The Prevalence of Depressive Symptoms in Women Attending Antenatal Care in Primary Healthcare Clinics in Johannesburg Metro District, South Africa

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Declaration

I, Dr Eliza Malaza, declare that this research report is my own unaided work. It is being submitted for the degree of the Master of Medicine in the branch of Family Medicine (MMed Fam Med) at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.

Dr Eliza Malaza 03 June 2021

Dedication

To my Heavenly Father, thank You for the wisdom, strength and perseverance to finish this report.

To my children Tshepo, Khwezi, Mpumelelo and Deborah: Throughout the duration of my MMed you have been understanding of my erratic work schedule and studies, hard-working and diligent in running the household without a lot of supervision; and in the process your incredible gifts and talents have come to light. I love you so much and thank you.

Abstract

Background: Perinatal or maternal mental health is a global problem with prevalence ranging from 7 to 40%. The prevalence rate of antenatal depression (AD) is 10.7% globally and as high as 20 to 40% in low-and-middle income countries (LMIC) like South Africa. There is currently no routine screening of maternal mental illness in South Africa and there is therefore a paucity of information on prevalence rates and risk factors of maternal mental health conditions, in particular of AD in South Africa, especially in the Gauteng Province.

Methods: A convenience sample of 436 pregnant women were recruited from five primary care clinics in the central and south of Johannesburg, while attending routine antenatal visits. All the women completed a socio-demographical questionnaire and the Edinburgh Postnatal Depression Scale (EPDS).

Results: The prevalence of AD was 31.3%. In the final multivariate analysis, pregnant women with one or more medical conditions were almost twice as likely to have AD than pregnant women with no medical condition (OR 1.81, 95% CI 1.08-3.02, P-value 0.02). Pregnant women with poor social support were five times more likely to have AD than pregnant women with good social support (OR 5.91, 95% CI 2.25-15.49, P-value 0.002). Employment, level of education, marital status, unplanned pregnancy and intimate partner violence (IPV) were not significantly associated with AD.

Conclusion: Although clinical confirmation was not conducted, almost a third of the pregnant women attending antenatal care (ANC) services in primary care clinics were depressed based on the EPDS. The integration of mental health care with existing maternal health services, in-cooperating routine screening of mental illness, referral and treatment for women in the perinatal period will help reduce the adverse maternal and infant outcomes associated with maternal mental illness.

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Table of contents

List of Tables

Nomenclature

ANC	Antenatal Care
AD	Antenatal Depression
BDI	Beck Depression Inventory
CHC	Community Health Centre
CI	Confidence Interval
DSM	Diagnostic and Statistical Manual of Mental Disorders
EPDS	Edinburgh Postnatal Depression Scale
HIV	Human Immunodeficiency Virus
IPV	Intimate Partner Violence
JHB	Johannesburg Metro Health District
KZN	KwaZulu-Natal
LMIC	Low-and middle-income countries
OR	Odds ratio
PHQ	Patient Health Questionnaire
PD	Postnatal Depression
PTSD	Post-Traumatic Stress Disorder
WC	Western Cape

CHAPTER 1: INTRODUCTION

1.1 Background

Perinatal or maternal mental health is a well –established global public health concern but receives low priority in health care.[1,2,3,4,5,6] In South Africa, it is estimated that 20-40% of women in the perinatal period will suffer from a mental health condition.[1] Maternal mental health is seen as vital for the developing foetus and raising of healthy children.[1,3]

Pregnancy has generally been viewed as a period of emotional well-being for the mother and baby that is protected against mental disorder.[7,8] On the other hand, pregnancy has also been shown to be a period of increased vulnerability for the onset or relapse of mental illness, due to the physiological changes that take place.[1,3,8] Pregnancy-related sex steroids (oestradiol) and corticotrophin releasing hormone increase activation of the hypothalamic-pituitary-adrenal (HPA) axis.[7,8,9] Increased activity of the HPA axis leads to increased cortisol production and the development of depressive symptoms.[7,8,9] There has been little attention on the social and psychological characteristics of pregnant women.[4] In studies that have looked at the psychological profile of pregnant women, health professionals have been traditionally concerned with postnatal depression.[7,8,9,10]

Depression accounts for the greatest burden of disease among all mental health problems and it is expected to become the second highest among all the general health problems by 2020.[11] It is estimated to be the second leading cause of disability in the United States of America (US).[11] It is ranked as the third most prevalent moderate and severe disabling condition globally according to the World Health Organisation (WHO).[9] The WHO estimates that by the year 2020, depressive disorders will be the leading cause of global disease burden in women.[2,12]The rate of depressive disorders in women of reproductive age (15-49 years) is projected to be twice that of males in the same age group.[2] There is therefore an increased likelihood of depressive symptoms in pregnancy and the postpartum period.[2]

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM) - IV and the now revised DSM - V criteria, depression is a mood disorder that presents with core symptoms of prolonged sadness and marked loss of interest in daily activities lasting for two weeks or more.[9] Patients can also have the following symptoms: appetite changes, insomnia, feeling worthless and inadequate, feeling irritable and resentful, decreased energy, lack of concentration and poor memory, and suicidal ideation or thoughts of abortion in a pregnant woman.[9]

Depression although common, is an often missed disorder that can affect women during the antenatal period.[13] Mild depressive symptoms can be overlooked and attributed to emotional changes of pregnancy hormones.[8,14] There is an increasing recognition of the importance of psychosocial issues during the antenatal period and the recent Canadian and US national guidelines for prenatal care recognize this.[15] The Australian clinical practice guidelines recommend routine antenatal assessment of psychosocial risk factors and depression and anxiety symptoms using the Edinburgh Postnatal Depression Scale (EPDS).[15]

1.2 Rationale for the study

While doing an assignment on ANC in South Africa in 2014, the majority of the studies on maternal health focused on the poor outcomes with regards to then Millennium Development Goals (MDGs) of 2015.[16] The focus was mainly on MDG 4, 5 and 6. These goals were concerned with the improvement of maternal and child health in low-and -middle income countries like SA where the maternal and perinatal morbidity and mortality rates were high.[16]

A study by Manikkam and Burns (2012)[7] done at the primary antenatal clinic at King Edward VIII Hospital, Kwa-Zulu Natal (KZN), South Africa with a sample of 387 pregnant women, highlighted an important yet poorly researched area in the improvement of maternal and child health. The study was on AD and its risk factors in an urban setting. This study showed the prevalence rate of AD was 30% or more especially in LMIC. The study also highlighted the poor outcomes to the mother, the foetus and the baby.

The WHO has since implemented the newer Sustainable Development Goals of 2030 for the improvement of maternal and child health.[17] There has not been a global move to improve maternal mental health.[17] In South Africa, the National Mental Health Policy Framework and Strategic Plan of 2020 was established in 2013 to help integrate mental health care into the primary health care services by 2020.[18]

This study was carried out to review the prevalence of AD in women attending ANC in primary care clinics, and to identify the risk factors associated with AD, in the Johannesburg Metro District (JHB) in Gauteng, South Africa.

1.3 Aim

- To determine the prevalence of depressive symptoms in women attending antenatal care in primary health care clinics in the Johannesburg Metro Health District in South Africa.

1.4 Objectives

- To describe the demographic characteristics of women with depressive symptoms attending antenatal care in primary health care clinics.
- To determine the prevalence of women with depressive symptoms attending antenatal care in primary health care clinics.
- To identify the risk factors associated with the presence of depressive symptoms in women attending antenatal care in primary health care clinics.
- To describe associations between socio-demographic factors and depressive symptoms.

CHAPTER 2: LITERATURE REVIEW

2.1 Prevalence of antenatal depression

The prevalence of AD is estimated at 10.7% globally.[2] This prevalence varies considerably according to the income status of the country. Low rates of 7-20% of prevalence of AD are reported in high-income countries (HIC).[5,8,12,15,19,20,21]The prevalence rate of AD in Sweden was found to be as low as 5.5-7%.[22] A study by Richard-Edwards et al (2006) among women in a group medical practice in the US, found a prevalence rate of AD of 9%.[23] Another study in obstetric clinic settings in the US found a prevalence rate of 20%.[20] Higher prevalence rates of 20% or more were found in LMIC.[2,5,7,8,13,14] Prevalence rates in Ethiopia ranged from 16.3-24.9%.[24,25,26,27] Prevalence rates of 24.5% and 33.8% were found in Nigeria and Tanzania, respectively.[2,9] Prevalence rates in South African studies were as high as 48,9%.[1,7,14] Prevalence rates from 4 different studies in the Western Cape (WC) ranged from 11-48.9%.[28,29,30,31] Prevalence rates in KZN ranged from 15.9-47%.[7,32,33] Prevalence rates in 3 studies in JHB ranged between 19,3 and 27%.[34,35,36]

The type of scale or tool used in a study, trimester and the setting has been shown to influence the prevalence rate. Most of the studies used the EPDS scale as a tool, but applied different cut-off values for identifying women with AD. In a study by Vythilingum et al (2012) done in a WC midwife obstetric unit (MOU) using the EPDS, the prevalence rate of AD was 33.6% and 48.9%, with the EPDS cut-off of 15 and 12 respectively.[28] In a systematic review done in Ethiopia, two different tools (EPDS and Beck Depression Inventory (BDI)) were used in 2 different settings and assessed during all three trimesters.[24] The pooled prevalence rate of AD was 21.28%, 18.28% with the EPDS and 26.48% with the BDI. The prevalence was 19.1%, 18.86% and 32.1% in the first, second and third trimesters, respectively. Furthermore, the prevalence was 15% in participants from the community compared to 25.7% in participants from a hospital.[24]

2.2 Risk factors for the development of antenatal depression

In a systematic review, Biaggi et al (2016)[8] identified women at risk of antenatal anxiety and depression to have the following strong risk factors: lack of social support, sexual and/or physical abuse, previous history of a mental illness, unplanned pregnancy, recent experience adverse events or stress (death, illness), past pregnancy complications or loss, low educational level, low income or financial hardships, negative cognitive styles (pessimism, anger, low self-esteem and marital conflict).[8]

In a study done in South Africa on maternal mental health[1], nine risk factors were identified to be strongly associated with the development of common mental disorders (depression, anxiety and alcohol and substance use disorders). The risk factors were previous history of mental illness, lack of social support (emotional and financial), intimate partner violence (IPV), unwanted or unplanned pregnancy, low level of education, adolescent pregnancy, alcohol and substance use, poverty (food insecurity for the woman with adverse effects on the foetus) and refugees and migrants. South Africa has high rates of IPV and it has been shown to increase during pregnancy and to get worse as the pregnancy progresses and it is also worse against patients with mental illness.[1] Women who are abused can lose the pregnancy or have early pregnancy complications.[1,12] Education, employment and a healthy interpersonal relationship with a partner have been reported to be protective factors against developing depressive symptoms during pregnancy.[2,9,37]

Psychosocial risk factors in the antenatal period that are associated with an increased risk of depressive symptoms can be divided into the following groups: [1,2,3,4,5,6,7,8,9,12,13,14,15,19,28,37]

- Demographic or social factors
- Psychological factors
- Adverse health habits
- Medical factors

2.2.1 The socio-demographic factors associated with antenatal depression

a. Age

Younger age has been strongly associated with AD.[1,9,23,29] Adolescent pregnancy (women less than 20 years) is associated with higher rates of depression, an increased likelihood of a second pregnancy within two years, high suicide rates (from the maternal mortality statistics in SA) and decreased use of ANC services and thus an increase in pregnancy complications.[1,9,32] Rich-Edwards et al, found decreasing risks of AD with increasing maternal age, with younger women (younger than 23 years) at two or more times the risk of AD than older women, but with further adjusted analysis, age was not a significant predictor of AD.[23,38] Studies in Ethiopia found that pregnant women in the age range 20-29 years were at reduced risk of developing AD than those women younger than 20 years.[24,26]

b. Educational level

Low level of education has been shown to be significantly associated with AD and women who lack a formal education at a much higher risk.[5,8,9,20] Gavin et al[5] found that women who had less than 12 years of education were at higher risk of AD. Higher level if education was found to be a protective factor against persistent AD.[38]

c. Employment status

Unemployment has been found to be significantly associated with AD.[2,20] In two studies done in Ethiopia, being unemployed and working as a labourer or farm worker was associated with a higher risk of AD.[24,26]Employment status however has not been found to be an independent risk factor for AD.[2,5,22]

d. Family size

A large family size of six or more people was found to be significantly associated with AD.[9]

e. Race/ethnicity

Several studies have shown a significant association between race or ethnicity with the development of AD.[4,5,8,12,15,37] Gavin et al reported that black women were almost five times likely to develop AD, while Latinos had almost a twofold risk.[5,23]An Australian study, women from the CALD group were found to be 18 times more likely to have AD.[39] CALD refers to communities with diverse language, ethnic background, nationality, dress, traditions, food, societal structures, art and religion characteristics.[39] None of the studies reviewed in LMIC reported on race or ethnicity. AD has been found to be more prevalent in women of refugee status, asylum seekers or migrants,[1,3,4] due to factors such as increased vulnerability and mistrust of others with subsequent lack of social support, trauma, language barriers, unfamiliarity with western medical models and the stigma associated with mental illness.[1,3]

f. Single status

Pregnant women who are single or separated/divorced have been identified as being at higher risk for AD, compared to pregnant women who are married or living with a partner.[7,9,20,37]

g. Unplanned or unintended pregnancy

Unplanned pregnancy has been identified in a number of studies as a significant and independent risk factor for AD.[1,7,8,13,19,25,27,31,37]

2.2.2 Psychological factors associated with antenatal depression

a. Previous history of depression,

A history of previous episodes of depression was found to be the strongest and independent predictor of AD [3,8,14,15,23,24,25,30,40]

b. Psychosocial stress and anxiety[3,5,12,19,37,41]

Antenatal anxiety was found as a strong risk factor for AD.[3] psychosocial stress has been found to be a significant predictor of antenatal suicidal ideation.[21]AD has also been shown to be associated with the exposure to life threatening or adverse life events.[3,8,15,30,42]

c. Low self-esteem

Low self-esteem was identified as a significant predictor of AD.[3,19]

d. Poor partner relationships or marital conflict [2,13,25,29,32,39]

Marital conflict includes IPV which can be physical, sexual, emotional or financial.[1,2,3,5,8,29,32,39] Marital conflict and poor partner relations are strongly associated with AD, but are not always significant factors.

e. Lack of social support

Lack of social support is a strong and independent indicator of AD. [1,3,8,22,24,25,29,30,31,39,40,42] Pregnant women who experienced lack of social support from their partner and other family members are at a much higher risk for AD.

2.2.3 Adverse health habits associated with antenatal depression

Alcohol abuse, substance abuse and depression occur frequently in pregnant women and pose a serious public health problem.[1,28] Use of alcohol and substances before conception, seems to play an important role in the risk of use during pregnancy. It is, however, very important to note that at least 50% of women who use alcohol will stop when they discover they are pregnant.[28]

a. Excessive consumption of alcohol [1,3,20]

AD is significantly associated with alcohol use and risky drinking, and at higher EPDS cut-off, alcohol dependence.[28]

b. Smoking

No association has been found between depression and smoking.[20,28]

c. Substance abuse (illicit drug use) is found to be strongly associated with the presence of depressive symptoms in the pregnant woman[13,14,28]

2.2.4 Co-morbid medical conditions and antenatal depression

The presence of two or more co-morbid medical conditions (such as hypertension, diabetes mellitus, asthma, epilepsy and HIV) was found to be strongly associated with increased risk of antenatal depression.[5,9,12,15] An obstetric history of iron deficiency anaemia, present and past pregnancy complications and pregnancy loss are risk factors but not strong predictors for antenatal depression.[5,8,9,13]

2.3 Clinical outcomes of antenatal depression

The outcomes associated with AD were identified as follows:

2.3.1 To the mother

Pregnant women with AD have been shown to be at higher risk for the following unfavourable maternal outcomes: miscarriage, ante-partum haemorrhage, preeclampsia, operative deliveries (caesarean or instrumental vaginal deliveries),[1] spontaneous preterm births[21,38,43,47] and use of epidurals during labour. Women who had AD showed a 3.8 times higher risk of preterm delivery[44] but those on antidepressant therapy, there was no significant association between AD and preterm delivery.[21] AD is associated with decreased functional status and low self-care with nutritional deprivation and poor maternal weight gain[1,2,6,7,8,9] Women with AD are reported to have poor, inconsistent follow-up and late access of ANC services[2,6,7,8,9] All these factors are thought to further increase the likelihood of preterm delivery in women with AD.[44] Pregnant women with AD can also present with psychosis and postnatal depression, self -harm and suicidal ideation.[2,4,5,7,8,9,13,14,28] The women with AD are likely to have a negative experience of childbirth and poor interactions with their infants which can compromise their care-giving behaviour.[45]

2.3.2 To the neonate and infant

AD is associated with an increased risk of preterm birth (at less than 37 weeks gestation) or severe preterm birth (at less than 32 weeks gestation); low birth weight due to intra-uterine growth restriction; birth asphyxia, subsequent admission to the neonatal care unit, poor infant growth and development, infant behavioural problems and sudden death.[4,5,7,8,12,16,18,28] Infants of women who had AD show sleep problems including shorter sleep time. This in turn has been shown to place infants at increased risk of emotional and behavioural problems and delayed language development [1,3,4,5,8,9,15,46] The PRAM-D study by Osborne et al, showed that AD is associated with one-year old infants with increased cortisol reactivity to stress, thus providing evidence that the mother’s depression has an effect on the neurobehavioural function and activity of the HPA axis.[38,47] A study done in WC townships found that better care and parenting, mediated by regular visits from community health workers, in infants of women who had AD, is associated with improvement in child growth and cognitive development.[45]

Partners and older children can also suffer from secondary effects of maternal depression.[1,3,13]

One of the symptoms of depression can be suicidal ideation or thoughts of self-harm, including thoughts of aborting the foetus. Suicide is a leading cause of death among pregnant and postpartum women in the USA.[2,3] The same risk factors for suicide in the general population (i.e. suicidal ideation or thoughts of self – harm) have been found as precursors in the perinatal period. Maternal depression has been found to be a strong independent risk factor for suicidal ideation. The prevalence of suicidal ideation in pregnant women in a USA study was found to be 2.7% similar to results in a study of non-pregnant women.[6] Thought of deliberate self-harm was one of the strongest predictors of antenatal depression in a study done in KZN, SA.[7] This makes it vitally important to identify women at increased risk of antenatal depressive symptoms. Antenatal depression has been found as the strongest predictor of postnatal depression.[1,3,6,19,23,39] In turn postnatal depression has been identified as the strongest predictor for parenting stress.[1,6]

2.4 Tools for screening and diagnosis of antenatal depression

A number of tools are available for screening and diagnosis of common perinatal mental disorders (CPMD). These are some of the most widely used screening questionnaires: The Edinburgh Postnatal Depression Scale (EPDS), Beck Depression Inventory (BDI), Kessler Psychological Distress Scale (K10 & K6), Patient Health Questionnaire (PHQ-9), Whooley questions, the Hamilton Depression Rating Scale (HAM-D), Centre for Epidemiologic Studies Depression Scale (CESD-20), the two-item Generalized Anxiety Disorder Scale (GAD-2), the MINI-PLUS (a structured clinical interview).[4,36,48,49,50]

The EPDS is a 10-item scale using a Likert scoring system (0-3) with a possible score of 0 to 30. The EPDS has been validated in pregnancy in SA in isiXhosa and English. The cut-off score varies between more than 10 and 15 or more, depending on the setting and whether antenatal or postnatal population. The following studies used a cut-off of 13 and above to denote AD.[2,3,7,13,23,20,29,31,35,39,45]

Other studies used the Beck Depression Inventory (BDI) as a measure of depression.[3,6,24,26,48,50] The BDI can be used to determine the point prevalence of depression.[6] The BDI assesses 21 symptoms that have been divided into three categories: negative attitude (NA), performance difficulty (PD) and somatic symptoms (S).[4] In the BDI, patients also report on somatic symptoms. These have been found to be easily confused with early pregnancy symptoms.[8,14] The cut-off score is 15 or more.

The K10 is a 10-item scale that uses a Likert score. It has been validated in pregnancy and in the general population in English.[48] The cut-off score is more than 20.

The PHQ-9 is 9-item questionnaire that was developed from the Primary Care Evaluation of Mental Disorders Procedure (PRIME-MD) for the detection of depression in primary care settings.[5,12,37,41,44,48] It has been validated for use in perinatal settings for use by an interviewer. Scores are interpreted as follows: 0-4 normal, 5-9 mild depressive symptoms, 10-14 moderate depressive symptoms, 15-20 moderately severe and more than 20 severe depressive symptoms.

The Whooley questionnaire is a two-item questionnaire with an optional help question.[10,36,50] The score is 1 or more without the help question, and 1 or more + "yes" with the help question. The questionnaire has been validated for use in the pregnant population.

The MINI-PLUS is a structured clinical interview by a mental health care practitioner.[30,48,50] It is considered the gold standard in the detection of AD in the second trimester.

A majority of the studies reviewed used the Edinburgh Postnatal Depression Scale (EPDS) as a screening tool to identify women at risk of antenatal depression.[1,2,4,5,6,7,8,9,11,13,15,19,28] Other studies, used the DSMV-IV criteria to classify women at high risk of antenatal depression.[5] The DSM-IV criteria are: at least 2 weeks with five or more depressive symptoms present for more than half the days, with at least one of those symptoms being depressed mood or anhedonia.[21] The current criteria of symptoms for the diagnosis of depression (DSM-V) is exactly the same as the DSM-IV.

From the literature it is clear that perinatal mental health and therefore antenatal depression is a serious public health concern with a significant influence on maternal and neonatal outcome. In order to reduce national and global maternal and child mortality and morbidity, the psychosocial problems of pregnant women must be addressed fully and proper interventions introduced. It is thus imperative that routine antenatal care must incorporate a tool to assess the risk of pregnant women for developing antenatal depression. Secondly, there is a lack of prevalence studies of antenatal depression in the Gauteng Province and specifically in the JHB, and a lack of data on the associated risk factors.

CHAPTER 3: METHODOLOGY

3.1 Study setting

The City of Johannesburg Metropolitan Municipality (JHB) is a category A municipality and the largest of the three metropolitan municipalities in the Gauteng Province, South Africa.[51,52]This means the municipality has exclusive municipal executive and legislative authority in its area. JHB had an estimated population of 5 201 673 according to the 2018 mid-year population statistics, a population density of 3162,1 persons per square kilometre and an estimated medical scheme coverage of 22,2%.[52] JHB is an urban area and about 29% of the population live in informal housing. Approximately 1% of the population has no access to toilets.

JHB is divided into 135 wards and 7 health sub-districts (A – G).[52] There are 10 community health centres (CHC), 108 clinics – 27 provincial clinics and 80 local municipality clinics and 1 non-government run clinic, 2 district hospitals, 4 regional hospitals (one psychiatric, one tropical disease/TB) and 2 tertiary/quaternary hospitals.[52] These facilities do not include private healthcare facilities.

Clinics operate Monday to Friday from 07h00 – 16h00. Some clinics have extended hours and close at 22h00. Some clinics also operate on Saturday from 07h00 – 12h00. CHCs operate Monday to Sunday and include a 24- hour emergency unit and a 24-hour midwife obstetric unit (MOU). All the clinics and CHCs provide the following basic health care services: acute patient care, chronic patient care, TB services, well baby services, women's health (family planning, pap smears, termination of pregnancy), mental health, antenatal care (ANC) and obstetric services. ANC services also include 3-day and 10-day postnatal assessments of the mother and the baby. Medication is dispensed from the health practitioner's consulting rooms or from the pharmacy depending on the clinic. All CHCs have X-ray services. Some of the clinics have one or more allied health care services: dental health, optometry, podiatry, dietician, social worker, physiotherapy, speech therapy, audiology and occupational therapy. The majority of basic health care services at the clinics are provided by nurse practitioners. A small number of clinics have a doctor on a daily basis and the rest might have a doctor once a week on a specific day. CHCs have a number of doctors on a daily basis. The clinics offer basic antenatal care and women with low risk pregnancies are referred to their nearest MOU or district hospital for delivery. A pregnant woman books for antenatal care at their local clinic. This booking involves: a full obstetric history, medical history, basic blood work up (Rh, RPR, Hb, HIV), the gestation of the pregnancy. The woman will then follow -up at the clinic until the time of delivery. The MOUs are run by midwives and there is meant to be a doctor in the 24-hour emergency unit available to assist with emergencies. Only booked patients, are allowed to deliver at the MOUs. MOUs assist only with normal vaginal deliveries. Women with co-morbid medical or obstetric conditions, poor obstetric history, complications in the antenatal period and possible complications during labour, are referred to hospital for management during the antenatal period and for delivery.

3.2 Study design

A quantitative prospective cross-sectional study was done.

3.3 Study population

The study comprised women attending antenatal care (ANC) services in clinics in JHB, Gauteng. Data for this study was collected at clinics and CHCs only. The collection sites were Kibler Park and Glenanda clinics in sub-district F; Hillbrow CHC in sub-district F and Lillian Ngoyi CHC in sub-district D. A small pilot study was carried out at Eikenhof clinic in sub-district G.

3.3.1 Inclusion criteria*:* Pregnant women ages 15 – 49 years coming for ANC service on the day of data collection were eligible for inclusion in the study.

3.3.2 Exclusion criteria: a history of mental illness (patients with psychosis or those already on treatment for depression); those unable to complete the questionnaires on their own, for whatever reason.

3.4 The study sample

The desired sample size was 361, based on the expected national prevalence rate of 38.5% (p), 80% power, a 95% confidence interval, precision (d) of 0,05 and the Normal Distribution cut-off of 1.96 (z). The following formula was used:

$$\mathrm{n}= p(1 - p)z^2 / d^2$$

The researcher decided to use a sample size of 400, to account for poor/incomplete responses to the questionnaires. Thus, each of the four sites was meant to have 100 participants. Non-probability consecutive sampling of the participants was carried out.

3.5 Data collection

3.5.1 The pilot study

The aim of the pilot study was firstly, to identify if the tools used were suitable, easy to understand and be completed in full. Secondly, to identify any possible logistical obstacles to doing the study, such as space, patient flow, patient numbers per day, that would impact on time required to get to the desired number of participants (100) per site. The researcher had aimed to collect the data over a period of 2 months.

A pilot study of 20 pregnant women was done at Eikenhof Clinic. This is a primary care clinic close to farms and an informal settlement in the south of Johannesburg. The women were invited to participate in the study as they came for their ANC appointments. ANC services are run daily and includes both first time booking visits and those coming for follow-up visits. One nurse practitioner and administrative clerk run the ANC service. The study was carried out over a period of 6 days, with an average of 3 participants enrolled per day (2 -4 women on most days and only one day had 5 women), to reach the desired number. There were 2 minors in the total sample. A third minor could not be interviewed as the mother had gone to do errands. The interviews were carried out in a separate office. Each woman was given the patient information sheet and the study was explained to them. The women then provided written consent and completed the questionnaires. The women thus received individual attention when completing the questionnaires, were able to ask for clarity where they did not understand and thus were able to provide most of the required information.

The process was however very slow. Firstly, in terms of the time it took to interview the women individually. Secondly, the fact that the clinic had few patients coming for ANC services on a per day. And thirdly, I had limited time in the clinic (mornings only) due to work commitments. The EPDS did prove to a bit of a challenge in the wording. Three women had an EPDS score of 13 or more (15%) and 17 (85%) women scored less than 13. This was a lower percentage than the expected 35% for the SA setting. One woman was a teenager, one woman experienced intimate partner violence, one had poor social support and all three had unplanned pregnancies. The women were referred to the psychology services at the Lillian Ngoyi CHC.

3.5.2 Other sites

The data collection was done solely by the researcher. Data was collected from 26th June 2019 to 27th November 2019. The researcher explained the purpose of the study to all the women attending the clinic for ANC services while they were waiting to be seen by the nurse. The women were given the patient information sheet and then invited to participate in the study. The women were asked to give signed consent before filling in the questionnaires.

Two data collection tools were used. The first tool was a self - designed 17- item questionnaire with socio-demographic characteristics, medical and obstetric history and a social history. Items in the questionnaire were the following: age, nationality, ethnic group, parity, gravidity, gestation, medical conditions, employment, level of education, household possessions score (means score), marital status, social support, planned pregnancy, alcohol use, smoking, substance use and intimate partner violence. These are some of the more common risk factors associated with higher levels of AD in the literature.[1,2,3,4,7,8,19]

The second tool was the Edinburgh Postnatal Depression Scale (EPDS). The EPDS is a 10-item self –report scale used as a screening tool for depressive symptoms in the post-partum period.[2,5,7,9,10,13,19,28,37] It has been widely used by epidemiologists and researchers as a substitute for clinical diagnosis of Major Depressive Disorder (MDD).[9] Though the EPDS was developed in 1987 to screen for postnatal depressive symptoms, it has since been validated for use in pregnant women.[5,7,9,10,13,19,28] The EPDS has also been validated for use in the South African urban population in the antenatal period.[7,28] It has a been found to have a satisfactory sensitivity(79%) and specificity. The EPDS assesses the patient's feelings in the last seven days. The possible maximum score is 30 and the scale must be completed in full or the result is not valid. A score of 10 or more points to possible depression. The majority of the studies done in the SA setting recommend a cut off of 13 or more as possible depression[6,7,9,19]. Thus, I also chose the cut-off of 13 or more for this study. The women completed the EPDS and the socio-demographic questionnaire by themselves.

The data collection process was repeated at each of the chosen clinics until the required number of patients per clinic (100 women) would be reached. There were a few key differences between the other study sites and the pilot site. Firstly, there was no private office/space for the women to be approached individually, so they were approached as a group in the ANC waiting area. The waiting area in two of the clinics was very small and at one clinic was shared with other patients (well-baby clinic, acute and chronic patients). However, approaching the women as a group did work out as a better arrangement overall. Secondly, there were significantly more women seen on a daily basis at the CHCs compared to the smaller clinics.

At Glenanda clinic, the ANC service was on a Wednesday only with a daily attendance varying from 15 - 20 women, but at times there will be as few as ten women. On certain days, all the women attending the ANC services were already enrolled in the study. For this reason, a few Wednesdays were skipped to allow for new women to come to the clinic for ANC. First time bookings were only done on a Tuesday morning. As this was the day where all the basic pregnancy work-up was done, the women did not have all the necessary medical information to complete the questionnaires. So, no data collection was carried out on Tuesday mornings at Glenanda clinic. All minors below 18 years were referred to a local hospital for management. The final sample was 61. Seven women declined to participate citing time constraints, one participant did not "feel" comfortable completing the questionnaires and one participant could not complete the questionnaire due to a language barrier. The woman spoke French.

At Kibler Park clinic, the daily attendance ranged from 6 – 10 women. ANC services were run on a Wednesday and Thursday, with more women attending on Thursday. First bookings were done on the first day of attendance at the clinic. The data collection at Kibler Park was delayed by waiting for additional approval from the sub-district clinic manager. This was the only clinic with this requirement. Kibler Park also referred minors below 18 years to the hospital. Five women declined to participate, one due to language barrier. The woman spoke Portuguese. The final sample was 43.

Initially just over 100 participants were enrolled at both Hillbrow and Lillian Ngoyi CHCs over a period of five days per CHC. The five days were spread over three weeks. Each CHC had a daily attendance of 30 or more women and the ANC services were run every day. Due to these large numbers at the CHCs, further enrolment was done at each CHC with a final sample of 156 per CHC to make up for the lower numbers at the other clinics. There were also no minors at Hillbrow CHC, as they were managed at the hospital.10 women declined to participate at Hillbrow CHC citing lack of interest, fatigue, and 2 could not read English well. Lillian Ngoyi CHC had 5 women below 18 years, but they could not be enrolled as they were alone, and the researcher could not get parental/guardian consent. 7 women declined to participate, 2 of whom were due to language barrier. This brought the total sample to 436, including the participants from the pilot study.

The women who scored 13 or more on the EPDS were referred to hospital or psychology services in their clinics (CHCs), These women were given referral letters and also encouraged to use the Lifeline Hotline contact details provided on the patient information sheet should the need arise.

3.6 Data analysis

All patient identifiers were removed and put is separate file. All data was coded and entered into Excel as categorical variables. The data was analysed using Statistica 13.5.0.17 (2018). The categorical variables were presented as frequencies and percentages. The Pearson's chi-square test and two-way summary tables was done for all variables. All the variables were analysed with generalized linear model for odds ratios and confidence intervals. A univariate logistic regression was done for all the variables with P-value 0.2 or less. P-value of 0.05 or less was taken as statistically significant. Then all variables with a P-value of 0.05 or less were analysed in a multivariate logistic regression analysis to see which variables were the strongest risk factors for AD.

3.7 Ethics

The protocol for this study was approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand (M170342) and the Johannesburg District Research Committee (NHRD Ref no: GP_201708_022).

Minors below the age of 18 were included in the study because of literature that showed that teenage pregnancy conferred an increased risk for AD. The minors were required to have a guardian/parent to firstly give consent for participation in the study. And secondly, to also be able to assist them in completing the questionnaires where necessary.

Women who had scores of 13 and above on the EPDS scale were given referral letters to their nearest psychiatry centre.

CHAPTER 4: RESULTS

A total of 436 pregnant women participated in the study including the 20 women from the pilot study. The final numbers per facility were as follows, Eikenhof clinic (20), Glenanda clinic (61), Hillbrow CHC (156), Kibler Park clinic (43) and Lillian Ngoyi CHC (156). The final data analysis included 377 women. The other 59 women were not included in the analysis because they had not completed the EPDS scale in full.

Table 4.1 The number of participants per clinic

Clinic	Number expected (n=420)	Number recruited (n=436)	Number included in analysis (n=377)
Eikenhof	20	20	20
Glenanda	100	61	56
Hillbrow CHC	100	156	143
Kibler Park	100	43	40
Lillian Ngoyi CHC	100	156	118

4.1 Characteristics of the participants in the study

4.1.1 Socio-demographic characteristics and socio-economic status of the participants

The majority of women were between the ages of 21 – 30 years. Only two of the women were minors (below 18 years). About 1% of the women were of advanced maternal age. 97% of the women were African. A third of the women were non-South African. One-half of the women were single and the other half were married or living with a partner.

The majority of the participants had completed secondary school and 35% of the participants had a tertiary qualification. Almost 60% of the participants were unemployed.

Table 4.2 socio-demographic characteristics and socio-economic status of the participants

Variable	Group	Number (n=377)	Percentage (%)
Age (years)	15 – 20	38	10.1
	21 – 30	236	62.6
	31 – 40	98	26.0
	41- 49	5	1.3
	Missing	0	0.0
Ethnicity	African	366	97.1
	Other	8	2.1
	Missing	3	0.8

Nationality	SA	252	66.8
	Non-SA	114	30.2
	Missing	11	2.9
Marital status	Single	178	47.2
	Married	81	21.5
	Living with partner	104	27.6
	Other	6	1.6
	Missing	8	2.1
Education	Primary school	17	4.5
	Secondary school	206	54.6
	Tertiary	132	35.0
	missing	22	5.8
Employment	Yes	126	33.4
	No	222	58.9
	missing	29	7.7

4.1.2 The obstetric and medical history of the participants

More than one third of the participants were primigravidas (first pregnancy) and 43% had no children. Almost 55% of the participants were in their third trimester and less than 5% were in their first trimester of pregnancy. Thus, the sample included participants in all three trimesters of pregnancy.

Of the 28.4% participants with one or more medical conditions, 5.4% had hypertension, 4.5% had diabetes mellitus and 87% were HIV positive. Four participants had more than one medical condition. None of the participants indicated having a mental health condition

Table 4.3 Obstetric and medical history of the participants

Variable	Group	Number (n=377)	Percentage (%)
Parity (no. of children)	0	163	43.2
	1	99	26.2
	2	72	19.1
	3	26	6.9
	4 or more	5	1.3
	Missing	12	3.2
Gravidity (no. of pregnancies)	1	148	39.2
	2	93	24.7
	3	75	19.9

	4	34	9.0
	5 or more	8	2.1
	Missing	19	5.0
Gestation (no. of weeks)	First trimester (0 -12)	16	4.2
	Second trimester (13 -26)	122	32.4
	Third trimester (26 – 41)	207	54.9
	Missing	32	8.5
Medical condition	none	269	71.3
	1 or more	107	28.4
	missing	1	0.3

Table 4.4 The distribution of medical conditions among the participants

Medical condition	**Number (n=111)**	**Percentage (%)**
Hypertension	6	5.4
Diabetes Mellitus	5	4.5
HIV	97	87.4
Other	3	2.7

4.1.3 Psychological characteristics and health habits of the participants

Just over two-thirds of the participants admitted to having good social support, while only 6% indicated having poor social support. One-half of the participants had planned for the current pregnancy. Less than 4 % of the participants reported experiencing one or more forms of IPV.

Table 4.5 Psychological characteristics and health habits of the participants

Variable	**Group**	**Number (n=377)**	**Percentage (%)**
Social support	Good	253	67.1
	Adequate	74	19.6
	Poor	23	6.1
	Missing	27	7.2
Planned pregnancy	Yes	211	56.0
	No	155	41.1
	Missing	11	2.9
Intimate partner Violence	Yes	14	3.7
	No	347	92.0

	Missing	16	4.2
Alcohol use	Yes	15	4.0
	No	347	92.0
	missing	15	4.0
Smoking	Yes	13	3.4
	No	354	93.9
	missing	10	2.7
Drug use	Yes	2	0.5
	No	343	91.0
	missing	32	8.5

Less than 5% of the participants admitted to smoking and drinking alcohol. Less than a half of a percentage of participants admitted to using other drugs besides alcohol and cigarettes. The participants who admitted to drinking alcohol did not specify the quantity. The participants who reported using drugs did not indicate the type of substance they were using.

4.1.4 The proportion of participants with antenatal depression

The proportion of participants with AD was 31.3% compared to the 68.7 % who scored less than 13 on their EPDS. Table 4.7 shows a wide difference in the proportion of participants with AD between the different clinics, with the lowest proportion of 15% at Eikenhof clinic and the highest of 40% from Kibler Park clinic.

Table 4.6 EPDS scores of the participants

Variable	**Group**	**Number (n=377)**	**Percentage (%)**
EPDS	Less than 13	259	68.7
	13 and above	118	31.3

Table 4.7 EPDS scores of the participants per clinic

Facility	**Total Number (n)**	**Depressed EPDS above 13 (n)**	**Percentage (%)**	**Not depressed EPDS less than 13 (n)**	**Percentage (%)**
Eikenhof	20	3	15.0	17	85.0
Glenanda	56	10	17.9	46	82.1
Hilbrow	143	43	30.1	100	69.9
Kibler Park	40	16	40.0	24	60.0
Lillian Ngoyi	118	45	38.1	73	61.9

4.2 The association between the different participant characteristics and antenatal depression

4.2.1 The association between socio-demographic characteristics, socio-economic status and antenatal depression

In table 4.8, there is no significant association between age, ethnicity, nationality and AD with P-value above 0.3 for all three. There is a significant association between marital status and AD with P-value of 0.04

Table 4.8 shows a strong association between antenatal both the level of education and employment status, and AD as seen by the P- values less than 0,2.

Table 4.8 The association between socio-demographic characteristics, socio-economic status and antenatal depression

Variable	Group	Depressed EPDS 13 and above n(%)	Not depressed EPDS less than 13 n(%)	Chi-square	P-value
Age (years)	15 -20	14 (36.8)	24 (63.2)	0.97	0.80
	21-30	74 (31.6)	162 (68.6)		
	31-40	29 (29.6)	69 (70.4)		
	41-49	1 (20.0)	4 (80.0)		
Ethnicity	African	115 (31.4)	251 (68.6)	0.13	0.71
	Other	3 (37.5)	5 (62.5)		
Nationality	SA	84 (32.3)	161 (66.7)	1.00	0.32
	Non -SA	32 (28.1)	82 (71.9)		
Marital Status	Single	67 (37.6)	111 (62.4)	8.52	0.04
	Married	20 (24.7)	61 (75.3)		
	Living with Partner	25 (24.0)	79 (76.0)		
	Other	3 (50.0)	3 (50.0)		
Education	Primary	5 (29.4)	12 (70.6)	3.53	0.17
	Secondary	73 (35.4)	133 (64.6)		
	Tertiary	34 (25.8)	98 (74.2)		
Employment	Yes	31 (24.6)	95 (75.4)	2.36	0.12
	No	72 (32.4)	150 (67.6)		

4.2.2 The association between obstetric and medical history and antenatal depression

There was no significant association between antenatal depression and parity, gravidity or gestational age. The P-value for all three variables was above 0.3. In table 4.9, there is no significant association between antenatal depression and being HIV positive P-value of 0.58.

The association becomes significant when participants are grouped into two categories with P-value of 0.07.

Table 4.9 The association between obstetric history and antenatal depression

Variable	Group	Depressed EPDS 13 and above n (%)	Not depressed EPDS less than 13 n (%)	Chi-square	P-value
Parity	0	42 (25.8)	121 (74.2)	6.06	0.30
	1	35 (35.4)	64 (64.4)		
	2	27 (37.5)	45 (62.5)		
	3	6 (23.1)	20 (76.9)		
	4 and more	1 (20.0)	4 (80.0)		
Gravidity	1	40 (27.0)	108 (73.0)	3.93	0.41
	2	34 (36.6)	59 (63.4)		
	3	26 (34.7)	49 (65.3)		
	4	8 (23.5)	26 (76.5)		
	5 and more	2 (25.0)	6 (75.0)		
Gestation	1st trimester	3 (18.8)	13 (81.2)	1.43	0.49
	2nd trimester	39 (32.0)	83 (68.0)		
	3rd trimester	58 (28.0)	149 (72.0)		
Medical condition	None	77 (28.6)	192 (71.4)	5.69	0.58
	HIV	36 (36.4)	63 (63.6)		
	Other	5 (62.5)	3 (37.5)		
	One or more	41 (38.3)	66 (61.7)	3.34	0.07

4.2.3 The association between psychological factors, health habits and antenatal depression

Table 4.10 shows a significant association between psychological factors and AD with P-value less than 0.15 for all three factors. Both social support and planned pregnancy had P-value less than 0.05.

There was no significant association between AD and any of the lifestyle habits of the participants as shown by the large P-values that are more than 0.5.

Table 4.10 The association between psychological characteristics, health habits and antenatal depression

Variable	Group	Depressed EPDS 13 and above n (%)	Not depressed EPDS less than 13 n (%)	Chi-square	P-value
Social Support	Poor	5 (65.2)	8 (34.8)	17.68	0.0001
	Adequate	30 (40.5)	44 (59.5)		
	Good	67 (26.5)	186 (73.5)		
Planned Pregnancy	Yes	57 (27.0)	154 (73.0)	3.96	0.0047
	No	57 (36.8))	98 (63.2)		
IPV	Yes	7 (50.0)	7 (50.0)	2.53	0.11
	No	104 (30.0)	243 (70.0)		
Alcohol Use	Yes	5 (33.3)	10 (66.7)	0.52	0.82
	no	106 (30.6)	241 (69.4)		
Smoking	Yes	5 (38.5)	8 (61.5)	0.32	0.57
	No	110 (31.1)	244 (68.9)		
Drug use	Yes	1 (50.0)	1 (50.0)	0.34	0.56
	No	106 (30.9)	237 (69.1)		

4.3 Logistic regression

4.3.1 Univariate logistic regression

A logistic regression analysis was done to determine the significance of the association between the AD and the different variables. The variables with a P-value of less than 0.2 were included in the analysis. The following variables were included in the analysis: marital status, medical condition, education, employment, social support, planned pregnancy and IPV.

Table 4.11 social support and planned pregnancy were statistically significant with P-values of 0.004 and 0.0047, respectively. Participants with poor social support were 5 times more likely to present with than those with good social support. Being single or living with a partner was associated with AD than being married. Participants with one or more medical conditions were 1.55 increased risk of AD than those without a medical condition. Participants who experienced some form of IPV were 2.35 times more likely to have AD than participants who did not experience IPV. Being unemployed and having a lower level of education, seemed to confer an increased chance of AD.

Table 4.11 Univariate logistic regression

Variable	Group	Odds ratios	95% Confidence Intervals	P-value
Medical condition	None	1	1	1
	One or more	1.55	0.97-2.48	0.07
Marital Status	Married	1	1	1
	Single	1.66	0.32-8.44	0.45
	Living with Partner	3.05	0.57-16.33	0.26
	Other	0.96	0.49-1.90	0.10
Employment	Yes	1	1	1
	No	1.47	0.90-2.41	0.13
Education	Tertiary	1	1	1
	Primary school	1.20	0.39-3.16	0.93
	Secondary school	1.58	0.97-2.56	0.25
Social support	Good	1	1	1
	Poor	5.2	2.11-12.83	0.004
	Adequate	1.89	1.10-3.25	0.57
Planned pregnancy	Yes	1	1	1
	No	1.57	1.00-2.46	0.0047
IPV	No	1	1	1
	Yes	2.35	0.80-6.86	0.12

4.3.2 Multivariate logistic regression

The variables which were statistically significant were medical condition, social support and planned pregnancy. A multivariate logistic regression analysis of the two variables was done to see which factors are independent predictors of AD. The most significant predictors of AD are having one or more medical conditions and poor social support. The two variables had P-value of 0.02 and 0.002, respectively after multivariate logistic regression analysis.

Table 4.12 Multivariate logistic regression

Variable	Group	Odds ratio	95% Confidence Intervals	P-value
Medical condition	None	1	1	1
	One or more	1.81	1.08-3.02	0.02
Social support	Good	1	1	1
	Poor	5.91	2.25-15.49	0.002
	Adequate	1.80	1.02-3.18	0.39
Planned Pregnancy	Yes	1	1	1
	No	1.16	0.67-1.95	0.56

CHAPTER 5: DISCUSSION

The study was carried out in urban and peri -urban clinics in the JHB. Eikenhof Clinic, Glenanda Clinic, Hillbrow CHC, Kibler Park Clinic and Lillian Ngoyi CHC were the study sites. Each of the four sites was meant to have 100 participants and 20 participants at the pilot site, but this was not achieved due to large differences in patient loads between the different clinics. However, the desired number of 400 participants was achieved. The total number of participants recruited was 436. Table 4.1 shows the number of participants per clinic. The number of participants included in the final analysis was 377. The other participants were excluded because they did not complete their EPDS questionnaire in full. This was because the main analysis of the study was to compare the different variables with the EPDS score, and no other tool was used for comparison.

The majority of the studies have looked at maternal mental health, in particular PD, in women attending secondary or tertiary hospitals for their ANC services. Women attending their ANC services in secondary or tertiary level hospitals have medical conditions or pregnancy complications which require them to be in attended to in such facilities. Medical comorbidities and pregnancy complications (previous or current) have been shown to result in higher levels of depressive and anxiety symptoms. Thus, this study was done to determine the proportion of pregnant women with low risk pregnancies who have depressive symptoms. The other studies on AND in SA, were done in KZN and the Western Cape. This is probably the first study on AND in primary healthcare facilities in the JHB.

5.1 The prevalence antenatal depression in women in primary care clinics

Of the 377 pregnant women included in the final analysis, 31.3% of the participants had AD. This is in keeping with prevalence rates of 20 – 40% for AD in LMIC like South Africa.[7,29,31] Prevalence rates of AD in South Africa have been found to be as high as 48,7% in a study in WC.[28] In this study the participants were screened with the EPDS with a cut-off value of 12. However, the same study reported a lower prevalence of 33% with a higher cut-off value of

15. Brittain K et al, reported similar findings among HIV-infected women attending ANC in a primary care clinic in the WC.[31] They found a prevalence rate of 11% with EPDS cut-off of 13. The prevalence was 19% when the cut-off was 10. Thus, the same screening tool can give different results depending on the cut-off value selected. The prevalence of AD also depends on the tool selected. In a systematic review in Ethiopia, Ayano G et al, found the prevalence of AD of 18.28% with the EPDS and of 26.48% with the BDI.[24] The prevalence of AD ranged from 15 – 40% among the different clinics where the study was conducted. Eikenhof clinic, had the lowest proportion of 15% of participants with AD. Kibler Park clinic had the highest number of participants with AD at 40% (Table 4.7). In a Soweto study, the prevalence of AD was 27% during the second trimester and 25% during the third trimester.[35]

5.2 The socio-demographic characteristics of women with antenatal depression in primary care clinics

A tenth of the participants in the study were between the ages of 15 -20, and 36.8% of the participants in this age group had AD. This was not surprising as teenage pregnancy or young maternal age is identified as a risk factor for AD.[1,9,29] Literature reports increasing maternal age as a protective factor for AD. Only two participants in this age group were minors. It would have been ideal to get more minors as participants, but three of the clinics referred minors below 18 years to the nearest hospital for ANC. Lillian Ngoyi CHC had by far the largest number of participants below 18 years of age, but they attended the clinic alone and therefore there was no guardian or parent to sign the consent. This was a missed opportunity to include them in the study. 31 % of the participants in the 21–30 year age group and 29% of the participants in the 31-40 year age group had AD.

An overwhelming majority of the participants were African and 31% of these participants had AD. This was compared to 37% of non-African participants who had AD. Studies show that women from minority groups have a higher likelihood of AD.[5,15] All the studies that reviewed ethnicity and its effect on AD, were done in developed countries where Africans and people of colour are a minority. The very small number of non-African participants has possibly influenced the outcome. One-third of the participants were of South African nationality, yet 32% of the participants had compared to 28% of the participants who were not South African. In a study in Australia, minority groups and women of refugee background were more likely to have AD.[4]

Being married or having a live-in partner seems to play a protective role in the development of AD.[7,9,20,37] 37% of single participants had antenatal depression compared to the 24% of married participants or those living with a partner. A much greater proportion (50%) of participants who were divorced or separated had antenatal depression. This was however a very small group. On the other hand, a strained relationship leading to a divorce or separation during the current pregnancy would likely lead to increase in depression. Marital status was however not found to be an independent risk factor for AD with a P-value of 0.45 during logistic regression analysis.

There was no significant correlation between AD and parity or gravidity. There was not much difference between the various groups of parity and gravidity in terms of the proportion of women with AD. In literature, primigravid women have a high likelihood of AD, primarily due to perceived lack of parenting knowledge and skill.[2] A poor obstetric history or complications in the current pregnancy are associated with AD rather parity and gravidity.[5,8,9,13] On the other hand, women with AD are said to be at higher risk of pregnancy complications, especially preterm delivery.[21,38,43,47] Women who are depressed are prone to poor self-care, inconsistent attendance of ANC, poor weight gain with adverse on the mother and the growing foetus.[1,2,6,7,8,9] And still other less common factors include the woman's relationship with the nurses, and their perceived support. Attending a public facility for ANC services was found be important risk factor for AD.[9]

Antenatal depression has been found to be the highest in the second trimester and then it decreases in the third trimester and further decreases in the postpartum period[23,35,39] Just above half of the participants were in their 3rd trimester. The proportion of depressed women were 18.8%, 32.0% and 28% in the first, second and third trimesters respectively (table 4.9).

Less than a third of the participants had one or more medical conditions. This was not surprising, as the study was done intentionally in a primary care setting with women of low risk pregnancies who are generally healthy and have no co-morbidities. 87% of the participants with a medical condition were HIV-infected, about 5% had hypertension and 4.5% had diabetes mellitus. Four participants had two or more medical conditions concurrently. Only 36% of participants who are HIV-infected had AD, compared with the 62.5% of participants with other medical conditions. Less than 30% of participants without a medical condition had AD. During the analysis, having a medical condition was statistically significant with a P-value of 0.07, but when the analysis was done with specific conditions (HIV), the results were not statistically significant. Previous studies in SA have shown HIV and the stigma associated with being HIV positive, as a significant predictor of AD.[31]

Participants with a secondary school education and those who were unemployed are more likely to suffer from AD. Studies have previously shown that a lower level of education, being unemployed and thus having a low income, are predictors of AD.[1,2,9,24] Recent studies show that current economic difficulties or financial stressors, food insecurity together with poor social or partner support, and not necessarily income and employment, render women to be have high levels of anxiety and depressive symptoms in pregnancy.[19,23,24,34,40]

As part of this study, a household asset index was included in the questionnaire. The question had very poor responses, most were incomplete and some were not completed at all, despite the participants living in areas where the basic amenities included in the asset index, were all available. The asset index was not included in the data analysis.

Cultural differences and perceptions have been found to significantly increase the likelihood of antenatal depression. In a study in Ethiopia, part of socio-economic factors that might contribute to antenatal depression was the husband's status and level of education.[39] In the study the conclusion was that men who were highly educated were able to support their partners better. In Omani women, a poor relationship with the mother-in-law was found to significantly increase antenatal depression.[8]

Less than 10% of the participants indicated poor social support, and 65% of these participants had AD. In both univariate and multivariate logistic regression, social support was found to be a significant predictor of antenatal depression with P-values 0.004 and 0.002 respectively. Social support has been identified in a number of studies as a significant predictor of antenatal depression.[2,4, 6,7,11,16,22,39,40,43] Significant social support can be from the spouse or partner, parents and other family members. Rakwarema et al, found that pregnant women with high socio-economic status but poor social support from the partner, were thirteen times more likely to develop AD, than women of the same socio-economic status who had good social support.[2]

Participants who planned for the current pregnancy were 1.57 times less likely to have AD than those who did not plan to fall pregnant. In a number of studies women with an unplanned and unwanted pregnancy were more likely to be depressed. Planned pregnancy was however not a significant predictor of antenatal depression.[2,11,14,27,39]

Fewer than 5% of the participants admitted to IPV and 50% of participants who admitted to some form of IPV had AD. SA is one of the countries with the highest number of incidences of gender-based violence, with a majority of women being abused by their partners.[1,] The incidence of IPV increases in pregnancy and in those with a mental illness.[4,11,14,20,28] IPV was not found as a significant predictor of antenatal depression in this study.

A small proportion of the participants admitted to smoking (5%), drinking alcohol (4.5%) and using drugs (0.5%). Women with a history of substance use have to been found to have a high chance to have depression.[8,19,25] In a study in WC women who used stopped as soon as they discovered they were pregnant.[19] Many communities in South Africa have high levels of alcohol and substance use and this makes it difficult to understand whether substance use is a result of the depression and it is a cause of the depression.[11]

5.3 Risk factors associated with antenatal depression in women in primary care clinics

One of the objectives of this study was to find out which factors place pregnant women at higher risk for AD. At the initial data analysis having one or more medical conditions, being unemployed, being single, poor social support, the pregnancy not being planned was strongly associated with AD. After univariate logistic regression analysis, having one or more medical conditions, poor social support and unplanned pregnancy were found to be strongly associated with AD. However, after multivariate logistic regression analysis, having one or more medical conditions and poor social support were found to be independent risk factors for the development of AD in this study.

5.4 Bias and limitations of the study

EPDS is a screening tool that has been validated in the antenatal population in SA. There is however, variation to the cut-off values which can yield different results in the same group of participants. The tool also does not measure the severity of the depression i.e. mild, moderate and severe, but classifies women as either depressed or not depressed. The EPDS could not be completed independently by illiterate participants or those who did not understand English. This meant missing out on the participation of key immigrant participants.

The household asset index used was in retrospect not relevant and representative of this study population. The following assets microwave, car and washing machine would ideally be replaced by electricity, stove and a refrigerator. And instead of home ownership, rather the option of rental or own property and the type of home (brick, shack or RDP). The researcher would have liked to include household income as part of the socio-economic status. But this has been shown not to be significant risk factor for AD.

The study design being cross-sectional, does not allow for determination of a causality. The participants were selected via consecutive convenience sampling and were not randomised, this may have led to selection bias. The participants completed all the sections of the questionnaire on their own, and none of the information was retrieved from their antenatal records. This may have led to some recall bias.

The initial plan to have 100 participants per site would have been a limitation. The bigger CHCs with their larger would not have been proportionally represented in the final sample, and the smaller clinics would have been over-represented in the final sample. This would not have been a true representation of the general population, as each clinic was unique with a different unique population demographics.

At each site, there was at one participant who could not participate in the study due to language barrier. The participants either spoke French or Shona. The questionnaires were also not translated in any other language, due to expenses and time constraints. This could have led to some language bias. The researcher can understand and communicate in Zulu, Sotho and Afrikaans, but cannot read these languages fluently. This would have required additional help and increased the costs of the study.

Social desirability bias is possibly much higher in this sample than anticipated. The questionnaires contained questions of a sensitive nature, especially those regarding substance abuse and IPV, some of the participants could have given false information, as they would consider the activities unhealthy in pregnant women, and most likely to be frowned upon. This can be noted where participants completed both questionnaires in full but left out the questions on smoking, alcohol intake and drug use. The missing information was 2.7% for alcohol, 4.0% for smoking, 4.2% for IPV and 8.5% for drug use.

CHAPTER 6 - CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The prevalence of AD in this study was 31.1% based on the EPDS. This prevalence rate is significant, and adds to the body of existing literature on prevalence rates of AD. This highlights the importance of integrating mental health services in the existing maternal health care services. This integration will help reduce the poor maternal, neonatal and early childhood development outcomes associated with perinatal mental illness. The routine screening for perinatal mental illness will also help reduce the stigma associated with having a mental illness, therefore encouraging better health-seeking behaviour and adherence to treatment for those diagnosed with a mental illness.

The findings in this study can be generalized to pregnant women in primary care clinics. It will be helpful to have more studies done in low risk pregnant patients attending private antenatal clinics, to see if the prevalence rates will be similar.

6.2 Recommendations

Based on the results from this study the following recommendations are made:

6.2.1 Clinic Level

There should also be adequate training for clinicians to be able to screen, diagnose and treat women with mental illness in the perinatal period. There should be clear and open lines of communication and referral for women who cannot be managed in the clinics. The screening can be done by the nurse clinicians as they carry out the normal ANC services. This is also a good area to use community health workers. The screening for perinatal mental illness can be incorporated in their training. They can do the screening at the clinics or in the community. This will help with the workload for the nurse clinicians. Women who are classified as having a possible mental illness can be referred to the psychiatry services at the clinic or at the next level of care.

The clinic manager can arrange for regular patient health talks to educate patients about mental illness and the importance of seeking help, and the benefits of getting treatment.

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APPENDICES

APPENDIX 1: Patient Data Collection Tools

Socio-Demographic Questionnaire

1. **Age**:

□ 15-20 □ 21-30 □ 31-40 □ ≥41

2. **Ethnicity**:

□African □Asian □Coloured □White □other……..

3. **South African**: □ yes □ no (specify nationality) ....

4. **Parity (how many children**): ....

5. **Gravidity (how many pregnancies)** ....

6. **Gestation:**

□ 1^{st} trimester (‹3months) □ 2^{nd} trimester (3 - 6 months)

□ 3^{rd} trimester (› 6months)

7. **Medical conditions:**

□ none

□ High blood pressure

□ Diabetes mellitus

□ HIV

□ Epilepsy

□ Asthma

□ Mental illness

□ Other (specify) ....

8. Level of education:

□ Primary

□ Secondary

□ Tertiary

9. Employment: □ yes □ no

10. Household possessions:

□ none □ home ownership □ car ownership

□ microwave □ washing machine

□ indoor running water □ flush toilet inside home

11. Marital status

□ Single □ married □ separated □ widowed □ divorced

□ living with partner

12. Social support:

□ good □ adequate □ poor

13. Planned pregnancy: □ yes □ no

14. Alcohol use: □ yes (units per week) .... □ no

15. Smoking: □ yes □ no

16. Drug use: □yes (which drug?) .... □ no

17. Intimate partner violence (physical/ sexual/emotional abuse)

□ Yes (specify)…….. □ no

Edinburgh Postnatal Depression Scale[1] (EPDS)

Name: ______________________________ Address: ___________________________

Your Date of Birth: ____________________ ___________________________

Baby's Date of Birth: ___________________ Phone: ___________________________

As you are pregnant or have recently had a baby, we would like to know how you are feeling. Please check the answer that comes closest to how you have felt **IN THE PAST 7 DAYS**, not just how you feel today.

Here is an example, already completed.

I have felt happy:
- Yes, all the time
- ☒ Yes, most of the time — This would mean: "I have felt happy most of the time" during the past week.
- No, not very often — Please complete the other questions in the same way.
- No, not at all

In the past 7 days:

1. I have been able to laugh and see the funny side of things
   - As much as I always could
   - Not quite so much now
   - Definitely not so much now
   - Not at all

2. I have looked forward with enjoyment to things
   - As much as I ever did
   - Rather less than I used to
   - Definitely less than I used to
   - Hardly at all

*3. I have blamed myself unnecessarily when things went wrong
   - Yes, most of the time
   - Yes, some of the time
   - Not very often
   - No, never

4. I have been anxious or worried for no good reason
   - No, not at all
   - Hardly ever
   - Yes, sometimes
   - Yes, very often

*5 I have felt scared or panicky for no very good reason
   - Yes, quite a lot
   - Yes, sometimes
   - No, not much
   - No, not at all

*6. Things have been getting on top of me
   - Yes, most of the time I haven't been able to cope at all
   - Yes, sometimes I haven't been coping as well as usual
   - No, most of the time I have coped quite well
   - No, I have been coping 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 often
   - No, not at all

*8 I have felt sad or miserable
   - Yes, most of the time
   - Yes, quite often
   - Not very often
   - No, not at all

*9 I have been so unhappy that I have been crying
   - Yes, most of the time
   - Yes, quite often
   - Only occasionally
   - No, never

*10 The thought of harming myself has occurred to me
   - Yes, quite often
   - Sometimes
   - Hardly ever
   - Never

Administered/Reviewed by ______________________________ Date ___________________________

[1]Source: Cox, J.L., Holden, J.M., and Sagovsky, R. 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 150:782-786 .

[2]Source: K. L. Wisner, B. L. Parry, C.M. Piontek, Postpartum Depression N Engl J Med vol. 347, No 3, July 18, 2002, 194-199

Edinburgh Postnatal Depression Scale[1] (EPDS)

Postpartum depression is the most common complication of childbearing.[2] The 10-question Edinburgh Postnatal Depression Scale (EPDS) is a valuable and efficient way of identifying patients at risk for "perinatal" depression. The EPDS is easy to administer and has proven to be an effective screening tool.

Mothers who score above 13 are likely to be suffering from a depressive illness of varying severity. The EPDS score should not override clinical judgment. A careful clinical assessment should be carried out to confirm the diagnosis. The scale indicates how the mother has felt ***during the previous week***. In doubtful cases it may be useful to repeat the tool after 2 weeks. The scale will not detect mothers with anxiety neuroses, phobias or personality disorders.

Women with postpartum depression need not feel alone. They may find useful information on the web sites of the National Women's Health Information Center <www.4women.gov> and from groups such as Postpartum Support International <www.chss.iup.edu/postpartum> and Depression after Delivery <www.depressionafterdelivery.com>.

SCORING

QUESTIONS 1, 2, & 4 (without an *)
Are scored 0, 1, 2 or 3 with top box scored as 0 and the bottom box scored as 3.

QUESTIONS 3, 5-10 (marked with an *)
Are reverse scored, with the top box scored as a 3 and the bottom box scored as 0.

Maximum score: 30
Possible Depression: 10 or greater
Always look at item 10 (suicidal thoughts)

Instructions for using the Edinburgh Postnatal Depression Scale:

1. The mother is asked to check the response that comes closest to how she has been feeling in the previous 7 days.
2. All the items must be completed.
3. Care should be taken to avoid the possibility of the mother discussing her answers with others. (Answers come from the mother or pregnant woman.)
4. The mother should complete the scale herself, unless she has limited English or has difficulty with reading.

[1]Source: Cox, J.L., Holden, J.M., and Sagovsky, R. 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 150:782-786.

[2]Source: K. L. Wisner, B. L. Parry, C. M. Piontek, Postpartum Depression N Engl J Med vol. 347, No 3, July 18, 2002, 194-199

APPENDIX 2: Patient Information Sheet

Study title: The prevalence of depressive symptoms in women attending antenatal care services in primary healthcare clinics in the Johannesburg Metro District, South Africa.

Good Day

My name is Dr Eliza Malaza. I am a third-year registrar in the department of Family Medicine, University of the Witwatersrand. I am currently based in the Johannesburg Metro District. I am doing research on “The prevalence of depressive symptoms in women attending antenatal care in primary healthcare clinics in the Johannesburg Metro District, South Africa.” Research is a way by which we can see if we can learn an answer to a question. In this research we want to see how many of the pregnant women coming to our clinics for ‘booking’ have been feeling low are having problems with eating or sleeping, have no interest in meeting family or friends, or even having thoughts of killing themselves or their babies, in the last two weeks or so. And also, what are the things happening in a pregnant woman’s life that can increase the risk of having the above feelings. These feelings can start in pregnancy and continue after the woman has delivered.

A lot of studies done with regards to pregnancy have focused on making sure that women are healthy during pregnancy and have a safe delivery and therefore have healthy babies. These studies have paid little attention to the emotional well-being of the pregnant woman, and how that can affect the pregnancy, the delivery, the health of the unborn baby and how well the woman copes afterwards in taking care of the baby and the rest of her family.

I am asking you/asking for your permission for your child, to take part in this research study.

The study will involve you /your child answering two questionnaires while you are waiting for your check-up by the nurse. You only have to answer the questionnaires once. It will take about 30 minutes at most to answer the questions. The one questionnaire will ask questions about the mood and feelings of the pregnant woman in the last seven days (Edinburgh Postnatal Depression Scale). This questionnaire will assess whether they are feeling happy with the pregnancy and are coping well, and they have a lot of support from family; or they are feeling overwhelmed, unable to cope and have little or no support from family. The second questionnaire will ask questions about the woman’s social circumstances, and medical and pregnancy history. The questionnaires will be in English.

Anyone can take part in the study as long as they are able to answer the questions. Help to explain what some of the questions might be asking will be given by myself in English, Sotho or Zulu. 100 women per clinic will be needed to fill in the questionnaires. The research study will be done at five different clinics.

Participating in this research will not expose you to any discrimination or harm. And it will be done with your permission. There is no risk to participating in the research. Confidentiality will be maintained and no individual will be identified unless the information is required by the law. The patient information on the EPDS questionnaire will be removed and put in a separate file. For ethical reasons, women who are indicate thoughts of hurting themselves or their unborn babies will be referred for immediate psychiatric consultation at either Chris Hani Baragwanath or Charlotte Maxeke Academic Hospitals.

Taking part in this research study will firstly help those women who are taking part to see how they are coping with their pregnancies. Secondly, the information we get from the answers to the questionnaires will help us to improve the normal pregnancy care of women by making sure that those women who are not coping will get professional help.

Participation in the research is completely voluntary. Women who refuse to take part will not be treated any differently to those who take part. You can choose at any point to stop taking part in the research study and this will not affect your check-ups at the clinic.

Any concerns or complaints about this research can be directed to the Wits Human Research Committee (medical) chairperson: Prof P Cleaton-Jones, Tel 0117172301, email: peter.cleaton-jones1@wits.ac.za or the administrators: Ms Z Nldovu email:zanele.ndlovu@wits.ac.za/Mr R Mkansi email: Rhulani.mkansi@wits.ac.za/ Mr L Moeng, email:Lebo.moeng@wits.ac.za, Tel: 011 717 1252/2700/1234/2656.

The findings and the recommendations of the study will be reported to the staff working in the clinic, in order to improve the care of patients attending antenatal services at our local clinics. The findings may also be published in a journal for academic purposes. In both cases, confidentiality of your personal details will be strictly protected.

Thank You

Yours sincerely

Dr Eliza Malaza

Cell: 0748991528

email: mengelaza@hotmail.com

NB! If at any point in time after the study, you experience any of the above symptoms of, you can contact Lifeline, a 24- hour crisis centre, where experienced counsellors are available to help. Tel: 011 728-1347(crisis line) or 011 728 1331

Email: lifeline@lifelinejhb.org.za

Fax: 011 728-3497

Alternatively, you can contact the momconnect app for pregnant women. See the attached form.

momconnect

Summary: What number do you dial?

Number to dial from mobile phone	Who Dials it?	What does the line do?	Free to access?
*134*550#	Pregnant Woman, on her own phone	This is the one stop line for all pregnant mothers to dial for MomConnect where they can get all the information they need. Pregnant women can dial this line to sign-up for a small set of messages about MomConnect AND access additional Baby and Pregnancy Info AND to log a complaint or compliment. Women still need to go to a clinic to sign up for the full set of messages.	Yes
*134*550*1#	Pregnant Woman, on her own phone if she wants to opt out	This is the number that a women must dial if she wants to stop receiving messages for any reason (including loss of a baby or stillbirth). On this number the women can also inform us of why she wanted to opt out. Women can also opt out of receiving messages by replying 'STOP' to any of the messages she receives.	Yes
*134*550*2#	Nurse/ Clinic Representative on any phone (e.g nurse's own phone; facility phone; mom's phone)	This is the only number where you can register a pregnant woman for the full set of messages. Only a Clinic representative can register a mother because a clinic code is needed to complete registration. Do not use this number for demonstrations and training. **Do not promote this number to mothers directly. This number is for facility use only.**	Yes
*134*550*3#	CHW on any phone (e.g CHW's phone; mom's phone)	This number will allow a CHW to sign pregnant women up to a small set of messages about MomConnect. Women still need to go to a clinic to register for the full MomConnect program and full set of messages. **Do not promote this number to mothers directly. This number is for CHW-use only.**	Yes
*134*550*4#	Pregnant woman, on her phone	The day after a pregnant woman registers at the clinic, she will get an SMS from MomConnect. In this SMS she will be asked to dial this number, to rate the service. Only women who have been fully registered for MomConnect, will be able to do this.	Yes
*120*550*0#	Anyone during training on any phone	This number is for demonstrations, testing and training purposes ONLY. A pregnant woman will not be signed up to the programme if you use this number.	No - Costs 20c/20sec

How do women access the Helpdesk?

Women can dial *134*550# or reply to any SMS sent to them by MomConnect. She will then receive an SMS response from the Helpdesk.

How do women switch to baby messages once their baby has been born?

Women can reply to any message they have received from MomConnect with the word 'baby'. The Helpdesk will also respond with these instructions if she asks this question via SMS.

health
Department: Health
REPUBLIC OF SOUTH AFRICA

1

APPENDIX 3: Informed Consent Form

Title of study: The prevalence of depressive symptoms in women attending antenatal care in primary healthcare clinics in Johannesburg Metro District, South Africa.

I confirm that I have been informed by Dr Eliza Malaza about the nature of the study. I have also read/it was read to me and I understand the information sheet and have had the opportunity to ask questions.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care and my legal rights being affected.

I understand that sections of my medical records (antenatal card or maternity file) may be looked at by Dr Malaza. I am aware that I will not undergo any tests, but I will be required to complete two questionnaires. The answers on the questionnaires, including details such as age, marital status, number of pregnancies, other medical problems, history of mental illness, employment, educational level, amenities available in the house, social support, history of abuse (physical, emotional or sexual), thoughts of feeling sad or wanting to harm myself or my baby, will be anonymously entered into a computerised system. Information which can identify me, such as name, address and telephone number will be kept in a separate folder. This information is for use in case I may need to be contacted for urgent referral to a psychologist or psychiatrist. Data will be kept for two years if published or for six years if not published, after this period the data will be destroyed.

Should you wish to contact us at any stage regarding the consent, contact Dr Eliza Malaza at 074 899 1528 or Dr Jimmy Akii (supervisor) at 071 678 5777.

I agree/ for my daughter to take part in the above-mentioned study. I hereby give consent for my/my daughter's records to be used as per the above-mentioned conditions and for the purposes of research and also to identify which demographic details are associated with a higher prevalence of depressive symptoms.

Name and surname of patient………………… signature…………. date…………

Witness 1: name. . ………………………… signature…………………. date…………

Witness 2: name.. signature…………………. date…………

APPENDIX 4: Minor Assent Form

Title: The prevalence of depressive symptoms in women attending antenatal care services in primary healthcare clinics in the Johannesburg Metro District, South Africa.

Researcher: Dr Eliza Malaza

Contact number: 074 899 1528

Research is something we do to find new knowledge about how things or people work. We use research to find help us find out about different illnesses and possible treatments.

In this research, I am going to ask pregnant women to answer questions about their feelings about the pregnancy, the support they are getting from family and any challenges that they are experiencing because of being pregnant. The reason for this research is to see how many women among those who are pregnant and coming to the clinic for their check -ups, are finding it emotionally difficult to cope. Normally in the clinic the nurses and doctors (if available) will check the pregnant woman's medically or physically. But they do not check if the woman is okay emotionally with the pregnancy, if she has help or advice she needs and if she has any concerns about the pregnancy or the baby. I am hoping with this research to show that the there is a large number of pregnant women who have emotional difficulties which started when they got pregnant, and that it is important to include a way to check for the emotional well-being of the pregnant woman during check –up at the clinic.

Other research done before has shown that women who are not coping well emotionally during pregnancy have more complications with the delivery and the baby. The babies born to such women have low weights, are likely to be admitted to hospital after birth and they don't grow well.

In this research all we need is for you to answer questions in two questionnaires that will be given to you. The questions are easy to understand and mostly require just a tick (yes or no). Where you might not understand a question, the researcher will be available to explain. You will not be asked to say what your answers were. The information you provide will be treated confidentially and will not be linked to your name. There is a score you will get for the EPDS questionnaire. If you get a score of more than 13 or you answer yes to question 10, we will arrange for a referral to see a psychiatrist. We regard women who get scores more than 13 or who answer yes to question 10, at high risk and some women might really try to hurt themselves. This is done to protect the woman.

There is no risk of harm when agreeing to take part in this research. The good that will come out is that if you are having symptoms of feeling low, sad, with poor appetite and poor sleep, you will be able to get help. You are free to agree or to refuse to take part in the research. You will not be treated any differently by the nurses in the clinic. You can choose to withdraw from the research at any point.

Do you understand this research and are you willing to take part in it?

□ yes □ no

Has the researcher answered all your questions?

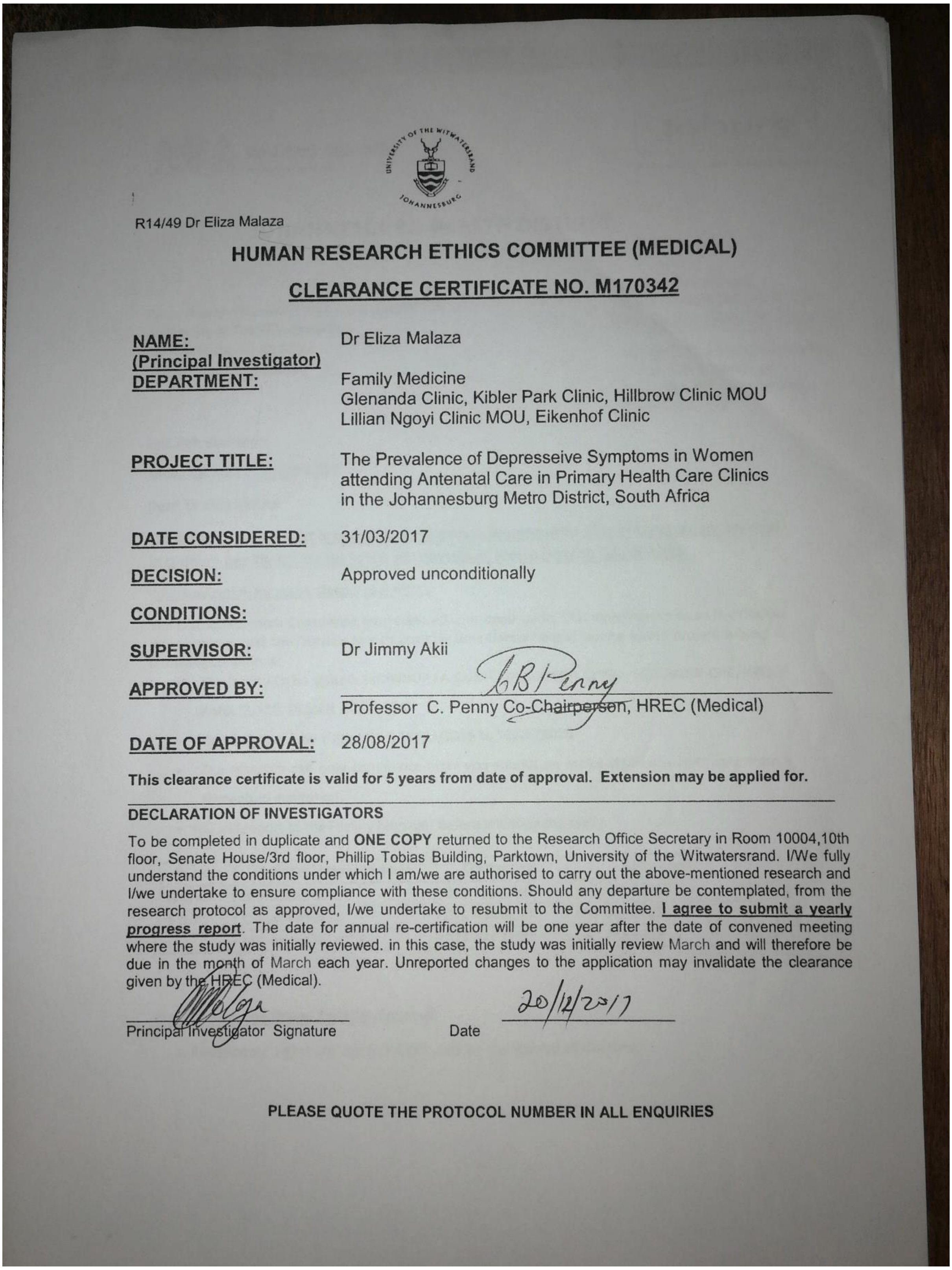
□ yes □ no

Do you understand that you can pull out of the research at any time?

□ yes □ no

Signature of child.................................... date...................................

APPENDIX 5: Human Research Ethics Clearance Certificate no. M170342



R14/49 Dr Eliza Malaza

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M170342

NAME: (Principal Investigator)	Dr Eliza Malaza
DEPARTMENT:	Family Medicine Glenanda Clinic, Kibler Park Clinic, Hillbrow Clinic MOU Lillian Ngoyi Clinic MOU, Eikenhof Clinic
PROJECT TITLE:	The Prevalence of Depresseive Symptoms in Women attending Antenatal Care in Primary Health Care Clinics in the Johannesburg Metro District, South Africa
DATE CONSIDERED:	31/03/2017
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Jimmy Akii
APPROVED BY:	CB Penny Professor C. Penny Co-~~Chairperson~~, HREC (Medical)
DATE OF APPROVAL:	28/08/2017

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 Research Office Secretary in Room 10004,10th floor, Senate House/3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the conditions under which I am/we are authorised 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 to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. in this case, the study was initially review March and will therefore be due in the month of March each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature

20/12/2017

Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX 6: Johannesburg Health District Research Approval

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

Joburg
a world class African city

JOHANNESBURG HEALTH DISTRICT

Enquiries: Dr EM Ohaju
Tel: 011 694 3888 Cell: 076 8831659
Email: Elizabeth.Ohaju@gauteng.gov.za

Hillbrow CHC: Administration Building
Cr Smith Str. & Klein Street
Private Bag X21, Johannesburg
South Africa, 2017

Wits - Human Research Ethics Committee(Medical)
University of The Witwatersrand,
Johannesburg, South Africa
mengelaza@hotmail.com

DRC Ref: Extension

NHRD Ref no: GP_201708_022

Dear: Dr Eliza Malaza

TITLE: **The prevalence of depressive symptoms in women attending antenatal care services in primary healthcare clinics in the Johannesburg Metro District, South Africa**

Your application for research approval refers.

The District Research Committee has reviewed your application. This letter serves as an in-principle approval to access the Districts Health facilities (mentioned below) for the above project subject to following conditions:

- The facility to be visited: **EIKENHOF LA CLINIC, GLENANDA CLINIC, HILLBROW CHC, KIBLER PARK CLINIC, LILLIAN NGOYI CHC**
- This facility will be visited from **14/06/2019 to 14/06/2020**
- The research can only commence after you submit an ethics clearance certificate from a recognized institution.
- You will report to the Facility Manager before initiating the study.

Region	Regional Health Manager	Contact No.	Cell phone
G (L A)	Hlubi Ntamehlo	011 211 8936	083 286 0388
F (L A)	Oupa Montsioa	011 681 8130	082 467 9423
D	Ms. Maria Mazibuko	011 674 1200	082 781 9919

The following conditions must be observed:

- Participants' rights and confidentiality will be maintained all the time.

- The study will comply with **Publicly Financed Research and Development Act, 2008 (Act 51 of 2008) and its related Regulations**.
- You will submit a copy (electronic and hard copy) of your final report. In addition, you will submit a six-monthly progress report to the District Research Committee.
- Your supervisor and University of The Witwatersrand will ensure that these reports are being submitted timeously to the District Research Committee.
- The District must be acknowledged in all the reports/publications generated from the research and a copy of these reports/publications must be submitted to the District Research Committee.

We reserve our right to withdraw our approval, if you breach any of the conditions mentioned above.

Please feel free to contact us, if you have any further queries. On behalf of the District Research Committee, we would like to thank you for choosing our District to conduct such an important study.

Regards,

Dr E.M Ohaju
Chairperson: District Research Committee
Johannesburg Health District
Date 13/06/2019

Mrs M.L Morewane
Chief Director
Johannesburg Health District
Date: 13/06/2019

Acting **Dr R Bismilla**
Executive Director
Johannesburg Health District
Date: 19/6/19