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FACTORS ASSOCIATED WITH POSTNATAL DEPRESSION AT LEVAI MBATHA COMMUNITY HEALTHCARE CENTRE EVATON, SEDIBENG DISTRICT

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in partial fulfillment of the requirements for the degree of Master of Medicine in Family Medicine

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Johannesburg, 2019

DECLARATION

I, Nyundu Phukuta, declare that this research report is my own, unaided work. It is being submitted for the degree of Master of Medicine in Family Medicine at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

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Signed on the 22nd day of May 2019 at JOHANNESBURG

ABSTRACT

Introduction

Depression is a significant cause of disability globally, and approximately one in five women will experience an episode of depression during pregnancy and/or the postnatal period. Despite it being a common postnatal psychiatric condition with an important impact on not only the mother and child but also the family, postnatal depression (PND) has received only little attention in developing countries. This study aimed to determine the point prevalence and factors associated with PND among postnatal mothers attending Levai Mbatha clinic, in Gauteng South Africa.

Method

This cross-sectional study was conducted among 227 consecutively recruited mothers who attended the postnatal clinic. A researcher-administrated Edinburg Postnatal Depression Scale (EPDS) questionnaire was used to collect information on mothers' mental state. In addition, socio-demographic and clinical information was also obtained. Analysis was done using descriptive statistics, chi square test and logistic regression. A score of more than 13 on the EPDS was considered positive for PND.

Results

Participants' mean age was 27 years. More than half (52.4%) did not complete secondary school education, were single (55.5%), and employed or had an employed partner (60%). Using the EPDS, the point prevalence of PND was 38.8%. Most participants had no medical illness (67%) or previous PND (97%), were breastfeeding (88%), and had an unplanned pregnancy (58%). More than a third had a negative view of pregnancy or the sex of the child (37% and 34%, respectively). Most participants reported having had a favorable delivery (93%), were in a monogamous relationship (85%), and were financially supported by their partner or family (85%).

Mothers who only completed primary school were significantly more likely to have PND (OR: 9.11; 95% CI: 1.03-80.22) than others. Mothers who used contraceptive methods prior falling pregnant were twice more likely to have PND compared to those who did not (OR: 2.05; 95% CI 1.12-3.72; p= 0.019). The likelihood of having PND was significantly lower for the mothers who

had a relationship with the father of the index child compared to mothers who did not have relationship with the father of the index child (OR: 0.42; 95% CI 0.18-0.94; p= 0.037). Mothers who had ever thought of harming themselves or the baby were 22 times more likely to have PND.

Conclusion

This study found that PND is highly prevalent in the study setting. While this underscores the need for routine screening for PND in the parturient in the postpartum period, interventions aimed at addressing PND need to be cognizant of the influence of unstable relationship between the mother and the father, low level of education, contraception failure and thoughts of self-harm on the development, assessment and management of PND.

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Table of Contents

CHAPTER 1: INTRODUCTION 1

1.1 BACKGROUND 1

1.2 RATIONALE 1

1.3 AIM 2

1.4 OBJECTIVES 2

CHAPTER 2: LITERATURE REVIEW 3

2.1 INTRODUCTION 3

2.2 HISTORICAL OVERVIEW 3

2.3 DEFINITION OF PND 4

2.4 ETIOLOGY OF PND 5

2.4.1 Biological theory 5

2.4.2 Psychological theory 5

2.4.3 Bio-psycho-socio-cultural theory 6

2.5 PREVALENCE OF PND 6

2.6 HEALTH IMPACT OF PND 7

2.6.1 Child's health 7

2.6.2 Woman's health 7

2.7 RISK FACTORS OF PND 8

2.7.1 Socio-demographic factors 8

2.7.2 Psychosocial factors 9

2.7.3 Infant-related factors 10

2.7.4 Pregnancy- and delivery-related factors 10

2.7.5 Maternal medical and psychiatric history 11

2.8 SCREENING OF PND 11

2.8.1 The Patient Health Questionnaire (PHQ-9) 12

2.8.2 The Beck Depression Inventory (BDI) 13

2.8.3 Edinburg Postnatal Depression Scale (EPDS) 13

2.9 CLINICAL MANIFESTATIONS 14

2.10 DIFFERENTIAL DIAGNOSIS 15

2.10.1 Postnatal blues 15
2.10.2 Postpartum psychosis 16
2.11 SUMMARY AND CONCLUSION 16
CHAPTER 3: METHODOLOGY 17
3.1 INTRODUCTION 17
3.2 STUDY DESIGN 17
3.3 STUDY SETTING 17
3.4 STUDY POPULATION 18
3.5 SAMPLING AND SAMPLE SIZE 18
3.6 INCLUSION AND EXCLUSION CRITERIA 18
3.6.1 Inclusion criteria 18
3.6.2 Exclusion criteria 19
3.7 DATA COLLECTION TOOL 19
3.8 DATA COLLECTION PROCESS 20
3.9 ETHICAL CONSIDERATIONS 21
3.10 DATA ANALYSIS 22
CHAPTER 4: RESULTS 23
4.1 INTRODUCTION 23
4.2 RESPONSE RATE 23
4.3 DESCRIPTIVE ANALYSIS 24
4.3.1 Socio-demographic characteristics of participants 24
4.3.2 Clinical characteristics of participants 25
4.3.3 Pregnancy and delivery experience 26
4.3.4 Infant characteristics 26
4.3.5 Delivery details 27
4.3.6 Relationship status 28
4.3.7 Suicide or infanticide risk assessment using the EPDS questionnaire 29
4.4 COMPARISON OF SCREEN POSITIVE AND SCREEN NEGATIVE FOR PND 29
4.4.1 Socio-demographic characteristics of participants 29
4.4.2 Clinical details of postnatal mothers 32
4.4.3 Pregnancy and delivery experience 33
4.4.4 Infant characteristics 33

4.4.5 Delivery details 34
4.4.6 Relationship status 35
4.4.7 Suicide or infanticide risk assessment using the EPDS questionnaire (Question 10) 36
4.4.8 Logistical regression 37
CHAPTER 5: DISCUSSION 40
5.1 INTRODUCTION 40
5.2 PROPORTION OF MOTHERS WHO SCREENED POSITIVE FOR PND 40
5.3 SOCIOECONOMIC FACTORS 41
5.3.1 Age 41
5.3.2 Marital status 41
5.3.3 Level of education 42
5.3.4 Employment status of one of the parents 42
5.4 MATERNAL HEALTH 43
5.4.1 Medical condition 43
5.4.2 Mothers with a history of previous mental illness 43
5.4.3 Mother's family history of mental illness 44
5.4.4 Mothers with a history of PND 45
5.4.5 Mothers who were breastfeeding 45
5.4.6 Mothers who used contraceptive methods that failed prior to falling pregnant 46
5.5 PREGNANCY AND DELIVERY EXPERIENCE 47
5.5.1 Mothers who planned the pregnancy 47
5.5.2 Mothers with negative perception of the pregnancy 47
5.6 INFANT CHARACTERISTICS 48
5.6.1 Desired sex of the child 48
5.6.2 Mother's perception that the child cries often 49
5.6.3 Mothers with a sick child 49
5.7 DELIVERY DETAILS OF POSTNATAL MOTHERS 50
5.7.1 History of miscarriage (one or multiple) 50
5.7.2 Mode of delivery 50
5.7.3 Mothers who had complications during labour 51
5.7.4 Baby outcome 52
5.8 RELATIONSHIP STATUS 52

5.8.1 Mothers who are in relationship with the father of the child 52
5.8.2 Mothers who are living with the father of the child 53
5.8.3 Mothers whose partners are financially supportive 54
5.8.4 Mothers who are in polygamous relationships 55
5.8.5 Mothers who are receiving support from their family or in-laws 55
5.9 SUICIDAL OR INFANTICIDE ASSESSMENT USING EPDS QUESTION 10 56
5.10 LIMITATIONS AND BIAS 57
5.10.1 Cross-sectional study 57
5.10.2 Selection bias 57
5.10.3 Reporting bias 57
CHAPTER 6: CONCLUSION AND RECOMMENDATIONS 59
6.1 INTRODUCTION 59
6.2 CONCLUSION 59
6.3 RECOMMENDATIONS 59
REFERENCES 61
APPENDICES 67
APPENDIX A 67
Part I: Participant information sheet 67
Part II: Consent form 69
APPENDIX B: EDINBURGH POSTNATAL DEPRESSION SCALE 70
APPENDIX C: SOCIO-DEMOGRAPHIC AND HEALTH QUESTIONNAIRE 71
APPENDIX D: ETHICAL APPROVAL 73
APPENDIX E: REQUEST FOR RESEARCH PERMISSION 74
APPENDIX F: CONSENT FOR CONDUCTING RESEARCH 75
APPENDIX G: DECLARATION OF EDITING SERVICES 76

List of Tables

Table 3. 1: Statistical Test Table 22
Table 4. 1: Socioeconomic description of postnatal mothers at Levai Mbatha CHC 24
Table 4. 2: Medical details of postnatal mothers at Levai Mbatha CHC 25
Table 4. 3: Pregnancy and delivery experience of postnatal mothers 26
Table 4. 4: Infant characteristics 27
Table 4. 5: Delivery details of postnatal mothers 29
Table 4. 6: Relationship status of mothers 30
Table 4. 7: Suicidal and infanticide risk assessment based on the question 10 of EPDS 31
Table 4. 8: Comparison of socioeconomic descriptions of post-natal mothers at Levai Mbatha CHC based on the EPDS outcome 33
Table 4. 9: Comparison of clinical details of post-natal mothers at Levai Mbatha CHC based on the EPDS outcome. 34
Table 4. 10: Comparison of the pregnancy and delivery experience of post-natal mothers at Levai Mbatha CHC based on the EPDS outcome 35
Table 4. 11: Comparison of infant characteristics of postnatal mothers at Levai Mbatha CHC based on the EPDS outcome 36
Table 4. 12: Comparison of delivery details of post-natal mothers at Levai Mbatha CHC according to the EPDS outcome. 37
Table 4. 13: Comparison of relationship status of mothers at Levai Mbatha CHC based on the EPDS outcome 38
Table 4. 14: Comparison of Question 10 of the EPDS score of mothers at Levai Mbatha CHC according to the EPDS outcome 39
Table 4. 15: Multivariable analysis (Adjusted) predicting factors associated with PND 40

Acronyms

APA	American Psychiatric Association
BDI	Beck Depression Inventory
BMD	Bipolar Mood Disorder
CHC	Community Health Centre
DSM	Statistical Manual of Mental Disorders
DSM-5	Statistical Manual of Mental Disorders 5th Edition
EPDS	Edinburgh Postnatal Depression Scale
EPI	Expanded Programme of Immunisation
HIV	Human Immunodeficiency Virus
ICD	International Classification of Diseases
PHC	Primary Health Care
PHQ-9	Patient Health Questionnaire
PND	Postnatal depression
PPD	Postpartum depression
PPND	Paternal postnatal depression
SI	Suicidal Ideation
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Depression is one of the conditions that contributes largely to the global burden of disease; it affects the population worldwide.[1] Women in general, and those in the perinatal period in particular, are more vulnerable.[2] It is estimated that 20% of women globally will experience a depressive episode while in the perinatal period,[3] and of these, very few will seek, or benefit from, medical attention especially in economically challenged communities.[3] In the United State of America (USA), in 2009, the Center for Disease Control and Prevention (CDC) reported that 10 to 15% of women had signs and symptoms of depression. The same report concluded that the prevalence in poor communities in the USA might be higher because of the poor health seeking behavior of those communities and the lack of access to healthcare.[4]

In developing countries, there is a wide range in the prevalence of postnatal depression (PND). The lowest reported prevalence in literature is in Nepal, in a study conducted by Ho-Yen et al., which found 5% of women in the studied population had PND.[5] The highest reported prevalence in poor countries was in India, where 59% was found among postnatal mothers.[6] Despite this discrepancy, the prevalence in developing countries is higher than that globally.[7] In Africa, PND has been reported to be the most predominant psychiatric condition.[8] In South Africa, prevalence has been reported in literature in different communities, with the highest (50%) reported among mothers in a rural community in the Western Cape.[9]

Like all other medical conditions, PND has risk factors. Several factors have been reported to be in association with PND, but these differ from one community to another and their identification will play a major role in preventing and managing PND. If remained undiagnosed and untreated, PND can lead to complications, which might affect the mother, the infant, the family and the entire community in general.[10]

1.2 RATIONALE

The World Health Organisation (WHO) has set goals to improve the global health of communities. The prompt diagnosis and treatment of mental disorders are part of the WHO's sustainable development goals.[3] Despite its impact on the mother's, children's and families' lives,

PND is not receiving the attention it deserves compared to other medical disorders in general and psychiatric disorders, particularly in developing countries.[7,8] There is very little data available in the developing world in regards to PND, as most data is collected in developed countries.[8] There is therefore a need to know the prevalence of this condition in developing and economically challenged communities.

Poverty has been reported to be a risk factor for PND and Sedibeng district, in Gauteng Province, South Africa, has an employment rate of only 35.4%. Compared to other districts in Gauteng, Sedibeng has the lowest number of tertiary graduates and the highest number of people with only primary education.[11] Based on these statistical figures, it is important to know whether these socio-demographic factors modulate the risk of PND in this community. Evaton is a township in the Sedibeng district.

This study can provide information and data on PND and help to isolate risk factors that are more likely to be found in mothers who have PND in this particular community. The results might lay a scientific foundation for the development of policies for early detection of PND in the Evaton community, but also in other similar communities. Furthermore, from the literature review, no other studies have been conducted to evaluate the prevalence of PND in the Sedibeng district in general and in Evaton in particular communities.

1.3 AIM

- To explore the point-prevalence and factors associated with PND in Levai Mbatha Community Health Centre (CHC), Sedibeng District.

1.4 OBJECTIVES

- To describe participants' socio-demographic characteristics and clinical profile
- To determine the proportion of women who screen positive for PND among mothers attending the postnatal clinic at Levai Mbatha CHC, using the Edinburgh Postnatal Depression Scale (EPDS).
- To compare the socio-demographic and clinical profile of postnatal mothers who screened positive for PND with those who screened negative for PND.
- To determine those factors that are significantly associated with PND at the postnatal clinic of Levai Mbatha CHC, Evaton.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

This chapter provides an overview of the current knowledge on PND. The research involved a search of articles using PubMed and Google scholar engines for studies written in English or French and published between 2000 and 2018. The search focused on the prevalence and risk factors or determinants of postnatal or postpartum depression. The Medical Subject Headings (MeSH) was used with the following keywords: “depression”, “postnatal”, “risk factors” and “prevalence”. Statistical and government reports were also included in the search. Articles dealing with PND in mothers who had premature delivery, hospitalised mothers, HIV (Human Immunodeficiency Virus) positive mothers and mothers of babies admitted to an intensive care unit were excluded from the search.

This chapter comprises the following: Historical overview, definition of PND or postpartum depression (PPD), as used by the Statistical Manual of Mental Disorders (DSM), its aetiology, the prevalence of the condition, the health impact, risk factors, screening, and differential diagnosis.

2.2 HISTORICAL OVERVIEW

Hippocrates saw symptoms of what is now called PND in some women after delivery, but it was believed that PND was caused by the ascension of lochia into the brain after the vaginal secretion had stopped.[12] Other classic writers also described a depressed mood post-delivery with different theories on its etiology. Only in the 19th century did studies describe negative symptoms such as low mood, insomnia and melancholy in women after delivery.

In 1984 PND was described in a diagnostic document, the DSM, which was already at its third edition. The DSM was developed by the American Psychiatric Association (APA) with the aim of giving psychiatrists a nomenclature and description of all recognised psychiatric conditions.[12] PND has since evolved in term of its definition, diagnostic criteria and coding. As mentioned before in the fifth edition of the DSM, PND was included in a more comprehensive diagnosis, “perinatal depression”, as authors and scientists strongly believed that the depressive event

occurring in the postnatal period could be a manifestation of a broader condition which probably started during the perinatal period.[12, 13]

2.3 DEFINITION OF PND

In its fourth edition the DSM defined PND as a "major depressive disorder which symptoms last at least 2 weeks and occur within the 4 weeks post-delivery".[13,14] A diagnosis of major depressive disorder is made when five of the following nine symptoms associated with major depression are fulfilled: a depressed mood, diminished interest or pleasure, significant weight loss, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue or loss of energy, inappropriate guilt, lack of concentration, and suicidal ideation. Either depressed mood or loss of interest or pleasure must be present.[13] The diagnosis of PND should be made when five of the nine symptoms of depressive mood cited above occurred in the postnatal period, within four weeks postpartum.[12,13]

Almost 10 years later, the fifth edition of the DSM made changes to the definition, especially in terms of the period of onset and the term "postpartum" that was replaced with "perinatal", which in the DSM-5 includes ante- or prenatal depression and postnatal or postpartum depression. These changes were based on the fact that, although the disease usually begins in the post-natal period, it is influenced by prenatal factors.[15] However, both the DSM-IV and DSM-5 have maintained the four-weeks postpartum period regarding the onset of the illness.[14, 15] Despite the DSM-5 changes, experts still use the terms postpartum or postnatal depression for depression diagnosed after delivery, and antenatal depression when diagnosed before delivery.[15]

Contrary to the changes in the DSM-5, the International Classification of Diseases in its 10th edition (ICD-10) kept the DSM-IV definition and criteria of postpartum or postnatal depression, except that symptoms must occur within 6 weeks post-delivery.[13]

Experts are still divided on the length of time of the postnatal period to be considered for PPD. Some opinions go beyond the 4 weeks suggested by the DSM or the 6 weeks suggested by the ICD-10.[13, 16] Various experts have defined PND as a depressive psychological mood disorder which can affect women's moods from delivery up to one year post-delivery.[17] As cases of PND diagnosed up to one year post-delivery have been described in the literature, this study will use the definition of PND where a one-year period is indicated.

While the focus in research has been on women, the literature also describes paternal postnatal depression (PPND) and indicates that 1.2% to 24.4 % of fathers may develop PPND within 12 months post-delivery. [18] These figures double when the mother concurrently has maternal PND. Therefore, the risk of the father's developing PND is exponentially higher when the mother has PND. Similar tools used to screen for maternal PND are also used for PPND[18, 19] with the latter condition also having a negative effect on the child's emotional and behavioral wellbeing.[19]

2.4 ETIOLOGY OF PND

The following three theories attempt to explain the etiology of the illness:

2.4.1 Biological theory

This theory is based on the belief that the disease is caused by changes in hormonal levels during pregnancy, delivery and the postnatal period. During pregnancy and the postpartum period, hormonal changes in the hypothalamic-pituitary-adrenal/gonadal axis lead to the mood changes seen in these periods.[16,20] This theory has been supported by the mood changes seen during the menstrual period, pregnancy and the postnatal period on the one hand, and the improvement in symptoms observed after oestradiol administration on the other.[16]

Furthermore, in comparing the gene expression of euthymic mothers with that of mothers with a PND-9 type gene, researchers have also been exploring the genetic changes which could expose mothers to developing PND. These findings that the PND-9 type was recurrent in more than 90% of mothers with PND indicated that genetic changes could be among the risk factors of PND. More studies are needed to consolidate this theory, though.[21]

2.4.2 Psychological theory

This theory assumes that the cause of PND resides in the stress accompanying pregnancy, delivery and parenting causing the mother to be vulnerable to depression. Several social and psychological factors might enhance this stress and lead to depression.[16] Social stressors and interpersonal events are believed to lead to neuro-transmission changes in the brain leading to a mood change. Psychodynamic factors such as difficulty in accepting the mother role, interpretation of childbirth as a loss of beauty or freedom, family members' negative attitude toward the pregnancy, or the relationship with the father of the child.[16, 22]

Cognitive factors also play a role in the psychological theory. Compulsive attitude, perfectionism, expectation of childbirth and pessimism are cognitive factors which can lead to psychological changes leading to postnatal depression. Life events that lead to dramatic changes, uncertainties in the relationship, divorce and lack of social support can be among personal factors that can affect the mother's psychological state. [22]

2.4.3 Bio-psycho-socio-cultural theory

This theory combines the biological and psychological frameworks and argues that this illness is not the result of one cause but a combination of several factors.[16]

2.5 PREVALENCE OF PND

According to the WHO, depression is the main cause of disability in the world. This includes depression during the perinatal period. More than 350 million people worldwide suffer from depression, women more so than men. During delivery almost 85% of women will experience some emotional disturbance but only 10% will later develop PND.[23] This condition affects women across the globe, with the prevalence varying from 0.5% to 60.8%.[14] Very few studies have reported a prevalence of above 50%. The large variation in prevalence may be due to differences in the definition and measurement tool of the disease as well as the influence of psychosocial factors. In the United States, 13% of women experience signs and symptoms of the disease[4] whereas in Brazil 26.3% of women reportedly experience PND.[24]

It has been shown that common perinatal mental disorders, including PND, are more common in developing countries than in high-income countries.[7,25] Also, in developing countries socio-economically challenged communities such as informal settlements, rural areas and townships are reported to have a very high prevalence of women suffering from PND.[25] Being one of the poorest regions in the world, Sub-Saharan Africa has a high prevalence of women suffering from PND.[7,8] In Nigeria, for example, a 30.6% prevalence of PND among Igbo women in rural settings was reported.[41] In South Africa, the literature describes a varying prevalence with the highest being 39% in urban settings[9] and 50% in rural areas.[26] Both the urban and rural South African studies were conducted in the Western Cape.

2.6 HEALTH IMPACT OF PND

2.6.1 Child's health

Maternal depression in general, and postpartum depression in particular, compromise children's developmental wellbeing. The Canadian Paediatrics Society has acknowledged the negative impact of maternal depression on the future development of the child. According to their findings, nutrition and health status as well as intellectual and emotional growth are impaired in children of mothers suffering from postpartum depression.[27]

There is also evidence of an increase in infant morbidity and mortality in low- and middle-income countries among children of mothers who suffered from PND.[28] In a longitudinal study conducted on 1 555 children between 12 and 24 months of mothers who had screened positive on the EPDS for PND, maternal PND was significantly associated with the children's poor communication skills.[29] A meta-analysis conducted among more than 900 children identified PND as a risk of low intelligence quotient in children.[30]

2.6.2 Woman's health

Culture plays a big role in the manifestation of PND. A review of the manifestation and prevalence of the disease around the globe has shown those women's experience and manifestation of the disease differ[31]. In African women, PND is more characterised by its physical symptoms (headache, generalised body pain, backache and fatigue), whereas in techno-centric cultures like Western Europe, North America and Australia, mood changes are more prevalent in women with PND.[31]

African women can in this also be victims of fear of stigmatisation, as in Africa pregnancy, birth and the postpartum period are considered a blessing to the woman and the entire community. As the latter want this period and the integration of the "gift baby" to be a positive experience, the idea of a postpartum period causing disease in the mother and/or the father can be seen as wickedness.[31, 32] As mentioned before, this disease negatively affects the child's nutritional, health, physical and connectives development, and these adverse effects on the child can be aggravated by contextual risk factors.[27, 28]

2.7 RISK FACTORS OF PND

There are a number of risk factors associated with PND. In a systematic review conducted by Yim I.S et al,[16] postnatal predictors were classified into biological and psychosocial predictors. Hypothalamic-Pituitary adrenaline deregulation, inflammation processes and genetic vulnerability were the major biological predictors. Recent research has focused on genetic changes in mothers with a history of PND because of the perception that genetic factors could play a role in the development of PND. If proven, this could resolve the heredity question of PND.[21]

The second group of predictors is psychosocial predictors. This group has been studied more than the biological predictors. Psychosocial predictors are divided into two subgroups: stress-related factors (difficult life events and chronic stress such as work, parenting stress and financial stress), and interpersonal factors (quality of the relationship between the partner and the mother, interpersonal abuse, poor social support, poor partner support and substance abuse). Other relationships such as with friends and colleagues seem not to be associated with PPD.[16]

Other authors have classified risk factors of PND into socio-demographic, pregnancy and birth-related and psychosocial groups.[8, 32, 33]

2.7.1 Socio-demographic factors

The influence of socio-demographic factors on PND is still not clear. A study conducted in Brazil over five years involving more than 23 000 postnatal mothers found that socioeconomic factors such as age, marital status and economic class of the mother did not influence the development of PND among Brazilian women.[24] Similar results were found in a prospective longitudinal study of 139 women conducted in Australia.[33]

In contrast, Sawyer et al[8] in a systematic review of the pre- and postnatal psychological wellbeing of African mothers found that the occurrence of PND was influenced by socio-demographic factors such as marital status and type of relationship, with single mothers being more likely to develop PND than married women.[8] Similar findings were reported in a cross-sectional study conducted in rural South Africa where unmarried women were more likely to have PND.[26] This can be linked to the social stigma faced by mothers who have children out of wedlock as some parts of African society could see it as being promiscuous.

Also, postnatal mothers living in a polygamous relationship were more likely to suffer from PND than those in a monogamous relationship. Although several African cultures practice polygamy, it has been known to create family instability.[8] These findings are in line with those of Fisher J. et al,[13] who found in a systematic review on the determinants of perinatal mental disorder in developing countries that several socio-demographic and socioeconomic factors could influence the perinatal mental health of mothers.[7] Those factors are marital status, economic status, and the gender of the baby, especially in communities where they discriminate against one gender.

Similar to the different predictions of PND on account of socio-demographic factors, researchers are not unanimous on the influence of certain pregnancy- and birth-related factors. Factors like parity, pregnancy complications and mode of delivery have been found not to significantly predict PND.[7, 24, 25, 26] However, a large Brazilian study found that although obstetric complications, mode of delivery and outcome did not lead to an increase in PND and parity, unplanned pregnancy and poor hospital care were strongly associated with PND.[24] A psychiatric history during pregnancy (especially a history of PND) was also found to be a strong predictor of PND. This has been confirmed in some systematic reviews and meta-analyses conducted in developed and developing countries.[16, 34]

2.7.2 Psychosocial factors

"Psychosocial factors play a major role in the occurrence and management of PND and are the most studied predictors compared to socio-demographic and pregnancy- and birth-related factors." In Sub-Saharan Africa, a systematic review on the cultural determinants of PND conducted by Wittkowski et al [14] has found that cultural factors weighed into the development of PND among women. "The cultural factors which influenced the development of PND among women in the region consisted of a difficult relationship with the father, a negative life event, an unplanned pregnancy, being unmarried, and a low level of education". Difficult economic circumstances have also been seen as a strong predictor of PND, together with drug and alcohol abuse. The above factors are among the determinants of high prevalence of PND in developing countries.[26, 32]

2.7.3 Infant-related factors

As the infant is the ultimate outcome of the pregnancy, it becomes the object of focus after delivery. Several determinants related to the newborn have been described in the literature. Of those, the sex of the baby seems to be significantly associated with the occurrence of PND. Studies among Jordanian and Chinese mothers have found that not having a child of the desired sex was significantly associated with the mother later developing PND.[35, 36] In Arab countries it has been found that having a baby girl was significantly associated with PND.[37] Such findings are a strong indication of the influence of society and religion on the mother's preferences.

Besides the child's sex, its health status has been described in the literature as a determinant of developing PND. Newborns' health problems and birth outcome have been significantly associated with maternal depression. In low- and lower-middle-income countries, mothers of a sick child were up to six times at risk of PND compared to those who had healthy babies.[7] This was confirmed in a cross-sectional study among postnatal mothers in Kinshasa in the Democratic Republic of the Congo[51] as well as in Kampala, Uganda.[54]

Apart from the newborn's health, the impression that the baby cries incessantly at night is considered a risk factor for PND. Studies conducted among mothers living in developing countries have found that the mother's frustration due to the crying of the baby, especially at night, exposes the new mother to psychological stress which makes her vulnerable to PND.[7]

2.7.4 Pregnancy- and delivery-related factors

The pregnancy experience and delivery play a big role in the mother's sense of satisfaction during the postnatal period. In a cross-sectional study conducted in rural South Africa, unplanned pregnancy was found to be associated with PND.[26] Miscarriage and loss of a child are among the most stressful events in a woman's life. Previous miscarriage/s have been linked with PND in a subsequent pregnancy, as the miscarriage experience could increase worries and pressure on the new mother.[38] Mothers with a history of stillbirth who lived in low- and middle-income countries had an eight times higher risk of developing a mental disorder, including depression, than those who had never had depression.[7]

Caesarian section and complications during delivery are both described in the literature as risk factors for PND. Mothers living in low- and middle-income countries including South Africa

were found to be at an almost four times higher risk of having PND when they delivered via Caesarian section.[7]

2.7.5 Maternal medical and psychiatric history

Maternal current and previous medical conditions have been shown to be associated with PND. A large survey in Brazil showed that mothers with a pre-existing medical condition had a three times higher risk of developing PND.[24]Mothers need to be in good health to carry out their motherhood duties well. If that is not the case, it can lead to frustration and stress which can lead to PND. Chronic and acute conditions can add much strain to a mother's life. In South America, a study has shown that mothers with medical conditions were almost three times more at risk to develop postnatal depression compared to their counterparts.

Although the South African National Department of Health has made tremendous progress regarding medical care, the cost, effort, family involvement and changes which occur because of acute or chronic disease can lead to a depressive state. According to an Argentinean study, a history of psychiatric condition including depression was a predictor of postnatal depression.[39] A large study conducted in rural South Africa has found that in the broad definition of psychiatric illness, almost two thirds of participants were found to be suffering from a certain level of such illness.[40]

2.8 SCREENING OF PND

The most valuable tool in diagnosing PND remains good clinical interviews, with the theory of systematic screening for PND among women still being controversial. Based on current evidence, the screening of postpartum mothers for depression using validated tools with a scheduled follow-up has been recommended by four major professional academies in the United States: The United States Preventive Services Task Force, the American Academy of Field Physicians, the American Association of Obstetrics and Gynaecology, and the American Academy of Paediatrics. In contrast, the Canadian Task Force on Preventive Health Care, the UK National Institute for Health and Clinical Excellence and the Scottish Intercollegiate Guideline Network still do not recommend screening for PND.[41] Nevertheless, there is unanimity on the increasing importance of screening in the presence of risk factors. This position has been endorsed by the United States Preventive Services Task Force, which in February 2016 made screening for

depression in postpartum women a recommendation. This was based on evidence that showed a reduction in morbidity and mortality when screening and follow-up are done.[27, 41]

In developing countries where the prevalence of the disease can be higher than in high-income countries, screening for the disease can be considered a major step in the delivery of postnatal care, leading to the improvement of maternal mental health in general. A large randomized controlled trial involving more than two thousand women found that screening and management of parturient for PND improved depression outcomes and quality of life of postnatal women.[42]

Several screening tools such as the Patient Health Questionnaire (PHQ-9), the Beck Depression Inventory (BDI) and the Edinburg Postnatal Depression Scale (EPDS) have been developed for the screening of PND.

2.8.1 The Patient Health Questionnaire (PHQ-9)

This comprises a list of nine questions derived from the nine depressive signs from the DSM-IV. Symptoms of depression over the previous 4 weeks are assessed. The PHQ-9 is part of the Primary Care Evaluation of Mental Disorder (PRIME-MD). Although this tool was initially developed to assess the progress of adult patients who are depressed, it can also be used as a screening tool for patients at high risk of depression such as postnatal patients, patients with a stroke, and those with a chronic disease.

The PHQ-9 also assesses the severity of PND. Each of the nine questions has four possibilities of answers which according to severity go from 0-3, leading to a global total of 0-27. Patients who score lower than four do not have depression. Those whose scores are between 5 and 9 have mild depression and require a follow-up screening. A score of 10-14 indicates moderate depression, and the patient might require pharmacotherapy. A score of 15-19 indicates that the patient may have moderately severe depression, for which counseling and pharmacotherapy are recommended. Mothers who score more than 19 are considered to have severe depression and on top of counseling and pharmacotherapy, a referral to a psychiatrist is strongly advised.

The PHQ-9 has been validated internationally in primary health care, with a sensitivity and specificity of 61% and 97%, respectively. It can be used in less than three minutes in primary health care to diagnose depression and assess its severity, including responsiveness to treatment.[43] PHQ-9 has been found to be effective in screening for PND and has shown good

concordance with the EPDS.[43] Because, it is a self-reporting tool, the PHQ-9 can fall victim to reporting bias. To mitigate this, the tool can be dispensed in a structured or semi-structured interview format.

2.8.2 The Beck Depression Inventory (BDI)

The BDI is a self-administered questionnaire of 21 items used to assess the severity of depression. It was developed in 1961 by A.T. Beck.[7] Items consist of specific common symptoms of depression grouped into affective and somatic symptoms. This tool was initially used to assess the severity of depression. Each question has four possible questions, scored from 0-3. According to the scale, depression can be minimal, mild (< 15), moderate (15-30) and severe (>30). From the original version, several variants have been developed including shorter versions with 13 items, 11 items and others.

The BDI can be used to screen for postpartum depression. It has a sensitivity of up to 82% and a specificity of 86-89%. Its second version, adapted to the DSM-IV, has a specificity of 97-100%.[44] Due to its being a self-administered questionnaire; reports are subject to patients' exaggerating or minimizing the symptoms. In South Africa this tool is validated in English and Xhosa.[26]

2.8.3 Edinburg Postnatal Depression Scale (EPDS)

The EPDS was developed in 1987 by Cox et al, initially to screen for PND in women in the United Kingdom. Later it was used for other types of depression as well. It assesses the patient's mood for the last seven days. It is the most often used of all screening tools.[45,46,47] and the most used screening tool for PND in Africa.[46] It is easily accessible, available and administered, and is widely accepted by women. It can be used for antenatal and postnatal depression.[45]

The EPDS is a scale comprising 10 question items with four possible answers each, scored 0 to 3. Patients with a total score of 13 and more out of a possible 30 are considered at risk of postpartum depression and strongly need further assessment and management. The last question item of the EPDS is thought to predict patient safety, as it assesses suicidal ideation and infanticide tendencies. It is recommended that any patient who scores 1, 2 or 3 in this item requires further evaluation before leaving the institution.

In South Africa the tool is validated in English, Xhosa and Zulu. In its original version of 10 questions, the EPDS can be delivered in less than five minutes. A score of lower than 8 is interpreted as depression being not likely, and the practitioner only needs to continue providing support. A score of 9-11 indicates that PND is possible. Such a patient needs to be closely monitored and reviewed in two to four weeks. A score of 11 to 13, though, shows a fairly high possibility of PND. The patient therefore needs to be assessed by a mental health practitioner. Lastly, a score of 14 and more means that postpartum depression is probable.[44]

As mentioned above, Question 10 of the EPDS assesses suicidal and infanticide risk. A score of 1, 2 or 3 to this question indicates suicidal risk and the patient requires urgent psychiatric assessment and, if necessary, admission based on the outcome of further suicide risk assessment tools such as the SAD PERSONS scale.[44] Screening between the sixth and 16th weeks postnatal is more specific, as it is during this period that the prevalence of PND is at its highest.[44]

In primary health care several tools are used to screen for PND, however, the EPDS is the most used in a primary health care setting.[45,46] A systematic review on the validity and reliability of peri-natal depression screening tools used in Africa found that the EPDS was the most used in Africa.[46] A systematic review conducted by Gibson J et al,[17] though, found that the sensitivity and specificity of the EPDS was widely different from one population to another, the overall sensitivity being 73% and the specificity 97%, with a highest positive likelihood of 78.

The English version of the EPDS has very high reliability, stability and accuracy in screening for postpartum depression.[47] Despite the advantages of assessing the affective and cognitive aspects of depression, EPDS does not consider the woman's contextual situation and does not assess the somatic aspect of depression. Also, EPDS only screens symptoms from the previous 7 days, thereby limiting the reporting of previous depressive episodes.

2.9 CLINICAL MANIFESTATIONS

Symptoms of PND are the same as those of major mood disorders as per the DSM-V. Several studies have isolated sadness and feelings of guilt about the believed incompetence to take care of the newborn to be specific to PND, as compared to depressive mood disorder resulting from pregnancy. Predominant signs like sadness, feelings of worthlessness, mood swings and worries about the care of the baby are predominant in PND.[48] Depressive mood disorder symptoms,

which can start at any time post-delivery, have been noted to appear mostly on the first year postnatal. Although the literature has described patients with PND symptoms after the first year postnatal, the APA limited the symptoms of PND to one year post-delivery with a peak seen in the first 16 weeks post-delivery.[32, 42]

Although psychotic features can be present in a severe PND episode, they are more visible in postnatal psychosis which is a rare but serious postnatal psychiatric condition that may lead to infanticide or suicide.[2, 5]

2.10 DIFFERENTIAL DIAGNOSIS

PND can be confused with other postnatal psychiatric entities, as most postnatal psychiatric conditions are due to the hormonal, psychological and emotional changes that occur during pregnancy and the postnatal period.[1, 5] There are two psychiatric conditions which manifest in the postnatal period that can be confused with PND.

2.10.1 Postnatal blues

Postnatal blues is a mood disorder which affects mothers from a few hours up to ten days after delivery.[1,15] New mothers feel depressed because they do not think they are able to take proper care of their newborn babies, and consider themselves failures.[15] Hormonal changes during pregnancy and the shift of certain hormone levels after delivery have been identified as the main cause of this condition.[1] Postnatal blues is so common, in some developed countries it affects up to 85% of parturient. It can easily be confused with PND, as both are postnatal mood disorders. However, contrary to PND, mothers suffering from postnatal blues do not fit the DSM-5 criteria of major depression.

Furthermore, the symptoms in postnatal blues do not influence the mother's social and functional life and do not last longer than 10 days.[1,15] Unlike PND, postnatal blues does not require any medical treatment or measures such as educating the mother about the disease and encouraging them to speak about their depressive experience. Medical observation and looking for this illness during the antenatal visit could help the mother to cope well.[5] However, mothers who developed postpartum blues are at risk of developing PND. Healthcare practitioners should therefore closely observe the new mother and at no point rule out more serious conditions.

2.10.2 Postpartum psychosis

Postpartum psychosis is a severe depressive mood disorder which appears in the four weeks post-delivery period. This disorder is associated with disorganised behavior, mood swings and psychotic features such as hallucinations and delusions.[15]

Compared to PND, postpartum psychosis is rarer, affecting only one to two of 1 000 postpartum mothers.[5] It has acute onset with dramatic outcomes such as suicide and infanticide. The illness can present itself either with manic episode where the mother experiences high levels of energy, "flight" of ideas, hallucination and delusion, or with depressive symptoms such as insomnia, anorexia and feelings of worthlessness. The latter can be confused with PND; however, the psychotic components of the disease will show the difference. PND has psychosocial and demographic risks as main factors whereas postnatal psychosis has more biological and genetic risk factors. There is a relationship between bipolar mood disorder (BMD) and postnatal psychosis, and mothers who have suffered from postnatal psychosis have a 30% risk of developing BMD. Apart from BMD, schizophrenia and schizoaffective disorder seem to be strong underlying elements in the development of postpartum psychosis.[1,2]

The management of puerperal psychosis requires ensuring the mother's and baby's safety. Therefore, hospitalisation with high supervision in a psychiatric unit is warranted. High potency conventional antipsychotics are recommended in the treatment. If the patient is also suffering from BMD or has suffered from it, mood stabilisers may be considered. However, the safety of the breastfed child needs to be taken into account.[2,5]

2.11 SUMMARY AND CONCLUSION

In summary, the prevalence of PND is not the same across the globe. Women living in developing countries and poor communities are more at risk to develop PND. Several factors are involved in the occurrence of PND, including demographic, cultural, biological and psychosocial factors. Sedibeng district is the most socio-economically deprived region of Gauteng province and the prevalence and risk factors associated with PND are not known. This study aimed to use the EPDS screening tool to determine the prevalence and factors associated with PND at Levai Mbatha clinic, Evaton.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This chapter describes the methods and steps taken to conduct this study. It reports on the study design, study setting, population, data collection and data analysis.

3.2 STUDY DESIGN

This research utilized a cross-sectional design. Also known as a prevalence study, this is a research design that gives a descriptive snapshot of the study population at a single point in time. It was deemed appropriate for this study as the relationship between PND and specific variables was observed only once, at a specific point in time.

3.3 STUDY SETTING

This study was conducted at Levai Mbatha CHC in Evaton, a township of 28.37 km^2 in the Vaal Region south of Gauteng. Apart from rendering a 24-hour emergency and maternity service, there are several programs that are run from 08:00-16:00 on weekdays (excluding public holidays): the EPI, primary mental health care services, oral health services, HIV voluntary counseling and testing, a medical male circumcision program, physiotherapy, and youth-friendly services. In the Evaton area, almost all residents speak Sotho, Zulu or English. The clinic provides primary health care (PHC) services to a population of 80 963 residents, of whom 67 491 do not have medical insurance.

Postnatal and baby cares are among the services that the PHC section of the clinic offers. Mothers who attend Levai Mbatha for their postnatal visits have mostly been delivered at secondary-level hospitals and at the Midwife Obstetrics Unit (MOU). Mothers are first seen by an enrolled nurse or community health care worker for vital signs and are then consecutively attended by the doctor or a professional nurse. Those who need immediate attention are seen as emergencies. While waiting for the vitals to be done or to be attended to by a doctor or a professional nurse, the community health care worker provides patients (including postnatal mothers) with community health education on breastfeeding, immunisation, hygiene, family planning, HIV and AIDS prevention, health-seeking behavior change, home affairs registration and other subjects.

Contrary to the postnatal and baby clinics which are part of the main building of the clinic, the mental health section is in a separate building. It is run by three professional nurses, one enrolled nurse, one psychologist, one social worker and the district psychiatrist. The psychiatrist supervises senior registrars from the University of the Witwatersrand Psychiatric Department who are on outreach rotation. This section of the clinic is open from 08:00-16:00 Monday to Friday. Similar to the postnatal and baby clinic; patients are seen consecutively as they arrive. In the mental health section, doctors' consultations are on Wednesdays only. Those who immediately require a doctor's consultation on other days besides Wednesday are transferred to Kopanong District Hospital or Sebokeng Hospital where services are rendered at a 24-hour Psychiatric Department.

3.4 STUDY POPULATION

Gibson et al defined the period of risk of PND from delivery to up to one year post-delivery.[17] However, noting that the incidence peaks in the first 16 weeks,[3] only women of 18 years and older who delivered up to 16 weeks before were included in this study.

3.5 SAMPLING AND SAMPLE SIZE

This was a cross-sectional study using the consecutive sampling method. According to the District Health Information System, an average of 405 women consulted at Levai Mbatha CHC for postnatal consultation every trimester. The minimum sample size of mothers meeting the inclusion criteria to get statistical value was calculated using the Raosoft Sample Size Calculator. Assuming a confidence interval of 95%, power of 80%, a margin error of 5% with a response distribution of 50%, the minimum sample size is 198 mothers. After adjusting this by 10% for incomplete and missing data, the final sample size comprised 220 mothers. Of the 231 patients who participated in the study, 227 were included in the analysis and 4 were excluded.

3.6 INCLUSION AND EXCLUSION CRITERIA

3.6.1 Inclusion criteria

To participate in this study, mothers had to:

- Be 18 years or older to avoid including minors in the study, as they would require specific conditions to obtain their consent legally.
- Be no more than 16 weeks postnatal. Although symptoms of PND can manifest up to a year post-delivery, it is during the first 16 weeks post-delivery that mothers are more likely to express symptoms of the illness.[3]
- Give consent to participate in the study

3.6.2 Exclusion criteria

- Postnatal patients who presented in the Emergency Department. Mothers who present to the emergency department are most likely not in an emotional state to participate in this study, as the EPDS questionnaire has very sensitive and emotional questions.
- Mothers of stillborn babies. Such mothers are emotionally affected by the loss and the study will be inappropriate, as it can add stress. Also, the accuracy of their answers to the questionnaire might be biased and influenced by their current emotional state.
- Mothers of babies who were still in hospital. Such mothers are already in a very stressful situation, which might influence an assessment of depression.

3.7 DATA COLLECTION TOOL

The EPDS is the most used internationally recognized tool for screening of PND.[45,46,47] The EPDS (Appendix B) was used as a screening tool for PND with a cut-off of more than 13 to be screened positive for postpartum depression.[44] There are 10 questions that assess the mother's mood, including assessment of the possibility of laughing, enjoying things, self-blaming, worrying for no reason, panicking for no reason, being unable to control things, sleeping difficulty, feeling sad, crying for no reason and self-harm thoughts. Besides the EPDS, a questionnaire comprising questions probing different risk factors for PND according to the literature and socio-demographic information was administered to the mothers (Appendix C). The questionnaire was divided into several sections, namely demographic details, socioeconomic details, medical details, infant characteristics, delivery details and mother's relationship status.

3.8 DATA COLLECTION PROCESS

Before starting the data collection, a research team was formed. The team consisted of the researcher, a research assistant, a community health care worker, a professional nurse working in the postnatal clinic, a professional nurse working in the baby clinic, and a professional nurse working in the mental health clinic. The researcher held a training session with the team to explain the aim, objectives and process of the study. The role of every team member was explained, including the importance of transferring to the mental health clinic all patients screened positive for PND as well as those who scored one or more for Question 10 of the EPDS.

An effort was made to standardize procedures among all members of the research team. The community health care worker helped facilitate the logistics in terms of queue management by explaining to the mothers what the study was all about while they were in the waiting hall. Community health care workers ran community education topics every morning and at the end of their speech they informed the mothers about the study and told them that they would be approached in that regard. Participation in the research was part of all team members' normal work, including the researcher.

All postnatal mothers who came to the postnatal clinic or the baby clinic were approached individually after their vitals had been taken. The objectives, processes, prospects, interests and benefits of the study were then explained to these mothers, as well as the possibility of their being referred to another health care practitioner in the mental health care section of the clinic for further assessment and management according to the outcome of the interview. The mothers were invited to participate, and those who agreed were taken to a separate room where the researcher again presented the study and discussed the participant information sheet (Appendix A Part 1) with them. After this, each mother was invited to sign an informed consent letter which was kept in the patient file. Once the consent form was duly signed, the researcher or the research assistant dispensed the questionnaire. A distinctive yellow sticker was attached to the front of the participating mother's file or to the child's clinic card to avoid duplication.

During the interview the mother's responses were immediately captured on the questionnaire, which consisted of three parts: the participant information sheet, the risk factors questionnaire, and the EPDS. The whole interview and data collection process lasted a minimum of 15 minutes. Each page of the questionnaire was marked by a unique code representing the participant's study

number. After the questionnaire had been administered, participants joined the queue to be seen either by the sister or the doctor. To avoid participants' losing their place in the queue, each participant was placed back at their initial number in the queue.

If it so happened that patients behind them had been seen while they were participating in the study, they were immediately moved to the number one spot in the queue. This process was explained to all mothers during the community health worker's address in the morning. Participants who were screened positive for PND or those who scored more than 0 for Question 10 of the EPDS were immediately referred to the mental health section of the clinic for a mental assessment and management. All completed questionnaires were collected by the researcher at the end of the business day for data capture.

Data from the completed questionnaires were captured in a secured computerized file to which only the researcher and the supervisor had access using a PIN code. All participants received feedback from this consultation.

3.9 ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Human Research Ethics Committee (HREC) of the University of The Witwatersrand, Johannesburg (reference M160930). Additional approval was granted by the Sedibeng Health District. Furthermore, a participant information sheet (Appendix A) was used to explain to all prospective participants the purpose of the study, areas in which questions would be asked, non-existence of risk or benefits in participating or not participating. An informed consent form was provided to mothers who were willing to participate. The form was explained to them personally before they signed it to give consent. Confidentiality of participant information was maintained throughout the study. Participants were allotted codes to prevent identification. Data from the completed questionnaires and EPNDS was captured in a secured computerised file to which only the researcher and the supervisor had access using a PIN code. The correlation between participants' names and their codes was saved in a PIN code protected file.

3.10 DATA ANALYSIS

The data collected from each patient's questionnaire were captured onto an MS Excel sheet and transferred to STATA-10 software for analysis and coding. Descriptive statistics was used to describe the participants' socio-demographic and clinical characteristics, and to determine the proportion of mothers who screened positive for PND. According to the EPDS scoring the sample was divided into two groups: positive and negative. Those who scored above 13 were considered screen positive and those with a score of 13 or less, screen negative.

Group comparisons and associations were made using Chi-Square tests and logistic regression analyses to compare the profiles of mothers who screened positive for PND with those who screened negative in terms of socio-demographic and clinical characteristics. Descriptive statistics were summarized as frequency and/or percentages deviation for categorical variables and as means with standard deviation for continuous variables. Where statistically significant associations were detected ($p<0.05$), further analyses were carried out using logistic regression analysis to determine the strength of the association.

Table 3.1 shows the outcomes of the statistical analyses as per the study objectives. Each objective was subjected to an appropriate statistical test to give specific measurable outcomes.

Table 3. 1: Statistical Test Table

Objectives	Data test/tool	Outcome measures
To describe the socio-demographic characteristics of mothers attending the postnatal clinic at Levai Mbatha CHC, Evaton.	Descriptive statistics: 1. Categorical variables: sex, race, education level 2. Continuous variable: age 3. Clinical problems	1. Frequencies and percentages 2. Range, mean and standard deviation 3. Frequencies and percentages
To describe the clinical profile including co-morbidities of mothers attending the postnatal clinic at Levai Mbatha	Descriptive statistics: 1.Co- morbidities 2.Obstetrical characteristics	1. Frequencies and percentages 2. Frequencies and percentages
To determine the proportion of women who screened positive for PND among mothers attending the postnatal clinic at Levai Mbatha	Descriptive statistics	Percentage positive screens

CHC, using the EPDS.		
To compare the socio-demographic and clinical profile of postnatal mothers who screened positive for PND with those screened negative for PND	For categorical variables: Chi-Square test	Statistically significant differences $p<0.05$
To determine factors that are significantly associated with PND at the postnatal clinic of Levai Mbatha CHC, Evaton	1. Logistic regression analysis	Factors that are significantly associated with a positive EPDS statistical differences $p<0.05$

CHAPTER 4: RESULTS

4.1 INTRODUCTION

This chapter presents the results of the study in terms of the socio-demographic and clinical characteristics of the participating postnatal mothers, the pregnancy and delivery experience of postnatal mothers, infant characteristics, proportion of postnatal mothers who screened positive for PND on the EPDS, and results of tests of association and logistic regression. A p value of less than 0.05 was regarded as significant in this study.

4.2 RESPONSE RATE

Every mother who was approached to participate had to be accounted for. During the study, 231 mothers attending the postnatal clinic at Levai Mbatha from 16 December 2016 to 27 February 2017 were approached to participate in the study. Of those, 227 respondents who completed the whole questionnaire and the EPDS were included in the study.

One patient declined to participate, and another one could only speak Portuguese therefore the administering of the questionnaire needed to be interpreted. The researcher could not guarantee the validity of the translation in terms of the questionnaire. Two other participants were removed from the study as, despite their stating their age as 18 years, their date of birth on the file showed that they were not yet 18 years old at the time of the study. This brought the response rate to 98%.

4.3 DESCRIPTIVE ANALYSIS

4.3.1 Socio-demographic characteristics of participants

In total, 227 mothers participated in the study. Participants had a mean age of 27 years. Most of the participants (45.81%) were young, falling in the 18-25 years category, and 9.69% (22) participants were older than 35 years old. More than half (55.51%) reported to be single. The level of education reported by the participants indicated that only 3.96 % did not complete primary school. The results illustrated that most of the participants (59.91%) were either employed or had a partner that was working.

Table 4.1 describes the socio-demographic characteristics of the participants in this study.

Table 4. 1: Socio-demographic description of postnatal mothers at Levai Mbatha CHC

Age group of mothers	**Number (%)**
18-25 years	104 (45.81)
26-30 years	56 (24.67)
31-35 years	45 (19.82)
>35 years	22 (9.69)
Marital Status	
Single	126 (55.51)
Cohabiting	58 (25.55)
Married	42 (18.50)
Level of education	**Number (%)**
Did not completed primary school	9 (3.96)
Complete primary school	110 (48.46)
Completed secondary school	91 (40.09)
Attended a tertiary institution	17 (7.49)
Babies with at least one parent employed	

Yes	136 (59.91)
No	91 (40.09)

4.3.2 Clinical characteristics of participants

When it came to the medical condition of the participants, 32.16% reported to be suffering from medical conditions. However, in terms of their mental history, four participants (1.76%) reported to have suffered from mental illness in general and eight participants (4.17%) reported to have suffered from PND specifically. Furthermore, about one in every 10 (9.69%) of participants reported that they had a family member suffering from mental illness. Regarding breastfeeding, the results showed a high number of breastfeeding mothers, as 201 (88.15%) of the 227 participants reported to be breastfeeding their babies. The clinical characteristics of the participants in this study are depicted in Table 4.2.

Table 4. 2: Medical details of postnatal mothers at Levai Mbatha CHC (n did not equal 227 and varied due to missing data)

Mothers suffering from any medical conditions	**Numbers**
Yes	73 (32.16)
No	154 (67.84)
Mothers with history of previous mental illness	
Yes	4 (1.76)
No	223 (98.24)
Mothers with family history of mental illness	
Yes	22 (9.69)
No	205 (90.31)
Mothers with history of PND	
Yes	8 (4.17)
No	184 (95.83)
Mothers breastfeeding	
Yes	201 (88.15)

No	26 (11.45)
Mothers who used contraceptive methods that failed prior to falling pregnant	
Yes	91 (40.09)
No	136 (59.91)

4.3.3 Pregnancy and delivery experience

The majority of participants (84.59%) had been pregnant at least once before. Ninety-six of the participants (42.29%) had planned their pregnancy, which means that most of the pregnancies (57.71%) had been unplanned. Nonetheless, most of the participants did not report any negative perception towards their pregnancy with only 37% of the 227 reporting a negative perception. Table 4.3 indicates the pregnancy and delivery experience of participants in this study.

Table 4. 3: Pregnancy and delivery experience of postnatal mothers

Variables	Number (%)
Mothers who had planned the pregnancy	
Yes	96 (42.29)
No	131 (57.71)
Mothers with negative perception of the pregnancy	
Yes	84 (37)
No	143 (63)
Parity	
Primipara	35 (15.41)
Multipara	192 (84.59)

4.3.4 Infant characteristics

The table of results below shows that most of the mothers (66.52%) reported to have babies of their desired sex. The majority (78.42%) of participants did not think their babies were crying

excessively. Only about 18 mothers out of 227 (7.93%) who participated in the study reported that their babies were sick either after delivery or at the time of the research interview.

Table 4. 4: Infant characteristics

Variables	Number (%)
Desired sex	
Yes	151 (66.52)
No	76 (33.48)
Mother's perception that cries often	
Yes	49 (21.58)
No	178 (78.42)
Mothers with a sick child	
Yes	18 (7.93)
No	209 (92.07)

4.3.5 Delivery details

The results showed that normal vertex delivery was the most reported mode of delivery (70.04%). Only 51 (22.47%) reported complications during labour. As regards the outcome of the baby after delivery, only 16 (7.05%) participants reported to have experienced a bad outcome. In the context of this study, this means a low APGAR score with babies who needed immediate active resuscitation or admission to the neonatal intensive care unit (ICU) or the high care unit. In terms of miscarriage, 17.18% reported having a history of miscarriage, while most (82.82%) denied having had any miscarriages.

Table 4. 5: Delivery details of postnatal mothers

Variables	Numbers (%)
History of miscarriage	
Yes	39 (17.18)
No	188 (82.82)

Mode of delivery	
Normal vertex delivery	159 (70.04)
Caesarean section	68 (29.96)
Mothers who had complications during labour	
Yes	51 (22.47)
No	176 (77.53)
Baby outcome after delivery	
Good	211 (92.95)
Bad	16 (7.05)

4.3.6 Relationship status

In exploring the relationship status of the participants, the study found that 85.46% of the mothers were still in a relationship with the father of the index baby, with 50.66% of the total number of participants living with the father of their baby. Most participants (85.02%) denied that their partner or themselves had other sexual partners or that they were involved in a polygamous relationship with the father of the current baby.

A large number (85.02%) of total participants had partners who were financially supportive, with 74.01% of participants receiving some sort of financial support from their family or in-laws.

The relationship status of mothers participating in this study is shown in Table 4.6 below.

Table 4. 6: Relationship status of mothers

Variables (%)	Numbers (%)
Mothers who were in relationship with the father of the child	
Yes	194 (85.46)
No	33 (14.54)
Mothers who were living with the father of the child	
Yes	115 (50.66)
No	112 (49.34)
Mothers whose partner was financially supportive	

Yes	193 (85.02)
No	34 (14.98)
Mothers who were in a polygamous relationship	
Yes	34 (14.98)
No	193 (85.02)
Mothers who were receiving support from their family or in-laws	
Yes	168 (74.01)
No	59 (25.99)

4.3.7 Suicide or infanticide risk assessment using the EPDS questionnaire

In exploring the suicide or infanticide risk, the study found that for Question 10 of the EPDS questionnaire around two-thirds of mothers scored 0 (indicating that they had never thought of harming themselves or the baby). One-third of the mothers, in scoring from 1-3 on Question 10 of the EPDS, presented a degree of suicide or infanticide ideation.

Table 4. 7: Suicidal and infanticide risk assessment based on the question 10 of EPDS

Question 10 scores	**Number (%)**
Score of 0	153 (67.40)
Score of 1-3	74 (32.60)
Total	**227 (100)**

4.4 COMPARISON OF SCREEN POSITIVE AND SCREEN NEGATIVE FOR PND

4.4.1 Socio-demographic characteristics of participants

Using Chi-Square as univariable analysis, participants who screened positive for PND on the EDPS (>13) were compared to those who screened negative (<13). Of all socioeconomic factors, only those participants who had not completed primary school (p= 0.023) had scores of more than 13 on the EDPS and were statistically significant in association with PND. No other socioeconomic factors were statistically significant.

Table 4. 8: Comparison of socio-demographic descriptors according to EPDS screening outcomes

EPDS			
Age	**Negative (%)**	**Positive (%)**	**p value**
18-25 years	62 (44.60%)	42 (47.7%)	0.250
26-30 years	39 (28.06%)	17(19.32%)	
31-35 Years	28 (20.14%)	17 (19.32%)	
>35 years	10 (7.19%)	12 (13.64%)	
Marital Status			
Single	72 (51.8%)	53 (42.06%)	0.441
Cohabiting	37 (26.62%)	21 (36.21%)	
Married	29 (20.86%)	13 (30.95%)	
Widow	1 (0.72%)	0 (0%)	
Level of education			
Did not completed primary school	8 (5.76%)	1 (1.14%)	**0.023***
Completed primary school	57 (41.01%)	53 (60.23%)	
Completed secondary school	63 (45.32%)	28 (31.82%)	

Attended a tertiary institution	11 (7.91%)	6 (6.82%)	
Babies with at least one parent employed			
No	52 (37.41%)	39 (44.32%)	0.301
Yes	87 (62.59%)	49 (55.68%)	

4.4.2 Clinical details of postnatal mothers

Using Chi-Square as univariable analysis, participants who screened positive for PND on the EDPS (>13) were compared to those who screened negative (<13). The table below shows that not breastfeeding their baby (p= 0.035) and the use of contraceptive methods which failed prior to the index pregnancy were statistically significantly associated with PND. No other clinical detail determinants were statistically significant.

Table 4. 9: Comparison of clinical details of mothers according to EPDS screening outcomes (n did not always equal 227 due to missing data).

EPDS			
	Negative (%)	**Positive (%)**	**p value**
Mothers suffering from any medical condition			
No	99 (71.22%)	55 (62.50%)	0.170
Yes	40 (28.78%)	33 (37.50%)	
Mothers with a history of mental illness			
No	138 (99.28%)	85 (96.59%)	0.301
Yes	1 (0.72%)	3 (3.41%)	
Mothers with a family history of mental illness			
No	126 (90.65%)	79 (89.77%)	0.828
Yes	13 (9.35%)	9 (10.23%)	
Mothers with a history of PND			
No	119 (98.35%)	65 (92.86%)	0.252
Yes	3 (1.65%)	5 (7.14%)	
Mothers who were breastfeeding			
No	11 (7.91%)	15 (17.05%)	**0.035***
Yes	128 (92.09%)	73 (82.95%)	
Mothers who used contraceptive methods that failed prior to falling pregnant			
No	91 (65.47%)	45 (51.14%)	**0.032***
Yes	48 (34.53%)	43 (48.86%)	

4.4.3 Pregnancy and delivery experience

Using Chi-Square as univariable analysis, participants who screened positive for PND on the EDPS (>13) were compared to those who screened negative (<13). It was found that one pregnancy and delivery experiences of participants was statistically significant in association with EPDS with a score of more than 13/30, namely having a negative perception of pregnancy (0.036).

Table 4.10 compares the pregnancy and delivery experience of participants.

Table 4. 10: Comparison of the pregnancy and delivery experience of mothers according to EPDS screening outcomes

EPDS			
	Negative (%)	**Positive (%)**	**p value**
Mothers who had planned the pregnancy			
No	75 (53.96)	56 (63.64)	0.150
Yes	64 (46.04)	32 (36.36)	
Mothers with a negative perception of the pregnancy			
No	95 (68.35)	48 (54.55)	**0.036***
Yes	44 (31.65)	40 (45.45)	
Parity			
Primipara	26 (16.15)	9 (13.64)	0.534
Multipara	135 (83.85)	57 (86,36)	

4.4.4 Infant characteristics

Using Chi-Square as univariable analysis, participants who screened positive for PND on the EDPS (>13) were compared to those who screened negative (<13), it was found that the characteristics of neither the participants nor the infants were statistically significant in association with PND.

Infant characteristics of postnatal participants in this study are compared in Table 4:11.

Table 4. 11: Comparison of infant characteristics of postnatal mothers at Levai Mbatha CHC based on the EPDS outcome

	EPDS		
	Negative (%)	**Positive (%)**	**p value**
Desired sex of the child			
No	41 (29.50)	35 (39.77)	0.110
Yes	98 (70.05)	53 (60.23)	
Mothers' perception that child cries often			
No	110 (79.14)	68 (77.27)	0.739
Yes	29 (20.86)	20 (22.73)	
Mothers with a sick child			
No	130 (93.53)	79 (89.77)	0.308
Yes	9 (6.47)	9 (10.23)	

4.4.5 Delivery details

Using Chi-Square as univariable analysis, participants who screened positive for PND on the EDPS (>13) were compared to those who screened negative (<13), it was found that none of the delivery details of participants were statistically significant in association with PND with an EPDS scoring of more than 13/30.

In Table 4:12 the delivery details in terms of the EPDS outcome of participants in this study are compared.

Table 4. 12: Comparison of delivery details of mothers according to the EPDS screening outcomes.

EPDS			
	Negative (%)	**Positive (%)**	**p value**
History of miscarriage			
No	115 (82.73)	73 (82.95)	0.966
Yes	24 (17.27)	15 (17.05)	
Mode of delivery			
Caesarean section	42 (30.22)	26 (29.55)	0.914
Normal vertex delivery	97 (69.78)	62 (70.45)	
Mothers who had complications during labour			
No	107 (76.98)	69 (78.41)	0.801
Yes	32 (23.02)	19 (21.59)	
Baby's outcome after delivery			
Bad	8 (5.76)	8 (9.09)	0.339
Good	131 (94.24)	80 (90.91)	

4.4.6 Relationship status

Using Chi-Square as univariable analysis, participants who screened positive for PND on the EDPS (>13) were compared to those who screened negative (<13), it was found that one relationship factors were statistically significant in association with PND not being in relationship with the father of the index child with p-score of 0.016.

The relationship status based on the EPDS outcome of participants in this study is indicated in Table 4.13.

Table 4. 13: Comparison of relationship status of mothers based on the EPDS screening outcomes

EPDS			
	Negative (%)	**Positive (%)**	**p value**
Mothers who were in relationship with the father the child			
No	14 (10.07)	19 (21.59)	**0.016***
Yes	125 (89.93)	69 (78.41)	
Mothers who were living with the father of the child			
No	66 (47.48)	46 (52.27)	0.482
Yes	73 (52.52)	42 (47.73)	
Mothers whose partners were financially supportive			
No	17 (12.23)	17 (19.32)	0.145
Yes	122 (87.77)	71 (80.68)	
Mothers who were in a polygamous relationship			
No	122 (87.77)	71 (80.68)	0.145
Yes	17 (12.23)	17 (19.32)	
Mothers who were receiving support from their family or in-laws			
No	35 (25.18)	24 (27.27)	0.726
Yes	104 (74.82)	64 (72.73)	

4.4.7 Suicide or infanticide risk assessment using the EPDS questionnaire (Question 10)

Chi-Square was used as univariable analysis to compare participants who screened positive for PND (>13) to those who screened negative (<13) on the EPDS. A score between 1 and 3 on Question 10 of the EPDS was statistically significant in association with EPDS scoring of more than 13/30 (p=0.000).

Table 4. 14: Comparison of Question 10 of the EPDS score of mothers at Levai Mbatha CHC according to the EPDS outcome

EPDS			
	Negative (%)	**Positive (%)**	**p value**
Mothers' score on Question 10 of the EPDS			
0	121 (86.43)	32 (36.78)	**0.000***
1-3	19 (13.57)	55 (63.22)	

4.4.8 Logistical regression

The following participant characteristics demonstrated a statistically significant association with PND: level of education, the mother breastfeeding, the mother's use of a contraceptive before pregnancy, mothers with negative perception about pregnancy, mothers who had anxiety during pregnancy and mothers who had a relationship with the father of the child.

Using the multivariable model, the level of education, mothers using a contraceptive before pregnancy and mothers who had a relationship with the father of the child remained statistically significantly associated with PND.

Mothers who completed primary school were 9.1 times more likely to have developed PND compared to mothers who did not complete primary education (OR: 9.11; 95% CI: 1.033962 - 80.22036; p= 0.047).

Mothers who had used a contraceptive before the index pregnancy were twice more likely to have suffered from PND compared to mothers who had not used any contraceptive (OR: 2.05; 95% CI: 1.126906 - 3.727434; p= 0.019).

Mothers who scored more than 0 on Question 10 of the EPDS (meaning that they answered "Hardly ever", "Sometimes", or "Quite often" to the question looking to know if they ever thought of harming themselves or the baby) were 11 times more likely to screen positive to PND compared to those who never had such thoughts (OR: 11.33; 95% CI: 5.788851-22.20847).

The likelihood of having postpartum depression was statistically significantly lower for mothers who were in a relationship with the father of the index child compared to mothers who did not have a relationship with the father of the index child (OR: 0.42; 95% CI: 0.1836298 - 0.9486429; p= 0.037).

Table 4. 15: Multivariable analysis (Adjusted) predicting factors associated with PND

Variables	Odds ratio	95% Confidence interval	P value
Level of education			
Did not completed primary school	1 (ref)		
Completed primary school	9.11	1.033962 - 80.22036	**0.047***
Completed secondary school	3.82	0.4276425 - 34.12008	0.230
Attended a tertiary institution	5.58	0.5103652 - 60.92015	0.159
Mothers breastfeeding			
No	1 (ref)		
Yes	0.45	0.1846343 - 1.102624	0.081
Mothers who used contraceptive methods that failed prior to falling pregnant			
No	1 (ref)		
Yes	2.05	1.126906 - 3.727434	**0.019***
Mothers with negative perception of the pregnancy			
No	1 (ref)		
Yes	1.45	0.7777214 – 2.705485	0.242
Mothers who had anxiety during pregnancy			
No	1 (ref)		
Yes	1.27	0.6688802 – 2.404694	0.467
Mothers who were in relationship with the father of the child			
No	1 (ref)		
Yes	0.42	0.1836298 - 0.9486429	**0.037***
Mothers' score on Question 10 of the EPDS			
0	1 (ref)		
1-3	7.08	5.788851 – 22.20847	**0.000***

The last table in this chapter, Table 4:6 below, gives a summary of all significant compared variables in terms of the findings of this study.

Table 4. 16 : Summary of all significant compared variables

	Odds ratio	**95% Confidence interval**	**P value**
Mothers who were in relationship with the father of the child			
No	1 (ref)		
Yes	0.42	0.1836298 - 0.9486429	**0.037***
Mothers' score on Question 10 of the EPDS			
0	1 (ref)		
1-3	7.08	5.788851 – 22.20847	**0.000***
Mothers who used contraceptive methods that failed prior to falling pregnant			
No	1 (ref)		
Yes	2.05	1.126906 - 3.727434	**0.019***
Level of education			
Did not complete primary school	1 (ref)		
Completed primary school	9.11	1.033962 - 80.22036	**0.047***
Completed secondary school	3.82	0.4276425 - 34.12008	**0.230**
Attended a tertiary institution	5.58	0.5103652 - 60.92015	**0.159**

CHAPTER 5: DISCUSSION

5.1 INTRODUCTION

In this chapter, key findings of the study are compared to the literature, and the implications for clinical practice and research are highlighted.

5.2 PROPORTION OF MOTHERS WHO SCREENED POSITIVE FOR PND

This study found that when using the EPDS, the point-prevalence of PND was 38.77%. This prevalence is not only higher than the global prevalence of 10% reported by the WHO,[31] but also higher than that of different other communities in developing countries.[24,35] The high prevalence in this study can be attributed to the fact that Sedibeng district has been classified as one of the poorest districts in Gauteng, with an unemployment rate of more than 35%.[11] Poverty, together with other factors that increase stress, are known to be associated with PND.[9]

Several studies conducted in South Africa in communities similar to that of this study in terms of population profile, especially financial deprivation and social stressors, have found prevalence approaching that of this study.[9,24,38] In contrast, in a study in the rural Western Cape the prevalence was higher than found in this study (50%).[26] This could be due to the higher intensity of life challenges endured in the rural population compared to those of urban or semi-urban communities like Levai Mbatha where the current study was conducted.[7, 9, 38]

As a cross-sectional study conducted in one health facility, this research offers only a point prevalence and therefore a more longitudinal study with a bigger sample will present a clearer picture of the prevalence of PND and the likely associated factors over time in the community setting. However, when findings indicate a prevalence that is almost triple the world prevalence, there is an urgent need to establish and implement a health policy that requires screening for PND among mothers who attend the clinic in question as well as other clinics in communities with a similar population profile. For a holistic approach and knowing that the causes and symptoms of PND can start before delivery, mothers attending antenatal clinics should also be screened for signs and symptoms of depression.[27,41,42]

5.3 SOCIOECONOMIC FACTORS

5.3.1 Age

The mean age in the study was found to be around 26 years with most mothers (70%) being between 18 and 30 years old, which aligns with a cross-sectional study conducted among Nepalese women.[5] According to the 2017 mid-year South African statistics, almost 35% of women in South Africa are from that age bracket. It should however be acknowledged that age groups in the study were based on obstetrical risk and not on socio-demography.

Age in this study was not found to be significantly associated with PND, confirming the findings of studies conducted among postnatal women in Jordan, Kenya and Brazil.[24,35] However, this is contrary to findings in several other studies which found that younger age was a risk factor for depression during the postnatal period.[5,9,18,19] Therefore more studies using larger sample size are needed to establish with certainty if there is an association between age and PND. This will help the developing evidence-based policy for prevention and early detection of PND.

5.3.2 Marital status

More than half the mothers in this study were single but marital status was found to be not associated with PND. This is in line with findings of cross-sectional studies conducted in Brazil[24] and Nepal,[5] yet different from findings in a study conducted in Cape Town where being single was associated with depression during pregnancy.[26] Similar findings were made in a systematic review on peri-natal mental health disorders indicating that unmarried women were almost six times more likely to suffer from mental illness (including depression) during the peri-natal period.[19] Other studies have found marriage to be associated with lower prevalence of PND.[19,54]

This difference could be attributed to cultural differences, as in some cultures having a child out of wedlock is not supported by the community therefore single mothers are more prone to stress than married women.[19] The latter does not apply to the Evaton population, where this study has found more single than married mothers. The fact that most mothers in this study were young and single indicates that childbearing in the Evaton community may not be determined by marital status. Being a growing township comprising a younger population, the Evaton community may have embraced Western culture which seems to have a different apprehension of marital status and childbearing and where having a child out of wedlock appears to be easily accepted.

5.3.3 Level of education

Most of mothers in our study had some form of education having completed at least primary education, with very few having completed tertiary education

In this study, completing primary school only was associated with PND, which is in line with findings in several developing countries.[37,49] Higher level of education was not found to be associated with PND. In contrast, a systematic review of postnatal depression amongst women in low and lower-income countries concluded that more years of education was a protective determinant for PND. Several other studies agree with these findings.[19,39]

Poverty and unemployment, which are both linked to education, remain a challenge in South Africa. Lack of education limits the chance of finding a decent job, thereby reducing the possibility to alleviate economic deprivation. Poverty was found to be one of the factors that increase stress levels in South African mothers in the perinatal period; therefore, exposing those to depression.[9] Completing primary education only will have less impact in alleviating poverty in the current South African context. However, this research did not find a relationship between higher level of education and PND, which could possibly be attributed to the type of design and smaller sample size. Further focused studies are therefore recommended.

5.3.4 Employment status of one of the parents

Only 27.31% of mothers in this study reported that they or their partners were employed. The 27.31% employment rate of this study is below the 35% reported by the Gauteng survey of the Sedibeng District.[11] This study found that the employment status of the mother and father was not associated with PND (p value 0.301). This correlates with the findings of several other studies conducted in developing countries, including South Africa.[26,36,50] However, it is contrary to findings by Fisher et al[19] in a study conducted in Pennsylvania who found that mothers in the peri-natal period who were victim of economic disadvantages including unemployment were up to 13 times at risk of depressive mood disorders, including depression.

It has been well documented that unemployment can lead to social and financial stressors, which can lead to PND.[9,38,49,50] Most of the mothers in this study, though, were not staying with their partners as described above, implying that they stayed with family members thereby benefiting from their support. Furthermore, mothers and children in most poor areas in South Africa are

recipients of several types of social relief interventions from the South African social development services. Social support and interventions from family members, the community and the state in the child's life can reduce stress in the mother's life by alleviating financial stressors, thereby limiting the risk of PND.

5.4 MATERNAL HEALTH

5.4.1 Medical condition

In this research it was found that maternal medical condition was not associated with PND. This finding is in line with a prospective cohort study of 539 mothers conducted in South America.[39] However, a survey in Brazil comprising 1 000 postnatal mothers found a strong association between maternal medical condition and PND, where mothers with a medical chronic condition were 2.72 time more likely to have PND than those with no medical illness (95%CI 1.63-4.53). [24]

Although the level of control and severity of the medical condition reported by the mother were not assessed in this study, the lack of correlation with PND can be attributed to the fact that the health of mothers with chronic medical condition could be controlled, which prevented it from having much impact on the care of the baby. Secondly, during peripartum visits to the clinic the focus is on giving the child good health care. This study has found that more than 90% of mothers were satisfied with their children's health and did not consider them being sick. Such satisfaction generally reduces the impact of the mother's medical condition. Lastly, chronic conditions including HIV have been well managed in the community due to an effective primary healthcare system in the district.

5.4.2 Mothers with a history of previous mental illness

Less than 2% of mothers reported to have previous mental illness, therefore indicating that in this study history of maternal previous mental illness is not associated with PND. This finding is contrary to findings in Brazil where an association between previous maternal mental illness and PND was isolated in research conducted among more than 23 000 postnatal mothers.[24] Similarly a strong association was found in Argentina between a previous history of maternal and postnatal depression among women.[39]

Despite several other studies reporting that a previous history of mental illness was a risk factor for PND, this study found no association. The discrepancy can be attributed to the fact that in this study the participants were not screened for psychiatric disorders, compared to what Stein et al did in the South African survey[40] where mothers were actively screened for mental illness which meant those who were unaware were also diagnosed.[40]

In this study the results were based on patient report. The researcher relied on the mothers' reporting awareness of the disease, therefore only those who had been previously diagnosed could answer in the affirmative to the question pertaining to mental illness. Furthermore, the understanding of psychiatric disorder in this research did not include conditions such as substance and alcohol abuse, which Stein et al included.

With alcohol and substance abuse being the second most prevalent psychiatric disorder in South Africa, this might have contributed to the low percentage of mental illness reported in the present study. In light of Stein et al's definition[40] mental illness of participants was under-diagnosed in this study. Also, because of the stigma attached to mental illness in the Evaton community, the self-reporting method used in this study could have resulted in a measure of reporting bias. Mental health screening of mothers who attend Levai Mbatha could give a good idea of the prevalence of mental illness and help in the planning and management of patients' psychiatric conditions.

5.4.3 Mother's family history of mental illness

Fewer than 10% of mothers reported a family history of mental illness, indicating that in this study having a family history of mental illness was not associated with the risk of developing PND. This is in line with findings in rural South Africa and similar findings in Argentina and Saudi Arabia.[37,39]

The finding in this study which indicates lack of a relationship between a family history of mental illness and PND could have been influenced by the very small number of mothers who acknowledged having a family history of mental illness (9.35%). Mental health conditions receive less focus in many low and middle-income countries, including South Africa. Few patients are screened for mental health problems in our facilities, leading to under-diagnosis of mental illnesses including depression.

Apart from a need to increase screening for mental illness, community education on mental health and mental illness may reduce the stigma linked to these conditions.

5.4.4 Mothers with a history of PND

Only 3.2% of mothers reported having suffered from PND previously. The finding in our study, however, does not correlate with the expected high prevalence of PND as reported in the literature in developing countries.[9,18,26,32] This shows that most cases of PND were undiagnosed and that only the few who had been diagnosed could report having suffered from PND. In this study almost 40% of mothers screened positive for PND, reinforcing the above argument that the lower number reporting a previous history of PND was the result of lack of active screening of PND during pregnancy.

Previous history of PND was not significantly associated with the risk of developing PND in the index pregnancy. This finding is in line with research in the literature conducted in South Africa[26] or elsewhere. However, in an observational prospective cohort study conducted among more than a thousand mothers in Brazil using the EPDS, previous history of PND was significantly associated with risk of PND in future pregnancies.[39] As most mothers are not screened at Levai Mbatha CHC during the postnatal period, many go undiagnosed for episodes of PND.

As with other psychiatric conditions, PND has been under-diagnosed and insufficiently investigated. This could explain the discrepancy in the prevalence of more than 37% screening positive for PND and the 3.2% who reported a previous history of mental illness. Also, the stigma attached to psychiatric conditions in general and PND in particular could lead to underreporting of the disease. The researcher therefore suggests a community education policy on PND to help break the stigma and achieve an increase of early diagnosis of the condition. Protocol on the screening for depression of mothers attending antenatal and postnatal should be reinforced. Lastly, there is a need to raise awareness on PND among healthcare providers and to provide proper training, guidelines, and opportunities for case discussions.

5.4.5 Mothers who were breastfeeding

More than 80% of postnatal mothers at Levai Mbatha were breastfeeding. These findings are similar to those of a cross-sectional study conducted in other developing countries.[5,51] In South Africa, the Department of Health has for many years on national and provincial level been

promoting breastfeeding as the best feeding method. Clinics and hospitals have been encouraged to be breastfeeding-friendly zones, with bottle feeding being reserved only for mothers who despite counseling have chosen this method. In addition, the display and/or promotion of milk products has been discouraged on the premises of government clinics and hospitals.

This study has found breastfeeding to be significantly associated with PND (p value= 0.035), confirming previous studies findings in the Democratic Republic of the Congo and Cameroun.[38,51] However, statistical significance was lost in the logistic regression analysis, contradicting the findings of studies in Jordan and Vietnam where a significant relationship between breastfeeding and PND was found.[36,52] Breastfeeding being an emotional act was neither protective nor exposing to PND, however; when problems or difficulties are encountered, it can lead to depression. As this study did not look for breastfeeding difficulties, it will be important to study breastfeeding in general (including when there are problems or difficulties) in relation to PND among mothers in the study setting.

5.4.6 Mothers who used contraceptive methods that failed prior to falling pregnant

About 40% of mothers used a contraceptive method prior to falling pregnancy. This might have resulted in contraceptive use being a significant risk factor for PND in this study (p=0.019). Similar findings were made in a study conducted in Soweto[18]. This could firstly be explained as contraception failure resulting in those who found themselves becoming pregnant while using a contraceptive being at risk of PND. It has been proven by several research studies in developed and developing countries that unplanned pregnancy was associated with an increased risk of PND.[26.38] If this is the case, a high contraception failure rate underscores the need to investigate the effectiveness and coverage of the contraception service in the study setting. Secondly, certain types of contraception, especially hormonal contraception, have been found to expose women to developing PND.[53] The mother could therefore have developed PND either because of contraception failure resulting in an unplanned pregnancy or because of the contraceptive's hormonal effects on the mother.

In this study emphasis was not put on the type, term and time regarding contraception. These aspects could have been important in adding clarity to the association between the prior use of contraception and PND that was found in this research. However, the findings indicate the need for health practitioners to identify cases of failed contraception and unplanned pregnancy in order

to screen for PND. This research could not definitely isolate the reason why prior use of contraception can lead to depression in this community. There is a need for protocol which helps to identify and follow cases of contraception failure especially in term of the risk of developing PND. Medical practitioners need to be made aware of this relationship.

5.5 PREGNANCY AND DELIVERY EXPERIENCE

5.5.1 Mothers who planned the pregnancy

Most mothers (57.7%) did not plan their pregnancy. Planning the pregnancy was found not to be associated with PND among mothers (p= 0.15). This is in line with findings of an observational prospective cohort in Argentina of more than 500 mothers using the EPDS[39] and a cluster-randomised controlled trial conducted among more than 1000 mothers in a peri-urban settlement in the Western Cape in South Africa using the EPDNS as a screening tool for PND.[9] However, a cross-sectional study conducted in the same province (Western Cape) found that unplanned pregnancy was associated with the risk of PND and also influenced it severely.[26] Similarly, in a study conducted in Cameroon it was found that an unplanned pregnancy almost tripled the risk of the mother developing PND.[38]

This discrepancy in findings can be due to the use of different methodology: this study used a researcher-administered questionnaire with possible reporting bias, especially on sensitive questions such as this. This is contrary to the Cameroon and Soweto studies where a self-administered questionnaire was used, limiting reporting bias on this specific question. There is therefore need for a study using a self-administered questionnaire on a larger sample of postnatal mothers in Evaton. Unplanned pregnancy not being significant in this study may merely be due to a small sample size and a study with a larger sample is therefore recommended.

The lack of association between planning the pregnancy and PND can be attributed to the maternal satisfaction regarding the outcome of what was planned. Planned pregnancy translates into maternal psychological readiness.

5.5.2 Mothers with negative perception of the pregnancy

Only 37% of participating mothers acknowledged having had a negative perception of pregnancy prior to the index child, indicating that the majority did not have a negative perception. Findings

indicated that not having a negative perception toward pregnancy was significantly associated with PND (p=0.036). This is similar to the findings of a cross-sectional study conducted among 120 mothers attending a postnatal clinic in Kinshasa in the Democratic Republic of the Congo.[51]

However, statistical significance was lost in the logistic regression analysis, in line with a similar study conducted elsewhere in South Africa.[34] The lack of significant association with PND can be attributed to the popular view and beliefs that pregnancy and babies are a gift. Therefore, a negative perception of pregnancy might be considered by the community as wickedness.[18,23,32] Noting that this study was based on self-report, the results might not reflect the true perception of pregnancy among mothers since there is a high risk of reporting/information bias. A qualitative study that explores this perception may be useful to provide in-depth understanding of the experiences, views and attitudes of mothers regarding their pregnancies.

5.6 INFANT CHARACTERISTICS

5.6.1 Desired sex of the child

Most participating mothers in this study claimed that their babies were of their preferred sex. The researcher found that mothers having their desired sex of the baby were not significantly associated with the risk of developing PND. This is in line with findings of similar studies conducted in another community in South Africa,[26] and one in Vietnam.[52]

However, it is contrary to the finding of a cross-sectional study conducted among Jordanian, Saudi Arabian and Chinese mothers.[35,36,37] The opposite findings could be due to cultural consideration of the sex of the baby, as some cultures including the Chinese and Islamic countries like Jordan have a gender preference. A male child is more preferred than a female child, as it is believed that only the male can perpetuate the family lineage.[35,36] This will strongly influence the mother's desire regarding the sex of the baby and bring worries of social rejection of the mother or the baby if the baby is not of the desired sex. Mothers of male babies seem to be easily accepted by the father and the community compared to those who give birth to female babies.[37]

In South Africa, the South African government has been promoting gender equality since 1994. This could have played a notable role in reducing discrimination against a certain gender. Also, programs with affirmative measures have helped balance the previously disadvantaged communities, including women. All this could lead to a mother easily accepting her child's sex.

Future qualitative studies could explore mothers' perceptions of their babies' sexes and the views regarding their preference of a particular sex.

5.6.2 Mother's perception that the child cries often

The majority of mothers did not have the perception that their babies were crying a lot. This study found that the mothers' perception of the crying of the baby was not significantly associated with the risk of PND. This is similar to the findings of an analytical case control study conducted over a period of 12 months in Cameroon among more than 200 mothers.[38] However, a systematic review conducted by Fisher et al[19] found that mothers who had the perception that their babies cried a lot had almost twice the risk to develop peri-natal mental disorder, including PND.

The perception of the baby crying a lot can be linked to the number of hours the mother sleeps. Lack of sufficient sleep was significantly associated with PND in a cross-sectional study conducted among 200 Egyptian mothers.[49] Similarly, a cross-sectional study conducted among Cameroonian postnatal mothers found that mothers who had a problem with their babies' sleep were more than twice at risk to develop PND.[38] Also, the perception of an inappropriate crying of the baby can make the mother believe that the baby could be ill. A study conducted among mothers attending an antenatal clinic in the Democratic Republic of the Congo has shown that mothers of sick babies were at risk of PND.[51]

Although in this study very few mothers reported that their babies were suffering from an illness, this did not expose them to developing PND. Compared to their Congolese counterparts, South African mothers in general and those who attend Levai Mbatha CHC in particular have access to better health care for their children.[51] There is evidence that higher quality maternal and child care reduces mortality and morbidity, which the literature has shown to be among high risk factors for PND. [34,35]

5.6.3 Mothers with a sick child

Fewer than 10% of mothers reported to have a sick child. It was found in this study that mothers reporting that their baby was ill was not significantly associated with PND (p=0.308). This is similar to the findings of cross-sectional studies conducted in Cameroon, China and Saudi Arabia.[35,37,38] Contrary to these findings, a study in the Democratic Republic of the Congo found

that mothers having an unwell baby was significantly associated with PND ($p < 0.02$).[51] Furthermore, systematic reviews of risk factors of PND in low and middle-income countries found that having a sick baby increased the risk of PND fourfold.[19]

This study did not find significant association between the baby's health status and maternal risk of PND, therefore screening of mothers for PND should be done independently from the baby's health status. Although the relationship between the severities of the baby's condition was not explored in this research, it should be considered as it might influence the mother's stress level.

5.7 DELIVERY DETAILS OF POSTNATAL MOTHERS

5.7.1 History of miscarriage (one or multiple)

More than a third of the participating mothers in this study reported to have had at least one miscarriage. Analysis found that history of previous miscarriage was not significantly associated with PND. This is similar to findings of a cross-sectional study conducted in Central Africa using the EPDS to assess risk factors for depression in a hospital setting.[38] However, a Sub-Saharan systematic review found that women in developing countries with a history of stillbirth or miscarriage had a three to eight times higher risk of developing perinatal mental conditions including PND.[19]

The discordance with the finding of this study could be because of smaller sample size and difference in methodology. Previous miscarriage can increase the stress levels of expectant and new mothers, and there is unanimity that a high stress level is among the leading causes of PND.[16,54]

5.7.2 Mode of delivery

Almost one third of participating mother's delivered by caesarean section. This study found mode of delivery among participating mothers not to be significantly associated with the risk of developing PND. This is in line with findings by several cross-sectional studies conducted in Latin America, Asia and Africa.[25,26,36,37,39] However, in a cross-sectional study of 727 mothers in a hospital setting, using multi-factorial analysis and progressive regression, Fisher et al in a Sub-Saharan systematic review found that mothers who underwent caesarean section were 2.5 to 3.5

times higher at risk of developing a mental disorder before-or after delivery than those who had normal vaginal delivery.[19]

This study could not make the association between mode of delivery and PND. Almost one third of participating mothers were delivered by caesarean section yet the stress level of these mothers did not warrant depression. This is probably because of the high level of care provided in hospitals and clinics to mothers who had a caesarean section. Also, the stigma attached to caesarean section delivery has been dramatically reduced through patient education and better outcomes of birth by caesarean section. Lastly, during their post-operative period mothers receive assistance and support from family members and the community in taking care of the child. This will reduce the level of stress during the postnatal period.

However, there is need for a study looking at the social impact of caesarian section delivery to help understand the journey of mothers discharged from hospitals, as this unnatural mode of delivery comes with medical complications such as pain, infection and socio-economic implications.

5.7.3 Mothers who had complications during labour

Less than a quarter of participating mothers reported experiencing complications during childbirth. This study therefore found that experiencing complications during labour was not significantly associated with PND among the studied population in Levai Mbatha CHC. This is in line with Mohammed et al's findings in a cross-sectional community-based study conducted in a rural area in Egypt,[49] and with findings in a Cameroonian study.[38]

The findings in this study can be attributed to the fact that, despite complications encountered by the mother during childbirth, the health system's management of their benefits helped alleviate their stress and concern. Policies that facilitate regular training in the management of obstetrics emergencies on secondary and primary care level has improved childbirth outcomes and therefore reduced mothers' concern and stress in the postpartum period. The postnatal consultation also helps to continue and consolidate acceptable outcomes of childbirth. However, there is a possibility that mothers who had previous bad pregnancy outcomes are deemed high risk and therefore attended to in hospital and followed up postdelivery in hospital with their babies. This may lower the proportion of mothers with previous bad pregnancy outcomes at the PHC clinic. A longitudinal study assessing the impact of delivery complications on maternal

mental health may therefore be needed. The implementation of policies and training already in place in the public sector related to childbirth (labour and delivery) should be reinforced and implemented in Levai Mbatha CHC. Regular quality improvement studies can be done to assess compliance to guidelines and areas that need to be improved, to minimize the rate of complications during labour.

5.7.4 Baby outcome

In this study, fewer than 10% of mothers reported that their babies' outcome after delivery was not satisfactory. The researcher found that the baby outcome was not significantly associated with PND. This is similar to findings in studies conducted in other African countries[38] but opposite to the findings of a cross-sectional study conducted in the DRC which indicated that the baby's outcome was significantly associated with maternal PND.

The findings of this study can be attributed to the fact that, although 7% of mothers reported that the postpartum outcome of the baby was not good, the management of and treatment given to the baby could improve its condition thereby reducing the stress level of the mother. Also, the multidisciplinary support received by the child on the secondary and primary health care levels can bring confidence and relief to the mother in terms of future improvement. The purpose of this study was limited to collecting the maternal report of the baby outcome after delivery and assessing if there was a relationship between this outcome and the mother's risk of later developing PND.

However, the fact that only 7% of mothers reported a bad outcome is a reason for concern, indicating the need for a study to assess the maternal and medical reports on the baby outcome using an evidence-based assessment tool. In addition, regular training of health practitioners involved in maternal health and delivery should be reinforced to further improve maternal and child outcome. Lastly, regular assessment of the implementation of policies and guidelines regarding maternal health and delivery already in place should be encouraged.

5.8 RELATIONSHIP STATUS

5.8.1 Mothers who are in relationship with the father of the child

Most participating mothers were still in a relationship with the father of the child.

Analysis in this research established that not being in relationship with the father of the index child was significantly associated with PND, and that the risk of mothers having PND was significantly lower when she was in relationship with the father of the index baby. This is in line with findings in Tunisia and Malaysia. [55,56]

In South Africa, a large cohort study in Soweto using the Pitt Depression Questionnaires (PDQ) isolated difficulty in relationship with the partner and/or the father of the index child to be a significant risk factor for mothers to develop PND. A relationship stressor related to the partner proved to be almost double the risk of the Sowetan mothers to develop PND.[18] Similarly, a study in rural South Africa found that a "None" satisfaction expressed by the mother regarding her romantic relationship with the father of the index child was associated with PND.[26]

This study supports the findings of a systematic review of studies in Middle Eastern countries that isolated the quality of relationship with the father of the child as one of the socio-cultural determinants of PND.[57] This can be attributed to the stress level induced by a strenuous relationship with the index child's father, as the latter is supposed to bring support to the mother. Also, the financial stressor of rising the child alone, the fear of tackling the future alone, lack of emotional support and the sense of regret of the previous relationship which ended with the child could be a few of many sentiments which might lead to a depressive state.

It is therefore important as per the findings of this study for healthcare practitioners working with postnatal mothers to ask about the relationship with the index father. If it happens that there is no relationship the mother should be screened for PND using a validated tool.

Future qualitative studies that provide an understanding of the emotional impact of a strenuous or no relationship with the father of the child are needed. Community education on family planning involving both partners and the importance of parenting using evidence-based tools and techniques is warranted to avoid or reduce the risk of an absent father. The latter is a complex social ill which should involve multiple stakeholders and socio-politico-cultural role players.

5.8.2 Mothers who are living with the father of the child

In this study, half the mothers were living with the father of the index child. Analysis in this study found that living with the father of the index child was not significantly associated with positive screening on the EPDS. This is in line with the findings of a similar study conducted in

different communities in Africa [26] yet contrary to findings by Fisher et al [19] who concluded that not living with a nuclear family was among the elements indicating a lack of social support to mothers in their perinatal period, and that this quadrupled the risk of developing mental disorders including depression among mothers living in developing countries.[19]

The explanation for this could be that, although the measure of support from the partner has been found to play a big role in the occurrence of PND, [18] their living together does not imply that the mother is receiving support from her partner. The support from the partner might reflect the quality of the relationship: if the relationship is good, the partner's support is probably a given.

Future studies need to assess the perception of mothers on the social and emotional benefits of staying together with the father of the child, including exploring the social dynamics involved in not staying with the father of their child. This could lead not only to an understanding of the core reason for the father's absence and therefore assists in the development of evidence-based policies and strategies to remediate this problem, through social education.

5.8.3 Mothers whose partners are financially supportive

Most mothers in this study reported receiving financial support from their partner. In this study, it was determined that the father's financial support was not significantly associated with PND amongst mothers at Levai Mbatha. This is contrary to findings in a similar study conducted in Cameroon showing that instrumental support from the father was significantly associated with PND[38] and that mothers who claimed not to receive instrumental support from their partner were almost five times more at risk of developing PND.[38] The Cameroonian findings are supported by other studies in Africa and the Middle East indicating that paternal financial support was a protective factor from PND.[9,37]

Material and financial support to the mother will reduce her financial burden, thereby reducing stress levels. A descriptive cross-sectional study conducted in Saudi Arabia isolated financial struggle and unemployment as risk factors for postpartum depression among young mothers.[37] Similarly, in the Cameroonian study the partner's financial support and other family members' emotional support were significant protective factors for depression for the mothers in the postnatal period.[38]

This raises a question: Is it only the financial support that has an impact on the mother's life during the postnatal period, or are there other emotional factors with regard to the support and the risk of PND? Although most participants in this study were relatively well supported financially and had a stable relationship with the father of the index baby, they had a high prevalence of PND (39%). As this study was limited to determining whether the mothers were receiving financial support from their partners, the mothers' satisfaction in terms of the financial support was not explored. Satisfaction on the mother's side regarding the support will have more impact on the development of PND than mere financial support from the father. Therefore, further studies are recommended to look at the satisfaction aspect of the support and its relationship to the development of PND.

5.8.4 Mothers who are in polygamous relationships

Almost 15% of participants reported to be involved in a polygamous relationship, or their partner had more than one sexual partner. In this study, it was found that being in a polygamous relationship was not associated with PND, consistent with findings by a Kenyan descriptive cross-sectional study which found that, among HIV-positive postnatal mothers in Kenya, an affirmative response to the question on whether the male partner was having an extramarital relationship did not result in risk of PND.[50] However, in Nepal and Nigeria, polygamy was found to be a common determinant of peri-natal. [50] This is in line with a finding of a systematic review conducted in developed countries.[19]The argument for the association between PND and a polygamous relationship was that the women were prone to marital and societal friction which could increase their stress levels and expose them to depression. However, this argument could not be supported in this study.

5.8.5 Mothers who are receiving support from their family or in-laws

More than three quarters of participants reported to benefit from support from their family and family-in-law. In this study, it was found that family support received by postnatal mothers from their families or in-laws was not significantly associated with PND (p= 0.726). This is in line with findings in Egypt [49] and in Kenya.[50] However, it is contrary to findings in a study conducted in Cameroon which found that mothers who did not receive emotional support from their family had an almost threefold risk of developing PND.[38] Furthermore, mothers who did not benefit from instrumental support by their family were four times more at risk of PND than those who

had support. Similarly, Murray et al found that mothers who reported to be afraid of their families were 11 times more at risk of PND. [52]

In the same line, systematic reviews of articles published in low and lower-middle-income countries found that insufficient family support was significantly associated with peri-natal depression and doubled or quadrupled the risk of depression during this period.[7] In several cultures in the world mothers-in-law seem to have an influence on the stability of the marital relationship, but their intervention in taking care of the grandchildren assisted in good cohesion. A good relationship with her mother-in-law could therefore ease the mother's stress.[57]

The mother's stress levels could be influenced by some Middle Eastern cultural practices where postpartum mothers are required to have a 40-days rest period where in most cases they are cared for by their family-in-law. A strenuous relationship with the in-laws will increase the daughter-in-law's stress during that period. Similar cultural dependence is not seen in other parts of the world, especially in cities and semi-rural areas.

5.9 SUICIDAL OR INFANTICIDE ASSESSMENT USING EPDS QUESTION 10

Mothers' score of between 1 and 3 on Question 10 of the EPDS to assess maternal risk of suicide or/and infanticide indicated that almost one third had some risk of suicide or infanticide. This is in line with findings of a South African study conducted in a similar community in KwaZulu-Natal,[60] but higher than findings in developed countries where a prevalence of suicidal ideation of around 15 to 20%was found.[57,59]

Analyses in this study found that a score of at least 1 in Question 10 showed a statistically significant association with PND, with such mothers having an up to a 22 times higher risk of PND than those who never thought of harming themselves or the baby. This is in line with studies conducted in several developed countries and in South Africa.[57, 59, 60.]

Although Question 10 of the EPDS is not a specific tool to assess suicidal ideation, it has shown good reliability and sensitivity in this regard. Based on the strong association demonstrated in this study between PND and suicidal ideation, there is a need for training of and raising awareness among practitioners regarding this high prevalence. A policy that requires screening for suicidal ideation in all mothers where PND is suspected needs to be implemented So that all mothers attending the postnatal clinic are asked at least Question 10 of the EPDS.

5.10 LIMITATIONS AND BIAS

This study could be limited in terms of the following:

5.10.1 Cross-sectional study

The fact that this research is a cross-sectional study is limiting in the sense that the findings cannot be generalised to the entire South African context. The causality of findings was also not established.

5.10.2 Selection bias

The possibility of selection bias exists because the consecutive sampling method was used whereby patients were enrolled as they arrived, with no specific selection method being applied. Furthermore, the sample was limited to postnatal mothers who attended the postnatal clinic, and mothers under 18 were excluded in a community where teenage pregnancy could be high.

Excluding mothers who were more than 16 weeks post-partum could have affected the prevalence estimates. Hence, as per the definition used, PND is more prevalent for delivery to 16 weeks post-delivery.

This study was conducted at a PHC level of care setting, which could have led to under-representation of mothers with severe depression as they might have been admitted. This is also applicable to those with sick babies. Mothers who for any reason could not come to the clinic because they were depressed and had to send caregivers to could have also been missed.

The Evaton community is becoming heterogeneous in terms of communicating with African migrants who do not speak Zulu, Sotho and English, yet patients who spoke languages other than these three indigenous languages could not participate in the study.

5.10.3 Reporting bias

There is a possibility of reporting bias, as this study used a researcher-administered questionnaire. The questionnaire contained sensitive questions, and the answers might have been biased in terms of the administering method even though an effort was made to make the patients comfortable by extensively explaining the purpose and anonymous character of the study.

CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter concludes this study by drawing an inference based on important findings, after which recommendations in terms of healthcare guidelines and future researches made.

6.2 CONCLUSION

The point-prevalence of PND at Levai Mbatha CHC using the EPDS as a screening tool, is high and almost triple the global prevalence. This high prevalence is concomitant with significant odds of harm to the baby and self and suggests a serious need for routine screening for PND among mothers in the postpartum period. In doing this, close attention needs to be paid to mothers' suicidal and infanticide thoughts.

The significant correlates of PND in this study (low educational attainment, and child, contraception failure in the index pregnancy and poor relationship between the index child's mother and father) suggest that it is important to address non-clinical issues such as promoting female education and social cohesion between parents in the management of PND.

6.3 RECOMMENDATIONS

1. The following may assist in the screening and management of mothers attending the postnatal clinic:

- Awareness of PND should be raised among health practitioners by organising continuous educative and training, both on the disorder, the available screening tools and associated factors.
- A standard guideline on how and when to screen for PND should be developed and implemented. This must be in line with the current recommendations of international and national medical societies. This implementation may be led by the community psychiatry unit and the district clinical specialist team.
- Question 10 of the EPDS which screens suicidal and infanticide ideation, should be asked to all mothers attending the postnatal clinic. Mothers who score 1 or more on this question should be referred to the mental health clinic for further assessment and management.

2. Healthcare practitioners should routinely explore social contexts of the parturient at postpartum visits, especially the educational status and the relationship status between them and the father of the index baby. The presence of a strenuous or non-existent relationship and / or low educational attainment must prompt screening for PND.

3. Considering that this was a cross sectional study conducted at one health facility, future studies with bigger sample size may be needed for generalization of the study findings to the community.

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APPENDICES

APPENDIX A

Appendix A.1

Part I: Participant information sheet

Factors associated with postnatal depression at Levai Mbatha community healthcare centre

Good day,

My name is Dr. N. Phukuta, and I am a post –graduate student in the department of family medicine at the University of The Witwatersrand. Research is just the process to learn the answer to question. In this study I would like to find out how many women are at risk of developing postnatal depression among postnatal mother who attend Levai Mbatha and what are the factors exposing them to develop this condition. Indeed, postnatal depression is a condition that manifest in mood change after the delivery of the baby. It can have negative consequences for the mother, the new born and the whole family. If diagnosed early, it can be treated and complications can be avoided.

Invitation to participate:

I would like to invite to participate in the following study which is considering in asking you questions for you to answer. Those questions will be about you, the pregnancy experience, the delivery and how do you feel. Answers to those questions will give an idea on how many mother are at risk to develop postnatal depression and what are the elements which put them at risk to develop this condition. This process will take a maximum of 15 minutes.

If it happen that in the process I find out that you are at risk of developing postnatal depression or to harm yourself or to harm the baby I will immediately transfer you to the mental health clinic for them to confirm the diagnosis and to take care of you.

Risks/Benefits for participating to the study:

In participating to this study you will have the opportunity of been screen for risk and possibility of having postnatal depression. And if it so happens that you have risk of having postnatal depression or yourself or the baby are in danger of been harmed you will be referred to the mental section of the clinic where further management will be offered to you.

Participation:

Your participation in this study is entirely voluntary. Whether you choose to participate or not, all services you are entitle to receive at the clinic will be rendered to you. You will sign a consent letter before participating into the study. You may change your mind and stop your participation at any time even if you agreed earlier.

Confidentiality / autonomity:

The information that we collect from you in this study will be kept confidential. You will be allocated a number. Only the researcher will be in possession of the correlation between the research number and your name. This information will be kept in a locked file which only the research will have access. Information will be kept for 5 years after which it will be destroyed. The overall result of the study will be submitted to the district, the clinic and to the University of the Witwatersrand. And also it could be published in a scientific journal for the scientific progress.

Ethical approval:

This research has been approved by The University of The Witwatersrand Human Research Ethic Committee (HREC).

Contacts:

Please feel free to contact the researcher, Doctor Nyundu PHUKUTA on cell n° 076 344 75 68 or email: drphukuta@gmail.com for any queries or reports to make. Should you require to direct queries, concerns or complaints regarding the ethical activities surrounding the study, please contact The University of The Witwatersrand Human Research Ethic Committee (HREC) through Professor P Cleaton-Jones, tel: 0117172301, email: peter.cleaton-jones@wits.ac.za or Ms Z Ndlovu, Mr Rhulani Mkansi, Mr Lebo Moeng. Administrative officers tel :0117172700/2656/1252 or email: zanele.ndlovu@wits.ac.za; Rhulani.mkansi@wits.ac.za and Lebo.moeng@wits.ac.za

Thank you for taking the time to read this information sheet.

Part II: Consent form

Appendix A.2

Factors associated with postnatal depression at Levai Mbatha community healthcare centre.

I have read the foregoing information sheet, or it has been read to me. I had the opportunity to ask questions about the study and my questions have been answered to my satisfaction.

I hereby consenting voluntarily to participate in this study on the factors associated with postnatal depression at Levai Mbatha Community Healthcare Centre.

Participant Name and Surname	Witness name and surname
…….	……
Signature……..	Signature……
Date…….	Date……

APPENDIX B: EDINBURGH POSTNATAL DEPRESSION SCALE

Appendix B

These questions are about how you have been feeling IN THE PAST TWO WEEKS, not just how you feel today.

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, nev**er**

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 or baby has occurred to me

□ Yes, quite often

□ Sometimes

□ Hardly ever

□ Never

Score

APPENDIX C: SOCIO-DEMOGRAPHIC AND HEALTH QUESTIONNAIRE

Appendix C

GENERAL DETAILS:

Participant Study Number: …….....

1. Age: ……..……..…….....

2. Marital status: single / cohabiting / married / separated / divorced / widowed

SOCIO-DEMOGRAPHIC DETAILS

3. What is the highest school grade you attained? Yes / No

4. Do you have a regular income? Yes / No

5. Is the father of the child or your current partner or you are employed? Yes / No

MEDICAL DETAILS

6. Are you suffering from any medical disease? Yes / No

7. Are you taking any chronic medication? Yes / No

8. Do you have any history of a mental condition? Yes / No

9. Is there any history of psychiatric condition in your family? Yes / No

10. Have you been diagnosed with postnatal depression? Yes / No

11. Are you breastfeeding this child? Yes / No

12. Before falling pregnant, were you using contraception that failed? Yes / No

13. Did you plan to have this baby? Yes / No

INFANT CHARACTERISTICS

14. Is your new child of your desired sex? Yes / No

15. Is the child crying for prolonged period of time? Yes / No

16. Is your child ill? Yes / No

DELIVERY DETAILS

17. After how many of these pregnancies did you deliver live babies? Yes / No

18. Have you ever had miscarriages? Yes / No

19. How did you deliver the baby? Normal vaginal delivery / Caesarean Section

20. Did you experience any complications during labour? Yes / No

21. Do you think that you coped well during labour? Yes / No

22. What was the condition of your baby after delivery? Good /Nursery /Premature /ICU/ Dead

RELATIONSHIP STATUS

23. Are you currently in a relationship with the father of this child? Yes / No

24. Do you have any other children with him? Yes / No

25. Does the father of the child assist financially in taking care of this child? Yes / No

26. Are you in a polygamous relationship? Yes / No

27. Are you receiving any assistance from your family members or in-laws? Yes / No

APPENDIX D: ETHICAL APPROVAL

Appendix D

R14/49 Dr Nyundu Phukuta

HUMAN RESEARCH ETHICS COMMITTEE (MEDIC

CLEARANCE CERTIFICATE NO. M160930

NAME: (Principal Investigator)	Dr Nyundu Phukuta
DEPARTMENT:	Family Medicine Levai Mbatha Community Health Centre
PROJECT TITLE:	Factors Associated with Postnatal Depression at Levai Mbatha Community Health Centre
DATE CONSIDERED:	30/09/2016
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	O.B Omole
APPROVED BY:	Professor P Cleaton-Jones,Chairperson, HREC (M
DATE OF APPROVAL:	21/11/2016

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

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Ro Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/w to carry out the above-mentioned research and I/we undertake to ensure compliance with thes Should any departure be contemplated, from the research protocol as approved, I/we undertak resubmit the application to the Committee. **I agree to submit a yearly progress report**. The c annual re-certification will be one year after the date of convened meeting where the study was reviewed. In this case, the study was initially reviewed in September and will therefore be due i September each year. Unreported changes to the application may invalidate the clearance give HREC (Medical).

Principal Investigator Signature

Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

APPENDIX E: REQUEST FOR RESEARCH PERMISSION

Appendix E



GAUTENG PROVI
HEALTH
REPUBLIC OF SOUTH AFRICA

Enq: Dr. N. Phul
076 3
(016) 9
drphukuta@gm

TO	:	**Ms. S. Hlahane – Director: Sedibeng DHS**
FROM	:	**Dr. N. Phukuta – Registrar (Family Medicine Unit)**
DATE	:	**06.07.2016**
SUBJECT	:	**REQUEST PERMISSION TO CONDUCT A RESEARCH ON RISK FACTORS OF POST PARTUM DEPRESSION AT LEVAI MBATHA CHC**

I hereby request your permission to conduct the above research in Levai Mbatha Comn Health Centre.

I am a third year registrar in the department of Family Medicine University of Witwatersra research project is among the requirements of the faculty in pursuing the Masters in Me degree in Family Medicine studies. The title of the research is: "risk factors of post p depression".

Thank you for your anticipated approval

DR. N. PHUKUTA
REGISTRAR – DEPARTMENT OF FAMILY MEDICINE WITS UNIVERSITY/ SEDIE DHS

DATE: 07/

APPENDIX F: CONSENT FOR CONDUCTING RESEARCH

Appendix F

GAUTENG PROV
HEALTH
REPUBLIC OF SOUTH AFRICA

Enq: Dr.Victor
01(
08:
(016)

TO	:	**Sedibeng District Management – PHC Services**
FROM	:	**Dr. Victor Figueroa – Research Coordinator (Sedibeng DHS**
DATE	:	**06.07.2016**
SUBJECT	:	**CONSENT FOR CONDUCTING TO DR. NYUNDU PHUKUTA FROM SEDIBENG DHS**

This is to certify that Dr. N. Phukuta, currently a registrar in Family Medicine will be con
a research as part of the requirements of the Faculty in pursuing his Master Degree in
Medicine.

The title of the research is: "risk factors of post partum depression". The site of the stu
be Levai Mbatha Community Health Centre, Sedibeng District.

I Dr. Victor Figueroa in my capacity as Sedibeng District Research Co-ordinator recor
and support for permission to be granted to the above researcher.

Regards

DR. VICTOR FIGUEROA
RESEARCH CO-ORDINATOR
SEDIBENG DISTRICT HEALTH SERVCES

DATE: 2016/07/06

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APPENDIX G: DECLARATION OF EDITING SERVICES

Appendix G

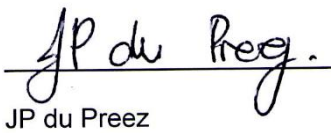
Date: **03 October 2017**

Name of Candidate: **Dr Nyundu Phukuta**

Student Number: **1022748**

Qualification: **Master of Medicine (Family Medicine)**

I declare that I have read and edited the above candidate's research paper.



JP du Preez

Cell: **082 925 8263**

Email: **tpdp.home@gmail.com**