GHQ-12 has the highest sensitivity and specificity of 89 and 80.4% respectively in postnatal depression (255).

Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 is a commonly used generic self-report four-point Likert-type scale questionnaire used in primary health care settings (256). The test has a high positive predictive value in primary health care settings and is seen to be the best available tool for depression screening in such contexts (257). However, the PHQ-9 has not been well studied in relation to perinatal depression. It consists of 9 items and contains questions on sleep, appetite and energy: these are not ideal for use in the perinatal period where such somatic symptoms could be pregnancy related or associated with very early mothering. It also includes a question on self-harm. The PHQ-9 has been validated in one study against the DSM diagnostic criteria in pregnancy using a cut-off of 10, and had a sensitivity and specificity of 85 and 84% respectively (258).

The PHQ-2 is a shortened version of the tool consisting of the first two questions relating to low mood and anhedonia. The PHQ-9 and PHQ-2 have been validated against diagnostic criteria for depression in the postnatal period with a sensitivity and specificity of 82 and 84% respectively for the PHQ-9 and 84 and 79% for the PHQ-2 (259).

The Center for Epidemiological Depression Scale (CES-D)

The CES-D (260) is a generic self-report tool consisting of 20 items that measure depressive symptomatology. Respondents are asked to indicate how many days in the last week they experience symptoms. The scores range form 0-60, with a cut off of more than or equal to 16. In one study conducted in the United States, among 1033 postnatal women, the CES-D showed sensitivity and specificity of 60 and 95% respectively (261).

The Zung Self-Rating Depression Scale (Zung SDS)

The Zung SDS (262) is a generic self report questionnaire, with 20 items and a 4-point Likert measure of depression. Scores range between 20 and 80 with a cut off for depression of 50. The Zung SDS has been compared to diagnostic criteria for depression in postpartum women with a sensitivity and specificity of 89 and 77% respectively. However one study demonstrated a low sensitivity and positive predictive value (253). This raises questions about its validity as a screening tool in the perinatal period.

Kessler-10 (K-10)

The K-10 is a generic, 10-item self report tool designed to identify psychological stress (263). The K-10 has been proposed as a screening tool for use in resource limited primary care settings. The reason for this is that the tool is useful in identifying both mood and anxiety disorders and is fairly brief. The K-10 has been validated against the Structured Clinical Interview for DSM IV, in South Africa using a cut-off of more than or equal to 21.5 and has a sensitivity and specificity of 73 and 54% respectively (264). In a small study of 61 postnatal women in Burkino Faso, using a cut off of more than or equal to 14 the sensitivity and specificity were 59 and 91% respectively (265).

The Edinburgh Postnatal Depression Scale (EPDS)

The EPDS is a perinatal-specific self-report 10-item 4-point Likert scale. It is brief, and the most widely used tool used for both antenatal and postnatal depression (266). Scores range from 0-30 with a cut off of more than or equal to 13 (247). Symptoms elicited relate to low

mood, anhedonia, anxiety and self-harm in the last 7 days. A recent review found the sensitivity and specificity of the EPDS both range between 80-90% (214) .Compared with other tools used in the perinatal period the EPDS's performance is favourable (214).

The Postpartum Depression Screening Scale (PDSS)

The PDSS (267) is a perinatal-specific 35-item Likert self-report measure created specifically for new mothers. It focuses on the following 7 areas in the context of new motherhood: sleeping/eating disturbances; anxiety/insecurity; emotional lability; cognitive impairment; loss of self; guilt/shame; contemplating harming oneself in the past two weeks. The PDSS has been validated by the authors against DSM criteria for depression and yielded a sensitivity and specificity of 91 and 72% respectively (268). The tool requires a grade 7 reading level to complete and so is not useful for women with low education levels, or, arguably, among women with varied competence in English (242). However, a Spanish version of the scale has been validated in Spanish-speaking women (269).

Bromley Postnatal Depression Scale (BPDS)

The BPDS (270) is a 10 item measure including open-ended questions and yes/no questions. There is no recommended cut-off, a positive result is based on the mother's answers, and clinical training is required in order to interpret the results. There is only one study validating this tool and it was not validated against a gold-standard measure (270).

The Whooley questions

The Whooley questions are case-finding questions that require only a yes or no response. They can identify anxiety and depression with reasonable accuracy (271) . They are short and do not require scoring or interpretation like pencil and paper tests, and so are more time-effective. They do not require literacy. These two questions address symptoms of depression that are necessary but not sufficient to make a diagnosis of depression: "During the past month, have you often been bothered by feeling down, depressed or hopeless?" and "During the past month, have you often been bothered by little interest or pleasure in doing things?" These questions have been validated by Whooley and colleagues against diagnostic criteria for depression and a positive response to either question had a sensitivity and specificity of 96 and 57% respectively (272). In some settings, a third question is posed, asking the women whether or not they would like help with the problem: "Is this something you feel you need or want help with?" There has been much debate about the inclusion of the 'help' question in

perinatal settings, as it seems to reduce the sensitivity, raising questions of the usefulness of the question (273-275) The first two Whooley questions, in contrast, show consistently high sensitivity and moderate specificity in a variety of settings with different populations (274), although again with limited evidence to support their use in perinatal settings (212, 247, 276).

In conclusion, since Boyd's (242)suggestion in 2005 that using generic tools to identify perinatal depression showed promise, there has been little recent research to support the use of generic tools compared to the EPDS in the perinatal period (36, 247, 277).

Screening tools for anxiety

Anxiety is an increasingly important issue in women's mental health, both for women and because it has negative impacts on the fetus and infant. Therefore screening for anxiety during the perinatal period is critical. There are a number of generic and perinatal-specific screening tools available, although screening tools for perinatal anxiety require further investigation before recommendations are made. It is also suggested that anxiety screens need to be repeated to avoid overpathologising transient distress (213) pg 103. It is common to have a few anxious days, which do not result in changes in mood in the longer term. Generic anxiety tools that have been considered are the State-Trait Anxiety Inventory; the Hospital Anxiety and Depression Scale – Anxiety subscale (HADS); and the EPDS anxiety-subscale. Pregnancy specific measures of anxiety include Pregnancy-related Anxiety Questionnaire (PRAQ); Pregnancy Anxiety Scale (12) and Pregnancy-specific Anxiety Scale (PSAS) (213).

The new UK National Institute of Health and Excellence guideline for the first time also includes the 2-item, Likert type questions, the Generalized Anxiety Disorder scale (GAD-2), using a cut off of more than or equal to three (273). The questions are "over the last 2 weeks, how often have you been bothered by feeling nervous, anxious or on edge?" and "over the last 2 weeks, how often have you been bothered by not being able to stop or control worrying?" The GAD-2 shows high sensitivity and specificity in general populations (278). However there appears to be limited data describing the GAD-2 performance in perinatal populations.

Review of screening tools

Boyd and colleagues in 2005 evaluated 36 studies of postpartum depression screens (242). These postpartum screens are based on self-report screens conducted at least two weeks postpartum. Most studies had small sample sizes of less than 400 participants. Eight

instruments were assessed including: The Beck Depression Inventory l (BDI); the Beck Depression Inventory II (BDI II); Bromley Postnatal Depression Scale (BPDS); Centre of Epidemiologic Studies Depression Scale (CES-D); Edinburgh Postnatal Depression Scale (EPDS); General Health Questionnaire (GHQ); Inventory of Depressive Symptomatology (188); Postpartum Depression Screening Scale (PDSS) and the Zung Self-rating Depression Scale (Zung SDS). This review indicated that the EPDS was the most well studied screening tool with postpartum women, and had moderate psychometric validity.

The third review was commissioned by the Agency for Healthcare Research and Quality (AHRQ), which is the lead federal agency charged with improving the safety and quality of the United States health care system. The Agency collaborated with the Safe Motherhood Group (SMG), an international group dedicated to improved maternal and newborn survival (36). The aim of the review was to determine the accuracy of different screening tools during the perinatal period. Ten studies limited to English screening tools were included, and limited to white American women, hence the accuracy of screening in other ethnic groups is not clear. Most of these displayed sound methodology, although the external validity was questioned. Further, very small numbers of patients suffering from depression were involved in these studies, which resulted in an imprecise point estimate of sensitivity, so preventing the determination of an ideal cut-off point. For women with major depression, the Beck Depression Inventory (BDI), the Postpartum Depression Screening Scale (PDSS) and the EPDS had high specificity. The sensitivities of these scales were much lower. The point estimates are consistent with depression screens in primary health care settings. However, it is important to note the significance of the imprecise cut-off. The above screening tools are more accurate for assessing non-perinatal major depression, and the sensitivity is lower for perinatal depression.

In conclusion the EPDS seems to be the gold standard for screening for perinatal depression - despite its name, for both antenatal and postpartum depression - as it consistently recommended in the literature. Current national policy in the UK [CG 192] (279) promotes the use of the Whooley questions for all women at their first antenatal visit and during the early postnatal period, despite limited evidence of the validity of this tool. The appeal of these questions is their simplicity, which makes them an attractive option in resource limited settings, and their use has been considered in South Africa, in a primary health care setting which will be discussed below (280).

Review of screening tools in South Africa

Recently the Perinatal Mental Health Project (PMHP) in Cape Town (280) has used and validated, in English, a three item, binary version of the Whooley questions. The scoring system was modified slightly, so that if a woman scored 2/3 (that is, answered 'yes' to 2 of 3 questions), she would be referred for mental health care. This cut-off scoring has an acceptable sensitivity of 73% and specificity of 82%. Because the tool is short and easy to score, it does not require any specialized mental health training and can be administered by primary health care workers (280). The GAD-2 has also been validated in the setting by the Perinatal Mental Health Project and has a sensitivity and specificity of 64 and 80% respectively (280).

The Edinburgh Postnatal Depression scale has been validated in South Africa against a clinical interview among mostly black postnatal women at Coronation Hospital, in Johannesburg, a tertiary level hospital. A score of 12/13 was shown to have a specificity of >72.3% and sensitivity of 87.5% for both major and minor depression (63). This is similar to validation studies done internationally (214). In 2004 a study investigated and confirmed the validity of the interviewer-administered isiXhosa version of the EPDS in a peri-urban area, with black women, from a low socioeconomic background, in Cape Town (281). It has been established that the DSM IV diagnostic interview and the EPDS are culturally sensitive tools in both the rural Kwa-Zulu Natal and the peri-urban setting of Khayelitsha in Cape Town (15). The Kessler 10 (K-10), which as noted above is a generic self-report measure that identifies psychological distress, also has good sensitivity and specificity for identifying depression in a sample of healthy pregnant women in Cape Town (264).

Conclusion

Given the high rates and compounding associated risk factors for perinatal depression globally and in South Africa, early identification for perinatal depression is important. Screening programs with referral are a valuable strategy for mitigating the devastating consequences of the illness on mothers and their families. However, more evidence is required to show that screening programs are effective (213). Currently there is no national policy on perinatal screening for perinatal depression. There are few routine mental health programs for perinatal women in South Africa, despite evidence showing that these programs can be effectively introduced to a primary health care setting (282, 283). Therefore, common

perinatal mental health problems remained under diagnosed and are left untreated in the majority of cases.

Perinatal depression is understudied in Gauteng, the smallest but most densely populated province; most of the relevant research has been conducted in the Western Cape. Many people migrate to Johannesburg seeking employment, as there are more work opportunities in the area. This influences the demographics of the population and may result in unique psychosocial stressors for these women and their families, which remains unknown. Good quality data are needed to establish health needs in the country, and so to develop appropriate and effective health services. Working with women, listening to their needs and experiences, can help provide information that leads to improved mental health care for South African women. Studies which use an explanatory, transformative design, as described by Creswell and Plano-Clark, are needed to generate data that can be used to guide effective national policy (284). The development and implementation of sound policies will help protect against adverse affects of perinatal depression and anxiety in a significant number of women.

This PhD aims to add useful information where gaps in our knowledge exist. Firstly, it would be beneficial to gather more information of the validity and utility of the Whooley questions in poor urban South African women attending a high-risk antenatal clinic. This information can help to guide the choice of screening tool used in a potential screening program. Secondly, it would be helpful to determine the impact of screening for antenatal anxiety and depression in pregnant women. Thirdly, by listening to women stories about their perinatal mental health experiences, we can gain insight into the core issues that affect women at this stage of their lives.

CHAPTER 2 METHODOLOGY

INTRODUCTION TO STUDY

The aim and objectives of the study were developed bearing in mind the gaps in knowledge elicited from the literature, especially with regard to knowledge about perinatal depression in South Africa, which is a significant public health problem. I was particularly interested in seeing whether the Whooley questions were an option as a quick and easy screening tool that could be implemented in busy antenatal clinics. Screening tests need to be acceptable to the population being screened and so I was interested in how women perceived being screened for antenatal anxiety and depression. Lastly I was interested to see if the screening process with referral to community psychiatry clinics impacted on women's moods after the birth of their infants.

This study aimed to investigate whether women benefit from antenatal screening for perinatal depression. The objectives were:

> Phase 1. To evaluate the Whooley case finding questions as a potential screening tool for both anxiety and depression, against a clinical interview and the EPDS in women attending an antenatal clinic and between 22 and 28 weeks gestation.
>
> Phase 2. To evaluate women's response to and experience of the screening process in which they participated in phase 1.
>
> Phase 3. To explore the postnatal changes in mood experienced by women who underwent antenatal screening for anxiety and depression, and the contextual factors that impacted on these changes.

MIXED-METHOD STUDY DESIGN

The study used a mixed-method explanatory, convergent, parallel design as described by Creswell and Plano-Clark (284). The central premise for using a mixed-method design is that quantitative and qualitative approaches, in combination, provide a better understanding of research problems than either approach alone (285).

In its formative stages in the late 1980s and early 1990s, mixed-method research was used in various fields such as education, management, sociology, and health sciences. Mixed-method research emerged in response to the ongoing debates about whether qualitative or quantitative

research paradigms were superior to the other. Mixed-methods help resolve this issue by providing a space for the two main paradigms that dominate in epistemological debates, allowing for both a positivist approach (a philosophical system recognizing only that which can be scientifically verified or which is capable of logical or mathematical proof) and a constructivist approach (a philosophical system focused on how humans make meaning in relation to the interaction between their experiences and their ideas). Mixed-method research involves the collection of both qualitative (open-ended) and quantitative (closed-ended) data in response to a research question. The procedures for both qualitative and quantitative data collection and analysis need to be conducted rigorously. The two forms of data are integrated in the design analysis through merging, connecting or embedding the data. The timing of the procedures is distinctive, with either a concurrent or sequential design depending on aims and the proposed use of the different data.

A mixed-method design is a useful strategy for understanding complex research problems or questions. Qualitative researchers have the option to choose from a vast array of theoretical perspectives, including, but not limited to, grounded theory, ethnography or narrative approaches. In the search for epistemological credibility, researchers often feel obliged to position studies in a specific framework, when in fact their work can be better described as simply qualitative description with overtones from these theoretical orientations (286). In reality eclectic techniques are often used.

The use of mixed-methods in mental health is driven by theories that promote assessment of mental health care users' perspectives and contextual factors when considering delivery of mental health services and implementation of evidence-based practices (287). Objective elements such as perspectives and contextual factors are difficult to measure with quantitative methods and are better assessed with qualitative methods through interviews and observation. In contrast, subjective elements such as diagnosis and demographic details lend themselves to quantitative measures. Although there has been little guidance in the mental health literature on how to blend these two methods (288), it does make sense given the biopsychosocial nature of these disorders to use mixed-methods.

In this study a mixed-method approach was chosen to draw on the strengths of both quantitative and qualitative research methods, therefore reducing the limitations of both approaches. The quantitative results can be further explained and understood by generating

and analysing qualitative follow-up data. This can create a better understanding of the need for and impact of an intervention program.

Convergent parallel design

A well-known and commonly used approach to mixed methods research is the convergent design. The convergent design was initially conceptualized as an approach that allowed for triangulation, whereby the two different methods were used to triangulate data about a single topic. Since the 1970s, this design has been known by many names including 'parallel study', 'convergence model' and 'concurrent triangulation'. However, whatever it is called, the terms refers to a design whereby the researcher collects and analyzes both qualitative and quantitative data during the same phase of the research process, and merges the two data sets in the overall interpretation. The aim of the convergent design is to obtain different but complementary data on the same topic, in order to understand the research problem.

The reason for electing to use a convergent design is to bring together the strengths of each separate methodological approach. For quantitative research the strengths are the large sample sizes, allowing for the analysis of trends and generalisations. In qualitative research, the strengths are in the detail and depth of information (289). There are four main steps involved in implementing this design. First, using a range of instruments, the researcher collects quantitative and qualitative data about the select topic. Data collection is concurrent but separate, as the results of the one data set do not depend on the results of the other. The researcher analyses the two data sets separately and independently using qualitative and quantitative analytic procedures. Finally, the researcher reaches the point of interface and works to merge the results of the two data sets. The researcher then interprets to what extent and in what ways the two data sets converge or diverge, and how they relate to each other to create a better understanding of the research question (284).

Philosophical assumptions behind the design

This design involves collecting, analysing and merging both quantitative and qualitative data in one study, and this can raise difficulties regarding the philosophical assumptions behind the research. It is recommended that a researcher use a pragmatism paradigm. This is a practical approach to problem solving in the social world and offers a flexible, alternate and more reflexive guide to research design. Pragmatism frees the researcher from the dichotomy between postpositivism and constructivism and focuses rather on the problem to be

researched and the consequences of the research (290). It concentrates on the usefulness of the research.

Explanatory design

The explanatory design is a mixed method design where the researcher begins by collecting quantitative data in the first phase of the study. In the subsequent phases qualitative data are collected for the purpose of explaining the initial results in more detail, hence reference to this design as "explanatory." This design is well suited when the researcher needs qualitative data to explain surprising results or when the researcher wants to explain the mechanisms or reasons behind the quantitative results. Other prerequisites for this method are that the researcher is quantitatively orientated, knows the important variables and has access to quantitative instruments for measuring the primary topic. The researcher needs to be able to return to the participants for additional qualitative data collection (284).

Philosophical assumptions behind the explanatory design

In the quantitative phase of a study, the researcher has a post-positivist perspective in order to measure variables and assess statistical results. However as he or she moves to the qualitative phase that values in-depth description and multiple interpretations, the researcher needs to have a constructivist perspective. Therefore the philosophical assumption of this design is a shift from post-postivism to constructivism.

The Transformative Design

I refer here to the transformative design in this section, as parts of this project will be incorporated into a policy brief presented to the national department of health of South Africa. Although the study does not adopt a purely transformative design, it does have a transformative tone. The transformative design goes further than a simple mixed-method design and occurs when the researcher conducts a mixed-method study using a theoretical-based framework of a transformative worldview. This framework is used to advance the needs of underrepresented or marginalized populations. The researcher needs to be sensitive to the needs of the population being studied and to be able to (or desire to) recommend specific changes as a result of the research to address questions of social justice for the population under study. The aim is to conduct change-oriented research that seeks to advance social justice and empowers individuals or communities. In this design, values and ideology shape the choice of methods and procedures. Studies adopting this approach can use different theoretical lenses such as a feminist lens, a disability lens, or a socioeconomic lens.

Ultimately the researcher is able to collect data and produce results that are viewed as credible by stakeholders and policy makers. In this context, while the qualitative data provide the researcher with insight into causality or underlying meaning, the quantitative data are significant because of the predilection by policy makers for numeration and statistical significance (284).

Limitations of mixed-method research design (284)

1. One of the prerequisites is that the researcher is skilled in both qualitative and quantitative methods of research. In many studies, this is resolved through the use of multiple researchers.
2. The researcher needs to consider the consequences of having different samples with different sample sizes when merging the two data sets.
3. It can be difficult to interpret the data in a meaningful way, and the researcher needs to design a study that addresses the same concepts.
4. Researchers may need to accommodate and make sense of disagreement between quantitative and qualitative results. Contradictions may provide new insights on the topic, but may be difficult to resolve without the collection of additional data.
5. The researcher must develop trust with participants and be able to conduct the qualitative research in a culturally sensitive way.
6. This design can be more time consuming than using a simple quantitative approach.

Narrative inquiry in health sciences

Narrative inquiry was first used and so termed by Connelly and Clandinin (291), whose thinking was shaped by the philosopher John Dewey (292). Narrative research seeks to understand and then portray real life experiences through the stories given by study participants. It allows people to voice their personal stories in a real life setting, framed by what they perceive to be relevant and in the sequence that best suits them; in other types of study approaches, they may have remained silent and their unique perspectives or experience overlooked. The narrative approach acknowledges human experience as dynamic. The researcher asks questions that will help them to understand the life worlds of their participants, rather than try to explain or predict that world. In health research, it is assumed that the participant who had the experience has valuable insights and ideas that may help address health concerns and offer new perspectives as to how life experience can influence social and health dynamics (293). This offers the researcher an emic perspective or ‘insider

view', that is, the subjective truth for the participant within their own social context. Narrative inquiry is therefore the study of the ways people experience the world in which they live (294). The impulse to narrate is so natural and universal that it is inevitable that certain kinds of questions will produce narrative accounts (295, 296). Because of this universal cultural ability to tell stories, narrative inquiry is a good option of research in multicultural settings (297), as in South Africa.

Narrative inquiry focuses attention on the researcher-participant relationship, and together the two parties explore the meaning of the stories. The research activity is therefore regarded as a negotiated process concerning the researcher and participant. The researcher needs to be a good communicator who is able to empathise with participants, to establish rapport, ask good questions, and listen intently. The researcher needs to reflect on participants' stories within the context of their personal, social and political background. The process is complex and the researcher becomes part of the process. "Stories make the implicit explicit, the hidden seen and the uninformed formed and the confusing clear" (293)(pg 196).

In narrative inquiry the researcher seeks credibility based on accountability, trustworthiness and dependability, through a process of reflexivity rather than the traditional validity and reliability measures (294-296, 298). The researcher's position in therefore complex, as the researcher may play many roles. In the study reported in this dissertation, the principal investigator played the role of psychiatrist, researcher, observer and conversational partner, with the role of the researcher overlapping to a degree with that of psychiatrist. The conversations often become therapeutic as the women were able to tell their stories and became empowered to exercise personal agency in restorying their lives. There is however a degree to which the role of psychiatrist brings with it a degree of power. As a psychiatrist, whenever I work in a professional capacity, I am part of complex social structures in which I am granted more authority than my patients. In the past, power was seen as coming from the professional who has expert knowledge; in newer paradigms power is being transferred back to the individual (299). Foucault (300) suggests that the intellectual -- in this case the psychiatrist/researcher -- no longer has to play the role of advisor, but can provide instruments of analysis. He suggests that the role of the intellectual is that of 'looking at the battlefield' as an observer. This is perhaps a more passive role than the one I took, because my status as a psychiatrist meant that there was a limit to which I could "simply" observe.

In the interviews I took the stance of conversational partner (interlocutor) (301). This is understood as follows: the researcher should gently guide the conversation to maintain the flow dialogue, by leading the conversation through stages by asking questions which prompt the women to tell her story. In this way the women are the experts and a naïve approach is adopted by the researcher; this is fundamental to narrative ways of working (302).

Validity of qualitative research

In qualitative research, there are unique criteria for establishing the validity of results. These are credibility, dependability, confirmability and transferability; to a certain extent these criteria correspond with traditional criteria used in quantitative research. For example credibility has been compared with internal validity, confirmability with objectivity, and transferability with generalizability or external validity (303).

In order to improve validity in qualitative research, various principles have been proposed including triangulation, respondent validation, clear detailing of methods of data collection and analysis, and reflexivity (304). Another important factor in validity is the clinical relevance of the study (305).

Reflexivity

Reflexivity is an attitude of attending systematically to the context of knowledge construction, especially to the effect of the researcher at every step of the research process. Researcher background and position will affect what they chose to investigate, the angle of investigation, the methods used, the findings considered and the framing of the conclusions. The researcher's presence and perspective has an effect on their relationship with the participant, and their engagement, as already indicated above; therefore there is no such thing as a neutral observer (306). Throughout the research process, the effect of the researcher should be assessed, and this needs to be addressed in any discussion and interpretation of results. This was very evident in my study, and was explored in detail in the second paper (see results chapter 4). The interviews were conducted in a non-specific therapeutic way that made use of good listening skills and empathy, although at its conclusion, I also provided some basic psychoeducation. Using the principle of reflexivity, I identified that the quality of the initial screening interview may have affected the results of this study. This was perhaps unavoidable. Results may have differed if women had felt pushed into a screening interview by a non-empathetic interviewer who did not provide them with a therapeutic space, or if

screening proceeded with a simple pencil and paper test with no interviewer. In the case of this study, the empathetic interaction provided a therapeutic space, as I argue in Chapter 6.

In summary, qualitative research is a systematic and reflective process for the advancement of knowledge, which can be contested, shared and transferred beyond the study setting.

AIMS

This study aimed to address whether women benefit from antenatal screening for perinatal depression. The convergent parallel, as well as, explanatory design was conducted in three phases. In the first phase, as the principal investigator, I collected data using quantitative measures, with the aim of determining whether the Whooley case finding questions were a potential screening tool for both anxiety and depression. During the second phase, quantitative measures were used to identify changes in mood over time and follow-up qualitative interviews examined women's response to and experience of the screening process. In the third phase, quantitative measures were used again to identify changes, and again follow-up qualitative interviews examined postnatal changes in mood experienced by these women and contextual factors that impacted on these changes.

SETTING

The study was conducted at Rahima Moosa Hospital in Coronationville, Johannesburg. Rahima Moosa is a tertiary level mother and child hospital, and is also a training hospital affiliated with the University of the Witwatersrand. Pregnant women were recruited at the antenatal clinic of Rahima Moosa Hospital. Approximately, 12,000 women deliver at this hospital per annum. Women who attend the antenatal clinic in this setting all have high-risk pregnancies, defined as a condition that puts the mother and/or developing fetus at higher-than-normal-risk for complications during birth and pregnancy. High-risk excludes HIV infection, as diagnosis and treatment of HIV to prevent parenteral transmission is undertaken in primary health care centres. The category also excludes women who are obese, unless for other reasons they are identified as at risk of developing gestational diabetes. Hence the women who are referred to the hospital as at-risk are older women (> 35), women who have had a previous surgical delivery, previous pregnancy losses, are at risk of pre-eclampsia, or have been identified as having a multiple pregnancy. As a result of their classification as at risk, women often have more regular appointments and are usually seen by a nurse, midwife or physician more often than the four antenatal visits recommended in primary health care

settings. Yet despite the vulnerability of these women, no maternal mental health service is provided at Rahima Moosa, and the hospital does not offer a specific adult psychiatric service. Instead, in non-emergency cases, women are referred to their nearest mental health community clinic, without follow-up from the referring physician to check that the consultation had occurred; in the case of an adult psychiatric emergency, women are seen by the child psychiatrist on call and are then referred for further management to a nearby general medical and surgical public hospital, Helen Joseph Hospital which has an adult psychiatric unit.

SAMPLING

In Phase 1 a prospective cohort consisting of a convenience sample of women attending the antenatal clinic at Rahima Moosa Hospital was used. As only the principal investigator was collecting data, and the volume of women seen daily was high (approx. 100 women), this made consecutive sampling difficult.

Inclusion criteria were women who are:

- Able to communicate through the medium of English
- Attending antenatal clinic
- 18 years or older
- Between 22 – 28 weeks pregnant
- Willing to participate and signed the informed consent form

Of the 145 women recruited in Phase 1 and who had participated in the prenatal screening interview in Phase 1 at 22-28 weeks, 55 continued to Phase 2 and were re-interviewed at 34-38 weeks. Currently there is no exact recommended time to screen for antenatal depression and anxiety; rather a pragmatic approach of screening women when they are in contact with health service is recommended. These time periods reflect times when women were likely to first present to the high risk clinic and their last antenatal visit, factoring in for the higher likelihood of preterm labor in this study sample. Again, because the principal investigator was the only interviewer, it was possible that some women passed through the clinic while she was conducting interviews with other women either in Phase 1 or in Phase 2 of the study, which overlapped. Over 100 women attend the clinic on a daily basis, so it would be easy to miss someone especially if they didn't want to be re-interviewed. In addition, because of the

clinical load it was not possible to expect the staff at the clinic to assist in recruiting patients for the follow up interview.

In Phase 3, a purposive sample of 20 women, who had participated in the Phase 1 and Phase 2 prenatal interviews, were re-interviewed from 4 weeks to 6 months after the birth of their baby. Interviews were conducted at the postnatal clinic at Rahima Moosa Hospital and at local well baby clinics while women were waiting for their infants to be immunized.

Sample size

For Phase 1, a sample size of 145 patients was required to estimate sensitivity and specificity at 75% with 11% precision (rather than 10%), which is reasonable, given the exploratory nature of the study, with a 95% confidence interval, and the prevalence of the diagnosis of 40%.

For Phase 2 and 3, where the focus was the qualitative data collection the sample size was determined by data saturation. Data saturation is the point at which data collection can cease. At this point, the researcher collecting the data determines that the information that is being shared has become repetitive and contains no new ideas, and so he or she can be reasonably confident that the inclusion of additional participants is unlikely to generate any new ideas. There are currently no specific guidelines on data saturation, and the decision on saturation is necessarily a judgment call.

Of course, the qualitative sample will always be far smaller than the quantitative sample. This is because the aim of qualitative research is to obtain in-depth information, whereas quantitative data collection aims to collect larger quantities of data that can use used to establish significance in statistical tests. This inequality in sample size needs to be resolved in mixed-method research. This can be done in a few ways. Firstly one can recruit the same amount of individuals for both the quantitative and qualitative databases. This was the case in Phase 2, where both quantitative and qualitative data were collected and analysed with the same 55 women. With high numbers in the qualitative sample, this may limit the amount of data collected from each individual. Secondly, one could weight the qualitative sample so that they were theoretically equal to the numbers in the quantitative sample. For example; one interview would be the equivalent to ten survey questionnaires. The third solution is to not consider the inequality as a problem, as the quantitative method is needed to generalize a population and the qualitative method is needed to gain an in-depth perspective. This was the

approach in Phase 3 where interviews were conducted on 20 women, with the quantitative data used to enhance qualitative findings.

MEASURES

Biographical questionnaire

The biographical questionnaire, included in Appendix A, was used to collect demographic details and social and economic variables including age, level of education, employment status, relationship status, parity, gravidity, attitude to pregnancy, support of partner, medical and psychiatric history.

Screening Tools

The Whooley questions and the EPDS are screening tools used to assess symptoms of perinatal depression. Both were administered in this study in Phase 1. However only the EPDS was administered in Phase 2 and 3.

Edinburgh Postnatal Depression Scale

The decision to use the EPDS (Appendix B) reflected the fact that, despite its name, it is the most widely used tool used for both antenatal and postnatal depression (266). The EPDS is a 10-item self-report scale that explores symptoms of anxiety and depression experienced in the past seven days (307). It is easy to score with final scores between 0 and 30. For example, question, 9 reads and scores as follows:

I have been so unhappy that I have been crying

3 points = yes, most of the time,

2 points = yes, quite a lot,

1 point = only sometime,

0 points = no, never

Questions were read out to participants, and they indicated verbally which answer best described them. At the end, points for all questions are tallied.

A wide range of cut off points has been reported. The original validation study recommended a cut off of 10 for possible depression and ≥13 for probable depression or psychological

distress (307). Many authors suggest the most effective cut off point that balances sensitivity and specificity is equal to or more than 10 (212).

The scale has been validated in South Africa among both antenatal and postnatal women using an interview format (63, 138). The EPDS was first validated in 103 postnatal women attending the postnatal clinic at Rahima Moosa hospital, a tertiatry level hospital (63). The EPDS was compared to a clinical interview based on DSM IV criteria for depression. Women were assisted to complete the scale verbally and this proved to be a valid way of administering the screening tool. A score of ≥13 has shown to have a specificity of >76% for both major and minor depression, and the EPDS had a sensitivity of 80% and a specificity of 76.6% for major and minor depression (63). Subsequently the scale was also validated in 109 pregnant women in their second trimester attending a primary health care centre in a rural area, administered in isiZulu and with the results of the EPDS compared to results from a structured clinical interview of DSM IV for depression. A score of ≥ 13 was shown to have a sensitivity of 69% and a specificity of 78% (138). The scale has also been translated into isiXhosa and found to have a coherent internal validity in 147 postnatal women in Khayelitsha (281).

Although the EPDS has high sensitivity and specificity, there is still a small risk of a false negative result. Therefore, should someone appear visibly depressed they should be referred for further assessment by a mental health professional, despite their score. Scores should not override clinical judgment (212). In my study I was able to refer participants based on their diagnosis on the clinical interview, and I did not rely on EPDS score alone.

Whooley questions

The Whooley case-finding questions (Appendix C) were originally validated in 1997. There are two questions: “During the past month, have you often been bothered by feeling down, depressed, or hopeless?” and “During the past month, have you often been bothered by little interest or pleasure in doing things?” These two questions address symptoms of depression that are necessary but not sufficient to make a diagnosis. These questions were validated against six other screening tools and the Diagnostic Interview Schedule (DIS) (308) in 536 consecutive male patients attending a Veterans Affairs Medical Centre in the US. A simple yes or no answer is required, and a positive response to either question had a sensitivity and specificity of 96% and 57% respectively (272). The 2014 Service Guidelines of the National Institute of Clinical Excellence (NICE), an organization in the UK that provides national

guidance and advice to improve health care, recommend the use of the Whooley case finding questions to screen for perinatal depression (273). In some settings, including the earlier 2007 NICE Guidelines (276), a third question is posed, asking the woman whether or not she would like help with the problem. There has been much debate about the inclusion of the 'help' question in perinatal settings, as it seems to reduce the sensitivity, raising questions of the usefulness of the question (273-275). The first two Whooley questions, in contrast, show consistently high sensitivity and moderate specificity in a variety of settings with different populations (274), although again with limited evidence to support their use in perinatal settings (212, 247, 276).

In this study the 'help' question was included, and I was able to analyse its usefulness. The exact wording of the Whooley questions is as follows:

1. During the past month, have you often, been bothered by feeling down, depressed, or hopeless?
2. During the past month, have you often been bothered by little interest or pleasure in doing things?
3. Do you think it is something you want help with?

Structured Clinical Interview of DSM

The SCID is a structured clinical interview that can be used to assess mental disorders and provide diagnoses according to the definitions and criteria of the American Psychiatric Associations, Diagnostic and Statistical Manual of Mental Disorders (DSM 5). The SCID has been used in at least 700 studies in a variety of countries, cultures and settings. The SCID was designed to be administered by a mental health professional, either a psychologist or a psychiatrist who is familiar with the DSM classification and diagnostic criteria. It is considered to be the gold standard of psychiatric research interviews (309).

The clinical interviews were undertaken by me as the principal investigator (and as a psychiatrist), using the NetSCID, an electronic research version, non-patient edition of the Structure Interview of DSM (246) as a guide. Diagnoses are aligned with the DSM-5 classification. The NetSCID results in far fewer data-entry and branching errors than the paper SCID (310). The principal investigator had received online training on how to use the NetSCID. Only the mood and anxiety disorder modules, including trauma and stress related disorders, were administered. Although trauma and stress related disorders has been moved out of the anxiety disorder category they remains relevant due to the prominence of anxiety as

a core symptoms. Modules that were omitted included the psychotic disorders, eating disorders and personality disorders. The DSM 5 categories of unspecified anxiety and depression were used to categorise subsyndromal but clinically significant symptoms of anxiety and depression respectively. This is important because subsyndromal symptoms of anxiety and depression can cause similar levels of distress to women with a clear diagnosis (311), as noted above, and because perinatal depression and anxiety occur on a continuum of severity (312). Interviews were conducted in English, which is widely spoken in this urban area. All women who were able to understand the informed consent were able to effectively engage in the clinical interview, even if English was not their first language. This is a limitation of the study, as discussed in the limitations section.

Qualitative interviews at 34-38 weeks

Qualitative data were collected using a narrative inquiry approach (291, 293). These focused interviews (313) lasted between 10 and 40 minutes, and opened with "Do you remember that last time we spoke – I asked you some questions about your mood?" Probes included "How did it make you feel?" and "Did you find it helpful in anyway?" Another open-ended question was "How have you been since we last spoke?" and probes included "Are you still struggling with X symptoms?" and "Are there any new problems of difficulties in your life?" Women who were referred for further assessment and management in Phase 1 were asked if they had managed to go to the mental health clinic. If women still required further assessment and management, they were encouraged again and referred to their nearest mental health community clinic. All interviews were conducted in English.

Postnatal qualitative interviews

Qualitative data were collected using a narrative inquiry approach (291, 293) These focused interviews (313) lasted between 10 and 40 minutes, and opened with "How are you doing now that your baby is born?" All interviews were conducted in English.

Checklist of clinical services

In the original protocol it was suggested, by the assessor group, that I included a quantitative check-list designed to assess the quality of mental health service received by the participant. However, based on previous research follow-up, rates for treatment are low especially when that treatment takes place at a separate health visit at another location to the antenatal clinic. Only four women interviewed in Phase 2 had made contact with mental health services. One woman received a counselling session with a nurse; one saw a doctor and received

counselling and medication; one made an appointment but did not attend; and one had a counselling session with a psychologist. As a result of the extremely low numbers of women who made contact with services, the quantitative checklist was not a useful measure. This illustrates well a potential pitfall of quantitative research methods. The qualitative enquiry enabled me to make sense and explain why many women didn't attend mental health services, which could have not been predicted at the start of the study. The interviews thus elicited previously unknown information of the participants' lived experiences, and as Patton (314) explains, open ended responses provided the means to understand the experience of the participants, without a pre-determined bias.

PROCEDURE

In Phase 1 (July 2015-April 2016), participants were invited to enter the study by the clinical staff working at the antenatal clinic, on behalf of the principal investigator. Each participant was given an information sheet and, if willing to participate, they would sign the informed consent form. (Appendix D). Participation was completely voluntary. Once informed consent was given, each participant was interviewed by the principal investigator. During the interview the biological questionnaire, EPDS, Whooley questions and SCID were administered. Women who are diagnosed with depression or anxiety disorders, as per the SCID, were referred for treatment at their local community clinic.

In Phase 2 (September 2015–April 2016) the Edinburgh Postnatal Depression Scale and clinical diagnosis using the NetSCID were repeated on a sample of 55 women during an interview, late in their third trimester, in order to quantify temporal mood changes. These follow-up interviews were prearranged to take place at the 34-38 weeks antenatal visit, but interviews were not scheduled. Women who had undergone screening interviews in Phase 1 were identified by name in the antenatal waiting area by the first author, and were asked if they would like to participate in a second interview while they waited to be seen by the doctor. All women approached agreed to the interviews. After 55 interviews, themes were fully developed and no new information emerged. Sampling terminated as data saturation had been reached. All interviews were conducted face-to-face in a private room in the antenatal clinic. Informed consent was revisited and women were reminded that the interviews would be audio recorded and transcribed, and that they could withdraw from the study at any time. All interviews were conducted in English

In Phase 3 (December 2015- August 2016), a purposive sample of 20 women, who had participated in the Phase 1 prenatal interviews, were re-interviewed from 4 weeks to 6 months after the birth of their baby. Interviews were conducted at the postnatal clinic at Rahima Moosa Hospital and at local well baby clinics while women were waiting for their infants to be immunized. In Phase 3 the Edinburgh Postnatal Depression Scale and clinical diagnosis using the NetSCID were repeated in order to quantify temporal mood changes. The women's babies were present at the postnatal interviews and in most cases were held by the mother while she was being interviewed. In retrospect this may have been an ideal opportunity to observe mother-infant interaction as well as infant development. This was not included in the interview nor in the study, but may be very useful to consider in future longitudinal studies looking at the impact of screening on both mother and on parenting.

QUANTITATIVE OUTCOME MEASURES

An objective change in mood over the phases of the study was measured by

- An improvement in symptoms as determined by the clinical interview, and
- An improvement in the score on the rating scale (EPDS).

INTERVENTION

Should the participant require referral, a referral was made to the participant's local community psychiatric clinic for standard primary health care intervention for depression.

The Gauteng Department of Health, in association with the Department of Psychiatry at the University of the Witwatersrand, provides an outpatient psychiatric service at district level in the metropolitan municipalities of Johannesburg and Ekurhuleni and the district municipalities of Sedibeng and West Rand. The service aims to deliver specialized mental health care to patients that reside in the clinics catchment area. The outpatient services usually run from 8h00 to 16h00, Monday to Friday. Treatment at the clinics will follow the evidence-based standard treatment guidelines using medications available on the essential drug list (315). The treatment modalities include medication, individual and group therapy and psychoeducation for patients and families to help them understand and cope with mental illness. These district clinics provide a secondary level service and patients need to have a referral letter in order to be seen.

DATA MANAGEMENT

The biographical questionnaire, Whooley questions, EPDS and follow-up interview data were collected by the principal investigator, using RedCap software. REDCap (Research Electronic Data Capture) is a browser-based, meta-data driven electronic data capture software solution and workflow methodology for designing clinical and translational research databases. It is widely used in the academic research community (316).

An electronic web-based version of the SCID, called NetSCID, which was created in association with the Biometrics Research Department at Columbia University by a company called TeleSage, was used. Interviews were audio-recorded, transcribed and checked for accuracy. Transcriptions were kept in Word documents

DATA ANALYSIS

The challenge in mixed-method research is to converge or merge the data. The two databases were analysed separately and then brought together in the discussion of the papers. This approach is known as side-by-side comparison, where the researcher presents the quantitative data first and then uses the qualitative data to confirm or explain the results. This was the approach used in this study.

Quantitative data analysis

In Phase 1 categorical variables were summarised by frequency and percentage tabulation. Continuous variables were described by the mean, standard deviation, median and interquartile range. For the comparison between demographic and risk factors and diagnosis, patients were classified as having no diagnosis, a diagnosis of depression or a diagnosis of trauma-related or anxiety disorder. The X^2 test was used to assess the relationship between categorical risk factors and diagnosis, as well as between the 'help wanted' indicator and diagnosis. Fisher's exact test was used for 2 x 2 tables or where the requirements for the X^2 test could not be met. The strength of the associations was measured by Cramer's V and the phi coefficient respectively. The following scale of interpretation was used ≥ 0.50 high association; 0.3-0.49 moderate association; 0.10-0.29 weak association; ≤ 0.10 little or no association. One-way Analysis of Variance (ANOVA) was used to assess the relationship between age and diagnosis; the strength of the association was measured by Cohen's d.

The sensitivity and specificity (together with 95% confidence intervals) of the Whooley test, EPDS and EPDS anxiety subscale in identifying the various diagnoses were calculated, with the diagnostic interview used as the reference standard. Here, the diagnoses were considered

as follows: (317) any diagnosis vs. no diagnosis; (318) anxiety/trauma vs. no/any other diagnosis; (3) depressive disorders vs no/any other diagnosis. Trauma-related disorders were grouped with anxiety disorders, as there were too few to analyse separately. By considering different cut-off points for the scales, receiver-operating characteristic (ROC) curves were generated. The impact of the Whooley questions, including the 'help' question, on the diagnosis of depression was determined by log-binomial regression. Data analysis was carried out using SAS version 9.4 for Windows. The 5% significance level was used.

Qualitative data analysis

Interviews were audio-recorded, transcribed and checked for accuracy. Transcriptions were kept in Word documents and analysed for main themes, using a three phase coding system (319). The first author performed an initial scan of the transcribed texts, highlighting phrases used by the participants and detecting initial themes. An iterative, cyclic and reflective process was used to explore meaning (313, 320). The principal investigator and supervisor identified core themes through a process of collaborative content analysis and core themes relevant to this paper. The principal investigator then focused on connecting themes and finding links in the data. Finally the principal investigator reread the data and assigned excerpts that captured the themes extracted. All coding was checked by the supervisor to ensure consistency and accuracy.

The results of each data set and how they converge are discussed in detail in the discussion.

Trustworthiness and Rigor

Constructs described by Guba (321) were used to ensure trustworthiness and rigor of the study. Credibility is achieved by an attempt to demonstrate that a true picture of the phenomenon under investigation is presented. This was achieved by the using the EPDS score and clinical interview, which adds to the credibility through triangulation of data and internal validity (using well established methods). Another contributing factor was the prolonged engagement with women and environment, as they were followed-up over time. A rapport was established which helped to ensure honesty of the participants. Transferability is the achieved by providing sufficient detail of the context of the fieldwork for the reader to decide if the environment is similar or different to an environment they are familiar with and so they can decide. This has been addressed in the methods were the study setting and sample are described in detail. In addition, the limits to which the data can be transferred is described in detail in the discussion where we discuss the limitations of the study. Dependability is the

ability to enable future researches to repeat the study. The methodology is now clear and addresses this point. Confirmability is the ability to demonstrate findings emerged from the data and not the investigators own predispositions. In this study we used content analysis, which helped us stay close to the actual data without adding layer of interpretation based on other psychological frameworks. We also mention the use of an iterative, cyclic and reflective process to explore meaning, thereby addressing our own predisposition. In addition we have also mentioned how the first author is a psychiatrist, familiar with the setting.

LIMITATIONS

In Phase 1 the relatively small sample size of 145, as well as recruitment at a high-risk antenatal clinic may limit the study in terms of being able to generalize results to other settings. Pregnancy complication is a risk factor for perinatal depression, and therefore it may be expected that a high-risk clinic would have slightly higher rates of perinatal depression than a low risk clinic. In Phase 2, only women who wish to be interviewed took part in the screening and follow-up interviews. This may have biased the sample. All interviews were conducted by the first author and it is possible that some women passed through the clinic while the first author was conducting interviews with other women either in Phase 1 or in Phase 2 of the study, which overlapped to some degree. The clinic services about 100 women a day, which results in a high clinical load. Using the principle of reflexivity, I identified the quality of the initial screening interview may have affected the results of this study. As noted above, similar results may not have been found if women felt pushed into a screening interview by a non-empathetic interviewer or if screening proceeded with a simple pencil and paper test. As already described, these interviews were conducted in a non-specific therapeutic way that made use of good listening skills and empathy, as well as, at the end of the data, providing some basic psychoeducation.

In Phase 3 data were derived from women who agreed to participate in the interviews antenatally and were retained post-partum, so biasing the sample. There was a poor retention rate between the screening interview and the follow-up interviews because many women, who had migrated to Johannesburg, returned to their natal home after delivery for support. These women may have had different life experiences to those who participated in the postnatal interview. Timing of interviews had a wide range from four weeks to six months postpartum. Most interviews took place at six weeks postpartum, and for some women, depression may have emerged at a later stage.

Only participants with an adequate command of the English language could participate in the study. English is widely spoken in this urban area and is formally taught in schools as a second language. English is generally understood across the country and is the language of business, politics and media, and is regarded as the country's lingua franca (322). However English is not the mother tongue of many women, and accordingly participants who could understand the informed consent were likely to be proficient enough in English to participant in the screening and follow-up interviews. In total, only four interviews were terminated as women were not able to engage effectively as a result of language barriers. This is clearly a limitation of the study. If women were interviewed in their own language they may have given a richer account of themselves. Interviews in English also do not take into account that some expressions and terminology, including for mental health states, may be culture-specific or carry particular nuance, and therefore may have been interpreted incorrectly by either the participant or the investigator.

These findings cannot be generalized to other settings, as they are specific to poor urban women living in South Africa and attending a high-risk antenatal clinic. Further research is needed that incorporates more diverse samples of pregnant women, including low-risk and rural women.

In addition I would like to expand and reflect on how this study impacted on clinical practice at Rahima Moosa hospital where the study was conducted. Once the data collection phase of the study was completed a feedback session was held with the Department of Obstetrics and Gynaecology at the hospital during one of their academic meetings. The aim of this meeting was to report back on some of the findings that would be of specific interest to the daily running of the clinic. Prevalence rates, impacts of perinatal depression and anxiety and issues around screening were presented along with the validation study of the Whooley questions. Although this meeting has not directly changed clinical practice I feel that it generated an awareness of maternal mental health problems and gave doctors a sense of hope that an impact can be made even in a resource limited setting. Subsequent to this meeting I was invited to present at the Maternal Health Summit, in November 2017, which is the national conference for Obstetricians. This information was then presented to a larger audience and maternal mental health was included in the conference summary as an import area that needs clinical attention. The study has not directly contributed to clinical changes at the hospital where it was conducted, which is a limitation. However, I am aware that my efforts to promote maternal mental health are not in isolation, and so I feel that the best way to affect

change is to collaborate with other researchers and work towards a change in national policy which will have much further reaching effects that this individual small study. This view is supported by a discussion around advocacy that is presented in the final chapter.

ETHICS

- An application was made to the Human Research Ethics Committee of the University of the Witwatersand to grant ethical approval for the study. (Appendix E)
- Preliminary permission, subject to ethics clearance, was obtained from the management at Rahima Moosa hospital. Once ethics clearance was obtained, final permission was granted by management at Rahima Moosa Hosital. (Appendix F)
- Confidentiality was maximized by virtue of the fact that the database is password protected and the data traffic to and from the server is encrypted. The server is hosted in secure data centre and regular backups are done. The system allows restricted access to identifying data for each participant, and in this study only the principal investigator had access to this information.
- If the participant's condition remained unchanged or had deteriorated at either of the follow-up interviews, they were referred to the psychiatric services at Rahima Moosa where specialist psychiatric care is available for urgent cases. Once they were assessed, a decision would be made by the treating psychiatrist, with regard to the further management of the patient.
- Participation in the study was voluntary and participants could have withdrawn from the study at anytime. Withdrawal from the study would in no way affect their obstetric care.
- If participants felt distressed during or after the interviews, as a result of receiving a diagnosis or by certain topics discussed in the interview, the principal investigator would take time to contain the patient and then refer the patient to the psychiatric services at Rahima Moosa where specialist psychiatric care is available for urgent cases. Again, once they were assessed, a decision would be made by the treating psychiatrist with regard to the further management of the patient. In reality, this was not the case as women felt the interviews were therapeutic to a certain extent.
- All the relevant departments were approached to ensure their willingness to help with the follow-up care of the participants as needed.

TIMING

		June 2015	July 2015 - July 2016	August 2016 December 2017	January 2018
Submission to assessor group					
Data collection					
Analysis and write-up					
Submission					

CHAPTER 3

RESULTS: TESTING APPROACHES TO PERINATAL DEPRESSION IN AN ANTENATAL SETTING

Paper 1. Validation of the Whooley questions for antenatal depression and anxiety among low-income women in urban South Africa

Marsay C, Manderson L, Subramaney U. Validation of the Whooley questions for antenatal depression and anxiety among low-income women in urban South Africa. South African Journal of Psychiatry. 2017;23(317):1-7.

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Abstract

Background/Objective

In South Africa, approximately 40% of women suffer from depression during pregnancy. Although perinatal depression and anxiety are significant public health problems impacting maternal and infant morbidity and mortality, no routine mental health screening programmes exist in the country. A practical, accurate screening tool is needed to identify cases in these busy, resource scarce settings.

Method

A convenience sample of 145 women between 22 and 28 weeks gestation was recruited from Rahima Moosa Hospital antenatal clinic in Johannesburg. Women completed a biographical interview, the Edinburgh Postnatal Depression Scale (EPDS), the Whooley questions and a structured clinical interview.

Results

The results demonstrate the sensitivity and specificity of the Whooley questions and the EPDS in identifying depression, anxiety and stress disorders of varying severity. The

importance of personal, social and cultural context in influencing the content and expression of these common perinatal conditions was also identified.

Discussion and Conclusion

The validity of the Whooley questions in the context of urban South Africa, and the importance of ensuring clinical interviews to supplement any screening tools, is emphasised.

Keywords: Screening; Antenatal depression; South Africa

Introduction

The rate of perinatal depression among South African women living in relative poverty is approximately 40%, (1-3) three times the rate documented in high income countries. Perinatal depression is therefore a significant public health problem in South Africa, (2, 4) with potentially devastating consequences for the mother, foetus, infant and family (5, 6). Perinatal depression and anxiety are also associated with preterm birth and low birth weight, (7) malnutrition and poor growth in infants and children (8, 9), delayed initiation of breastfeeding,(10) impaired cognition and motor development (11-14) and increased child mortality (15). Maternal suicide is the leading cause of maternal death in high income countries with similar estimates to those in low-middle income countries (16, 17). The rate of neonaticide in South Africa is 19.6 per 100 000 live births, with 71% of the mothers being identified as the perpetrator (18). The high rates of perinatal depression appear to relate to specific risk factors prevalent in South Africa, including poverty, (19) intimate partner violence,(1, 20) lack of partner support,(21, 22) and the high prevalence of HIV in antenatal women (39-45%) (2, 23). Given the high rates and compounding associated risk factors for perinatal depression in South Africa, its early identification and management is important. Screening with referral is a valuable strategy for mitigating the devastating consequences of the illness on mothers and their families. However, more evidence is required to show that screening programmes are effective (24).

Choosing the best screening tool for a screening program depends on the context. One needs to consider the population being screened, as well as who will be administering and interpreting the results. As depression screening becomes more routine, the length of the tool also becomes important. Shorter tools, which are less time-consuming, are favoured over longer tools. Case finding questions can identify anxiety and depression with reasonable

accuracy (25). They are short, do not require scoring or interpretation like pencil and paper tests, so are more time-effective, and they do not require literacy.

The National Institute of Clinical Excellence (NICE) 2014 Service Guidelines recommend the use of the Whooley case finding questions to screen (26). These two questions address symptoms of depression that are necessary but not sufficient to make a diagnosis of depression. In some settings a third question is posed, asking the women whether or not they would like help with the problem. There has been much debate about the inclusion of the 'help' question in perinatal settings, as it seems to reduce the sensitivity, raising questions of the usefulness of the question (26, 27). The first two Whooley questions, in contrast, show consistently high sensitivity and moderate specificity in a variety of settings with different populations, (27) although again with limited evidence to support their use in perinatal settings (28-30).

Gaps exist in the detection of mental illness at the primary care level in South Africa, partly as a result of ineffective screening tools (31). Many screening tools have been tested in the country, but most appear to be too time-consuming to be administered successfully in busy under-resourced antenatal and postnatal clinics (32, 33). A study conducted in Cape Town illustrated that it is feasible and acceptable to incorporate mental health screening and depression assessment, with referral, into antenatal clinics, (34, 35) and as a result, the researchers who conducted this have advocated for the use of an accurate, practical 3-item screening tool, based on the Whooley case finding questions (32).

The aim of the study reported in this article was to evaluate the Whooley case finding questions as a potential screening tool, against a clinical interview and the EPDS. The study was conducted in a state hospital in Johannesburg. We determined whether the Whooley questions can be used as a practical, accurate screening tool, and if the addition of the 'help' question enhanced its utility.

Method

Sample size

A sample size of 145 patients was required to estimate sensitivity and specificity at 75% with 11% precision (rather than 10%), which is reasonable, given the exploratory nature of the study, with a 95% confidence interval, and the prevalence of the diagnosis of 40%.

Study Design

The study was conducted at Rahima Moosa Hospital in Johannesburg, South Africa. Rahima Moosa is a tertiary level mother and child hospital, and a training hospital affiliated with the University of the Witwatersrand. Women who attend the antenatal clinic in this setting all have high-risk pregnancies, defined as a condition that puts the mother and/or developing foetus at higher-than-normal-risk for complications during birth and pregnancy (23). Despite the vulnerability of these women, there is no maternal mental health service provided at Rahima Moosa, and the hospital does not offer a specific adult psychiatric service. In non-emergency cases, women are referred to their nearest mental health community clinic. In the case of an adult psychiatric emergency, women are seen by the child psychiatrist on call and are then referred to the nearby Helen Joseph Hospital, where there is an adult psychiatric unit, for further management.

A convenience sample of women attending the antenatal clinic at Rahima Moosa Hospital was used as only the principal investigator was collecting data, and the volume of women seen daily was high, making consecutive sampling difficult. The inclusion criteria were women able to communicate in English attending the antenatal clinic; 18 years or older; between 22 – 28 weeks pregnant; willing to participate; and who provided informed consent forms. Ethics clearance was granted by the Human Research Ethics Committee at the University of the Witwatersrand.

Of a total of 149 women were approached to partake, four who consented were not able to communicate adequately in English and their interviews were terminated. The remaining 145 patients provided informed consent and participated in the interview. Data were collected between July 2015 and April 2016.

Assessments

The Whooley questions and the EPDS are screening tools used to detect possible perinatal depression.

Edinburgh Postnatal Depression Scale

The most widely recognised screening instrument for perinatal depression is the Edinburgh Postnatal Depression Scale (EPDS). This scale was validated in South Africa, with a group of postnatal women at Rahima Moosa Hospital in 1998 (36). The EPDS is a 10-item self-report scale that explores symptoms of anxiety and depression experienced in the past seven days (37). It is easy to score with final scores between 0 and 30. The original validation study

recommended a cut off of 10 for possible depression and ≥13 for probable depression or psychological distress (37). In South Africa, a score of ≥13 has been shown to have a specificity of >76% for both major and minor depression (36). In a validation study conducted by Lawrie and colleagues, women were assisted to complete the scale verbally and this proved to be a valid way of administering the screening tool (36). In this present study, women were assisted by the principal investigator and gave verbal answers. A score of ≥13 was used as a cut off for probable depression and referral. The anxiety sub-test of the EPDS (questions 3-5) was also analysed to determine the effectiveness of the instrument in screening for anxiety disorders in this setting.

Whooley questions

The Whooley questions address core symptoms of depression (low mood and lack of interest):

1. During the past month, have you often been bothered by feeling down, depressed or hopeless?
2. During the past month, have you often been bothered by having little interest or pleasure in doing things?

A positive test is a 'yes' answer to either of those questions, and then a third question is posed:

3. Do you think it is something you want help with?

This third question provides an opportunity for the patient to request help with these symptoms (29).

Clinical Interview

The clinical interviews were undertaken by the principal investigator, a psychiatrist, using the NetSCID, an electronic research version, non-patient edition of the Structure Interview of DSM (318) as a guide and aligning the diagnoses with the DSM-5 classification. Only the mood and anxiety disorder modules, including stress/trauma related disorders, were administered. The DSM 5 categories of unspecified anxiety and depression were used to categorise subsyndromal but clinically significant symptoms of anxiety and depression respectively. This is important because subsyndromal symptoms of anxiety and depression

can cause similar levels of distress as reported in women with a clear diagnosis (38) and because perinatal depression and anxiety occur on a continuum of severity (39).

Analysis

Categorical variables were summarised by frequency and percentage tabulation. Continuous variables were described by the mean, standard deviation, median and interquartile range. For the comparison between demographic and risk factor and diagnosis, patients were classified as having no diagnosis, a diagnosis of depression or a diagnosis of trauma-related/anxiety disorder The X^2 test was used to assess the relationship between categorical risk factors and diagnosis, as well as between the 'help wanted' indicator and diagnosis. Fisher's exact test was used for 2 x 2 tables or where the requirements for the X^2 test could not be met. The strength of the associations was measured by Cramer's V and the phi coefficient respectively. The following scale of interpretation was used ≥ 0.50 high association; 0.3-0.49 moderate association; 0.10-0.29 weak association; ≤ 0.10 little or no association. One-way Analysis of Variance (ANOVA) was used to assess the relationship between age and diagnosis; the strength of the association was measured by Cohen's d.

The sensitivity and specificity (together with 95% confidence intervals) of the Whooley test, EPDS and EPDS anxiety subscale in identifying the various diagnoses were calculated, with the diagnostic interview used as the reference standard. Here, the diagnoses were considered as follows: (317) any diagnosis vs. no diagnosis; (318) anxiety/trauma vs. no/any other diagnosis; (3) depressive disorders vs no/any other diagnosis. Trauma-related disorders were grouped with anxiety disorders as there were too few to analyse separately. By considering different cut points for the scales, receiver-operating characteristic (ROC) curves were generated. The impact of the Whooley questions, including the 'help' question, on the diagnosis of depression was determined by log-binomial regression. Data analysis was carried out using SAS version 9.4 for Windows. The 5% significance level was used.

Results

The mean age of the sample was 31.1 years (range 18-42y; sd=6.0y). The majority of women was married/cohabiting (77.9%). Sixty three (43.5%) women had completed school and 36 (24.8%) had some form of tertiary education, while four (2.8%) women had only attended primary school. The majority of women was working (52.4%), either full-time (39.3%) or part-time (13.1%), 25% were unemployed and looking for work, consistent with the general unemployment rate in South Africa (23), while 22.6% were unemployed but not looking for

work. The median household monthly income was R 7,000 (interquartile range R 4,000-12,000; range R1,000-55,000). Congruent with the urban setting of the study, access to services was above the national average;(40) 95.9% of the participants had electricity connected to their homes and 82.8% had an inside toilet; while 16.6% had an outside toilet. Only one participant had to use a shared outside toilet. The majority of participants reported that their partners were very supportive or supportive (86.9%), while (13.1%) reported their partners as unsupportive.

Participants were fairly evenly spread between 22 and 28 weeks of pregnancy. The antenatal clinic sees women who have high risk pregnancies, and in this sample 95.2% of participants were defined as high risk. It is not unexpected then that 41.4% of these women had experienced a previous miscarriage or stillbirth. Most women (91.0%) in the study group reported that they were happy about the pregnancy, illustrating that mostly the babies were wanted, even if they were unexpected pregnancies. Approximately 19% of the participants were HIV-positive; the rest were HIV-negative. This is in contrast to much higher rates of HIV infection recorded in women in antenatal clinics in the rest of the country (23).

Overall, on the basis of the clinical interview, 56 (38.6%) of the participants were found to have at least one diagnosis of a perinatal mental disorder. Twenty eight (19.3%) had depression, of whom 16 (11.0%) had major depression. Thirty two women had diagnosis of either an anxiety disorder (21; 14.5%) or a trauma-related disorder (11; 7.6%). Only 20% of women felt they needed help according to the 'help' questions of the Whooley questions, thus having a positive screen. Twenty seven (18.6%) women had a diagnosis of a past mental illness on the clinical interview, although only 19 (13.1%) received treatment in the past, while eight (30%) of these women were untreated for their previous mental illness.

The mean age of those with trauma/anxiety (29.0 years; sd=6.5y) was significantly lower than that for those without any diagnosis (32.1 years; sd=5.5y; p=0.040). The effect size was moderate (Cohen's d=0.55). There were no other significant associations between any other social and demographic variables and having a diagnosis. There was a marginal, weak, association between happiness about pregnancy and diagnosis of depression (Fisher's exact test; p=0.050; phi coefficient=0.21); 16.7% of those who are happy about the pregnancy have depression, compared to 46.2% of those who are not happy about the pregnancy. There was also a significant, moderate, association between partner support and diagnosis of depression (Fisher's exact test; p=0.0072; phi coefficient=0.34); 12.7% of those who have very

supportive partners have depression, compared to 52.6% of those who do not have supportive partners. Women diagnosed with depression had a higher proportion of unsupportive partners compared to those not diagnosed with depression (Table 1).

Table 1: Association between a diagnosis of depression, trauma/anxiety, no mental illness and feeling happy about pregnancy and partner support.

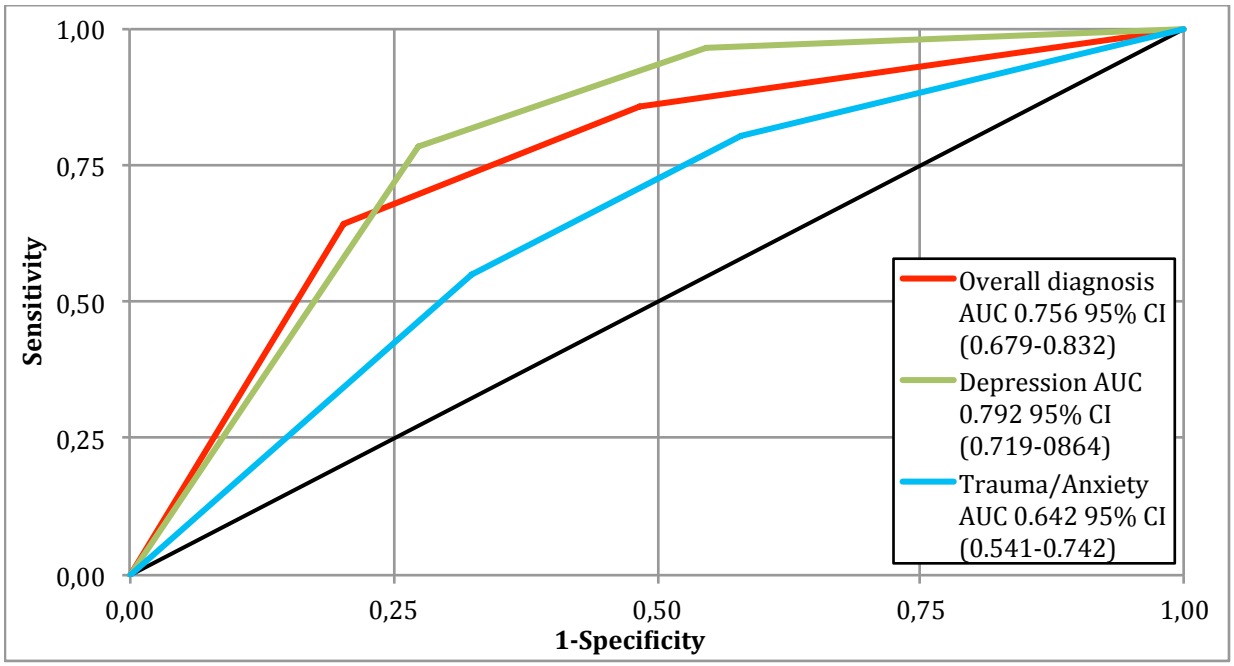
Table 1: Association between a diagnosis of depression and feeling happy about pregnancy and partner support

		Diagnosis							Prevalence Ratio (95% confidence interval)	
		No Mental Illness		Depression		Other Mental Illness		p-value for between-group test		
		n (89)	row %	n (28)	row %	n (28)	row %		Depression vs no mental illness	Other mental illness vs no mental illness
Happy about pregnancy	No	6	46.2	6	46.2	1	7.7	0.050	2.39 (1.22-4.70)	1.14 (0.82-1.57)
	Yes	83	62.9	22	16.7	27	20.5		1	1
Partner support	Not supportive	8	42.1	10	52.6	1	5.3	0.0072	3.44 (1.71-6.95)	1.18 (0.90-1.54)
	Supportive	29	61.7	8	17.0	10	21.3		1.34 (0.58-3.09)	0.99 (0.78-1.24)
	Very supportive	52	65.8	10	12.7	17	215		1	1

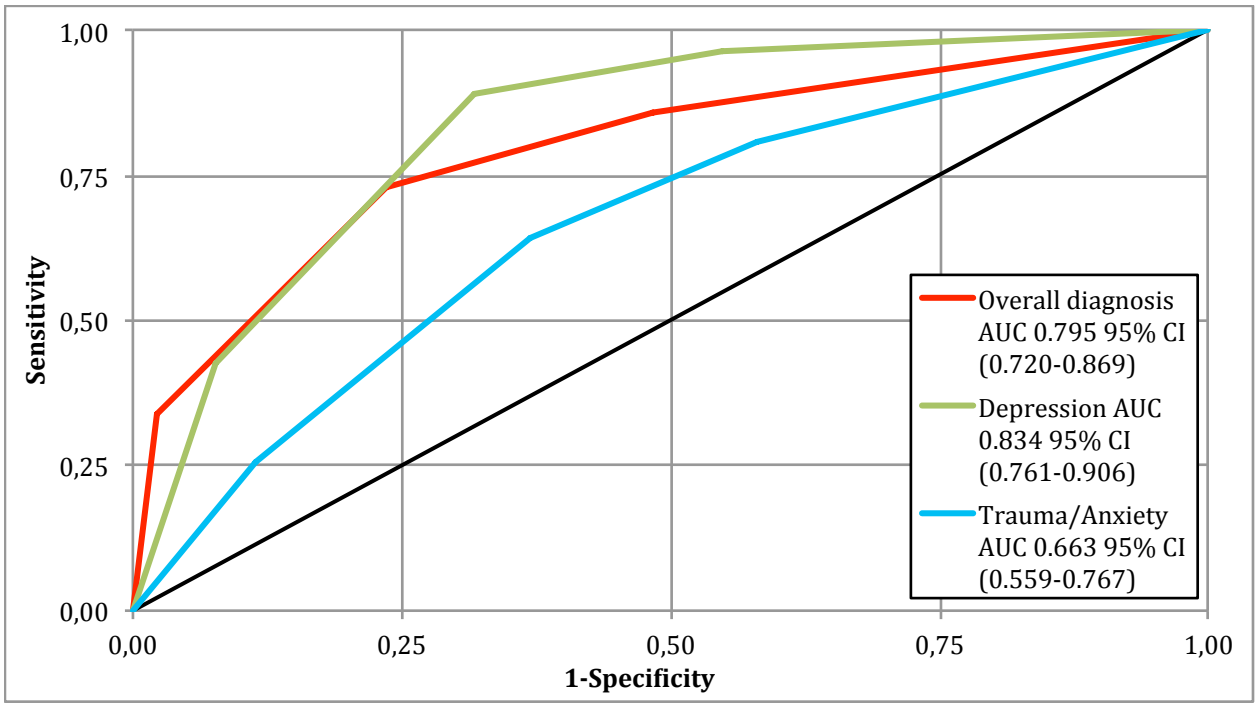
Whooley questions

To establish a diagnosis (a positive screen) using the Whooley questions, excluding the 'help' question, the optimal cutoff point is a score of 2, i.e. answering yes to the first two questions, giving a sensitivity and specificity of 64.3 and 79.8%, respectively. To establish a diagnosis (a positive screen) using the Whooley questions including the 'help' question, the optimal cutoff point is a score of ≥2, i.e. answering yes to 2 or more of the questions, including the 'help' question, giving a sensitivity and specificity of 73.2% and 76.4% respectively. The sensitivity increased when the 'help' question was added (p=0.31) (Figure 1.) The Whooley questions, including the 'help' question, had greater discrimination for depression than for anxiety/trauma disorders (Figure 1a and 1b)

Figure1: Comparison of ROC curves



1a. ROC curve for the Whooley questions, excluding the 'help' question.



1b. ROC curve for the Whooley questions, including the 'help' question.

The specificity of the Whooley questions, including the 'help' question (63.2%) was significantly higher than that of the Whooley questions, excluding the 'help' question (42.1%)

for a diagnosis of trauma/anxiety (p=0.0014). There was a significant association between the 'help' question and diagnosis (chi-sqaured test; p<0.0001; Cramer's V=0.48). Those who indicated that they wanted help were more likely to have a diagnosis of depression (51.7%) or anxiety/trauma (31.0%) compared to those who indicated that they did not want help (11.2% and 16.4% respectively)The impact of the Whooley questions, including the 'help' question, on the diagnosis of depression as determined by log-binomial regression are shown in Table 2. The first Whooley question and the 'help' question were both significant. The prevalence ratios indicate that 'yes' answers for each of these questions are associated with an increased likelihood of a diagnosis of depression. The second Whooley question was not significant. This shows that the 'help' question is useful in screening for depression.

Table 2: Impact of the Whooley questions, including the 'help' question, on the diagnosis of depression

	p-value	Prevalence Ratio	95% CI for Prevalence Ratio	
First Whooley question: yes vs. no	0.027	9.99	1.30	76.99
Second Whooley question: yes vs. no	0.14	1.86	0.81	4.23
'Help' question: yes vs. no	0.010	2.22	2.22	4.09

EPDS

The median EPDS score was 10 (IQR 6-14; range 0-25). To establish a diagnosis, the optimal cutoff point is a score of ≥12, giving a sensitivity and specificity of 78.6% and 84.3% respectively. Although the optimal cutoff points differed (≥14 for Depression; ≥11 for Trauma/Anxiety), the EPDS seemed to have greater discrimination towards depression than towards anxiety/trauma. There was no significant difference between the Whooley questions, excluding or including the 'help' question, and the EPDS when it came to sensitivity for depression. The EPDS had significantly higher specificity for depression (88.0%) than the Whooley questions, whether excluding or including the 'help' question (72.6 and 68.4 respectively; Table 3). The EPDS had slightly lower specificity (60.5%) for anxiety/trauma than the Whooley questions, excluding the 'help' question (42.1%).

EPDS anxiety sub-scale

The median EPDS anxiety sub-scale score was 5 (IQR 3-7; range 0-9). For the anxiety/trauma diagnosis, the optimal cutoff point is a score of ≥7, giving a sensitivity and specificity of 54.8% and 81.6%, respectively. The EPDS anxiety subscale had significantly lower sensitivity (54.8%) for anxiety/trauma than the Whooley questions, excluding the 'help' question, (80.6%) and EPDS (80.6%), but significantly higher specificity (81.6%) for anxiety/trauma, than the Whooley questions, excluding the 'help' question (42.1%) and EPDS (60.5%).

Table 3: Comparison of screening tools, sensitivity and specificity, with confidence intervals

	Overall Diagnosis		Depression		Trauma/Anxiety	
	Sensitivity (95% CI)	**Specificity (95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**
Whooley excluding 'help' question	64.3% (50.4-76.6%)	79.8% (69.9-88.6%)	78.6% (59.1-91.7%)	72.6% (63.6-80.5%)	80.6% (62.5-92.6%)	42.1% (32.9-51.7%)
Whooley including 'help' question	73.2% (59.7-84.2%)	76.4% (66.2-84.8%)	89.3% (71.8-97.7%)	68.4% (59.1-76.7%)	64.5% (45.4-80.8%)	63.2% (53.6-72.0%)
p-value for comparison to Whooley (excluding 'help')	0.31	0.58	0.28	0.48	0.16	0.0014
EPDS	78.6% (65.6-88.4%)	84.3% (75.0-91.1%)	89.3% (71.8-97.7%)	88.0% (80.7-93.3%)	80.6% (62.5-92.6%)	60.5% (50.9-69.6%)
p-value for comparison to Whooley (excluding 'help')	0.094	0.43	0.28	0.0031	>0.99	0.0054
p-value for comparison to Whooley (including 'help')	0.50	0.18	>0.99	0.0003	0.16	0.67

	Trauma/Anxiety		Trauma		Anxiety	
	Sensitivity (95% CI)	**Specificity (95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**
EPDS anxiety subscale	54.8% (36.0-72.7%)	81.6% (73.2-88.2%)	63.6% (30.8-89.1%)	76.9% (68.8-83.7%)	71.4% (47.8-88.7%)	62.1% (53.0-71.7%)
p-value for comparison to Whooley (excluding 'help')	0.030	<0.0001				
p-value for comparison to Whooley (including 'help')	0.44	0.0019				
p-value for comparison to EPDS scale	0.030	0.0004				

Discussion

Screening for anxiety is as important as screening for depression. Despite this, there are few studies on perinatal anxiety and no adequately validated screening tool for anxiety in South

Africa. In this study, the rate of perinatal mental disorder was 38.6%. Of those women with disorders, 19% had a depressive disorder and 21.4% had trauma/anxiety disorder. This is comparable to other studies that report that anxiety disorders are more prevalent than depressive disorders in women antenatally (32, 41). Nineteen percent of patients had a depressive disorder, which is much less than reported in other South African studies (1-3). This may be due to the setting and the patient profile. The women in the study overall had good partner support, were not living below the poverty line, had good access to services (indoor plumbing and electricity), were mostly educated, employed and happy about being pregnant. While 13% had received a mental health intervention previously, 18% were diagnosed with a past history of mental illness. Therefore, some women suffered mental illness without receiving treatment. This is possibly due to a general lack of awareness of mental health within the community, and lack of accessible mental health services. The rate of HIV in this setting is 18.6%, which is lower than other antenatal samples (23).

A weak association was noted between younger age and a diagnosis. This is in keeping with other literature that describes younger age as a risk factor. There was also a weak association between being happy about the pregnancy, partner support and depression, again in keeping with other South African studies (1, 2, 42).

In the original validation study of the Whooley questions, the sensitivity and specificity were 96% and 57% respectively, making it a promising screening tool (43). There has been much debate about the inclusion of the 'help' question as it seems to reduce the sensitivity when asked in a perinatal setting (44, 45). In this study, the 'help' question was valuable because it increased the sensitivity of the Whooley questions from 64.3% to 73.2%. However, due to the relatively small sample size, this difference is not statistically significant. This is a limitation of the study. The other notable difference is that in this study, the Whooley questions did not perform as well in terms of sensitivity as similar studies in other settings, but had higher specificity (45, 46). This may be because the language of the Whooley questions is complex, and more difficult to digest if English is not the patient's first or primary language. However with a sensitivity and specificity of 73.2 and 76.4% respectively, when adding the 'help question', it still has good utility as a screening tool. The 'help' question was also significantly associated with a diagnosis of depression, again suggesting that in this setting the 'help' question is valuable. Overall the EPDS had higher sensitivity and specificity when using a cut off of ≥12 than the Whooley questions, but again these differences are not significant. This makes the Whooley questions, whether including or

excluding the 'help' question, comparable to the EPDS when screening for antenatal anxiety and depression.

The EPDS anxiety subscale performed poorly as a screening tool for anxiety/trauma disorders with a sensitivity of 54.8%; however it showed good specificity of 81.6%. The Whooley questions, excluding the 'help' question, show greater sensitivity for the anxiety/trauma diagnosis than the EPDS anxiety subscale. For this reason, the Whooley questions could be used to screen for all perinatal mental disorders including anxiety disorders.

Conclusion

There is currently no policy on routine screening for perinatal depression and anxiety in South Africa (35). The Whooley questions have shown promise as a screening tool in this urban, low-income setting and possibly in other settings. When using the cut-off of ≥2, with the inclusion of the help questions they show good sensitivity and specificity to depression, anxiety and trauma related disorders. The questions allow for the early identification of probable antenatal depression and anxiety in about 30% of women attending antenatal clinic. This early identification, if followed by clinical assessment and adequate treatment, will help protect against adverse affects of perinatal depression and anxiety in a significant number of women. The sensitivity and specificity of this tool could be enhanced by either rewording it into more easily understandable language or by translating it into local languages.

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CHAPTER 4

Paper 2. Changes in mood, after screening for antenatal anxiety and depression

Marsay, C., Manderson, L. and Subramaney, U. In press. Changes in mood, after screening for anxiety and depression. *Journal of Reproductive and Infant Psychology*

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Abstract:

Background

Screening programs with referral are a valuable strategy for mitigating consequences of perinatal depression on mothers and their families. The effectiveness of these screening programs needs to be measured. One potential problem in assessing outcomes is measurement reactivity where the actual measure results in changes in the people being measured.

Aim

The aim of this article is to explain the mechanisms and circumstances by which measurement reactivity occurred in a sample of antenatal women who participated in a screening interview.

Methods

Fifty-five women who participated in an antenatal screening interview in their second trimester were re-interviewed in their third trimester. These qualitative interviews were conducted between September 2015 and April 2016.

Results

The qualitative data suggested that measurement reactivity occurred through mechanisms such as the disclosure, gaining self-knowledge, validation of experiences, and personal agency which resulted in them seeking out support from others.

Conclusion

Although the screening interview appeared to improve women's outcomes, this may have occurred through measurement reactivity. This needs to be considered when designing studies that aim to assess the effectiveness of screening with intervention for antenatal depression.

Keywords: antenatal depression and anxiety; measurement reactivity;

Screening

Introduction

Pregnant women who experience depression are more likely to have obstetric complications such as poor fetal growth, preterm labor, low birth weight infants and increased admissions of the newborn to neonatal intensive care units in association with these complications (Field, Diego, & Hernandez-Reif, 2006; Grote et al., 2010; Hobel, Goldstein, & Barrett, 2008). The impact of prenatal stress on the developing fetus can confer behavioral disturbances in childhood and beyond, though an epigenetic process (Oberlander et al., 2008). Women with antenatal depression are also more likely to have somatic complaints, poor self-care and functional impairment (Katon, 2011; Senturk et al., 2012). Among women living in low and middle-income countries, antenatal depression has been associated with an increased risk of perinatal complications, including a higher risk of prolonged labor (Hanlon et al., 2009), pre-eclampsia (Qiu, Sanchez, Lam, Garcia, & Williams, 2007), low birth weight infants (Rahman, Bunn, Lovel, & Creed, 2007), and delayed initiation of breastfeeding (Hanlon et al., 2009). Despite suffering experienced by common perinatal mental disorders such as anxiety and depression, and the adverse consequences of these disorders, about 80% of women affected remain undiagnosed and untreated, with potentially serious consequences for mother, infant and their families (323).

Pregnant women living in relative poverty in low and middle-income countries experience higher rates of antenatal depression, estimated at 16-20% (Fisher et al., 2012) as compared to 11-12% in high income countries (Le Strat, Dubertret, & Le Foll, 2011; Witt et al., 2010). In South Africa, rates of antenatal depression are even higher, ranging from 38-47% (Hartley et al., 2011; Manikkam & Burns, 2012; Rochat, Tomlinson, Bärnighausen, Newell, & Stein, 2011). Social and economic adversity compounds antenatal depression and anxiety (Chen, Subramanian, Acevedo-Garcia, & Kawachi, 2005; Lund et al., 2010; World Health Organization, 2014; Patel et al., 2010), and is also associated with a higher prevalence

of perinatal complications (Bitew, Hanlon, Kebede, Honikman, & Fekadu, 2017; Sontakke, Reshmi, & Sebastian, 2009; Zafar, Jean-Baptiste, Rahman, Neilson, & van den Broek, 2015). Untreated antenatal depression is also associated with more unscheduled obstetric visits, potentially overwhelming an already under resourced health system (Bitew, Hanlon, Kebede, Medhin, & Fekadu, 2016). Women with antenatal depression are at high risk for postnatal depression, as antenatal depression is likely to continue beyond pregnancy if not treated (Fisher et al., 2012; Leigh & Milgrom, 2008; Yazici, Kirkan, Aslan, Aydin, & Yazici, 2015).

Screening programs with referral are a valuable strategy for moderating perinatal depression and anxiety and reducing its impact on women and others. There is consensus that screening should be conducted both antenatally and postnatally, in order to improve early identification of perinatal depression and anxiety, and some high-income countries have successfully implemented routine depression screening with psychosocial assessment into antenatal care. The Edinburgh Postnatal Depression Scale (EPDS) has been shown to be acceptable for antenatal as well as postnatal depression screening in high-income countries (Buist et al., 2006; Gemmill, Leigh, Ericksen, & Milgrom, 2006; Leigh & Milgrom, 2007; Segre, O'Hara, Arndt, & Beck, 2010). Screening programs integrated into routine antenatal clinic visits have also been shown to be acceptable to low-income women in Cape Town, South Africa (Honikman, van Heyningen, Field, Baron, & Tomlinson, 2012). However, there is still limited evidence to illustrate the benefit of screening programs, and their outcomes need to be measured to determine their effectiveness. One potential problem in assessing these screening programs is measurement reactivity, where the actual measure results in changes in the people being measured. This is particularly evident in psychological studies where people who are asked to complete psychological measures at different time points; they report that they are altered by the initial experience, through cognitive, emotional and behavioral changes. It is also possible that they have a higher score on the first test due to test anxiety, or a lower score on the second test is due to the therapeutic effect of the initial measurement (French & Sutton, 2010). Measurement reactivity has also been described in perinatal women with maternal stress, who participated in routine psychosocial assessment and follow up interviews and reported that the interviews contributed to helping them cope with their stress (Darwin, McGowan, & Edozien, 2013). Two other studies have demonstrated a drop in scores of anxiety and depression on the Beck Depression Inventory (BDI) and the Hospital Anxiety and Depression Scale (HADS) from the first test point to the second test point, where the measure is likely to have had some kind of therapeutic effect on the participants (Johnston, 1999; Sharpe & Gilbert, 1998). In these studies, the time differences

between the measurements were one week and one day respectively, and it is not known whether improvements might be sustained over a longer period.

Little is known about the circumstances and mechanism through which these changes occur (French & Sutton, 2010), and whether these changes can be useful in any way. One suggested mechanism through which this reactivity occurs is the therapeutic encounter between doctor and patient, associated with context (Finniss et al., 2010; Miller & Kaptchuk, 2008; Price, Finniss, & Benedetti, 2008). In any therapeutic encounter non-specific or common affective qualities such as engagement, warmth, empathy, and active listening play an important role in patient outcome, regardless of therapeutic style or technique (Di Blasi, Harkness, Ernst, Georgiou, & Kleijnen, 2001; Lambert & Barley, 2001; Singla et al., 2017). These common yet basic elements identified in the therapeutic relationship can be used to good advantage in potential therapeutic interventions.

The focus of this article emerged in response to our analysis of data from a study in South Africa, illustrating measurement reactivity in antenatal women who participated in a screening interview. In the study, which we describe below, we explored the experiences of women screened for antenatal depression and anxiety with follow up interviews at least six weeks later, expecting that there would be a decrease in depression scores on the second measurement. The aims of this article are to describe the mechanisms and circumstances by which measurement reactivity may have occurred, and to address author and participant reflexivity and reactivity.

Methodology

The study reported here is part of a larger study, which was conducted in three phases, which aimed to establish whether screening antenatal women for anxiety and depression was useful or practical in this setting, and how women experienced the screening. A mixed methods explanatory design was used in the larger study because the combination of both quantitative and qualitative approaches provide a better understanding of research problems than either approach alone (Creswell & Plano Clark 2007, 2011). Qualitative interviews were conducted with participants in order to gain an in-depth understanding of the results (Creswell & Plano Clark 2011). The three phases of the study include:

- Phase 1 focused on antenatal screening for depression and anxiety, was conducted July 2015-April 2016, and is reported elsewhere (Author, 2017). This is the part of the study where the initial screening interview was conducted.
- Phase 2 was conducted September 2015–April 2016, and it is this component of the study on which we draw in this article. In this phase women who had undergone the screening interview in phase 1 were reinterviewed, in order to better understand their experiences of being screened for antenatal anxiety and depression.
- Phase 3, focusing on the experiences of 20 of these women postnatally, was conducted December 2015-August 2016, and is reported elsewhere (Author, 2018).

The qualitative data collected in phase 2 of the study are reported here. As noted elsewhere (Marsay; Manderson; &Subramaney, 2017), women were recruited and participated in the prenatal screening interview at 22-28 weeks gestation. They were all eligible to be re-interviewed at 34-38 weeks (Phase 2); of these, 55 women were reinterviewed. Currently there is no exact recommended time to screen for antenatal depression and anxiety; rather a pragmatic approach of screening women when they are in contact with a health service is recommended (Milgrom & Gemmill, 2015). The times when we interviewed the women reflect times when they were likely to first present to the high risk clinic (Phase 1) and their last antenatal visit (Phase 2), factoring in for the higher likeihood of preterm labor in this study sample.

Sample

The data on which we draw here were collected using qualitative methods and derived from a purposive sample of women who attended the antenatal clinic of Rahima Moosa Hospital, a large tertiary level mother and child hospital in Johannesburg, South Africa. Some 12,000 women give birth at this hospital per annum. All women who attend the antenatal clinic have high-risk pregnancies, excluding women with HIV infection, who are managed in primary health care centers, and excluding women who are obese, unless for other reasons they may be identified as at risk of developing gestational diabetes or of other complications in pregnancy or parturition. Most women were attending the clinic because of maternal age (> 35), previous caesarean section, previous pregnancy loss, risk of pre-eclampsia, or multiple pregnancy. Despite women's reproductive histories and perceived status as at risk, neither maternal mental health service nor specific adult psychiatric service is provided at the hospital. Instead, in non-emergency cases, women are referred to their nearest mental health

community clinic; in the case of an adult psychiatric emergency, women are seen by the child psychiatrist on call and are then referred for further management to a nearby general public hospital with an adult psychiatric unit.

Measures

The quantitative data, collected in Phase 1 by the first author during the woman's second trimester, included a demographic questionnaire, the Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden, & Sagovsky, 1987), the Whooley questions (Whooley, Avins, Miranda, & Browner, 1997) and clinical diagnosis using the NetSCID, an electronic research version, non-patient edition of the Structured Interview of DSM (First et al., 2002). These screening interviews were conducted face-to-face in a private room and all women provided informed consent. During the Phase 1 screening interview, women received feedback on their scores and diagnosis, they were given brief education on mental illness, including reassurance that it is not their fault, it is treatable and there is help available to them. All women with a clinical diagnosis were given a referral letter to their nearest clinic that provided a psychiatric service. In Phase 2, interviews were repeated with the 55 women, in their late third trimester, and qualitative data were collected, which is reported in this article.

The decision to use the EPDS reflected the fact that it is the most widely used tool used for both antenatal and postnatal depression (Cox & Holden, 2003) and the scale has been validated in South Africa, among both antenatal and postnatal women using an interview format (Lawrie, Hofmeyr, De Jager, & Berk, 1998; Rochat, Tomlinson, Newell, & Stein, 2013; Authors, 2017). Only the mood and anxiety disorder modules of the NetSCID, which include stress/trauma related disorders, were administered. Using the NetSCID as a guide, the diagnoses were aligned with the DSM-5 classification. The DSM 5 categories of unspecified anxiety and depression were used to categorise subsyndromal, but clinically significant, symptoms of anxiety and depression, as subsyndromal symptoms can occur on a continuum of severity and can cause similar levels of distress as reported in women with a clear diagnosis (Rakofsky et al., 2013; Rucci et al., 2003).

Procedure

Follow-up interviews were prearranged to take place at the 34-38 week antenatal visit, but interviews were not scheduled. Women who had undergone screening interviews in Phase 1 were identified by name in the antenatal waiting area by the first author, and asked if they

would like to participate in a second interview while they waited to be seen by the doctor. All women approached agreed to the interviews. All interviews were conducted face-to-face in a private room in the antenatal clinic. Informed consent was revisited and women were reminded that the interviews would be audio recorded and transcribed and that they could withdraw from the study at anytime. Women were also reminded that their responses to questions would not in anyway influence their obstetric care, and they were encouraged to answer honestly even if this meant a negative answer. All interviews were conducted in English, which is widely spoken in this urban setting. After 55 interviews, themes were fully developed and no new information emerged regarding the mechanism by which measurement reactivity occurred. As data saturation had been reached, sampling terminated.

Qualitative data were collected using a narrative inquiry approach (Connelly & Clandinin, 1990; Wang & Geale, 2015). These interviews (Higginbottom, Pillay, & Boadu, 2013) lasted between 10 and 40 minutes, and opened with "Do you remember that last time we spoke – I asked you some questions about your mood?" Probes included "How did it make you feel?" and "Did you find it helpful in anyway?" Another open-ended question was "How have you been since we last spoke?" and probes included "Are you still struggling with X symptoms?" and "Are there any new problems of difficulties in your life?" Women who were referred for further assessment and management in Phase 1 were asked if they had managed to go to the mental health clinic. If women still required further assessment and management, they were encouraged again and referred to their nearest mental health community clinic. Ethics clearance was granted by the Human Research Ethics Committee at (withheld for review).

Analysis

Interviews were audio-recorded, transcribed and checked for accuracy. Transcriptions were kept in Word documents and analyzed for main themes, using a three phase coding system (Neuman & Wiegand, 2000). The first author performed an initial scan of the transcribed texts, highlighting phrases used by the participants, and detecting initial themes. An iterative, cyclic and reflective process was used to explore meaning (Higginbottom et al., 2013; Pope, Ziebland, & Mays, 2000). The first and second author identified core themes through a process of collaborative content analysis and related core themes to the aim of this paper. The first author then focused on connecting themes and finding links in the data.

Finally the first author reread the data and assigned excerpts that captured the themes extracted. All coding was checked by the second author to ensure accuracy. Idiomatic expressions have been retained in the quotations below. The quotes were selected to be representative of themes that emerged.

Results

The sociodemographic profile of the sample of women is representative of the poor urban areas that surround the hospital

Table 1: Socio-demographic details of participants

Variable	Category	Results	
		n=55	%
Mean age	30.8y (sd=5.7y; range 20-42y)		
Median household income	R 5,500 approx US$ 426.32 (IQR R 4,000-12,000; range R1,000-40,000)		
Relationship status	Married/cohabiting	46	84
	Never married	7	13
	Divorced/annulled/separated	2	4
Highest level of education	Primary school	2	4
	High school	13	24
	Matric	29	53
	Tertiary	11	20
Employment status	Full-time	18	33
	Part-time	8	15
	Unemployed (looking for work)	18	33
	Unemployed (not looking for work)	11	20
Previous miscarriages/stillbirths	0	36	65
	1	11	20
	2 or more	8	15
Happy about pregnancy	No	5	9
	Yes	50	91
Partner support	Not supportive	8	15
	Supportive	17	31
	Very supportive	30	55
HIV status	Positive	8	15
	Negative	47	85

In the follow-up interview, women were asked how they felt during the screening interview, whether they thought it was helpful, and if so, in what way. Many different themes emerged as women spoke of their experiences during the interview and in the weeks that followed. The interviews were not designed to measure the effect of the screening interview; however women attributed improvements in their moods to changes in emotion, cognition and

behavior that occurred as a result of participating in the screening interview. Only three women reported having one visit to a mental health professional in the time between the two interviews. There was a notable absence of themes reporting that the interviews were not helpful, felt uncomfortable, or were harmful in anyway.

Talking helps: disclosure

Women disclosed personal details of their lives during the interviews, and spoke openly about the cathartic effect of telling someone how they were feeling. Almost one half of the women (27 of 55) described the release of stress during and after the interview: "You know, at least you asked me and it cancelled all the pain, because I don't even talk to someone but the time I talked to you, when I got at home I felt so happy that I took everything out to someone." In this study, most women did not receive further treatment, and yet the improvement was still noted in terms of clinical assessment and self-report. Disclosure has proven to be helpful regardless of the lack of support by another person (Afifi, Caughlin, Afifi, Spitzberg, & Cupach, 2007), and in this study, women's ability to share distress with someone else appeared in itself to be beneficial.

Anonymity

Disclosure is framed and constrained by interpersonal relationships, and most women spoke of barriers that prevented them from talking to people who lived with them or in their local environment. Women explained that they had little or no privacy in their household or local community, and they were concerned that people would judge them and gossip about them. To maintain their privacy, they chose not to speak: "I, like, can't talk to people. Like your neighbor would come spreading everything that you talked to them." Women expressed the view that speaking to an outsider, someone who did not know them, felt good: a stranger, they felt, would be objective and nonjudgmental: "It is easier to talk to someone that you don't know than to talk to someone that you know. Because someone you know, sometimes they will judge you."

The interviews for this study were conducted in a private room in the context of doctor-patient relationship as well as researcher–subject relationship. This may have helped to

reinforce confidentiality and so contributed to the reason women were comfortable to speak out in this setting: "Seriously, because if you have problems at home, like I said…sometimes you can't say it to someone. But if it is private like this, we talk (about) everything." One woman also mentioned that it was helpful to speak to someone who she regarded as objective, rather than to people with whom she was close: "Speaking to the person that you're actually close to doesn't always help... rather speaking to someone like you...an outsider."

Putting words to feelings: validation of experience

Ten women (18%) mentioned that the screening process helped them put words to their feelings and experiences, and this in turn helped them to be diagnosed: "Because it was exactly what I was thinking and feeling, but I couldn't say it out loud." Three women diagnosed with PTSD were previously unaware that they may be suffering from such a condition: "I never realized that I had it." The diagnosis enabled these women to make sense of how they were feeling, as they were able to identify the cause of their anxiety, analyse and address it. One woman was experiencing PTSD as a result of a road traffic accident, and reflected: "Even that thing of (being) scared of the cars, it's gone." Another woman mentioned that the screening interview had helped her normalize what she was experiencing, and she felt less isolated as a result: "Because it helps you realize the emotion that you are going through, is it normal, is it abnormal, is it something, you know, other people might be going through. So sometimes you think you are the only one who is feeling that." The identification of the diagnosis emerged as one of the keys to moving forward from it.

Gaining Self-knowledge

Fourteen women stated that after the interview, they started to pay more attention to their mental health. The screening interview gave them an opportunity to reflect and think about themselves. For some, this was the only opportunity they had to take some time for themselves in their busy lives: "Yes, kind of it was helpful like because you realize, like you actually sit and reflect. Because I'm full time mother, like, I don't really get to reflect on myself quite often. So, you sit back and you like actually think and you know you get to reflect on you for once. Yeah, so it was quite helpful." The screening interview also attuned them to think specifically about their feelings: "There are some things that I discovered that I

never actually thought about them." Women spoke of increased self-awareness and self-knowledge, which assisted them to think and act more objectively about their thoughts and feelings:

> In a way, I got to know myself more in this pregnancy. I could say that. Because then when I got home, like I still had the questions, and I was okay so this is where I am standing ... Okay, I am not depressed okay. Those kinds of things. I would say that because mostly in my everyday life now in this pregnancy I wake up in the morning and I think okay what is my mood like? How am I feeling now? And okay I get to answer that and as the day goes by, I also sit down and I think okay how am I feeling? Am I feeling depressed? Am I happy? Am I down?

Agency

Women were able to reflect on how they were coping, and this gave them an opportunity to improve existing coping mechanisms. After the screening interview, almost half the women (22) were able to make positive changes in their lives that sustained them until the next interview. These women all had substantial reductions in EPDS scores and improved diagnoses. Women who had improved reported that changes in their lives, triggered by the screening interview, had contributed to this improvement. One woman spoke of coming to terms with her (unintended) pregnancy, and this acceptance helped her to move forward: "Like last time when I spoke to you, I was not happy about the baby, but when I spoke to you, I felt better, yes. And now I accept everything."

Some women mentioned specific improvements in symptoms of depression, including improved motivation, reduced irritability and increased energy levels. One woman reported a decrease in headaches and other somatic symptoms, and she now no longer required her doctor to prescribe analgesics: "I had a headache every time, I can't sleep. At least if I drink Panado (paracetamol) I can sleep. Even my doctor said, 'no Panados this time?' Yes, doctor, everything is better."

Women also reported that they were more open about their feelings. They felt that it was easier to speak about their mental health to their partners and other family members, and, notwithstanding concerns about gossip, to others in their communities. The catharsis of disclosure was therapeutic:

> And now I can actually speak to people and tell them yes, I feel like this, I'm going through this. I can actually speak to people. For me, it was actually, it was God sending you to me at that moment, at that time. And I'm more open now. I'm more relaxed. I actually felt like this whole weight, this darkness came out. You know, that thing that was holding you down all the time.

By being more open with others about their emotions and feelings, women were able to harness more support. Several women said that after sharing their feelings with their partners, they were able together to develop ways in which the partner could be more supportive. One woman explained that her husband had began to offer her more emotional support: "When I showed my husband the letter and then I think maybe he realized maybe he must be more there. And then whenever I had to talk, I can talk to him. Ja. He actually felt bad, you know. Ja, he thought he was not there enough. So then, but now he is very supportive." Another woman was able to speak to her husband and let him know of a previous depressive episode, which she had not shared previously.

> I sat down with him and we spoke about this and he asked me a couple of questions and he also did not realize I was in a… I was once depressed. I think maybe it is a good thing you know, to talk about it. Not to bottle it up because one day it'll all … I think so, it kind of did open up a conversation and that is where you realize okay maybe you need to help here.

After their conversation, her husband agreed to employ someone to help her with her young daughter and with housework, as she worked full-time and was tired when she returned home from work each day:

> So I was a bit overwhelmed because I couldn't have that (dinner on the table when he gets home) and be pregnant at the same time and this little one (toddler). So I just said to him, you know what, can you just take care of this while I am in this condition – for now. I am pregnant for now and we will see what happens after. So at the moment we are looking for someone who would be able to take care of that. Yes, so that they can be able to help me out. Yes.

Poor social support is a risk factor for perinatal depression (Lancaster et al., 2010; Leigh & Milgrom, 2008; O'Hara, 2009; O'Hara & Swain, 1996; Robertson, Grace, Wallington, & Stewart, 2004); conversely satisfaction with social support is associated with good mental health in mothers (Razurel & Kaiser, 2015). The increased social support these women were able to access may have mitigated their depressive symptoms. For example, one woman

mentioned that her anxiety levels had reduced after she had disclosed the pregnancy to her family and gained their support:

> That time when we spoke, many of my family members didn't know that I'm pregnant; it was only my aunt. So that thing was stressing me, like how am I going to tell them, how are they going to take it and stuff? So finally I told them, so I saw that everyone is supporting me. Everyone is fine with it, so yes, they give me that support I needed.

In South Africa, church membership is an important aspect of everyday life. The churches, including traditional Christian churches, Pentecostal and African churches, play a role in both the spiritual and social support of communities. Six women stated that after the screening interview, they had started attending church again, and benefited from the social and spiritual support it provided. One woman mentioned she had joined a pregnant women's group at church:

> Like I felt so happy, I even went to church. A pregnant ladies group, so everybody is talking about how she feels about the baby and everything. What is happening inside, the family issues, because some churches they have counseling groups. Because I can't stay at home forever. At least you showed me something.

Another woman spoke of her conversation with a church member that she found encouraging:

> I think it was since our session, I started looking at things differently. I spoke to, I don't know if it's a prophet or what, but it's someone from my friend's church that approached me and said that, you know this is what you have been going through, that is what you have been going through, this is what I want you to do to go forward, and I think that is what helped me as well.

Another woman mentioned that she managed to get more involved in her church; she saw this as a sign of starting to feel better.

> I'm being getting more involved in church is helping me a lot, because I actually I just stopped, you know, going to church and just, it just everything just stopped and… Getting back to my normal routine, to the person that I was before, is kind of like helping me to.

Apart from social support from fellow church members, many women mentioned that they found comfort and strength in praying, either alone or at church services: “I just pray like to be like normal;” “They pray for me and it’s the belief, you know. What you believe in.”

Women also illustrated a strong sense of personal agency. Many were able to make changes in their lives to improve or sustain their mental health. They were often extremely self-reliant, able to act independently and to make their own positive choices. Agency is the motivation needed to achieve goals, and often this is lost in depression as patients become anhedonic and unmotivated. These women indicated their willingness to try new strategies to overcome a range of challenges in their lives, which assisted them to improve their mental health: “Like I always say that change, if you want change you have to do it yourself. You can’t expect anybody to change you. So yes, just thinking about it and everything made it better.” One woman described that cognitive processes helped her:

> I started realizing that the only person that can help me change and feel better about things about my moods and the things...emotions that I’m experiencing, is me...I have to do something about it, I can’t just sit and think... agh, you know, I don’t feel well so ... everyone is against me. So that helped me look at the bigger picture. I said how can I cope, what can I do differently? What must I do, what must I change? I’m trying to think more positive, I’m trying to see the better in everything... like there is light at the end of the tunnel it’s not just bad, my situation is like this and I can’t change anything. Now the thought is how to change, what can I do to make me feel better? What can I do to be a better person so that people around me, wanna be around me. It helped me look at things and say, okay this is how I’m feeling and realizing why I’m feeling this. So I’m looking for the reasons why I’m feeling this, what can I do? Look for help, support from my family, from my friends.

Another described practical changes in behavior:

> In all ways, I’m feeling better ... because I can walk even outside now. I can walk. That time we walk because I took out my kid out of school so we’d walk and play in the park; that keeps me going. I think, keeping busy because I’ve been keeping busy, the house, going shopping for the baby and you know, being just out. Because I

thought maybe being indoors too much is making me feel down, so maybe being out and visiting friends, because I told him that I have to be out more because being in the house, I don't know, it was maybe the thing that was making me depressed.

Yet another women described how she decided to focus on herself and her unborn child and stop worrying about other things. This helped to reduce her anxiety levels: "Well, I just decided to take care of me and my child. So, ja. Just leave the rest… the world to be. So far, I've been much happier." In addition, four women spoke about hope, and explained that the screening interview had infused a sense of hope into their lives: "Rather, I will become hopeful that things will turn out better."

Discussion

The data from interviews in this study illustrated the possibility of measurement reactivity in studies that evaluate screening programs, including in this case for perinatal depression and anxiety. Analysis of the data showed reactivity occurred through mechanisms such as the process of disclosure, gaining self-knowledge, validation of experiences and personal agency, and seeking out support from others. These mechanisms were in part related to the content of the interview and measurement instruments, and through interaction with the interviewer.

Both physical and mental health improvements have been noted following expressive writing about adverse experiences (Graf, Gaudiano, & Geller, 2008; Magai, Consedine, Fiori, & King, 2009; Stroebe, Schut, & Stroebe, 2006). It is possible that active listening during the interview acted in a similar way. The screening interview gave women a chance to 'offload' their stress, and provided them with validation and normalization of their experiences. For some this was therapeutic, making the screening interview an intervention (Darwin et al., 2013; McGowan, Luker, Creed, & Chew-Graham, 2007).

Reactivity may have also occurred as women gained self-knowledge during and after the screening interview. This process of self-exploration may have helped them to connect their thoughts, feelings and behaviors. This is a component of cognitive behavioral therapy, which is effective in the treatment of common mental disorders, including perinatal depression and anxiety.

During the screening interview, women received feedback on their scores and diagnosis, and advice on referral pathways to care. This approach mirrors the Screening and Brief Intervention (SBI) strategy used in the context of alcohol abuse as implemented at a

primary health care level, and the value of this approach in relation to alcohol use in pregnancy (Chang, 2004; Chang et al., 2005; Nilsen, 2009; O'Connor & Whaley, 2007). In this context, brief screening and interventions have been shown to avert more serious adverse consequences; are well received by women; can be provided by a range of health care workers (not only specialists in the field); and are cost effective. Pregnant women are especially receptive to brief interventions, as they are motivated to change behaviors that may adversely affect their infants. Screening and brief interventions have also proven effective in intimate partner violence, with a broader role of creating awareness through psychoeducation (Koziol-McLain, Giddings, Rameka, & Fyfe, 2008). In this study, we found that the screening and brief intervention with referral may have had a part to play in building resilience, through creating awareness and providing a therapeutic space for women to explore their emotional state.

On analysis of the transcriptions, women described feeling supported by the interviewer as a person who was warm and empathetic. Women mentioned that they felt someone cared about them and they felt free to speak. This interview style is again similar to interventions such as "listening visits," which are recommended for women antenatally (Clement, 1995; National Collaborating Centre for Mental Health, 2007; Segre, Stasik, O'Hara, & Arndt, 2010). Supportive, empathetic listening is a critical component of any therapeutic intervention (Di Blasi et al., 2001; Lambert & Barley, 2001; Singla et al., 2017). These women showed how their resilience grew as a result of the screening interview, and how this helped to alleviate some of their initial anxiety and depressive symptoms. This ability to recover from adversity had a protective effect on their mental health.

Limitations

All interviews were conducted by the first author and it is possible that some women passed through the clinic while the first author was conducting interviews with other women either in Phase 1 or in Phase 2 of the study, which overlapped to some degree. Over 100 women attend the clinic on a daily basis, and the clinic is consequently extremely busy. There is no formal booking system at the clinic. Women check in informally, and are allocated a number in the queue. It would be easy to miss someone especially if they did not want to be re-interviewed, were in a rush or did not feel well enough either physically or mentally to attend a second interview. This may have biased the sample. Using the principle of reflexivity the first author identified the quality of the initial screening interview may have affected the

results of this study. Similar results may not have been found if women felt pushed into a screening interview by a non-empathetic interviewer who did not provide a therapeutic space for them, or if screening proceeded with a simple pencil and paper test with no interviewer. The first author is a psychiatrist, and this may have influenced the quality of the interviews. These interviews were conducted in a non-specific therapeutic way that made use of good listening skills and empathy, as well as providing some basic psychoeducation. These findings cannot be generalized to other settings as they are specific to poor urban women living in South Africa and attending a high-risk antenatal clinic. Further research is needed that incorporates more diverse samples of pregnant women, including low-risk and rural women, to test the wider applicability of this approach to screening. There was no control group in the study. The use of a control group to test the value of the assessment could be a valuable approach for further research.

Conclusion

Although the initial screening and diagnostic interview appeared to act as an intervention in a significant number of women, this may have occurred through measurement reactivity effects on behavior, emotion and cognition. This highlights two important issues. Firstly, studies aiming to assess the effectiveness of screening with intervention for antenatal depression need to consider this phenomenon in their design. Alternate methods like a Solomon four-group design could be used to estimate the effect of measurement on an intervention effect (French & Sutton, 2010).

Secondly, measurement reactivity as a result of mechanisms such as the process of disclosure, gaining self-knowledge, validation of experiences, and a sense of personal agency and seeking out support from others, as described in this article, could be used to advantage to enhance clinical practice. Especially where there are limited resources and few dedicated mental health services, screening and brief intervention may be particularly beneficial.

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CHAPTER 5

Paper 3. Postnatal mood and socioeconomic context among low-income women in Johannesburg, South Africa

Marsay, C., Manderson, L. and Subramaney, U. Accepted subject to revisions. Postnatal mood and socioeconomic context among low-income women in Johannesburg, South Africa. *Health Care for Women International*

Abstract

Maternal depression affects many women, especially in poorer countries where environmental influences are important contributing factors. We explore the postnatal experiences of low income, urban women living in Johannesburg. The women were initially screened for antenatal anxiety and depression, and 20 women were followed up to identify changes in mood, if any, postnatally, and to identify contextual factors that might have impacted these changes. Women's experiences reflected their social and economic circumstances. Promotion of mental health through action on the social determinants of health is needed, with an emphasis on poverty alleviation, secure employment and enhancing existing social support structures.

Keywords:

Postnatal depression, low and middle-income countries, poverty, socioeconomic status, employment, South Africa.

Introduction

Maternal depression has serious consequences on women's ability to care for their own and their infants' physical and emotional needs, particularly in low and middle income countries where chronic social and economic adversity impacts on maternal mood and parenting quality (Field, 2010; Stein et al., 2014). These adverse outcomes perpetuate social and economic inequalities across generations. Poverty and low socioeconomic status affect more women of a given population in low and middle-income countries like South Africa, compared to high-income countries, making them particularly vulnerable to depression.

This is very clear in South Africa where racial and wealth disparities, coupled with political and economic instability, have continued post-apartheid, and the country is one of the most economically unequal countries in the world (Leibbrandt, Finn, & Woolard, 2012). This is significant as social injustice impacts negatively on health and health equality (Marmot et al., 2008). It is estimated that approximately 40% of women living in relative poverty will experience perinatal depression -- three times the rate documented in high income countries (Hartley et al., 2011; Manikkam & Burns, 2012; Rochat, Tomlinson, Bärnighausen, Newell, & Stein, 2011). These high rates may be related to the compounding nature of multiple economic, social and psychosocial stressors (Davies, Schneider, Nyatsanza, & Lund, 2016; Hartley et al., 2011; Kathree, Selohilwe, Bhana, & Petersen, 2014; Manikkam & Burns, 2012; Mathews et al., 2004). Clearly maternal depression has multiple etiologies, and cannot be explained solely by biological and psychological vulnerability.

Poverty is a well-established social determinant of poor mental health, including depression and anxiety, and associations between social and economic stressors and maternal depression have been identified in various low and middle-income countries (Chen, Subramanian, Acevedo-Garcia, & Kawachi, 2005; Fisher et al., 2012; Lund et al., 2010; World Health Organization, 2014; Patel et al., 2010). Socioeconomic status can be ill-defined especially when comparing low socioeconomic status in low and middle income countries and high income countries. Consequently, measures of socioeconomic status in studies on perinatal women are inconsistent, and various risks are associated with depression in different cultural settings (Andajani-Sutjahjo, Manderson, & Astbury, 2007; Ban et al., 2012; Kathree et al., 2014; Melo et al., 2012; Rahman & Creed, 2007; Stewart, 2007).

Lack of social support from partners and family members can be a risk factor for perinatal depression in women living in low and middle-income countries (Andajani-Sutjahjo

et al., 2007; Davies et al., 2016; Dubey, Gupta, Bhasin, Muthal, & Arora, 2012; Fisher et al., 2012; Kathree et al., 2014; Leigh & Milgrom, 2008; Ngai & Ngu, 2015; O'Hara & Wisner, 2014; Stewart et al., 2010), despite again that measures of social support are inconsistent and specific aspects of social support are rarely explored in detail. This is salient in post-apartheid South Africa, where poverty, unemployment and HIV have undermined men's ability to meet the social roles of manhood and fatherhood (Mfecane, 2008; Roy, 2008; Wilson, 2006). During apartheid, migrant labor systems and state laws restricted the opportunities men had to live with their families, weakening family life (324). Today, many women in South Africa are single parents and have little financial or emotional support from their children's fathers.

The Government of South Africa is committed to women's and children's health. However the focus of programs tends to be on physical health with the aim of decreasing morbidity and mortality (National Department of Health, 2012), despite the importance of maternal mental health in healthy child development. As described above, causal factors of perinatal depression are complex and a multifaceted approach is needed to facilitate policies that promote mental health and prevent consequences of untreated mental illness among mothers with infants.

In this article, we explore the experiences of low income, urban women living in Johannesburg, who underwent antenatal screening for anxiety and depression. We were interested finding out how their mood changed or remained the same in the postnatal period, and what contextual factors impacted on these changes.

Methods

Study Design

An explanatory design, as described by Creswell and Plano Clark (2011), was used in this study, with different quantitative and qualitative approaches to enhance our understanding of the research problems in ways that would not have been possible using either instrumentation or interviews alone (Creswell & Plano Clark, 2007). Quantitative measures were used to identify changes, and then data were collected using qualitative interviews with participants to explain the results in greater depth (Creswell & Plano Clark, 2011). In this article, we draw on data collected (December 2015- August 2016), from a purposive sample of 20 women, who had participated in a prenatal screening interview for antenatal depression and anxiety (conducted July 2015-April 2016, and is reported elsewhere). These women were re-interviewed from 4 weeks to 6 months after the birth of their baby. Interviews were

conducted at the postnatal clinic at Rahima Moosa Hospital and at local well baby clinics while women were waiting for their infants to be immunized.

Study setting

The data were collected from a purposive sample of women who attended the antenatal clinic of Rahima Moosa Hospital, a large tertiary level mother and child hospital in Johannesburg, South Africa. Some 12,000 women give birth at this hospital per annum. All women who attend the antenatal clinic have high-risk pregnancies; this excludes women who are infected with HIV, which is managed in primary health care centers, and women who are obese unless for other reasons they are identified as at risk of developing gestational diabetes or other complications in pregnancy or parturition. Most women were attending the clinic because of age (> 35), previous pregnancy loss, risk of pre-eclampsia or multiple pregnancy.

Study sample

The study sample was a purposive sample of 20 women who attended the antenatal clinic of Rahima Moosa Hospital, and underwent an initial screening interview in their second trimester. As these women were followed-up over time a relationship was established between the women and the first author who conducted the interviews. After 20 interviews, themes were fully developed and no new information emerged. As data saturation had been reached, sampling terminated.

Most women in the sample (80%) were living with their partner. Four women had separated from their partners during the pregnancy. Less than half (9) of the women reported having a very supportive partner while four women described their partner as sometimes supportive and seven women described having unsupportive partners. Consequently, three women were living with an unsupportive partner. Half of the women (10) were employed during their pregnancy; two of these women subsequently lost their jobs as a result of pregnancy. The median household income of the women was Rand 6750.00 (c. US$491) per month. Only one woman in the sample did not have electricity at home, while four of the women did not have indoor plumbing. Three women lived in a dwelling with only one room. The majority of women (16) were HIV negative, while four were HIV positive. Most women (14) had between one and two children at home, while for three women this was their first live birth. Nine women had had previous miscarriages, which is not surprising as they were attending a high risk pregnancy clinic. Although most women (12) had no mental illness at the time of their follow-up interview, four women were diagnosed on clinical interview at the

time of their postnatal follow-up interview, with a depressive disorder and four women with an anxiety disorder. Despite the vulnerability of women attending this clinic, neither maternal mental health services nor a specific adult psychiatric service is provided at the hospital.

Measures

The quantitative data, collected in Phase 1 by the first author during the woman's second trimester, included a demographic questionnaire, the Edinburgh Postnatal Depression Scale (EPDS) and clinical diagnosis using the NetSCID. In Phase 3 the Edinburgh Postnatal Depression Scale and clinical diagnosis using the NetSCID were repeated in order to quantify temporal mood changes. The EPDS scale was validated at Rahima Moosa Hospital in 1998, with a group of postnatal women who were assisted to complete the scale verbally (Lawrie, Hofmeyr, De Jager, & Berk, 1998). This approach was used in our study, with women assisted by the first author. The clinical interviews were also undertaken by the first author, a psychiatrist, using the NetSCID, an electronic research version, non-patient edition of the Structure Interview of DSM (First et al., 2002) as a guide and aligning the diagnoses with the DSM-5 classification. Only mood and anxiety disorder modules, including stress/trauma related disorders, were administered. The DSM 5 categories of unspecified anxiety and depression were used to categorise subsyndromal but clinically significant symptoms of anxiety and depression respectively. Subsyndromal symptoms of anxiety and depression can occur on a continuum of severity and can cause similar levels of distress as reported in women with a clear diagnosis (Rakofsky et al., 2013; Rucci et al., 2003).

Qualitative data were collected using a narrative inquiry approach (Connelly & Clandinin, 1990; Wang & Geale, 2015). Narrative research seeks to portray experiences of the world through accounts provided by study participants. It allows people to voice their personal stories in a real life setting, framed by what they perceive to be relevant and in the sequence that best suits them (294). The impulse to narrate is considered to be natural and universal, and therefore narrative inquiry is a good choice in multicultural settings (297), as in South Africa. These focused ethnographic interviews (Higginbottom, Pillay, & Boadu, 2013) lasted between 10 and 40 minutes, and opened with "How are you doing now that your baby is born?" All interviews were conducted in English, which is widely spoken in this urban setting.

Ethics

Ethics clearance was granted by the Human Research Ethics Committee at (withheld for review). All women who participated in the study signed informed consent, which was revisited at the postnatal interview. Women were reminded that the interviews would be audio recorded and transcribed and that they could speak freely without concern that their answers would negatively affect their postnatal care.

Analysis

Interviews were audio-recorded, transcribed and checked for accuracy. Transcriptions were kept in Word documents and analysed for main themes, using a three phase coding system (Neuman & Wiegand, 2000). The first author performed an initial scan of the transcribed texts, highlighting phrases used by the participants and detecting initial themes. An iterative, cyclic and reflective process was used to explore meaning (Higginbottom et al., 2013; Pope, Ziebland, & Mays, 2000). The first and second authors identified core themes through a process of collaborative content analysis and core themes relevant to this paper. Themes identified were endorsed by at least three women. The first author then focused on connecting themes and finding links in the data. Finally the first author reread the data and assigned excerpts that captured the themes extracted phase. This multi-step process has also been described in heath science literature by Vaismoradi and colleagues, using phases described as initialization, construction, rectification and finalization (Vaismoradi, Jones, Turunen, & Snelgrove, 2016). All coding was checked by the second author to ensure accuracy. Idiomatic expressions have been retained in the quotations below, which are attributed by pseudonym. Quotes were selected to be representative of themes that emerged.

Rigor and Trustworthiness

Constructs described by Guba (321) were used to ensure trustworthiness and rigor of the study. Credibility is achieved by an attempt to demonstrate that a true picture of the phenomenon under investigation is presented. Transferability is achieved by providing sufficient detail of the context of the fieldwork for the reader to decide if the environment is similar or different to an environment they are familiar with. Dependability is the ability to enable future researches to repeat the study. Lastly, confirmability is the ability to demonstrate findings emerged from the data and not from the investigators own predispositions.

Results

Relief that babies arrived safely and were healthy

Four women described relief that their babies had arrived safely as they were fearful about losing them, or that they would be born with HIV. Mpho and Cassandra both of who had prior miscarriages, described improved symptoms post delivery. "Now, everything is better. Because now she is out. Ja, because I was scaring of losing her. I'm feeling much better" and "Ja, much better at ease. That was the only thing I wanted to see. He's born, see how it is, no problems." One woman, Justine, described the relief she experienced on learning that her baby was HIV negative. She had been anxious, although able to cope, throughout her pregnancy about how her HIV status would affect her baby."I'm feeling good. Ja, I'm managing. Because you know what, my baby was negative. That's the only thing. I just thank God that the baby is negative. My mind is settled. The baby is safe."

Babies were a source of joy and helped build resilience

Joy

All women expressed a sense of love and connection with their infants, and emphasized that their infants brought joy and a sense of purpose into their lives. Philile, for example, had financial concerns but still was able to enjoy her infant: "I love her to bits. When I look at her I just smile. No, because she's the lovely one this one. She's always laughing even if she's sick. You see she's sick now but she's always having a smile. This one you can sit the whole day, she'll be busy playing, laughing." Josephine was HIV positive, diagnosed in this pregnancy, and her partner had left her. But she had this to say about feeling bonded with her infant: "A lot really. What can I say, he's adorable." Barbara too had been diagnosed HIV positive in her recent unplanned pregnancy, was left by her partner, and was unemployed. She had to move in with her stepfather with whom she had a poor relationship. At time of interview, she had two older children from a different father and a 6 week old infant. She had symptoms of anxiety on the clinical interview yet she commented: "I'm actually content with my kids. They give me some sort of peace in my spirit."

Even women with a current diagnosis of depression still described their babies in a positive light and felt their babies were easy to manage and a joy. Amanda and her partner are both unemployed, and the family often did not have enough food to eat. Yet Amanda too felt able cope with her infant (6 months): "It's a good baby. Bonding - a lot, yes."

Resilience

Women, therefore, felt able to cope with practical, relational and health problems because of their commitment to and love for their children. It seemed that the children helped to enhance women's resilience. Amanda reflected: "I just have to be strong for my kids, cause I don't want to show them that I'm worrying too much." Similarly Lana commented: "What keep me going, I can't lie to you, it's my kids. Maybe sometime I'm thinking about problems but when I think of my children, it give me strength. It's the only joy I can say I have in this world. My kids."

Acceptance of relationships changes

Four women had partners who left them during pregnancy and were not at the delivery nor involved with the baby. However, these women did not report this as contributing to their mood postpartum. Patience lived on her own: "He just came to see me and the baby with nothing, and that made me upset for a while, then I told myself I don't need him in my life. I won't let that upset me. I just let him see the baby." Sabrina's partner left her for another women and was not providing any support for the baby or his older child. She explained: "I just think to myself, I'm living for my children now. But I'm not actually that much worried about him. I'm not going to let his pain and his suffering keep me back because most people fall behind when they've had a disappointment in their life and I can't live that way." Women consistently demonstrated independence and resilience despite their disappointment in unsupportive, uninvolved partners.

Partner's impact on women's mood

Winnie attributed the resolution of antenatal depression to an improved relationship with her husband following the baby's arrival: "It's much better. Very much better. He (baby) brought everything better. He's a hands-on dad, I should say." In her situation, good partner support contributed to the improvement of her depressive symptoms. In contrast, Lana, who was experiencing a major depressive episode, complained about the poor support her husband offered, and his failure to meet her own and social expectations as a father and husband. She was unhappy in the relationship:

> I'm living with my husband. For that side, I don't like to talk about it because any time I think about the behavior of him, we're not happy. Yes, because he does what he wants. If he want to sleep out, he sleep out. If he want to give money for milk, he give. If he doesn't want, there's nothing I can do by forcing him.

Protective effectives of family support

Women spoke about their families and the support they received from them postnatally. They described the practical and emotional support that their mothers provided, as expected. However, from our conversations, it was evident that male family members – the fathers and brothers of the women -- also played a strong role. Sabrina, whose partner left her, described her father's role in her life: "My father is helping me financially, he is helping me emotionally. He talks to me, encourages me. And when I need things for the children he's there. I do have people that still care for me."

Barbara, who was also single, spoke about the role her brother played in her life:

> The person who's actually helping me, is my brother, quite ironically, hey – my big brother. He's more involved into this baby like I didn't even expect that from him, He sends me money, if you need to buy this, you need to go to the clinic – I'll send you transport money, He's helping and I actually do appreciate it.

These women described both emotional and practical support from family members, that was clearly protective in their situations; women valued and appreciated the help given.

In contrast, Ferosa, who had clinically significant anxiety symptoms, had lost her father in the past year. Her father rather than her mother had been an important source of support, and his absence was difficult: "I was really missing him a lot and even when I was in labour like, if I could just, if I could just have that time, if he could just phone me you know, just so that I could think that okay, he's there, I'm going to see him you know, after. Because he also always had that outlook, everything is going to be okay."

Prayer and church attendance

In South Africa, church membership is an important aspect of everyday life for the majority of the population, and churches provide both spiritual and social support (325, 326). Many women explained that prayer and personal support from church members was helpful, as Josephine explained: "The church help me a lot. You know, just sitting there, hearing the word of God. Come out of the church, be surrounded by people, makes me feel good." Barbara described how attending church infused her with hope and inner strength: "I'm still going to church that's why I still have that hope; I still have that dream. I'm hoping for things to get better. My church is my strength." Another woman, Patience had suffered postnatal depression with her first child, but with her second baby she was coping

well, which she attributed in part to being close to God: “Chain of prayer, we do for family and stuff and all that. When you pray you feel like this is my situation and when I’m praying for it I become strong that way. I become close to God.”

Unemployment, precarious employment and financial insecurity

Unemployment or precarious employment was a major problem and impacted significantly on the moods of ten women. Women’s worry about supporting their family while on maternity leave was more prominent postnatally than antenatally, possible because financial stresses were more likely to emerge when women were caring for their newborns and when they had lost their job due to pregnancy. Amanda had developed postnatal depression. She lost her job as a result of her pregnancy. Both she and her boyfriend were unemployed and often went hungry.

> We just struggle to get work. Like sometimes we eat at my mother’s place. Since I got pregnant I couldn’t work anymore. I sometimes I ask a friend of mine to stay with her and then I go out and take my CVs to shops. I’m hoping for a good job or maybe back to promoting. Maybe my boyfriend getting a job also.

Margret described how her unemployment caused her anxiety: “I am not going to work and I am the one who supports my mom. Only the job is worrying me, only the job.” Philile spoke of her wish for a career so she could better support her family. Her concerns contributed to her low mood. “I’m beating myself (up) every time that I didn’t do things right. Maybe if I had a career or something then things would have been better. It would have been easy to find work.” Lana. who was self-employed as a hairdresser, attributed difficulties to the current economic climate:

> I’m thinking the economy is down because everything is expensive. People don’t like doing their hair again because the money they’re supposed to do hair, they can buy food. Yes. And the hairpieces are very expensive because I heard like things are not coming into the country like from Nigeria.

Abuse at home and at work

According to South African law, women are entitled to four months of maternity leave and are entitled to return to their work post maternity leave without discrimination. (Department of Labour, 2014). But not all employers adhere to this law. Nomsa described what happened to her: “I was working, and then, my boss, when I told her that I’ve got a

baby, she told me she's not going to pay me. I don't know why. She didn't even give me notice, she said that I don't need to come back." Two other women in the study also experienced losing their job as a result of their pregnancy.

Ferosa felt that her two months maternity leave was too short. She felt conflicted about going back to earn money, for the family, because this would mean having to stop breastfeeding:

> Because right now he is so dependent on me, I mean I'm breastfeeding, that's all. There's nothing I can do and then I'll be forced to be putting him on formula. I think finance is my main worry. Up until I find a way to fix it and then it's out of my mind. So that is why I need to rush back to work…

Alicia who was in an abusive relationship, described that she enjoyed her job, which was secure and able to support the family, but her partner perceived her job as a threat: "He didn't want me to go to work. Now I'm on six months leave, I'm at home where he wants me to be. What's going to happen when I go back to work? That's when the jealousy is going to start."

Josephine had a permanent job, but she was anxious about going back to work as her boss was abusive. She had concerns related to both physical safety at work and emotional abuse: "It's just work stress. The thing is, my boss is very nasty. He's you know, your life is all in his hands. I can't work with someone like that. And you know to pick up that steel and all that with my back. I had an injury at work and then he denies it."

Secure employment

Two women, Patience and Kerry who reported their moods as normal and felt they were coping well, had secure, accommodating jobs to which they were returning after their maternity leave. Patience, who worked as domestic worker, said "I'm going back on Monday (6 weeks). Yes, we're going back together (taking baby with her to work), which is a big help for me." Kerry had a clerical job at an insurance firm:

> I think it's for the company, the chatting with the friends and the other people. I've established friends there and, it's like a secure position. I do have a lot of stress there but end of the day it's worth it. I'm getting full pay. Which is nice cause I know lot of companies say they like maybe pay you like a month and a half salary and then you have to go claim. They handle the UIF (unemployment insurance fund) from their side.

Kerry's company contributes to the state unemployment insurance fund, so that while she was on maternity leave the insurance fund covered her salary. In South Africa employees are legally required to make a monthly contribution to UIF for their employer; however this is not often practiced and, as elucidated above, often leaves women with no source of income while caring for a newborn.

Immigrant women's concerns

Two women were worried about deportation and not having the right documents, contributing directly to their financial insecurity. Lana, a hairdresser, was unable to work in the formal sector as she did not have any documentation; it had been confiscated by an official with no explanation: "Before, I can have clients … that will say come and do a house call. But now I can't go because I'm scared. I can go out and (what if) they arrest me, what about my children? But now without the document, how can they employ me? Lana attributed her low mood to financial insecurity and not having the correct documentation. "But now what is my main problem in South Africa? I can't tell you it's my children. It's financial problem, I'm not having documents. It's not easy to live in a country without documents." Like many immigrant women, Lana had no social support in South Africa. "All my family, they're home. Nobody to help me, even family. Nobody to say I'm going to support you with this." She was also distressed because she had left her older children in her country of birth: "Six years. It's stressing me. I hear, come see me, won't you see me. My mom is crying."

Esther was a trained nurse in her home country, but her qualification had to be verified by the South Africa Qualification Authority before she could apply for a work visa and so find a job. However, her visa had expired. She was fearful of the risk of deportation; this was compounded by threats of being reported by her husband's previous partner:

> My husband has another kid who is not mine and I find it hard. The mother (of her step-child) sometimes she's saying the message, she gives your number to the people who are deporting you, you understand and you are scared. What it's like that you think you are not safe. Me, I think that I am not safe.

Discussion and conclusions

Variations in mood and anxiety symptoms among postnatal women in South Africa appear to be aggravated by poor partner support; financial insecurity related to unemployment

or poor conditions of employment, no access to family support and lack of formal residential status. Symptoms were mitigated by family support, church attendance, good conditions of employment, and the babies themselves.

Women mostly spoke about work and the challenges of being women, mothers and breadwinners in relation to this. Some women found that their jobs were no longer available after their pregnancy and delivery. This highlights the need for improved advocacy for maternity leave for women. In addition, achieving health equality requires safe, secure, fairly paid work all year round (Marmot et al., 2008). In this study, most women experienced precarious employment, which was poorly paid and unprotected, with no social benefits (Benach et al., 2014). Insecurity of employment is associated with poor mental health (Keuskamp, Ziersch, Baum, & LaMontagne, 2013; Moscone, Tosetti, & Vittadini, 2016), and women with significant symptoms of depression and/or anxiety all expressed distress about work. Work issues were related to economic decline, poor working conditions, inadequate maternity leave, intimate partner violence associated with work, lack of career, and inability to find work.

A permanent job is protective for perinatal mental illness in women living in low and middle-income countries (Fisher, de Mello, Izutsu, & Tran, 2011; Fisher et al., 2012), as this is likely to prevent or moderate financial insecurity. Employment is also protective of postnatal depression for reasons including the benefits of time structure, purpose, shared experiences, and self-identity, reflecting inherent values of employment (Gjerdingen, McGovern, Attanasio, Johnson, & Kozhimannil, 2014). In this study, women who reported fair, flexible employment that accommodated their maternity leave were not experiencing mood symptoms.

Immigrant women, particularly if undocumented, face particular disadvantages because of limited access to employment, education and health services and have much higher rates of postnatal depression (Callister, Beckstrand, & Corbett, 2011; Collins, Zimmerman, & Howard, 2011; O'Mahony & Donnelly, 2013; O'Mahony, Donnelly, Bouchal, & Este, 2012). Most studies investigating postnatal depression in immigrant women are conducted in high-income countries, and report that women experience problems of financial insecurity and poor social support (Callister et al., 2011; Collins et al., 2011; O'Mahony et al., 2012) Women in this study had immigrated from other low-middle income countries to South Africa, but faced similar problems. The two immigrant women who were seeking permanent residency reported both employment difficulties and financial problems. In addition, both women feared of being

arrested or deported, and this was the main cause of their anxiety. Improving services for the application, processing and renewal of asylum documents and work visas would help mitigate these problems. Given that 8% of the population in the study area are foreign-born, immigrant specific issues are important to consider when addressing perinatal depression and anxiety (Budlender & Hartman-Pickerill, 2014).

Three married women experiencing conflict with their husbands had symptoms of depression and/or anxiety. In all cases, the conflict was related to financial stressors and the women felt their husbands were not supporting the family appropriately. However, although poor partner support is a predictor of postnatal depression (Cooper et al., 1999; Fisher et al., 2012; Sawyer, Ayers, & Smith, 2010; Tomlinson, Cooper, & Murray, 2005), not all women perceived lack of partner support as a problem. Four women experienced a breakdown in their relationship during pregnancy, and although this was initially difficult, they appeared to accept the failed relationship and no longer felt disappointed. Rather, they were pragmatic about the relationship and the limits to which the men might be involved with their baby. These results may also help to explain findings of a study conducted in Cape Town, also among poor postnatal women, which reported that women who lived with an unsupportive partner were more likely to be depressed than those who did not live with an unsupportive partner (Tomlinson et al., 2004).

In this study, the role of male kin in supporting women postnatally was particularly evident (Richter, Chikovore, & Makusha, 2010). In South Africa children often live with their mothers, maternal uncles and grandfathers; only one third of children live with their fathers (Richter et al., 2012). This relates to the lingering effects of apartheid where group area laws and pass laws limited the opportunities for men to live with their families (324). As a result other men, such as uncles and grandfathers, in some cases, assume a social fatherhood relationship with a child, and provide care (Montgomery, Hosegood, Busza, & Timaeus, 2006). Where partners were absent, women's fathers played a significant role in their own and their infants' lives. Brothers also helped financially and emotionally. These family ties were in some cases stronger than the partner relationship, suggesting the importance of social support from the family. A similar finding was noted in a study in Cape Town, where lack of perceived family support was a higher predictor of antenatal depression than lack of partner support (van Heyningen et al., 2016).

Women did not attribute their low or anxious mood to difficulties with their infants and early mothering. Most women felt a deep connection and a sense of joy in interacting with

their infants. Many women, even some with depression at time of interview, described their infants as 'easy'. The infants and other children gave women a sense of resilience, enabling them to set aside their problems and feelings to care for their children as best they could. Similar findings were reported in a study in Indonesia, where babies gave women a sense of joy that motivated them to find ways to move on with their lives. Again, for these women, negative emotions were related to their social and economic circumstances (Andajani-Sutjahjo et al., 2007). This contrasts with studies in high-income countries where depressed women report more negative mother-infant interactions, feelings of detachment, guilt and lack of interest in the baby (Beck, 1996; Field, 2010; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Martins & Gaffan, 2000; Yonkers, Vigod, & Ross, 2012). In this study, some women had suffered antenatal depression and anxiety, partly associated with concerns about the risk and the viability of the pregnancy. This resolved once their babies were born, were healthy and, particularly, HIV negative. Holding their live, healthy babies was a significant turning point for their mood. The rapid improvement in symptoms post delivery in these women may suggest different trajectories depending on social and economic circumstances.

Finally, as noted, in South African churches, including conventional Christian churches, Pentecostal and African churches, are important in providing spiritual and social support of their congregations (325, 326). Prayer and church attendance has been described elsewhere as a positive self-care strategy for postnatal women with depression (Abrams, Dornig, & Curran, 2009; Logsdon, Hines-Martin, & Rakestraw, 2009), and there is a well-established link between spirituality and religion, and health, which may occur through the mechanisms of social support and positive religious coping (327). Both South African citizens and immigrant women reported benefiting from the social support and spiritual aspects of prayer and church attendance.

There are limitations. These data derive from women who agreed to participate in the interviews antenatally and were retained post-partum, so biasing the sample. There was a poor retention rate between the screening interview and the follow-up interviews because many women, who migrated to Johannesburg, returned to their natal home after delivery for support. These women may have had different life experiences to those who participated in the postnatal interview. Timing of interviews had a wide range from 4 weeks to 6 months postpartum. Most interviews took place at 6 weeks postpartum, and for some women, depression may have emerged at a later stage. In addition, the findings cannot be generalized to other settings as they are specific to women in Johannesburg attending a high-risk antenatal

clinic. Further research is needed to explore the experiences of more diverse samples of pregnant women, including low-risk and rural women.

In order to manage the extensive problem of perinatal depression in the country, social and economic problems cannot be ignored. Emphasis should be placed on poverty alleviation, secure employment, and enhancing existing social support structures such as churches and extended family. Social and political strategies can play an important role in mitigating the effects of postnatal depression and addressing its underlying causes for women and their families in South Africa.

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CHAPTER 6

DISCUSSION AND CONCLUSION: Understanding perinatal depression to prevent postnatal depression

Anxiety, post-traumatic stress disorder (PTSD) and depression are among the leading causes of disability globally (328). These disabilities, and other mental health disorders, affect individual functioning, including occupational functioning, and so the economic cost of these disorders is high. Millions of people are affected by mental disorders, which account for about 13% of the 'global burden of disease' as defined by WHO (329). Over 70% of this burden lies in low and middle-income countries (330), and violence, abuse and other traumas increase the risk of multiple health problems including PTSD, anxiety and depression. Global prevalence rates for depression are 4.7% (331) and for anxiety, 7.3% (332). However, in countries affected by political violence and displacement, these prevalence rates can be 30.6% for depression and 30.8% for PTSD (333). In affected countries poverty, inequality and interpersonal violence are often rife; the presence of these characteristics as well as unemployment, food and housing insecurity, and gender-based violence, may explain in some part why in South Africa the rate of perinatal depression in higher than other low and middle-income countries. Despite the high prevalence of poor mental health, most people living in low-and middle-income countries do not receive adequate mental health care.

The field of global mental health is evolving, leading to expressed concern that mental health services be improved; especially in underserved areas worldwide (334-336). The gap between those who experience mental health problems and those who receive any kind of treatment is substantial. In low-middle income countries up to 90% of people needing care do not receive it, and this is referred to by WHO as the "treatment gap." (337). In South Africa this treatment gap is marked.

Among the millions of people affected by mental disorders, women in the perinatal period are particularly vulnerable, and perinatal depression is a significant public health problem affecting proportionally more women living in low and middle-income countries than women in high-income countries (1). It has multiple etiologies, but social and environmental conditions are important contributing factors and determinants of risk.

Perinatal depression can be defined as depression occurring any time from conception, during pregnancy, and throughout the first postpartum year. Anxiety symptoms are also prominent during this period, and can be separate or comorbid with perinatal depression, and so the

distinction between anxiety and depression is difficult and sometimes not clinically relevant. In fact, some definitions of perinatal depression include anxiety as a core symptom (35, 36). The most relevant clinical question in terms of making a diagnosis is the impact of the negative thoughts, moods and behavior on functionality in three main areas: work, home and relationships. If functioning is impaired, in one or more areas then the symptoms are treated as a disorder, and the disorder will require intervention in order to prevent adverse consequences.

WHY IS THIS AN IMPORTANT ISSUE?

Rates of depression in women perinatally are reported to be around 10-15% in high-income countries (2, 338). In other low and middle-income countries rates are 16-20% (3). In South Africa however, the rates of perinatal depression range from 22-47% (3, 13-15, 164). As discussed in the introduction and literature review of this dissertation, the combination of maternal depression and chronic social and economic adversity, as experienced by poor women living in poor countries, can result in difficulties in parenting (11). In these settings, poor mental health during the antenatal period is a risk factor for low birth weight and preterm delivery (6, 7). The daily demands of early infant care are more difficult to negotiate when functioning is suboptimal (5), and as a result, infants and children of depressed mothers have poorer physical, cognitive and emotional outcomes including poor quality attachment (10). Poor quality emotional attachment results in behavioral and psychological difficulties that can last into adolescence and adulthood (11). Poor infant growth and malnutrition and increased frequency of infant diarrheal illness are prevalent, possibly related to early cessation of breastfeeding in depressed mothers living in poverty (8). Compromised cognitive functioning and delayed development also affect the infants and children of depressed mothers, impacting on their scholastic achievement (12). These adverse outcomes limit children's opportunities and so further perpetuate social and economic inequality, adding to the economic cost of the burden of disease. Depressed mothers are also at risk of losing their income and economic potential as a result of their impaired mental state. These women also have higher risks of intimate partner violence, substance abuse and suicide (119, 156, 339). Given the high rates and compounding associated risk factors for maternal depression, its early identification and management is important. Screening with referral is a valuable, strategy for mitigating the devastating consequences of the illness on mothers and their families.

WHAT IS BEING DONE ABOUT IT GLOBALLY?

Perinatal depression meets most of the principles for disease screening (340). The condition is serious, prevalent and treatable, and an acceptable test of known accuracy is available (212, 341). Although there is global consensus that screening for perinatal depression is essential, recommendations about how and when to screen, with what instruments, vary and are not always evidence based. Most literature related to screening for perinatal depression comes from screening programs implemented and evaluated in high-income countries, and far less work has been undertaken in low and middle-income countries.

As discussed in the literature review, studies conducted in high income settings provide evidence that screening is most effective when it is implemented as a well-resourced, integrated programme with clearly defined pathways to treatment, including acting on all positive screening results by offering confirmatory follow-up procedures and treatment if indicated (215). This implies a certain level of available resources, including adequate numbers of appropriately trained staff in primary health care settings and up-referral services. These prerequisites are generally not available to women in low and middle-income countries.

Countries like the United Kingdom, Australia, and some states in Canada and the United States have recognized screening policies for perinatal depression. In the United Kingdom, current national policy promotes patient-centred, co-ordinated care, as outlined in the clinical guidelines published by the National Institute of Health and Clinical Excellence (NICE) and referred to as Antenatal and Postnatal Mental Health: Clinical Management and Service Guidelines [CG 192]. This guideline updates and replaces the NICE Clinical Guideline 45 [CG 45] and partly replaces Guideline 62 [CG 62]. The new guideline offers recommendations for recognizing perinatal anxiety and depression. It suggests that all women both at their first obstetric visit (approx. 10 weeks gestation), and during the early postnatal period, are asked the Whooley questions as part of a general discussion with them on mental health. A positive/ yes answer to either of these questions prompts further assessment, either using the EPDS or PHQ 9, or by referral to the women's GP for further clinical assessment. This differs from the previous guideline where if the women answered yes to either of the questions, the third 'help' question was posed. The guidelines also recommend asking about past own history of mental illness and family history of mental illness. Although there is not a specific tool, it is recommended that women's social circumstances are also explored in order to help assess risk. (279)

Australia has been proactive in the development of national public health policy for the mental health care needs of perinatal women. Guidelines have been developed, aimed at the primary health care level. Assessment is broad and includes depression screening and psychosocial assessment at repeated intervals. The EPDS and psychosocial assessment are done during pregnancy and at 6-12 weeks postnatally. Perinatal care is integrated and most care is provided at primary care level with the support of mental health services. There are clear criteria for management within primary care and for referral using a stepped care approach. This approach is critical to providing women with access to early intervention if needed. While referral and care pathways vary with setting (e.g. general practice, maternity services) and location (e.g. metropolitan, rural and remote), it is important that women are provided with access to timely, appropriate services post-assessment, ongoing psychosocial support and appropriate treatments (342).

In the United States, the American College of Obstetricians and Gynecologists recommends routine screening of postpartum women with the EPDS or similar tool. It advocates that screening for depression has the potential to benefit a women and her family and should be strongly considered. Much more recently, in 2016, a report for the US Preventative Service Task Force stated the screening pregnant and postpartum women for depression may reduce depressive symptoms in women with depression, especially when they receive treatment (215). Although no national guidelines have been implemented, some states have their own perinatal policies.

In Canada, a report by the Canadian Task Force on Preventative Health Care in 2013 recommended against routine screening for depression, including perinatal women, citing lack of evidence as the reason. Like the US, Canada has no national policy of perinatal depression screening. However two provinces, British Columbia and Saskatchewan, have developed guidelines, which include screening with the EPDS twice in pregnancy and once postnatally at the infant's immunization visits (341).

In contrast, few low to middle income countries have policies for maternal mental health. Despite policies in South Africa emphasizing the importance of integrating mental health care into primary care, and specifically into maternal care, current national guidelines do not address perinatal depression and anxiety screening, an essential aspect of any effort to implement the policies successfully.

The Adult Primary Care Guidelines (APC) 2016/2017 (343) have been adopted by the National Department of Health and form part of the Ideal Clinic programme. Although risk screening is not advocated, the APC indicates that 'mental health' should be assessed at the booking visit and at every follow up visit, including during postnatal care.

These guidelines provide two questions which are amended versions the British Whooley screening tool (272) and pertain, for the past month, to being down, depressed or hopeless or having little interest/pleasure in things. An endorsement of one or more of these two items leads to the "Depression and Anxiety: Diagnosis" page which proscribe another set of questions to assess for depression. This page has several weaknesses, which include: mention of anxiety only within the context of trauma or phobia and reliance, for diagnosis of depression, on many somatic features which may ordinarily be prominent in the perinatal period. The routine care page for depression and/or anxiety has an evidence-based, stepped care approach for primary level provider engagement and treatment.

In South Africa, maternal mental health is incorporated into the general mental health policy, and focuses on the treatment of perinatal depression and anxiety within antenatal and postnatal clinics. However the policy does not clarify the screening processes for identification of perinatal depression and anxiety, and the emphasis is on the management of severe mental illness rather than the prevention of common disorders such as anxiety and depression. However, health promotion and screening can prevent the severe adverse effects of depression, including loss of quality of life and the risk of suicide and neonaticide in extreme cases.

WHAT CAN BE DONE DIFFERENTLY IN SA?

Screen with an appropriate tool: "Validation of the Whooley questions for antenatal depression and anxiety among low-income women in urban South Africa".

Gaps exist in the detection of mental illness at the primary care level in South Africa, partly as a result of ineffective screening tools (344). Many screening tools have been tested in the country, but most appear to be too time-consuming to be administered successfully in busy under-resourced antenatal and postnatal clinics (28, 280).

Screening with referral is a valuable strategy for mitigating the devastating consequences of perinatal anxiety and depression on mothers and their families. However, a practical,

accurate screening tool is needed to identify cases in busy, resource scarce settings. In this context, one needs to consider the population being screened, as well as who will be administering and interpreting the results. Shorter tools, which are less time-consuming, are favoured over longer tools. Another aspect to consider is which diagnosis is being screened for? There are few screening tools for perinatal anxiety, and mostly the emphasis is placed on screening for perinatal depression. However perinatal anxiety is just as prevalent and also has adverse consequences for mother and infant. There is also high comorbidity between the two diagnoses. It would make sense to incorporate screening for anxiety in a perinatal screening programme. This would help to save time and resources in a busy resource limited setting where a transdiagnostic approach, to mental health care may be beneficial. The transdiagnostic approach involves understanding mental disorders outside the conceptual structure provided by a diagnosis. Although the EPDS is considered to have an anxiety subscale within the 10 questions, it takes time to complete and score, especially if a sub-score is calculated. It also requires literacy as a pen and paper test and privacy for administration. Case finding questions, like the Whooley questions, are time-effective to administer, do not require scoring or interpretation, and therefore do not require highly skilled staff to administer them (272). They also have the benefit of not requiring literacy as they are asked verbally during a routine confidential consultation. The Whooley questions can identify anxiety and depression with reasonable accuracy and they have shown promise as a screening tool in an urban, low-income setting in Johannesburg, South Africa (271, 345). When using the cut-off of answering yes to ≥ 2 of the questions with the inclusion of the help questions, they show good sensitivity (73.2%) and specificity (76.4%) for depression, as well as for anxiety and trauma related disorders (345). Therefore in this setting, and arguably other low and middle-income settings, the Whooley questions have good utility as a screening tool for both diagnoses. It has also been suggested that the tool be used to screen for emotional distress. Furthermore, the sensitivity and specificity of this tool could be enhanced by either rewording questions into more easily understandable language or by translating them into local languages.

In summary, it is feasible to:

- Implement screening programmes for perinatal anxiety and depression at primary healthcare level.
- Use the Whooley questions, which are quick and easy for staff to administer and do not require extensive training.

What does this article add?

This article adds to the evidence based to support the use of the Whooley questions in antenatal women. It also validates the use of these questions in a subsample of pregnant, South African women. The most exciting finding of this study is the ability of the questions to screen with good sensitivity and specificity for both anxiety and depression. This sparks the idea of potentially using a transdiagnotic approach, that will identify any psychological distress, in the screening and intervention of common perinatal mental disorders. This approach has been suggested as a cost effective, practical approach for implementation in resource limited settings such as in low and middle-income countries.

Use screening as an opportunity for intervention: *"Changes in mood, after screening for antenatal anxiety and depression"*

Screening and brief interventions have been shown to be effective in alcohol abuse and intimate partner violence, and have also had a broader role of creating awareness through psychoeducation (346-350). Women attending antenatal clinics are responsive to health promotion and brief interventions, as they are motivated to change behaviours that may adversely affect their infants. Brief screening and interventions have been shown to avert more serious adverse consequences; are well received by women; can be provided by a range of health care workers, not only specialists in the field, therefore a task-sharing approach can be used); and their use is cost effective. In addition, psychosocial assessment alone, in perinatal screening, is beneficial as it creates awareness and opens conversations about psychosocial issues and mental health (351). In the second article based on the findings of this PhD, 44% of the participants had a diagnosis at the screening interview and only 15% had diagnosis at the follow-up interview. The median EPDS score improved from 10 at the first interview to 7 at the follow-up interview, representing a statistically significant improvement in women's mental health subsequent to the screening interview. However, there was no significant association between the decreasing score and the specific diagnosis. It did not matter whether women had a diagnosis of anxiety or depression: their symptoms still resolved to some extent. This supports the transdiagnostic approach, suggesting that common elements were addressed in the screening interview as opposed to specific treatment effect for either diagnosis. Screening appeared to act as an intervention through mechanisms such as the process of disclosure, gaining self-knowledge, validation of experiences, and a sense of

personal agency, which resulted in the women seeking support from others. The screening and brief intervention in this study, consisting of a clinical interview, Edinburgh Postnatal Depression Scale, the Whooley questions, feedback and referral, had a part to play in building resilience, through creating awareness and providing a therapeutic space for women to reflect on their emotional state. Although most women did not seek out or receive treatment for their depression or anxiety, they still showed improvement. These women showed how their resilience grew as a result of the screening interview, and how this helped to alleviate some of their initial anxiety and depressive symptoms. This ability to recover despite adversity had a protective effect on their mental health. These interviews were conducted in a non-specific therapeutic way that made use of good listening skills and empathy, as well as providing some basic psychoeducation. These non-specific skills such as supportive and empathetic listening are a critical component of any therapeutic intervention (352-354).

Although the initial screening and diagnostic interview appeared to act as an intervention in a significant number of women, this may have occurred through measurement reactivity effects on behavior, emotion and cognition. This highlights two important issues. Firstly, studies aiming to assess the effectiveness of screening with intervention for antenatal depression need to consider this phenomenon in their design. Secondly, measurement reactivity, as a result of mechanisms discussed above and described in the article, could be used to advantage to enhance clinical practice. Especially where there are limited resources and few dedicated mental health services, screening and brief intervention using a transdiagnositic approach may be particularly beneficial. Finally these findings suggest that screening provides opportunities for prompt intervention, and could play a role in shaping future interventions.

In summary, the screening process in this study helped women in the following ways:

- Women are given an opportunity to talk about their feelings in a confidential, non-judgmental way.
- Women are assisted to put words to feelings, and acknowledge their diagnosis.
- Women gain self-knowledge and awareness of mental health.
- Women find their own ways of making changes, by developing their own coping strategies.

What does this article add?

This article highlighted the methodological problems with conducting research that aims to assess whether an intervention or screening programme would lead to improved outcomes. It also raises many interesting questions around brief interventions, as well as a non-specific or common elements approach to an intervention which can be incorporated into a resource limited setting using a task-sharing or lay counseling approach. This generates ideas about how we can start to think about and formulate transdiagnostic treatment protocols that can be tested in future studies

Look further than just diagnosis and management: *"Postnatal mood and socioeconomic context among low-income women in Johannesburg, South Africa."*

In the third phase of this study, 20 women who participated in focused interviews between four weeks to six months postpartum were asked about their moods postnatally. Women's experiences were common whether or not they had a diagnosis of postnatal anxiety or depression, and reflected the social and economic circumstances in which they lived. Variations in mood and anxiety symptoms among postnatal women in South Africa appeared to be aggravated by poor partner support; no access to family support; financial insecurity and poverty related to unemployment or poor conditions of employment; and for women whose visas had lapsed, formal residential status. Symptoms were mitigated by family support, church attendance, good conditions of employment, and by the babies themselves. Most of the factors identified here are supported by other studies both in South Africa and other low and middle-income countries (1, 133). Mobilizing and recognizing informal resources already within the community and able to be expanded and optimized, has been identified as valuable strategy in the improvement of mental health services, especially in low and middle-income countries (355) These resources, such as churches, local business and employers, families and departments of home affairs, are currently an untapped resource that with some grassroots advocacy could be helpful stakeholders in the quest for improved maternal mental health in the country. As previously in the literature review, because of the major role that social support plays in perinatal depression and anxiety, social interventions have a place in the management and prevention of perinatal depression and anxiety.

In summary, factors that impact on postnatal mood among low-income women in the study include the following:

- Babies bring joy into women's otherwise difficult lives.

- Supportive partners are helpful, but supportive families are even more helpful.
- Good quality employment.
- Church attendance and prayer.
- Formal residential status.

What does this article add?

This study adds to this body of evidence and contributes a different methodological approach in that this information was elicited by qualitative interviews where participants volunteered information about their daily lives. These narratives provide information from experts (participants) within a social context about the factors that impact most on their lives during the postnatal period. This adds evidence that can be presented to multiple stakeholders and policy makers.

CONCLUSION

In order to manage the extensive problem of perinatal depression in the country, social and economic problems cannot be ignored. Promotion of mental health through action on the social determinants of health is needed, with an emphasis on poverty alleviation, secure employment and enhancing already existing social support structures in churches and extended families. Social and political strategies can play an important role in preventing or mitigating the effects of postnatal depression, and in addressing the underlying causes of depression and anxiety for women and their families in South Africa.

Emphasis should be placed on pregnant women, with the management of postnatal depression starting antenatally, as the best predictor of postnatal depression is antenatal anxiety and depression (30, 31, 68). As discussed in the literature review, women with antenatal depression are more prone to adverse obstetric outcomes (6, 7, 164). This has implications for antenatal care and especially antenatal interventions for maternal depression and anxiety. Antenatal clinics provide maximum opportunity, as women's rates of attendance are much higher antenatally than postnatally. Women in the antenatal period are in regular contact with health professionals and any intervention is convenient if it takes place at the same time as a general health visit. In comparison, in low and middle income countries, women often do not attend postnatal visits for financial and logistical reasons. Many women return to their natal home after delivery, often in rural areas for practical support from their families (356). As a result, postnatal screening may miss many women who are still at risk. However, most infants

in South Africa receive immunizations, and well baby visits are well attended in the postnatal period. The current Maternal Care Guidelines include only a vague reference to mental health (15). There is no reference to assessing or documenting current mental state, nor recommendations regarding stepped referral for mental health care.

Although these new findings are from studies conducted in South Africa, other research in low to middle-income countries similarly emphasizes social and economic conditions and their relationship to perinatal depression and anxiety (1, 21, 22). South Africa has high rates of perinatal depression, unemployment, HIV and poverty, with limited health resources particularly in rural areas. If these strategies are effective here, it may be worth exploring similar strategies in other low and middle-income countries.

RECOMMENDATIONS

As a result of the growing global burden attributed to mental disorders, there is an increased interest in designing and evaluating strategies that can effectively help countries scale up mental health services for their populations (357, 358). The integration of mental health services into primary health care is a fundamental strategy required to provide adequate mental health care including prevention and health promotion, early intervention and rehabilitation (359, 360).

In a recent study conducted by the Emerald research consortium, a number of low and middle income countries were assessed to determine if they had the required systems in place to support integration of mental health into primary health care. A checklist list guided by the World Health Organization Assessment Instrument for Mental Health Systems (WHO-AIMS) was used to determine how countries were doing. South Africa was seen to be ahead of other low and middle income countries in the study. South Africa has a recent Mental Health Care Act; the country also has a standalone mental healthcare policy. The problems, rather, lie with implementation as a result of inadequate budget allocation from the healthcare budget for mental health (360).

There are some basic principles for integrating mental health into primary health care as outlined by the World Health Organization. These include:

- Policy and plans need to incorporate primary care for mental health.
- Advocacy is required to shift attitudes and behaviours.
- Adequate training of primary care workers is required.

- Primary care tasks must be limited and doable.
- Patients must have access to essential psychotropic medications in primary care.
- Integration is a process, not an event.
- A mental health service coordinator is crucial.
- Collaboration with other government non-health sectors, nongovernmental organizations, village and community health workers and volunteers is required.
- Financial and human resources are needed.

Based on the findings of this PhD, I would like to emphasize a few of these principles as action points for an improved health system in South Africa. These have already been alluded to in the articles above.

Simple, workable tasks for adequately trained primary care workers

Primary care workers achieve better results when their mental health tasks are limited and doable. These primary care workers, with time and specialist supervision, can gain skill and confidence in dealing with mental health issues (361) As discussed above, the Whooley questions are easy and quick to administer, and because they do not require scoring or pen and paper, they do not depend on literacy no any equipment. This simple yet effective tool therefore lends itself well to a primary health care setting where health care tasks need to be workable for the already stretched staff (222). Once patients have been identified as being at risk or having a common mental disorder the next step would be acceptable and effective treatment of this disorder at primary care level.

The World Health Organization Mental Health Gap Action Programme recommends that psychological treatments should be used as first-line treatment for common mental disorders. However, this is a challenge, given that there are a limited number of clinical psychologists, specialists and trained therapists (362). This raises ethical issues especially in low-income countries about whether it is ethical to spend resources on screening programmes when there are no first-line treatment resources available for patients who screen positive. Traditionally, specific treatment packages for disorders have been developed, but the use of these again compounds the challenges such as limited human resources and training (363-366). Therefore global mental health researchers have moved towards a transdiagnostic or common elements approach that addresses barrier to focusing on treating a single diagnosis in an attempt to find a way to close the treatment gap. These treatments work for common mental health disorders as these disorders have similar familial and environmental risk factors (367, 368) they are also often comorbid conditions (369) The transdiagnostic treatment approach teaches a common

set of practice elements that can be delivered in varying combination to address and range of problems and diagnoses. Identifying which common elements are effective in psychological treatments is a strategy that may help to up-scale, disseminate and provide a sustainable treatment strategy. It is also more feasible to train non-specialist personnel to deliver psychological treatments for multiple diagnoses, given the limited resources, rather than training and having multiple manuals for each diagnosis. A recent review of the literature evaluated 27 trial studies from low and middle-income countries where treatments were delivered by community health workers or peers, either in community or primary health care settings. These treatments were delivered face-face in fewer than 10 sessions over 2-3 months. All the treatments examined used common elements such as non-specific engagement and specific behavioral, interpersonal, emotional and cognitive elements. An element is defined as a therapeutic strategy that is implemented or delivered during therapy. Non-specific elements are universal to the therapy experience and reflect the therapist-patient relationship (370-372) The specific elements are related to specific psychological mechanisms grouped in four main domains: emotional, behavioral, cognitive and interpersonal. The results indicated that psychological treatments using a set of identified common elements delivered by low-cost, widely available human resources had a strong effect in reducing the burden of common mental disorders (354) These findings are supported by other recent trials (373-375) that also demonstrate the value of brief psychological interventions comprising of common elements for adults with common mental disorders, which are administered by non-specialist personal in routine care settings. Another study describing the implementation of a common elements treatment approach found that local supervisors and lay counselors with little previous experience in mental health were able to implement the model with success. Furthermore most patients were retained in the treatment, suggesting its acceptability (376). The common elements approach to treatment also has value in supporting women socially as they negotiate motherhood in the face of social adversity. Social adversity is not a diagnosis, with a specific treatment plan, although it plays a significant role in common perinatal mental disorders and therefore a treatment approach that transcends diagnosis is of value.

This transdiagnostic approach towards both screening, using the Whooley questions, and treatment, has the potential to be implemented in a primary health care setting in South Africa. It has been shown to be cost effective from a human resources point of view and the training is uncomplicated and does not require highly trained personal. This approach can also be delivered in a group format making it even more time and cost efficient.

Advocacy and collaboration

Advocacy is the act of "taking a position on an issue and initiating actions in a deliberate attempt to influence private and public sector choices" (377)(page 263). The community health needs of diverse populations, and the limited resources available to support these needs, provide motivation for the initiation of advocacy efforts to improve community health. In order to effective advocacy for a particular public health issue, it is useful to examine the different approaches and strategies to health advocacy. A 'grassroots' or 'bottom-up' approach is based on the needs and goals of a community itself. Like-minded people from a community identify a problem and initiate action. A 'top-down' approach, in contrast, is when the needs and goals are established by experts, professionals outside the community, or community leaders (although, in this later case, they could be involved in either a bottom-up and top-down approach). Another approach is one of assessment, where members identify and define critical issues in their communities, through a evidence-based needs assessment (378).

Action strategies include advocacy through the media, courts, legislative bodies and regulatory processes. Media advocacy is the most common advocacy strategy used to gain support for health issues. This requires the identification of issues and concerns related to public wellbeing, an emphasis on the broader context of the concerns, the maintenance of media attention and the provision of entertainment to the audience hearing of those concerns. An excellent example of media advocacy is the Treatment Action Campaign (TAC) in South Africa, which raises public awareness regarding the lack of access to adequate HIV care for infected people in the country. This campaign was undertaken to raise public awareness and to enlist public sentiment to support desired change and to put pressure on stakeholders to modify their actions in a certain direction. Media campaigns can make appropriate use of the following techniques: sound bites, social math (translating statistics into easily understandable information), fact sheets, source lists, talking points, question and answer sheets, and press releases. Another effective action strategy is the use of coalitions. Coalitions are groups of people with a shared goal and can consist of individuals and/or organizations. Coalitions need to have structure and organizational capacity. They need staff, volunteers, task forces, membership, and leadership with clear allocation of roles and responsibilities. Technical assistance may also be required, through consultations and training. Again, the Treatment Action Campaign, an association of organizations, networks and individuals representing all HIV infected persons in South Africa, made good use of this strategy. The coalition was originally formed by 15 people, and their capacity increased through the activities and expertise of their members, which included individuals, professional organizations and

networks. In South Africa, mental health advocacy initiatives by non-governmental organizations (NGOs) such as the South African Federation for Mental Health, the South African Depression and Anxiety Group and Ubuntu have been established. However there is a need to grow, sustain and improve the advocacy movement in South Africa. Despite these advocacy groups and government support of mental health through the Directorate: Mental Health and Substance Abuse in the national Department of Health, there are still areas for improvement. Lack of budget allocations to mental health continues to be a problem (379) Stigma and ignorance continue to influence public opinion (380) and mental health remains poorly integrated into primary health care (381).

The following have been identified as key areas of focus for advocacy both in South Africa and in other low and middle-income countries.

1. Advocates for people with mental illness need to have a clear, united and cohesive message as well as the ability to generate political will. Fragmentation in advocacy by different stakeholders that may have different perspectives on mental health can lead to contradictory messages. This lack of consensus can negatively impact policy makers and donors. Therefore is it important to set aside differences and agree on a common message (355, 382). This PhD supports global and local recommendations that universal screening for common mental disorders is vital for all perinatal women as it is helpful in migitating some of the adverse effects of perinatal depression and anxiety.
2. This common message needs to be focused and deal with a single important issue (382). For example, the TAC focused on the issue on 'right to treatment'.
3. There is also a role for community members affected by mental illness to be involved in advocacy (382, 383). Too often people with mental illness and their families are marginalized and voiceless. A good example of where people affected by mental illness were involved in advocacy is the Mental Health Users Network of Zambia which, included clients and family members as stakeholders, and were successful in generating reforms in policy in 2000 (355).
4. Stigma reduction using evidence–based strategies is essential. Public education is usually achieved by high levels of media coverage (380). Public interest in mental health also needs to be high, as public opinion can persuade governments to allocate more funds to mental health (355). One of the outcomes of the screening interview in this PhD was that women gained knowledge about mental health issues, which in turn

can reduce there own stigma. Educating perinatal women about mental health, can help to increase public awareness in general.

5. Build alliances between different sectors. It is essential that advocacy messages radiate from a range of sectors within government and civil society (382). This point is also supported by this PhD, as women described employment, immigration and social support problems impacting their moods. They also reported gaining support from civil society groups such as churches.

Action points:

- Maternity leave and better working conditions for women should be promoted in a number of different sectors, including Departments of Labour and Social Development and Health.
- Collaborating with already existing community support structures like churches and families would be an effective grassroots strategy for improving awareness and advocacy for maternal mental health. These community structures, which already provide some support, have the potential to be developed further to enhance the support they provide.
- Implementing universal screening on a national level for common mental disorders in perinatal women. A brief and validated screening tool that can identify depression and anxiety in South African perinatal women would be a valuable addition to update the Adult Primary Care Guideline and for inclusion in the Maternal Care Guidelines and amendments to the Maternity Case Record (antenatal clinic card).
- In the future, integrating screening into existing mobile health platforms, such as MomConnect and NurseConnect, may facilitate population coverage, ease of administration, and linkage to mobile management strategies and referral algorithms.

* * *

In this study with women in Johannesburg, I identified that women were affected by social and economic conditions including poor conditions of employment, and that these factors contributed to poor mental health. They are not health specific problems. Although many of these structural and economic issues need to be dealt with by other government departments, and may also involve nongovernmental organizations and individuals, public health professionals and clinical health providers need to acknowledge these. Part of the value of advocacy, as discussed above, is its role in highlighting the needs of particular sectors of

society. Health workers have a responsibility to populations and patients to draw attention to the social determinants of health, and to illustrate how inequalities deriving from social and economic environments create the conditions for depression. Screening for poor mental health even when considering the ethical dimension, in the face of limited resources, is simply the first step to improve mental health, but it is important even so.

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APPENDICES

Biographical Questionnaire (Appendix A)

Confidential

Biographical Interview

Record ID	_____
Age	_____
first name	_____
surname	_____
Cell phone number	_____
Relationship status	◯ married/living with someone as if married ◯ widowed ◯ divorced/annulled/separated ◯ never married
What is your highest level of education?	◯ primary school ◯ high school - never completed grade 12 ◯ high school - completed grade 12 ◯ tertiary level/training
Are you currently working?	◯ Full time ◯ Part time ◯ unemployed - looking for work ◯ unemployed - not looking for work
What is your households monthly income	_____
Is your household connected to an electricity supply?	◯ Yes ◯ No
Where is the toilet in your house?	◯ inside ◯ outside, on the stand ◯ outside off the stand
How many people live in the household?	_____
How many rooms does your house have?	_____ (excluding bathroom/toilet and passages)
Do you feel happy about being pregnant?	◯ Yes ◯ No
How many weeks pregnant are you?	_____
How many times have you been pregnant?	_____
How many babies have you delivered?	_____
How many miscarriages have you had?	_____
How supportive is your partner?	◯ not supportive ◯ supportive ◯ very supportive
Do you have any complications with this pregnancy?	◯ Yes ◯ No
If yes; what problems have you experienced?	_____
Have you ever been treated for a psychiatric/mental illness before?	◯ Yes ◯ No
If yes; explain	_____

Would you be willing to tell me your HIV status?	◯ positive ◯ negative ◯ unknown ◯ not willing to disclose
Follow-up date at 36 weeks	_____
SCID 5 Diagnosis	(record clinical diagnosis here, including substances)

Edinburgh Postnatal Depression Scale (Appendix B)

Confidential

Edinburgh Scale

Record ID _____

1. I have been able to 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
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
3. I have blamed myself when things went wrong, and it wasn't my fault	◯ Yes, most of the time ◯ Yes, some of the time ◯ Not very often ◯ No, never
4. I have been worried and I don't know why:	◯ No, not at all ◯ Hardly ever ◯ Yes, sometimes ◯ Yes, very much
5. I have felt scared or panicky and I don't know why:	◯ Yes, quite a lot ◯ Yes, sometimes ◯ No, not much ◯ No, not at all
6. I have had difficulty coping with things:	◯ Yes, most of the time 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
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
8. I have felt sad or miserable	◯ Yes, most of the time ◯ Yes, quite a lot ◯ Not very much ◯ No, not at all
9. I have been so unhappy that I have been crying:	◯ Yes, most of the time ◯ Yes, quite a lot ◯ Only sometimes ◯ No, never
10. I have thought of harming myself or ending my life:	◯ Yes, quite a lot ◯ Sometimes ◯ Hardly ever ◯ Never

Score _____

Whooley questions (Appendix C)

Whooley questions

Record ID _____

In the last month have you often been bothered by feeling down, depressed or hopeless?
◯ Yes
◯ No

In the last month have you often been bothered by having little interest in doing things?
◯ Yes
◯ No

Do you think it is something you feel you need or want help with?
◯ Yes
◯ No

Participant information sheet and informed consent (Appendix D)

PARTICIPANT INFORMATION SHEET

Dear Participant

My name is Dr Carina Marsay and I am a psychiatrist. I am registered as a PhD student at the University of the Witwatersrand and I am affiliated with the Department of Psychiatry.

I want to find out am working on a research project to find out if screening women for depression during pregnancy improves their outcomes later on.

This letter explains the study and will help you to decide if you want to take part in this study or not.

I will be interviewing women who are pregnant and asking them some details about themselves. During the interview I will use 2 screening questionaires, which are designed to look for depression in pregnancy. I will also ask you some questions about your mental health during a clinical interview. If you have symptoms of depression, or would like to see someone about how you are feeling, you will be given a referral letter to your nearest clinic. If your symptoms are so severe that you require admission, it will be arranged. I would also like to see you again at your 36 week check up and at 4-6 weeks after the baby is born at the postnatal clinic for another interview to see how you are doing. These interviews may be voice recorded. Each interview should only take 15-20 minutes of your time.

You are not obliged to participate in this study. It is absolutely voluntary. You only take part if you want to.

Your confidentiality will be maintained at all times. No one will be able to see or access your answers other than me.

You may leave the study at anytime if you wish to do so.

The research committee of the University of the Witwatersrand and the Faculty of Health Sciences have granted written approval for this study.

The results of this study may be published. However, none of your personal details will be made known. Your confidentiality will be protected at all times.

Should you have any questions with regard to this study or perinatal depression, you are welcome to contact me at any time via email: carinamarsay@gmail.com or call me on 082 853 6470.

Lastly, may you be truly blessed with all the joys of motherhood.

Kind regards

Dr Carina Marsay

INFORMED CONSENT FORM

I hereby confirm that I have been informed about the study by …… I understand what is expected of me and what the study is about.

- I have also read and understood the patient information leaflet with regard to this study.
- I am aware that the results of the study, including personal details such as age, date of birth, diagnosis and my test scores will be anonymously processed into a research report and remain confidential.
- I agree that the data collected during this study can be processed in a computerised system by the researcher.
- I may, at any stage, without prejudice, withdraw from the study.
- I have had enough time and opportunity to ask questions and of my own free will, I have decided to participate in the study.
- I understand that I will only be asked to answer questions asked in the interview.

PARTICIPANT:

NAME: SIGNATURE

....

DATE:……..

PLACE:……..

I ....., herewith confirm that the above participant has been fully informed about the nature, procedure and potential outcomes of the above study.

DR CARINA MARSAY SIGNATURE

....

DATE:.....

PLACE:……..…

WITNESS:

NAME: SIGNATURE

....

DATE:..... PLACE:……

Ethics Clearance Certificate (Appendix E)

R14/49 Dr Carina Marsay

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M150311

NAME: (Principal Investigator)	Dr Carina Marsay
DEPARTMENT:	Psychiatry Rahima Moosa Hospital
PROJECT TITLE:	Antenatal Depression Screening and Perinatal Depression among Women at Rahim Moosa Hospital
DATE CONSIDERED:	27/03/2015
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Ugash Subramaney
APPROVED BY:	Professor A Woodiwiss, Co-Chairperson, HREC (Medical)
DATE OF APPROVAL:	22/07/2015

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature _____ Date _____

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Permission from CEO (Appendix F)

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

RAHIMA MOOSA MOTHER AND CHILD HOSPITAL

Enquiries : Dr Edward Hank
Tel : (011) 470 9030/1
Fax : (011) 477 4117
Email : Edward.Hank@gauteng.gov.za

Dr. CY Marsay
6 Cabernet Crescent
Hurlingham Manor
2196

Dear Dr. Marsay,

RE: ANTINATAL DEPRESSION SCREENING AND PERINATAL DEPRESSION AMONG WOMEN AT RAHIMA MOOSA HOSPITAL

Permission is granted for you to conduct the research as indicated in the title above.

The terms under which this permission is granted is contained in the Researcher Declaration form that you have signed. Failure to comply with these conditions will result in the withdrawal of such permission.

It is crucial for you to inform the Research Coordinator, Karen Marshall of the actual start and end dates of your study. This could be done by e-mail.

Should the study commence more than 12 months after receipt of this approval letter you will have to go through the process of applying again.

You are strongly advised to keep a signed copy of the declaration form so as to ensure that the terms of this agreement are complied with at all times.

Yours sincerely,

DR EDWARD HANK
Clinical Manager
2017:03:08

ADDRESS: Cnr. FUEL & OUDSTHOORN STREET CORONATIONVILLE 2093 / PRIVATE BAG X20 NEWCLARE 2112 JHB

Turnitin report (Appendix G)

The similarity index on this Turnitin report appears high, however the reason for this is that at the time the report was generated the first paper was published. Therefore a fair amount of similarity is picked up, however this is not plagiarism. In addition, the whole document has been checked to ensure all sources are referenced and no plagiarism is present.

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