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A retrospective review of psychiatric admissions of females of childbearing age to a Gauteng Hospital, comparing those in the peripartum period to the general population

Hart, Bianca

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A RETROSPECTIVE REVIEW OF PSYCHIATRIC ADMISSIONS OF FEMALES OF CHILDBEARING AGE TO A GAUTENG HOSPITAL, COMPARING THOSE IN THE PERIPARTUM PERIOD TO THE GENERAL POPULATION

Dr. Bianca Hart

A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Medicine in the branch of Psychiatry.

Johannesburg, 2021

DECLARATION

I, Bianca Hart, declare that this Research Report is my own, unaided work. It is being submitted for the Degree of Master of Medicine in the branch of Psychiatry at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other university.

_____

Signature of candidate

26th **day of February 2021 in Johannesburg**

ABSTRACT

Introduction

Pregnancy and the peripartum period can be challenging, especially for women who have or are susceptible to a mental illness. Mental illness in the peripartum period impacts on the mother and the family as a whole. There is a paucity of data from South Africa on in-patient admissions of women during the peripartum period and therefore we hope to describe this group within our context in Johannesburg in order to improve our understanding of this population.

Aim of the Study

To describe the population of female psychiatric patients admitted to Chris Hani Baragwanath Academic Hospital and to compare those presenting in the peripartum period with the non-pregnant, general female admissions.

Study Design

A retrospective record review of patient admissions to the female psychiatric wards in 2017. Patients within the reproductive age group were included in the study.

Results

Within the peripartum sub-group 46.2% had a diagnosis of bipolar and related disorders, while only 11.5% were diagnosed with a depressive disorder. For the overall study cohort, bipolar and related disorders were shown to be the most frequently diagnosed psychiatric disorder (41.4%), followed by psychotic disorders (30.1%), substance-related disorders (21.8%) and depressive disorders (14.4%). Women in the peripartum period did not differ from the general admissions based on diagnosis or length of stay but were prescribed less of the mood stabiliser class of medication and were younger in age.

Conclusion

The findings of this study describe the common presentation of inpatient female admissions. The most common presentation for women both in the peripartum period and the general population is bipolar disorder. This is considered a severe mental illness and has long-term considerations for both the mother and child. Specialised services should be considered for this high-risk group.

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CHAPTER 1 – INTRODUCTION

1.1 Introduction

Pregnancy is a significant event in any woman's life. During this time, a woman undergoes many changes, including psychological, physiological, and social changes. Pregnancy together with the first year after childbirth can be challenging for new mothers, but it can be particularly difficult for women who have, or are susceptible to, mental illness.[1] The acute presentation of a psychiatric illness during the peripartum period can be severe and is a psychiatric emergency, which requires urgent management and referral to a mental health care facility.[2]

If a psychiatric disorder is present in the peripartum period, it can cause significant distress and can have an impact on the attachment between the mother and the new-born, as well as have long standing effects on the mother, the baby, and the rest of the family unit.[1] In some cases, psychiatric illnesses may lead to suicide[3] or even infanticide.[4]

The aim of this study was to describe the population of female psychiatric patients admitted for inpatient care, treatment and rehabilitation at a tertiary hospital. By furthering our understanding of the characteristics of patients in an inpatient setting and comparing those in the peripartum period to the general population, the hope is to better understand psychiatric illnesses in the peripartum period and possibly identify some associations. This would allow women who are at high risk to be recognised early in the disease process, therefore decreasing the burden of disease on the mother, child and family unit.

1.2 Literature Review

1.2.1 Mental Health in the Peripartum Period

Pregnancy and the perinatal period are a complex and vulnerable time that can present several challenges to women, including the increased risk of the onset of a psychiatric illness or the worsening of a pre-existing mental illnesses. All types of psychiatric

disorders can occur during the peripartum period, including depression, anxiety and psychosis. Chronic disorders can start before pregnancy and continue throughout the pregnancy and into the postpartum period.[5]

The cause of psychiatric disorders, including postpartum psychiatric disorders, is thought to be an interplay between biological, psychological and social factors. The effect of environmental and genetic factors on increased risk has also been suggested. It has been shown that biological factors might play a greater role in causing postpartum psychosis while psychosocial factors may have a bigger influence on the development of postpartum depression.[6]

According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), the specifier for peripartum onset can apply to a mood or psychotic episode if the onset of symptoms occurs during pregnancy or within the first 4 weeks post-delivery.[7] However, this narrow time frame may limit diagnoses, particularly regarding depressive episodes. The World Health Organisation defines the postpartum period as 6 weeks after delivery which is also the period where women are at a higher risk of developing symptoms of a mental illness.[8]

The prevalence of postpartum psychosis is said to be low (1-2/1000 births)[9]; however, it is known to cause adverse outcomes for both the mother and child. In most cases, a hospital admission is required due to the severity of the symptoms, as well as the high risk to the mother and child.[8] The risk of developing postpartum psychosis is greatest in the first 30 days post-delivery.[10] Research has shown that women with schizophrenia present with psychotic symptoms later in the postpartum period than those with bipolar disorders or other affective illnesses.[11] Little is known about the role that sociodemographic and socioeconomic factors play in the development of postpartum psychosis.[8] Previous studies that have been done in both low- and middle-income countries (LMIC) have shown inconsistencies with regards to their results. Some found that there was a correlation between postpartum psychosis and a low income (for

example, in Nigeria, Nepal and Thailand),[12] while others have confirmed no relationship between the type of social class, employment, or the patient's level of education.[8]
Women who have a previous history of postpartum psychosis have a 100-fold increased risk when compared to the general population of having another episode during the peripartum period.[13]

Depression is one of the leading causes of disability on a global scale,[14] with depressive disorders being the leading cause of disability from neuropsychiatric disorders among the female population.[15] The Netherlands mental health survey and incident study (NEMESIS) found that women experience a higher incidence of mood and anxiety disorders.[16] Depressive and anxiety disorders are frequently seen in pregnancy, with estimations of 11% for depressive disorders and 15% for anxiety disorders.[17] It has been shown in a study conducted in Germany that the presence of anxiety and depression before pregnancy is a high predictor of anxiety and depressive disorders in the peripartum period.[18] Depression during pregnancy predisposes women to inadequate antenatal care, alcohol use and poor nutrition during pregnancy.[19] These factors all have a negative effect on the infant in-utero and can lead to low birth weights as well as stunted fetal growth.[20]

Postnatal depression has an adverse effect on mother-child bonding as well as the overall development of the child.[21] In LMICs, it has been reported that postnatal depression is related to poor child growth, poor mental development[22] and a higher risk of infant diarrhoea.[23]

Pregnancy and childbirth are strong risk factors for developing bipolar disorder. The risk of underlying bipolar disorder in a patient presenting with a first episode of depression during the postpartum period is higher than the risk in first episode depression occurring separately from the peripartum period. Women who are known with bipolar disorder are at a greater risk of developing depression, anxiety, mania and psychosis during the postpartum period.[24] The risk of relapse during the postpartum period for a woman known with bipolar disorder is estimated to be 37%.[25]

A strong association exists between intimate partner violence (IPV) and mental disorders amongst pregnant women and those that are in the postpartum period especially in LMICs. A systematic review of twenty-four studies done across ten LMICs found that IPV was reported by 2-35% of the study participants. IPV may include physical, sexual or psychological violence. Women who had experienced IPV during pregnancy had a higher risk of antenatal and postnatal depression when compared to those who had not. The review also reported a higher prevalence of anxiety, post-traumatic stress disorder, somatoform disorders and suicidal ideation amongst women who had a history of IPV. The risk varied depending on the type and severity of the violence as well as the country.[26] Psychological consequences of perinatal IPV include maternal dissociation and withdrawal[27] which leads to an increased risk of insecure and disorganised infant attachment styles.[28] Women with a history of perinatal IPV tended to use more abusive parenting practices which would also have a negative effect on bonding and attachment.[29]

Illicit substance use during the peripartum period can have negative effects for both the mother and the fetus.[30] The impact of substance use depends on the type of substance used, the point at which the fetus is exposed during the pregnancy as well as the severity of the maternal substance use.[31] According to a National data base in the United States of America, the most frequently used substance during the perinatal period was nicotine, followed by alcohol, cannabis and cocaine. Polysubstance use was present in 50% of cases.[32] The consequences of alcohol use during pregnancy have been widely documented especially regarding the development and consequences of fetal alcohol syndrome.[31] Illicit substance use is also associated with infant mortality, low birth weight, premature delivery and cognitive impairment. The adverse effects of substance use in pregnancy is further complicated by the presence of a comorbid maternal psychiatric illness.[30]

1.2.2 Prevalence of Mental Disorders in the Peripartum Period from High-Income Countries

A Scottish national linkage study conducted from 2005 to 2009 included 3290 admissions (1889 pregnancies and 1730 women) due to a psychiatric illness.[8] Scottish maternity

records were linked with the psychiatric hospital admissions and the pregnancy-related admissions were then assessed. They looked at the admissions during the pregnancy period, early postpartum period (up to 6 weeks post-delivery) and late postpartum period (up to 2 years post-delivery) and compared these with admissions in the pre-pregnancy period (up to 2 years before pregnancy). During the early postpartum period, most of the hospital admissions were for psychosis (39.7%), followed by depression without psychotic features (22.4%) and then bipolar disorder (14.4%). For the other time periods, it was noted that depression without psychotic features accounted for the greatest number of hospital admissions. With regards to the non-pregnant females, it was found that there was a high percentage of personality disorders that required an admission.[8]

When looking at social factors in the same Scottish study, the women admitted during the early postpartum period were older, had a longer duration of hospital stay and in general did not have a previous history of psychiatric illness. Women from socially disadvantaged backgrounds constituted the majority of admissions; however, in the early postpartum period there was an increased number of admissions from more affluent groups. An admission for a previous psychiatric illness was a factor that was considered important as this group had admission rates that were higher in both the non-pregnant and pregnant time periods but lower during the late postpartum period. Parity played a role, as primiparity was shown to be a risk factor for postpartum admission.[8]

The Scottish study concluded that the early postpartum period, as well as the late postpartum period, were times of increased risk for woman being admitted for psychiatric management. It showed that admissions were highest at two weeks post-delivery for psychosis and highest at one week post-delivery for depression.[8]

A Swedish population-based linkage study aimed to determine whether characteristics of pre-pregnancy psychiatric illnesses had an influence on whether a woman developed a psychotic or bipolar episode during the postpartum period. All women who delivered their first live infant between January 1987 and December 2001 were included in the study.

Admissions were categorised as pre-pregnancy, prenatal (42 weeks before delivery) and postnatal (90 days after delivery).[33]

Among the 612 306 women who were included in the study, 2259 (0,37%) had an admission for a psychiatric illness prior to delivery. Of these admissions, 13.45% occurred during the prenatal period while 86.55% occurred prior to the pregnancy. Results showed that a diagnosis requiring hospitalisation during the prenatal period resulted in a higher rate of admission for an episode in the postpartum period when compared to the women who were admitted for a psychiatric illness pre-pregnancy.[33]

Furthermore, results showed that women that had a pre-pregnancy admission for schizophrenia or bipolar disorder had a re-admission rate of 21.72% and 8.46% respectively in the postpartum period. Thus, pre-pregnancy psychotic or bipolar illness requiring a hospital admission increased the risk of a postpartum episode requiring hospitalisation.[33]

The findings from the study noted that women with a history of a previous hospitalisation for mental illness were older at the time of their first delivery, more likely to smoke and were less likely to be staying with the father of their infant, when compared to those with no history of a previous admission. Lastly, the Swedish study showed that regardless of the diagnosis in the postpartum period, majority of the admissions occurred in the first two weeks post-delivery and slowly declined over the next three months.[33]

1.2.3 Studies on Mental Health Disorders in the Peripartum Period from South Africa

Mental health greatly impacts the health of both the individual patient as well as the population.[34] According to estimates from the South African National Burden of Disease study, neuropsychiatric disorders were the third highest contributors to disability-adjusted life-years, after HIV/AIDS and other infectious diseases.[35]

In 2007, the Western Cape Provincial Department of Health initiated the Burden of Disease Reduction Project.[36] A large focus was on interventions that could be

implemented to decrease the burden of disease. The review assessed four categories relating to the burden of disease. These included prevalence or incidence of mental illness, risk factors for mental illness, consequences in terms of disability-adjusted life-years, and social and economic costs.[34] It was noted that available data most likely underestimates the prevalence of mental illness due to under-diagnosis, as well as limited access to mental health care.[34] Mental disorders during the perinatal period were identified as contributing risk factors to the burden of disease. Studies conducted in the Western Cape report a high incidence of various mental illnesses amongst pregnant woman. A large percentage of pregnant woman have multiple risk factors for adverse peripartum outcomes (including alcohol use and depression).[37]

Studies done in South African communities have shown that there is a high prevalence of depression amongst pregnant and postnatal woman.[38] In a low-income settlement in Cape Town, 39% of pregnant woman screened positive for a depressed mood after completing the Edinburgh Postnatal Depression Scale[38] and 34.7% of women in the postnatal period were diagnosed with depression.[39] A study conducted at the antenatal clinic at Rahima Moosa Hospital in Johannesburg concluded that 38.6% of the participants had at least one perinatal mental health disorder.[40] It further reported that 19.3% had depression, 14.5% were diagnosed with anxiety disorder and 7.6% had a trauma and stressor related disorder.[40]

1.2.4 Interventions to Improve Maternal Mental Health

Evidence exists that peripartum psychiatric illnesses not only have an impact on the mother but can cause severe psychological and developmental complications for the child.[41] Complications may include internalising disorders, impaired social competence, as well as a higher risk of developing depression during adolescence. An important initial step would be to identify parents and children who are at high risk of adverse outcomes due to illness of the mother in the peripartum period.[41] Confidential Enquiries into maternal deaths are programmes initiated to investigate the causes of death in this specific population. These enquiries have emphasised that suicide is one of the leading causes of maternal death.[42] Many of these women had suffered from an acute onset of

psychiatric illness during the peripartum period. Factors such as a history of bipolar disorder or a previous episode of a postpartum illness, which would have put them in a high-risk group, were potentially missed at follow-up and an appropriate management plan was not implemented.[42] The National Institute for Health and Care Excellence (NICE) guidelines recommend that antenatal services should be equipped to identify women who are at-risk and allow them to be referred to a specialist perinatal mental health care service.[43] A risk assessment should be done from the first antenatal visit. This would allow for early treatment and possible prevention. In South Africa, even with the high rates of depression within the peripartum period, there is no routine screening for maternal mental disorders or treatment of these disorders at a primary care level. The Perinatal Mental Health Project in the Western Cape initiated a stepped-care intervention that combines maternal mental health care and antenatal care, thus, bridging the gap between maternal health, child health and maternal mental health.[44]

The Mental Health Policy Framework and Action Plan for South Africa (2013-2020) advocates for mental health treatment programmes to be incorporated into routine antenatal and postnatal care plans as well as programmes to address alcohol and substance misuse in pregnancy.[45] However, implementation of these programmes is inconsistent.

A situational analysis of maternal mental health in primary care in five LMICs (including South Africa), reported that the availability of psychiatric specialist care at a primary health care site was limited and that most women within the perinatal period were referred to general hospitals for further care. The analysis also noted that there was limited human resources available at a primary health care level and that training of nursing staff in maternal mental health was lacking. Even though staff at primary health care facilities were willing to provide maternal mental health care, they did not feel confident enough to manage these cases. It was highlighted during this analysis that none of the districts that were included had strategies in place at a primary health care level to detect maternal mental illness. Referral protocols to specialist mental health care facilities, including to tertiary hospitals, were in place.[46]

Even though policies have been put in place, maternal mental health care at a primary care level is still lacking. Due to the lack of trained health personal, lack of prescribing guidelines for psychiatric medication in pregnant and breastfeeding women and the ongoing stigma surrounding mental illness there is a decreased opportunity for women with mental illness to be detected and receive care at a primary level.[46]

1.3 Motivation for Conducting this Study

A limited number of studies regarding maternal mental health have been conducted in Johannesburg, South Africa. The studies that have been done thus far are aimed at the outpatient population and therefore data regarding more severe mental illnesses, which required hospital admissions, is lacking.

We hope to further our understanding of the characteristics of the female psychiatric inpatient population and assess if there are any associations with the need for admission for psychiatric illnesses in the general population, as well as the peripartum period. We hope to describe any differences in characteristics between those who present in the peripartum period versus the general population. With improved understanding of the characteristics of each group, resources can be more effectively directed to the needs of the patient population.

1.4 Hypothesis

There will be a greater number of admissions for depression among the peripartum population during the early postpartum period (up to 6 weeks post-delivery) compared to the general population; and they will have a longer admission duration compared to women not in the peripartum period.

1.5 Aim of the Study

To describe the population of female psychiatric patients admitted to Chris Hani Baragwanath Academic Hospital and to compare those presenting in the peripartum period with non-pregnant, general female admissions.

1.6 Study Objectives

1. To describe the demographics of the population admitted to Chris Hani Baragwanath Academic Hospital female psychiatry wards.
2. To compare the peripartum admissions with the general population admissions.

CHAPTER 2 - METHODS

2.1 Study Design and Population

This study was a retrospective record review of patient admissions to Chris Hani Baragwanath Academic Hospital female psychiatric wards over a 12-month period from 1st January 2017 to the 31st December 2017.

The Psychiatric Department at Chris Hani Baragwanath Academic Hospital, a tertiary academic hospital, is situated in Soweto. Soweto is an urban settlement, Southwest of Johannesburg, which has a population of about 1.3 million.[47] However, Chris Hani Baragwanath Academic Hospital caters for mental health care users in the Southern Metro District, Johannesburg, which is a total catchment population of 3 million. The adult psychiatry department receives referrals from surrounding clinics and private health care practitioners within the catchment area. Referrals are also received from other medical disciplines within Chris Hani Baragwanath Academic Hospital (inpatient and outpatient) as well as from allied health professionals who are based at the hospital.[48] District hospitals within the catchment area refer patients if further tertiary level care is needed. Referrals for inpatient care are only accepted based on the bed availability at the time. There are currently two wards at the hospital that admit female psychiatric patients from the age of 13 years onwards.

All female patients that were admitted from the 1st January 2017 to 31st December 2017 to the psychiatric wards at Chris Hani Baragwanath Academic Hospital and who were within the reproductive age group of 15-49 years were included in the study.

Patients that were admitted with a confirmed pregnancy (either by urine B-HCG testing or ultrasound) or that were admitted within 52 weeks (1 year) post-delivery were included in the peripartum data set. 52 weeks post-delivery was selected as the time frame, as literature has shown that late postpartum admissions have been reported for various psychiatric illnesses.[8]

Patients that were admitted more than 52 weeks (1 year) post-delivery were included in the general population data set.

All patients not within the reproductive age group of 15-49 years were excluded from the study. Any patient that was admitted but whose file was unavailable was also excluded from the study.

2.2 Data Collection

Initially, the patient's hospital numbers and individualised psychiatric patient file numbers were captured from the admissions book that was completed after each new admission to the psychiatric wards. These were then cross-referenced with the number of files that were opened during the study period at the psychiatric patient's registry. The patient numbers were entered into an Excel spreadsheet according to their month of admission. Patient files were located from the psychiatric patient registry and as each discharge summary was reviewed, the clinical data was captured on a REDCap online database system. The REDCap online database system (Vanderbilt University) is a free, secure application for building and maintaining online surveys and databases.[49]

In the psychiatric wards, assessment tools, such as the Structured Interview for DSM-5 (SCID),[50] are not used and the final diagnosis is made based on the clinical impressions of the patient at the time of their admission and the subsequent progress that is made during their admission in the ward. All data was extrapolated from the patient's discharge summary. The diagnosis and medication at the time of discharge was a representation of the patient's psychopathology which was observed during the full admission period.

During the data capturing process if any file was noted to have an incomplete discharge summary it was flagged on the Excel spreadsheet to be located at the main hospital registry.

Variables for analysis included:

- Demographic data: age (at the time of admission), marital status, source of income and employment status
- Diagnosis at the time of discharge
- Length of stay
- Substance use history
- Previous psychiatric history or previous psychiatric inpatient care
- Medication at the time of discharge
- If in the peripartum period; gestational age or number of weeks post-delivery

2.3 Data analysis

2.3.1 Sample Size Calculation

The sample size was dependant on the number of female patients that were admitted to the psychiatric wards at Chris Hani Baragwanath Academic Hospital for the period of 1st January 2017 to 31st December 2017 and was a sample of convenience.

2.3.2 Statistical Analysis

Descriptive statistics such as mean (standard deviation) and median (interquartile ranges [IQR]) were calculated for age. Additionally, the minimum and maximum values were determined to illustrate the age range of participants. Age was categorised into 15-24, 25-34 and 35-49 age groups. Frequencies were determined for categorical variables. Both continuous and categorical analysis were stratified by group for example, peripartum vs. general population. The continuous measures were compared by group using both the parametric t-test and non-parametric Kruskal-Wallis tests.

Characteristics associated with psychotic disorders, bipolar and related disorders and depressive disorders were assessed using univariate and multivariate logistic regression. Since these outcome variables occurred in more than 10% of the participants, the relative risk was used due to its superiority in controlling for bias when affected proportions are high. Univariate analysis was first determined and then variables with a p-value < 0.15 were considered for entry into the multivariate.

Categorical measures were compared using the Chi-square test of proportions.

All the statistical tests were conducted using the SAS statistical software (SAS Enterprise Guide 7.15, SAS Institute Inc, Cary, USA).

2.4 Ethics

This study was approved by the University of the Witwatersrand's Human Research Ethics Committee (M181122). Authorisation to conduct the study was obtained from the CEO of Chris Hani Baragwanath Academic Hospital.

This study is a retrospective review, and the patient's anonymity was maintained. The data collection was done at the hospital. Patient hospital numbers were initially used to obtain the clinical records, but they were not entered into the database at any time. The primary investigator controlled the access to the database which was password protected. Due to the nature of the retrospective data collection, patient consent was not needed for this study.

CHAPTER 3 - RESULTS

3.1 Study Group Derivation

For the period 1st January 2017 to 31st December 2017 there was a total of 534 admissions to the female psychiatric wards at Chris Hani Baragwanath Academic Hospital. A total of 172 admissions were excluded: 102 admissions did not meet the age criteria, and 70 admissions had incomplete records on discharge.

Data for 362 admissions was entered into a REDCap database. Of these, 52 admissions met criteria to be included in the peripartum dataset and 310 were included in the general population dataset.

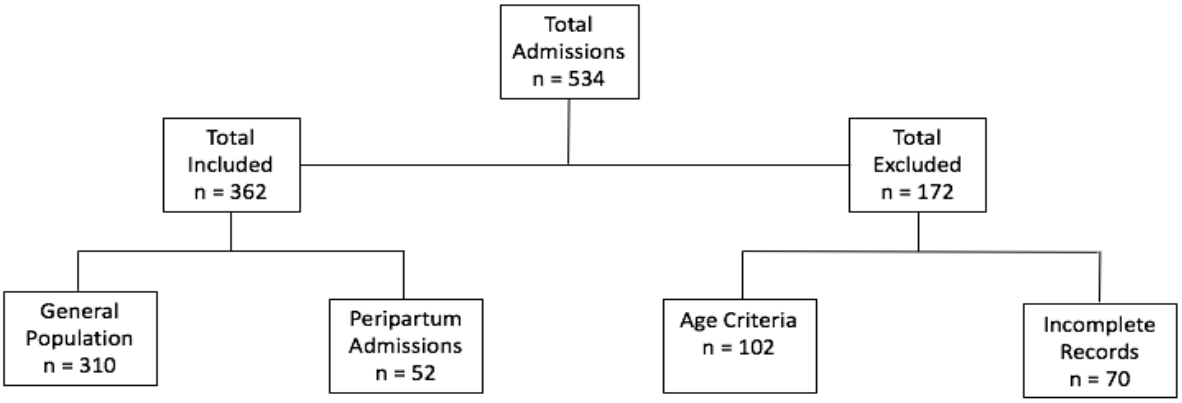


Figure 1: Study group derivation

3.2 Descriptive Analysis of the Study Group

The median age of the patients admitted was 32 years (IQR: 25-39) with most of the admissions falling in the 25-34-year age group (40.3%). Most of the patients were single (74.6%), relied on spouse or family support as a source of income (59.4%) and had no or an incomplete secondary level of education (54.7%).

Of the patients admitted, 31.9% reported a history of substance use, with cannabis use being the highest reported (51.3%), followed by alcohol (40.4%) and then stimulant use (22.6%).

Regarding parity, 33.9% of all patients admitted were nulliparous, 28% had only one child, and the remaining 38.1% of women were multiparous.

With regards to the peripartum sub-group, most of the patients were in the 25-35-year age group (median 28 years). Majority of the patients were single (71.2%), relied on spouse or family support (78.9%) and had no or an incomplete secondary level of education (57.7%).

Regarding substance use, 73.1% of the patients reported that they did not have a history of substance use while 26.9% reported that they had. Of the women that reported a positive substance use history, alcohol (57.1%), cannabis (42.9%) and stimulants (35.7%) were the most commonly used substances. Within the peripartum sub-group 31.4% already had a child and 31.4% had two children while 19.6% were nulliparous. The remaining patients had three or more children (17.6%).

The median age of the patients in the general population sub-group was 33 years (IQR: 26- 40) with majority being in the 35-49-year age group (42.2%). Most of the patients in this group were single (75.2%), relied on spouse or family support (56.1%) and had none or an incomplete secondary level of education (54.2%). Within the general population 67.3% denied a history of substance use while 32.7% reported that they had previously used substances. Cannabis (52.5%), alcohol (49.5%) and stimulants (20.1%) were again reported as being the most frequently used. Regarding parity, 36.3% of the women were nulliparous, 27.5% had one child and 36.2% were multiparous.

Table 1: Demographic characteristics of study cohort				
Variable	**Overall (%)**	**Peripartum (n=52) (%)**	**General Population (n=310) (%)**	**P-Value**
Age (in years)				
15-24 (%)	78/362 (21.55)	14/52 (26.92)	64/310 (20.65)	0.3082
25-34 (%)	146/362 (40.33)	31/52 (59.62)	115/310 (37.10)	**0.0022**
35+ (%)	138/362 (38.12)	7/52 (13.46)	131/310 (42.26)	**0.0001**
Median (IQR)	32.0 (25.0-39)	28.0 (24.0-31)	33.0 (26.0-40)	**<.0001**
Mean (SD)	32.1 (8.53)	28.0 (5.44)	32.8 (8.76)	**<.0001**
Min, Max	(14-49)	(18-41)	(14-49)	
Marital Status				
Single (%)	270/362 (74.59)	37/52 (71.15)	233/310 (75.16)	0.5391
Other (%)	92/362 (25.41)	15/52 (28.85)	77/310 (24.84)	
Source of Income				
Spouse or Family Support (%)	215/362 (59.39)	41/52 (78.85)	174/310 (56.13)	**0.0020**
Other (%)	147/362 (40.61)	11/52 (21.15)	136/310 (43.87)	
Highest Level of Education				
None/Incomplete secondary (%)	198/362 (54.70)	30/52 (57.69)	168/310 (54.19)	0.6391
Complete/post matric (%)	164/362 (45.30)	22/52 (42.31)	142/310 (45.81)	
History of Substance Use				
No (%)	246/361 (68.14)	38/52 (73.08)	208/309 (67.31)	0.4092
Yes (%)	115/361 (31.86)	14/52 (26.92)	101/309 (32.69)	
Alcohol				
No (%)	57/115 (49.57)	6/14 (42.86)	51/101 (50.50)	0.5922
Yes (%)	58/115 (50.43)	8/14 (57.14)	50/101 (49.50)	
Cannabis				
No (%)	56/115 (48.70)	8/14 (57.14)	48/101 (47.52)	0.4998
Yes (%)	59/115 (51.30)	6/14 (42.86)	53/101 (52.48)	
Inhalant				
No (%)	113/115 (98.26)	14/14 (100.0)	99/101 (98.02)	-
Yes (%)	2/115 (1.74)	0/14 (0.00)	2/101 (1.98)	
Opioid				
No (%)	111/115 (96.52)	14/14 (100.0)	97/101 (96.04)	-
Yes (%)	4/115 (3.48)	0/14 (0.00)	4/101 (3.96)	
Sedative, Hypnotic, or Anxiolytic				
No (%)	109/115 (94.78)	14/14 (100.0)	95/101 (94.06)	-
Yes (%)	6/115 (5.22)	0/14 (0.00)	6/101 (5.94)	
Stimulant				
No (%)	89/115 (77.39)	9/14 (64.29)	80/101 (79.21)	0.3030
Yes (%)	26/115 (22.61)	5/14 (35.71)	21/101 (20.79)	
Tobacco				
No (%)	113/115 (98.26)	13/14 (92.86)	100/101 (99.01)	0.2296
Yes (%)	2/115 (1.74)	1/14 (7.14)	1/101 (0.99)	
Parity				
Nulliparous (%)	121/357 (33.89)	10/51 (19.61)	111/306 (36.27)	**0.0199**
One (%)	100/357 (28.01)	16/51 (31.37)	84/306 (27.45)	0.5637
More than one (%)	136/357 (38.10)	25/51 (49.02)	111/306 (36.27)	0.0827

Overall on discharge, bipolar and related disorders were shown to be the most frequently diagnosed psychiatric disorder (41.4%), followed by psychotic disorders (30.1%), substance-related disorders (21.8%) and depressive disorders (14.4%).
A high percentage of patients reported having a previous history of a psychiatric illness (67.3%), of which 63.3% required previous psychiatric inpatient care. Co-morbid medical illnesses were reported by 55.1% of the patients.
For the whole cohort of patients, the length of stay in the ward while receiving inpatient care, ranged from 19 to 46 days (median 32 days).

In the peripartum sub-group, bipolar and related disorders were the most frequently diagnosed disorders at the time of discharge (46.2%), followed by substance-related disorders (21.2%), psychotic disorders (19.2%) and depressive disorders (11.5%). Majority of the peripartum patients reported previously having had a history of mental illness (62.8%) of which 59.6% required in-hospital care. The median length of stay in the ward for a patient in the peripartum subgroup was 31 days (IQR: 21-52 days). Co-morbid medical illnesses were reported by 49% of the patients.

For the general population sub-group, the majority of the patients had bipolar and related disorders as their diagnosis on discharge (40.7%). The second most frequent diagnosis was psychotic disorders (31.9%) followed by substance-related disorders (21.9%) and depressive disorders (14.4%). Most of the general population had a previous history of a mental illness (68.1%) and 63.9% of these required an admission to hospital. Of note, 56.1% of the general population subgroup reported a comorbid medical illness. The median length of stay for a patient in the general population was 32 days (IQR: 19-46 days).

Table 2: Diagnosis and previous psychiatric characteristics of study cohort				
Variable	**Overall (%)**	**Peripartum (%)**	**General Population (%)**	**P-Value**
Psychotic Disorders				
No (%)	253/362 (69.89)	42/52 (80.77)	211/310 (68.06)	0.0646
Yes (%)	109/362 (30.11)	10/52 (19.23)	99/310 (31.94)	
Bipolar and Related Disorders				
No (%)	212/362 (58.56)	28/52 (53.85)	184/310 (59.35)	0.4555
Yes (%)	150/362 (41.44)	24/52 (46.15)	126/310 (40.65)	
Depressive Disorders				
No (%)	310/362 (85.64)	46/52 (88.46)	264/310 (85.16)	0.5301
Yes (%)	52/362 (14.36)	6/52 (11.54)	46/310 (14.84)	
Anxiety Disorders				
No (%)	356/362 (98.34)	51/52 (98.08)	305/310 (98.39)	0.8712
Yes (%)	6/362 (1.66)	1/52 (1.92)	5/310 (1.61)	
Trauma and Stressor-Related Disorders				
Post-traumatic Stress Disorder (%)	4/9 (44.44)	0/1 (0.00)	4/8 (50.00)	-
Adjustment Disorder (%)	5/9 (55.56)	1/1 (100.0)	4/8 (50.00)	
Substance-Related Disorders				
No (%)	283/362 (78.18)	41/52 (78.85)	242/310 (78.06)	0.8995
Yes (%)	79/362 (21.82)	11/52 (21.15)	68/310 (21.94)	
Personality Disorders				
No (%)	316/362 (87.29)	47/52 (90.38)	269/310 (86.77)	0.4694
Yes (%)	46/362 (12.71)	5/52 (9.62)	41/310 (13.23)	
Any Disorder				
No (%)	30/362 (8.29)	6/52 (11.54)	24/310 (7.74)	0.3581
Yes (%)	332/362 (91.71)	46/52 (88.46)	286/310 (92.26)	
Intellectual Disability				
Mild (%)	8/21 (38.10)	2/4 (50.00)	6/17 (35.29)	0.7190
Moderate (%)	11/21 (52.38)	2/4 (50.00)	9/17 (52.94)	
Severe (%)	2/21 (9.52)	0/4 (0.00)	2/17 (11.76)	
Neurocognitive Disorder				
Major or Mild Vascular Neurocognitive Disorder (%)	2/21 (9.52)	0/1 (0.00)	2/20 (10.00)	-
Major or Mild Neurocognitive Disorder due to Traumatic Brain Injury (%)	2/21 (9.52)	0/1 (0.00)	2/20 (10.00)	
Major or Mild Neurocognitive Disorder due to HIV Infection (%)	15/21 (71.43)	1/1 (100.0)	14/20 (70.00)	
Substance/Medication-Induced Major or Mild Neurocognitive Disorder (%)	1/21 (4.76)	0/1 (0.00)	1/20 (5.00)	
Major or Mild Neurocognitive Disorder due to Another Medical Condition (%)	1/21 (4.76)	0/1 (0.00)	1/20 (5.00)	
Length of stay (in days)				
≤31 Days (%)	175/355 (49.30)	27/52 (51.92)	148/303 (48.84)	0.6817
>31 Days (%)	180/355 (50.70)	25/52 (48.08)	155/303 (51.16)	
Median (IQR)	32.0 (19.0-46)	30.5 (21.0-51.5)	32.0 (19.0-46)	0.4780
Mean (SD)	37.0 (26.4)	38.6 (23.6)	36.7 (26.9)	0.6346
Min, Max	(3-246)	(10-113)	(3-246)	

Previous Psychiatric History				
No (%)	117/358 (32.68)	19/51 (37.25)	98/307 (31.92)	0.4521
Yes (%)	241/358 (67.32)	32/51 (62.75)	209/307 (68.08)	
Previous Psychiatric Inpatient Care				
No (%)	133/362 (36.74)	21/52 (40.38)	112/310 (36.13)	0.5558
Yes (%)	229/362 (63.26)	31/52 (59.62)	198/310 (63.87)	
Co-morbid Medical Diagnosis				
No (%)	162/361 (44.88)	26/51 (50.98)	136/310 (43.87)	0.3442
Yes (%)	199/361 (55.12)	25/51 (49.02)	174/310 (56.13)	
Readmission (during data collection period)				
No (%)	334/362 (92.27)	48/52 (92.31)	286/310 (92.26)	0.9901
Yes (%)	28/362 (7.73)	4/52 (7.69)	24/310 (7.74)	

Almost all admissions received medication on discharge (96%). Most patients were discharged on an antipsychotic medication, predominantly second generation antipsychotics (73.2%). There were a large number of patients discharged on mood stabilisers (54.14%) and a smaller number discharged on antidepressants (22.93%).

With regards to the peripartum sub-group, majority of the patients were discharged on second generation antipsychotics (63.5%) while 26.9% and 23.1% were discharged on mood stabilisers and antidepressant treatment respectively.

Table 3: Medication on discharge

Variable	Overall	Peripartum	General Population	P-Value
Antipsychotic (First generation)				
Haloperidol (%)	13/13 (100.0)	6/6 (100.0)	7/7 (100.0)	-
Antipsychotic (Second generation)				
No (%)	97/362 (26.80)	19/52 (36.54)	78/310 (25.16)	0.0865
Yes (%)	265/362 (73.20)	33/52 (63.46)	232/310 (74.84)	
Antipsychotic (Depot formulation)				
Flupentixol (%)	32/40 (80.00)	5/7 (71.43)	27/33 (81.82)	0.5325
Paliperidone (%)	4/40 (10.00)	0/7 (0.00)	4/33 (12.12)	-
Risperidone (%)	1/40 (2.50)	1/7 (14.29)	0/33 (0.00)	-
Zuclopenthixol (%)	3/40 (7.50)	1/7 (14.29)	2/33 (6.06)	0.4530
Mood Stabilizer				
No (%)	166/362 (45.86)	38/52 (73.08)	128/310 (41.29)	<.0001
Yes (%)	196/362 (54.14)	14/52 (26.92)	182/310 (58.71)	
Antidepressant				
No (%)	279/362 (77.07)	40/52 (76.92)	239/310 (77.10)	0.9780
Yes (%)	83/362 (22.93)	12/52 (23.08)	71/310 (22.90)	
Medication: Benzodiazepine				
Lorazepam (%)	8/16 (50.00)	1/1 (100.0)	7/15 (46.67)	-
Clonazepam (%)	8/16 (50.00)	0/1 (0.00)	8/15 (53.33)	

The peripartum sub-group had a median gestational age at the time of admission of 24 weeks (IQR: 13-33 weeks), while for those admitted in the postpartum period the median gestational age was 8 weeks post-delivery (IQR: 2-12 weeks).

Table 4: Representation of peripartum time period	
Variable	
Gestational Age (at time of admission, in weeks)	
Median (IQR)	24.0 (13.0-33)
Mean (SD)	22.7 (10.8)
Min, Max	(4-38)
Postpartum (in weeks)	
Median (IQR)	8.00 (2.00-12)
Mean (SD)	9.97 (10.3)
Min, Max	(1-40)

3.3 Comparing the Peripartum Admissions to the General Admissions

The median age of the peripartum group was significantly lower compared to the general population group (28 years vs. 33 years; p <0.0001). A higher number of the peripartum admissions reported spouse or family support as their source of income (78.9% vs. 56.1%; p=0.0020). There was no significant difference between the groups when comparing marital status, level of education and substance use. There was a non-significant difference between the groups with regards to the average length of admission in days. In the general population group, 68.1% had a previous psychiatric history compared to 62.8% in the peripartum group (p=0.4521). The general population group also had a higher but not significant proportion of previous inpatient care (63.9% vs. 59.6%, p=0.5558). When comparing the two groups regarding co-morbid medical illnesses, the general admissions had a higher percentage (56.1% vs. 49%, p=0.3442).

The proportion of psychotic disorders was higher in the general population group relative to the peripartum group (31.9% vs. 19.2%; p=0.0646). Bipolar and related disorders were

found to be the most prevalent psychiatric disorder in the peripartum period (46.2%), but were not statistically more common in this group versus those women with a general admission (p=0,4555).

With regards to the distribution of medication between the two groups, mood stabilisers were statistically more frequently prescribed in the general admissions (58.7% vs. 26.9%; p<0.0001). Although not significant, the proportion of admissions receiving second generation antipsychotics was also higher in the general admissions group (74.8% vs. 63.5%; p=0.0865).

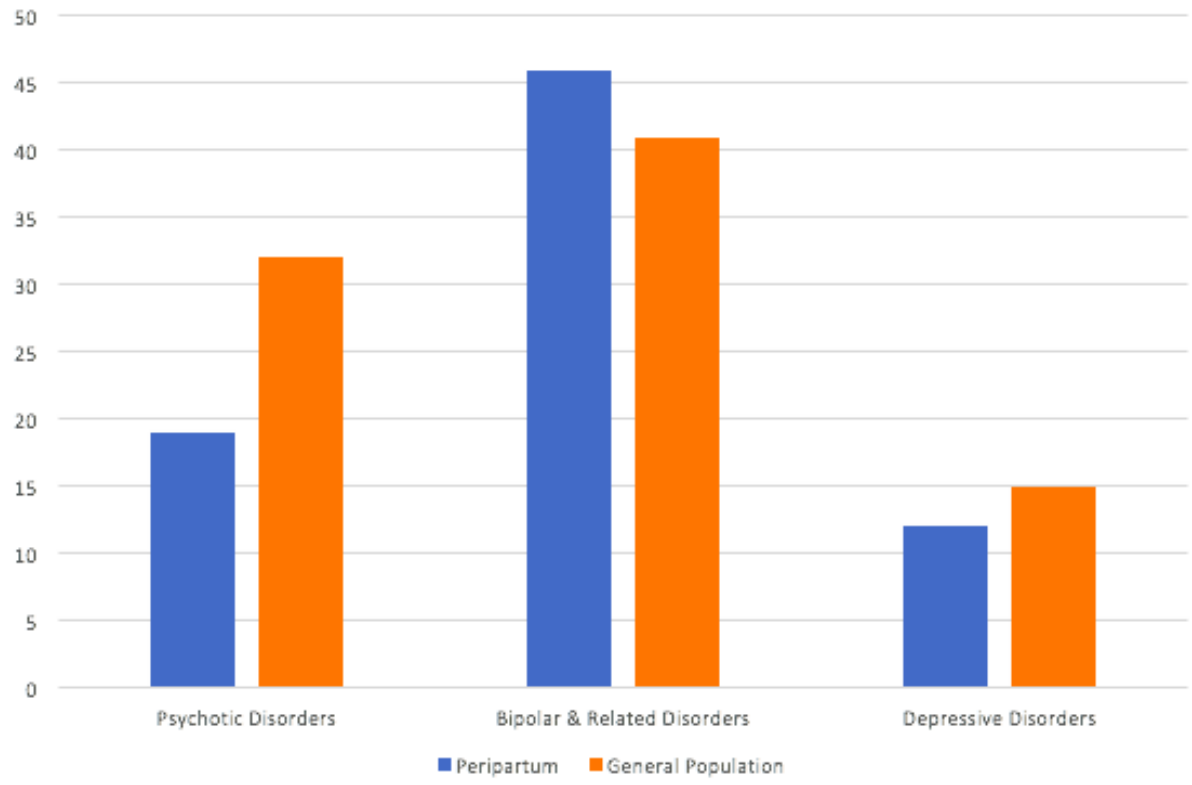


Figure 2: Common psychiatric diagnosis amongst admissions

3.4 Characteristics Associated with Psychotic Disorders

The relative risk for psychotic disorders was higher in those with complete/post matric qualifications compared with none/incomplete secondary education (RR: 1.444, 95% CI: 1.063-1.962; p=0.0189). Psychotic disorders also tended to be more prevalent in patients that were greater than 35 years of age when compared to the 15-24-year age group (RR: 1.365, 95% CI: 0.879-2.120; p=0.1659). Patients that were diagnosed with psychotic disorders had a higher incidence of not having a previous history of psychiatric illness (RR:1.228, 95% CI: 0.896-1.682; p=0.2022) and not having had previous inpatient care (RR: 1.153, 95% CI: 0.842-1.578; p=0.3740). However, there was a higher risk of co-morbid medical illnesses (RR: 1.361, 95% CI: 0.985-1.882, p=0.0618). Within the psychotic disorder admissions there was a trend towards not having a history of substance use (RR: 1.202, 95% CI: 0.846-1.708; p=0.3041), as well as not having a substance-related disorder (RR: 1.128, 95% CI: 0.759-1.975; p=0.5515). Admissions with a psychotic disorder diagnosis had a longer length of stay in days (RR: 1.008, 95% CI: 1.003-1.012; p=0.0009).

Table 5: Characteristics associated with Psychotic Disorders				
	Univariate		Multivariate	
Variable	**RR (95% CI)**	**P-Value**	**RR (95% CI)**	**P-Value**
Age (in years)				
25-34 vs. 15-24	1.107 (0.701-1.747)	0.6632	-	-
35+ vs. 15-24	1.365 (0.879-2.120)	0.1659	-	-
Marital Status				
Other vs. Single	1.072 (0.757-1.516)	0.6958	-	-
Source of Income				
Other vs. Spouse/Family Support	1.065 (0.778-1.456)	0.6954	-	-
Highest Level of Education				
Complete/post matric vs. None/Incomplete secondary	1.367 (1.002-1.865)	0.0487	1.444 (1.063-1.962)	**0.0189**
History of Substance Use				
No vs. Yes	1.202 (0.846-1.708)	0.3041	-	-
Parity				
Nulliparous vs. More than one	1.132 (0.782-1.640)	0.5111	-	-
One vs More than one	1.019 (0.679-1.528)	0.9286	-	-
Length of stay (in days)				
	1.008 (1.003-1.012)	0.0012	1.008 (1.003-1.012)	**0.0009**
Previous Psychiatric History				
No vs. Yes	1.228 (0.896-1.682)	0.2022	-	-
Previous Psychiatric Inpatient Care				
No vs. Yes	1.153 (0.842-1.578)	0.3740	-	-
Co-morbid Medical Diagnosis				
Yes vs. No	1.378 (0.995-1.908)	0.0537	1.361 (0.985-1.882)	0.0618
Readmission (during data collection period)				
No vs. Yes	1.231 (0.635-2.384)	0.5382	-	-
Within the Peripartum Period				
No vs. Yes	1.661 (0.930-2.967)	0.0867	1.616 (0.909-2.871)	0.1020
Substance-Related Disorders				
No vs. Yes	1.128 (0.759-1.675)	0.5515	-	-

3.5 Characteristics Associated with Bipolar and Related Disorders

Bipolar and related disorders tended to be more prevalent in the 25-34-year-old age group when compared to the younger age group of 15-24 year olds (RR: 1.300, 95% CI: 0.941-1.797; p=0.1121). When controlling for readmission and substance related disorders, the risk of bipolar and related disorders was significantly higher in admissions that had previously had a history of mental illness (RR: 2.052, 96% CI: 1.458-2.887; p<0.0001) and that had received previous inpatient care (RR: 2.088, 95% CI: 1.509-2.889; p<0.0001). There was a higher reported rate of not having a co-morbid medical illness (RR: 1.207, 95% CI: 0.948-1.537, p=0.1273). Within the bipolar and related disorder admissions there was a trend towards having a history of substance use (RR: 1.217, 95% CI: 0.951-1.558; p=0.1186) as well as having a substance-related disorder (RR: 1.276, 95% CI: 0.995-1.636; p=0.0546).

Table 6: Characteristics associated with Bipolar and Related Disorders				
	Univariate		Multivariate	
Variable	**RR (95% CI)**	**P-Value**	**RR (95% CI)**	**P-Value**
Age (in years)				
25-34 vs. 15-24	1.300 (0.941-1.797)	0.1121	-	-
35+ vs. 15-24	0.891 (0.620-1.281)	0.5343	-	-
Marital Status				
Other vs. Single	1.199 (0.888-1.620)	0.2363	-	-
Source of Income				
Other vs. Spouse/Family Support	1.058 (0.824-1.357)	0.6593	-	-
Highest Level of Education				
Complete/post matric vs. None/Incomplete secondary	1.014 (0.793-1.296)	0.9127	-	-
History of Substance Use				
Yes vs. No	1.217 (0.951-1.558)	0.1186	-	-
Parity				
Nulliparous vs. More than one	1.045 (0.769-1.420)	0.7779	-	-
One vs More than one	1.265 (0.941-1.700)	0.1197	-	-
Length of stay (in days)				
	1.001 (0.997-1.005)	0.6948	-	-
Previous Psychiatric History				
Yes vs. No	2.052 (1.458-2.887)	<.0001	-	-
Previous Psychiatric Inpatient Care				
Yes vs. No	2.132 (1.545-2.943)	<.0001	**2.088 (1.509-2.889)**	**<.0001**
Co-morbid Medical Diagnosis				
No vs. Yes	1.207 (0.948-1.537)	0.1273	-	-
Readmission (during data collection period)				
Yes vs. No	1.420 (1.005-2.007)	0.0470	1.113 (0.787-1.573)	0.5460
Within the Peripartum Period				
Yes vs. No	1.136 (0.822-1.568)	0.4405	-	-
Substance-Related Disorders				
Yes vs. No	1.325 (1.023-1.716)	0.0329	1.276 (0.995-1.636)	0.0546

3.6 Characteristics Associated with Depressive Disorders

With regards to the multivariate model, it was found that depressive disorders tended to be higher in the age group greater than 35 years of age when compared to the 15-24-year age group (RR: 1.691, 95% CI: 0.774-3.694; p=0.1875). Once age, marital status and source of income were controlled for, the risk of depressive disorders was higher in admissions that did not have a history of previous inpatient care (RR: 1.868, 95% CI: 1.115-3.130; p=0,0177) and they also had a shorter length of stay in days (RR: 0.987, 95% CI 0.977-0.998; p=0.0182).

The univariate model showed that depressive disorder admissions tended to not have a previous history of a psychotic illness (RR: 1.161, 95% CI: 0.690-1.954; p=0.5736) and did not have substance related disorders (RR: 1.394, 95% CI: 0.712-2.728; p=0.3325). Those admitted for depressive disorders had a higher risk of having a co-morbid medical illness (RR: 1.331, 95% CI: 0.795-2.230; p=0.2766).

Table 7: Characteristics associated with Depressive Disorders				
	Univariate		Multivariate	
Variable	**RR (95% CI)**	**P-Value**	**RR (95% CI)**	**P-Value**
Age (in years)				
25-34 vs. 15-24	0.820 (0.372-1.809)	0.6226	0.693 (0.310-1.546)	0.3702
35+ vs. 15-24	1.857 (0.930-3.708)	0.0793	1.691 (0.774-3.694)	0.1875
Marital Status				
Other vs. Single	1.754 (1.060-2.901)	0.0288	1.451 (0.866-2.431)	0.1578
Source of Income				
Other vs. Spouse/Family Support	1.624 (0.987-2.670)	0.0561	1.506 (0.913-2.484)	0.1092
Highest Level of Education				
None/Incomplete secondary vs. Complete/post matric	1.265 (0.759-2.107)	0.3672	-	-
History of Substance Use				
No vs. Yes	1.264 (0.714-2.240)	0.4212	-	-
Parity				
More than one vs. Nulliparous	2.061 (1.097-3.871)	0.0246	-	-
One vs Nulliparous	1.210 (0.569-2.575)	0.6207	-	-
Length of stay (in days)				
	0.986 (0.973-0.999)	0.0294	0.987 (0.977-0.998)	**0.0182**
Previous Psychiatric History				
No vs. Yes	1.161 (0.690-1.954)	0.5736	-	-
Previous Psychiatric Inpatient Care				
No vs. Yes	1.510 (0.920-2.479)	0.1034	1.868 (1.115-3.130)	**0.0177**
Co-morbid Medical Diagnosis				
Yes vs. No	1.331 (0.795-2.230)	0.2766	-	-
Readmission (during data collection period)				
No vs. Yes	1.381 (0.460-4.145)	0.5653	-	-
Within the Peripartum Period				
No vs. Yes	1.286 (0.579-2.858)	0.5369	-	-
Substance-Related Disorders				
No vs. Yes	1.394 (0.712-2.728)	0.3325	-	-

CHAPTER 4 - DISCUSSION

The primary focus of this study was to describe the population of female psychiatric patients admitted to a tertiary hospital for inpatient care and to compare those presenting in the peripartum period with the non-pregnant, general female admissions. Studies that have been done so far have mainly focused on the outpatient population; thus, data regarding the inpatient population is lacking. The discussion will examine how the findings relate to existing literature and explore characteristics of psychiatric illness in the peripartum period.

4.1 Study Cohort

Most of the patients included in this study were single, relied mainly on family for support and had no or an incomplete secondary level of education. This could suggest that the sample was predominantly comprised of individuals from a lower socioeconomic status, which has been shown to have an adverse effect on the prevalence of psychiatric illnesses. [51,52] Individuals living under lower socioeconomic conditions have been found to be more likely to face environmental adversity, discrimination, disadvantage, unemployment and stress, which has a negative effect on the trajectory of psychiatric illnesses.[53] This is particularly relevant in the South African context where psychiatric illness could impact an individual's ability to be socially mobile and overcome adversities related to their socioeconomic background.[54] According to a poverty and livelihoods study conducted in Soweto, South Africa, this area is predominantly comprised of individuals that would fall under a lower socioeconomic status.[55] Thus, the cohort included in this study may be of a lower socioeconomic status and therefore may be more likely to develop psychiatric illnesses, as well as face harsher environmental conditions which could possibly increase the likelihood of a poorer prognosis.

Existing literature has shown that the prevalence of depression in the peripartum period accounted for a large proportion of hospital admissions.[8] However, this was not found in this study cohort which included female patients of reproductive age. Bipolar and related disorders accounted for the largest number of admissions to the inpatient unit for both women within the peripartum period, as well as the general population. According to international literature, as well as a local study based in an outpatient setting,

depression was noted to be the most common neuropsychiatric disorder among females in the peripartum period. While this was hypothesised for this study cohort, depression was not found to be the most common psychiatric diagnosis, for women in the peripartum period as well as those in the general population. Furthermore, the hypothesis that the peripartum population would have a longer admission duration compared to women not in the peripartum period was not found in this study. The possible reasons for the deviation in expected results will be explored.

4.2 Peripartum Admissions

This study focused on the inpatient psychiatric female population at a tertiary hospital. In general, Chris Hani Baragwanath Academic Hospital receives referrals from local clinics and community health centres, as well as the outpatient department and the maternal mental health clinic based at Chris Hani Baragwanath Academic Hospital. An inpatient admission would be required based on the severity of the presenting symptoms and would depend on the availability of beds in the psychiatric wards. A cross-sectional study conducted to review the staff/bed ratio and staff/patient ratios in government-funded mental health care services in South Africa showed that the ratios are lower than those for developed countries. Throughout the country, the overall staff/bed ratio was 0.3 staff per bed, with Gauteng having a ratio of 0.22.[56] In another study, it was noted that the staff/population ratio in public mental health services per 100 000 population was 19.5. The psychiatrist/population ratio per 100 000 was 0.4.[57] These ratios would suggest that the current available resources (mental health staff, bed availability and infrastructure) only allow for the most acute and high-risk patients to be admitted with the others then being seen on an outpatient basis or not receiving treatment at all. These ratios may also impact on the average duration of admission as patients may be admitted or discharged depending on bed availability.

The reasons this study did not find depressive disorder to be the most common diagnosis made during the pre-pregnancy, pregnancy and postpartum period is possibly because depressive symptoms may not be as overt as manic and psychotic symptoms. A study done investigating the trajectory of depressive symptoms in a cohort of South African

women in the perinatal period, who came from a low socioeconomic status, showed a greater incidence of depressive symptoms when compared to global studies. Most of the study participants had mild depression with a marginal decrease in symptoms during the postpartum period.[58] Another study was conducted at the antenatal clinic at Chris Hani Baragwanath Academic Hospital, screening for the prevalence of depressive symptoms in women attending the clinic. The Edinburgh Postnatal Depression Scale (EPDS) was used as the screening tool and all patients above the age of 18 years were included in the study. Results showed that antenatal depressive symptoms were highly prevalent as 23.5% of the study cohort scored 13 on the EPDS. It was also reported that 32% had a score of greater than 10 on the EPDS which is suggestive of possible minor depression symptoms.[59] Hence, patients presenting with mild to moderate depressive symptoms and those assessed to be a low risk to themselves or others may not be referred for tertiary inpatient psychiatric care. Most likely, depression across the perinatal period was being managed primarily on an outpatient basis and therefore was not found to be part of this inpatient study cohort.

Bipolar and related disorders were shown to be the most frequently diagnosed psychiatric disorder during the study period. A possible explanation for the findings of this study is that bipolar and related disorders, as well as psychotic disorders, most likely present with a greater severity of symptoms requiring acute inpatient care, treatment and rehabilitation. Bipolar and related disorders present with risky and impulsive behaviours which could have a detrimental effect on both the mother as well as her baby. Management of these symptoms is urgent and may require inpatient care. Therefore, the higher incidence of inpatient admissions for bipolar and related disorders shown in this study could be due to the increased risk that these individuals pose to themselves and others.

In addition, over half of the study cohort reported a comorbid medical illness, with HIV (Human Immunodeficiency Virus) followed by epilepsy being among the most widely reported. A study conducted in East London, South Africa, showed that 53% of HIV positive patients had a primary psychiatric disorder secondary to HIV. A mood disorder (primarily manic) with psychotic features was the most common diagnosis. Of the HIV positive patients, 47% reported a previous diagnosis of bipolar mood disorder with their

most recent episode being manic with psychotic features.[60] For this study's cohort of female patients in the peripartum period, it is possible that the increased prevalence of bipolar and related disorders may be linked to a co-morbid diagnosis of HIV.

The majority of the peripartum patients in this study reported previously having had a history of mental illness with most resulting in hospitalisation. This finding is in line with the Swedish linkage study which concluded that a pre-pregnancy bipolar or psychotic episode greatly increased the chance of having a bipolar or psychotic event postpartum.[33] This is of importance as a potential risk factor when screening perinatal female patients who present with psychiatric symptoms. These patients require more frequent follow-up to monitor symptoms and identify relapse early on which could prevent the development of more severe symptoms which may necessitate the need for an inpatient admission.

Comorbid substance use was reported by a quarter of the participants in the peripartum subgroup. Of concern was that the most frequently used substance was alcohol followed by cannabis and stimulants. The extent of the problem is highlighted by the fact that the incidence of Foetal Alcohol Syndrome in the Western Cape, is amongst the highest in the world.[61] Pregnancy is thought to be a time when women are more motivated to decrease their substance use[46] so the topic of substance misuse should be addressed from the first antenatal visit. The Alcohol Use Disorder and Identification Test (AUDIT) is a screening tool for hazardous alcohol use that has been validated for use in South Africa.[62] The adverse effects of substance use can be prevented if appropriate intervention and management is instituted at an early stage therefore routine substance use screening should be performed. As mentioned earlier, substance use in the peripartum period not only has a negative effect on pregnancy outcomes but also has short as well as long-term effects on the child and attachment.

This study showed that the peripartum population were less likely to be prescribed a mood stabiliser as part of their treatment. This is in keeping with the NICE guidelines that states that mood stabilisers especially Sodium Valproate should not be prescribed to women of childbearing age.[63] Over the past decade there has been a shift towards the use of atypical antipsychotics to treat mania and psychosis in pregnancy. Research has shown that the use of antipsychotics in early pregnancy do not pose an increased risk of congenital or cardiac malformations (although a possible exception could be Risperidone).[43] Within the peripartum subgroup, the most frequently prescribed atypical antipsychotics were Olanzapine, Quetiapine and Risperidone. The mood stabilisers that

were prescribed in the minority of patients were Lithium, Sodium Valproate and Lamotrigine. Overall, inpatient care for this sub-group of patients appears to adhere to international guidelines in which the fact that they were in the perinatal period was considered when choosing the specific medication that was prescribed. However, the data from the study did not identify at which stage of the peripartum period the patient was in and what medication was prescribed at specific stages. This is important as certain medications are not contraindicated at specific times during the peripartum period. It is proposed that a risk versus benefit approach should be used for each individual patient.[64] Specific factors to be considered are previous psychiatric history, severity of symptoms, response to treatment, patient support, as well as whether the patient is planning on breastfeeding.

It is also possible that women experiencing psychiatric symptoms may not seek help. A consumer research study suggested that the majority of participants in the study did not seek diagnosis or treatment for approximately two years after showing psychiatric symptoms.[65] A possible reason for individuals to not seek treatment is that the label of having a mental illness is associated with stigma.[66]This has been shown in the South African setting where individuals with mental disorders are subjected to high levels of stigmatisation.[67] Individuals may avoid seeking treatment even though they may have severe psychiatric symptoms.[65] The fear of being labelled may also be applicable to females in the perinatal period.

Another reason why women in the perinatal period, specifically in the postpartum period, may not seek treatment is because their focus may be primarily on their baby as well as other children in their care. Seeking mental health care services would be difficult as the postpartum mother may need partner or family support to take care of her newborn and other children while she seeks treatment. It is likely that an extended period of absence from her newborn could deter a postpartum mother from seeking treatment.

The emotional connection that a mother has with her infant is of vital importance for emotional, social and cognitive development of the infant. Research has shown that

antenatal bonding and general wellbeing impact on bonding postnatally. These relationships are often disrupted by perinatal mental illness.[68] While the impact of an admission to an inpatient psychiatric ward on the specific patients and their baby cannot be ascertained in this study, the average length of stay was 31 days, which could potentially have a significant impact on the bond with their baby. Relationship disorders between a mother and infant are seen in 10-25% of women who are referred to a psychiatrist in the postpartum period.[69] This extended period of inpatient care could have a detrimental effect on mother-infant bonding, as well as influence the ability of the mother to breastfeed.

Research has shown that breastfeeding not only has nutritional and physical health benefits for the child but also has positive psychological effects for both the mother and child. There is evidence to show that breastfeeding has an impact on a child's brain, cognition and their social and emotional development.[70] Breastfeeding has been shown to have an impact on the mother's mood and reaction to stressful stimuli. Mothers who breastfed reported lower levels of stress, anxiety and a depressed mood.[71] A prospective study has also shown that breastfeeding mothers had a lower score on the EPDS and were less likely to be diagnosed with depression within the first four months postpartum.[72]

Therefore, the treating multidisciplinary team would need to consider both the benefits and negative impact on the mother-child pair of an admission to a psychiatric unit. The resources available in a South African tertiary inpatient psychiatric setting do not allow for rooming in with the baby resulting in an extended separation between the mother and child. This separation could negatively impact the bond between the mother and the child and not allow for breastfeeding.

4.3 Peripartum Subgroup Compared to the General Population

This study showed a lack of significant differences between the peripartum subgroup and the general population. Due to the high-risk nature of mental illness in the peripartum period one would assume that the peripartum subgroup may have had longer admissions and received a more specialised treatment plan when compared to the women in the

general population. However, due to the lack of available resources as well the increased demand for inpatient admissions to Chris Hani Baragwanath Academic Hospital psychiatric department, this may not always possible. Patients are admitted to the ward when they are in the acute stage of illness and at the highest risk, once they are stabilised they are then discharged to follow up at their local psychiatric outpatient department. The treating team would also take in to account the possible adverse effects that a prolonged admission could have on the mother's attachment with her child. Often there are other children at home that the mother must care for.

The antenatal as well as postnatal primary mental health care facilities should be empowered to screen and manage maternal mental health concerns early in the disease process. This could then decrease the overall risk to the patient but also to alleviate some of the burden on the inpatient setting. Various screening tools have been validated to be used in the peripartum population to timeously detect those women who are at risk of a mental illness. A protocol for prompt referral to a specialist psychiatric service should also be compiled. Ideally, specialist psychiatric care should be incorporated into the routine antenatal and postnatal programmes.

A further analysis of the primary mental health care services available could assist in allowing timely diagnosis and access to treatment for this vulnerable patient population. Due to the lack of resources and mental health care providers in the country, a shift to receiving care at a primary care level could relieve the burden on the tertiary hospitals. Furthermore, community care workers could be trained to recognise cases as well as offer counselling services. This would especially be helpful in assisting women in the postpartum period who are not able to get to health care facilities due to having to care for their infant. Community care workers would also be able to provide support to those women who have been discharged from an inpatient psychiatric ward and to assist them with the adjustment of being at home and having the new responsibility of being a mother. This would hopefully decrease the risk of early relapse and assist with medication adherence.

Health care practitioners who treat women of child-bearing age should always consider that many of them will become pregnant. Pregnancies may be planned or in most cases unplanned and so education regarding contraception, substance use, mental illnesses and other medical conditions should be done at every patient encounter.

4.4 Limitations

The study was a retrospective record review where data was taken from one tertiary hospital and relied on patient files that were from the psychiatric patient registry. The reliability of the data collected was dependant on the quality of record keeping. Incomplete records could not be used, and this reduced the overall sample size. Due to incomplete discharge summaries and clinical information or missing patient files, 13% of patients were not included in the study cohort. This highlights the importance of comprehensive record keeping by medical professionals working in the psychiatric wards. Diagnoses were based on clinical judgements with no standardised assessment tools being used. Even though a consultant psychiatrist supervises cases, the assessments were made by clinical personnel with varying degrees of clinical experience.

The diagnosis of depression may be under reported as many of the neurovegetative features associated with depression may overlap with the physiological symptoms experienced during pregnancy and the postpartum period. For example, decreased energy and libido, fatigue, sleep changes and appetite fluctuations. Similarly, the diagnosis of psychosis may have also been under reported due to the overlap of symptoms with Bipolar disorders with psychotic features. Mood symptoms noted may just be psychosis driven and the patient may not meet the criteria for Bipolar disorder. Adequate collateral information may also not be available to make the diagnosis of Schizoaffective disorder.

The study population was comprised of patients that required inpatient care at a tertiary level hospital and therefore had more acute presentations and were at a higher risk. This could have contributed to a selection bias within the study.

The peripartum subgroup was small when compared to the general population group

which may have impacted on identifying statistically significant data between groups. The study sample was from a tertiary hospital and therefore it cannot be generalised in other settings. The catchment area for Chris Hani Baragwanath Academic Hospital was represented in this study and it may not be generalisable to other areas within South Africa, for example rural areas. Due to the low socio-economic status of the study population it would be difficult to compare the findings to those of studies done in high-income countries.

CHAPTER 5 -CONCLUSION

The aim of the study was to describe the female psychiatric inpatient population admitted to a tertiary hospital in Johannesburg, South Africa. The most common presentation for both women in the peripartum period and women from the general population was bipolar and related disorders. Women in the peripartum period were not different from other female admissions based on diagnosis or length of stay but were prescribed less of the mood stabiliser class of medication and were younger.

It was expected that women in the peripartum period would present with a greater prevalence of depressive disorders. In order to understand if these women are simply not being admitted or if there is a lower prevalence, a follow-up study on patients presenting at the maternal mental health clinic during pregnancy could be conducted to examine the trajectory of psychiatric symptoms and whether they receive appropriate referral and management. This could assist in further understanding the severity of the presentation of psychiatric illnesses in this population and aide in the development of treatment approaches and preventative measures. As the length of stay in hospital was extended and most mothers had a severe mental illness (bipolar disorder), it would be important to further understand the impact of this on the children of these mothers. Early intervention may be beneficial to these children and therefore follow up studies would be favourable. Specialised psychiatric services should be considered for this high-risk population as mental illness during the peripartum period influences not only the mother but the child and family unit as a whole.

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Appendix A

Data Collection Sheet

Age (in years)	

Marital Status	
	Single
	Married
	Divorced
	Separated
	Widowed
	Cohabiting

Source of Income	
	Employed
	None
	Government Grant
	Spouse or Family Support

Highest Level of Education	
	None
	Primary Level
	Secondary Level
	Matric
	Tertiary Education

Diagnosis: Psychotic Disorders	
	Brief psychotic disorder
	Schizophreniform disorder
	Schizophrenia
	Schizoaffective Disorder
	Substance/Medicine -Induced Psychotic Disorder
	Psychotic disorder due to Another Medical Condition
	Other

Diagnosis: Bipolar and Related Disorders	
	Bipolar I Disorder
	Bipolar II Disorder
	Substance/Medication-Induced Bipolar and Related disorder
	Bipolar and Related Disorder due to Another Medical Condition
	Other

Diagnosis: Depressive Disorders	
	Major Depressive Disorder
	Persistent Depressive Disorder
	Substance/Medication-Induced Depressive Disorder
	Depressive Disorder due to Another Medical Condition
	Other

Diagnosis: Anxiety Disorders	
	Generalized Anxiety Disorder
	Social Anxiety Disorder
	Panic Disorder
	Substance/Medication-Induced Anxiety Disorder
	Anxiety Disorder due to Another Medical Condition
	Other

Diagnosis: Obsessive-Compulsive and Related Disorders	
	Obsessive-Compulsive Disorder
	Body Dysmorphic Disorder
	Substance/Medication-Induced Obsessive-Compulsive and Related Disorder
	Obsessive-Compulsive and Related Disorder due to Another Medical Condition
	Other

Diagnosis: Trauma and Stressor-Related Disorders	
	Posttraumatic Stress Disorder
	Acute Stress Disorder
	Adjustment Disorder
	Other

Diagnosis: Feeding and Eating Disorders	
	Pica
	Avoidant/Restrictive Food Intake Disorder
	Anorexia Nervosa
	Bulimia Nervosa
	Binge-Eating Disorder
	Other

Diagnosis: Substance-Related Disorders	
	Alcohol Use Disorder
	Cannabis Use Disorder
	Hallucinogenic Use Disorder
	Inhalant Use Disorder
	Opioid Use Disorder
	Sedative-, Hypnotic- or Anxiolytic Use Disorder
	Stimulant Use Disorder
	Tobacco Use Disorder
	Other

Diagnosis: Personality Disorders	
	Paranoid Personality Disorder
	Schizoid Personality Disorder
	Schizotypal Personality Disorder
	Antisocial Personality Disorder
	Borderline Personality Disorder
	Histrionic Personality Disorder
	Narcissistic Personality Disorder
	Avoidant Personality Disorder
	Dependent Personality Disorder
	Obsessive-Compulsive Personality Disorder

Diagnosis: Intellectual Disability	
	Mild
	Moderate
	Severe
	Profound

Diagnosis: Neurocognitive Disorder	
	Major or Mild Vascular Neurocognitive Disorder
	Major or Mild Neurocognitive Disorder due to Traumatic Brain Injury
	Major or Mild Neurocognitive Disorder due to HIV Infection
	Substance/Medication-Induced Major or Mild Neurocognitive Disorder
	Major or Mild Neurocognitive Disorder due to Another Medical Condition
	Other

Length of stay (in days)	

Medication: Antipsychotic (First generation)	
	Chlorpromazine
	Haloperidol

Medication: Antipsychotic (Second generation)	
	Amisulpiride
	Aripiprazole
	Olanzapine
	Quetiapine
	Risperidone
	Clozapine

Medication: Antipsychotic (Depot formulation)	
	Flupentixol
	Paliperidone
	Risperidone
	Zuclopenthixol

Medication: Mood Stabilizer	
	Lithium
	Sodium Valproate
	Lamotrigine
	Carbamazepine

Medication: Antidepressant	
	Citalopram
	Fluoxetine
	Sertraline
	Venlafaxine

Medication: Benzodiazepine	
	Lorazepam
	Clonazepam
	Diazepam

Within the Peripartum Period	
	Yes
	No

Gestational Age (at time of admission, in weeks)	

Postpartum (in weeks)	

Parity	
	Nulliparous
	1
	2
	3
	4
	5
	> 5

Previous Psychiatric History	
	Yes
	No

Previous Psychiatric Inpatient Care	
	Yes
	No

History of Substance Use	
	Yes
	No

If yes, Which Substance	
	Alcohol
	Cannabis
	Hallucinogenic
	Inhalant
	Opioid
	Sedative-, Hypnotic- or Anxiolytic
	Stimulant
	Tobacco
	Other

Co-morbid Medical Diagnosis	
	Yes
	No

If yes, Diagnosis:	

Readmission (during data collection period)	
	Yes
	No

Appendix B

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R14/49 Dr Bianca Hart

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M181122

NAME: (Principal Investigator)	Dr Bianca Hart
DEPARTMENT:	Psychiatry Chris Hani Baragwanath Academic Hospital
PROJECT TITLE:	A retrospective review of psychiatric admissions of females of childbearing age to a Gauteng Hospital, comparing those in the peripartum period to the general population
DATE CONSIDERED:	30/11/2018
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Dr Janice Buckley
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	05/03/2019

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

DECLARATION OF INVESTIGATORS

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

Principal Investigator Signature Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix C

GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

MEDICAL ADVISORY COMMITTEE

CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL

PERMISSION TO CONDUCT RESEARCH

Date: 31st January 2019

TITLE OF PROJECT:

A Retrospective Review of Psychiatric Admissions of Females of Childbearing Age to Gauteng Hospital, Comparing Those in the Peripartum Peiod to the General Population.

UNIVERSITY: Witwatersrand

Principal Investigator: Dr B Hart

Department: Psychiatry

Supervisor : Dr J Buckley

Permission Head Department (where research conducted): Yes

The Medical Advisory Committee recommends that the said research be conducted at Chris Hani Baragwanath Academic Hospital. The CEO / management of Chris Hani Baragwanath Academic Hospital is accordingly informed and the study is subject to:-

- **Permission having been granted by the Committee for Research on Human Subjects of the University of the Witwatersrand.**
- The Hospital will not incur extra costs as a result of the research being conducted on its patients within the hospital
- The MAC will be informed of any serious adverse events as soon as they occur
- Permission is granted for the duration of the Ethics Committee Approval.

.....
Recommended
(On behalf of the MAC)
Date: 31/01/2019.

.....
Approved/~~Not Approved~~
Hospital Management
Date: 05/02/2019

Appendix D

PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: APPENDIX ONE

I Bianca Hart (Student number: 1813030) am a student registered for the degree of MMed (Psychiatry) in the academic year 2021.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as an appendix a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature: _____ Date: 26/02/2021

1

Appendix E

1813030:Turnitin_doc.docx

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