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# HIV prevalence and socio-demographic characteristics of patients in a forensic unit at Sterkfotein psychiatric hospital - South Africa

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# HIV prevalence and socio-demographic characteristics of patients in a forensic unit at Sterkfontein Psychiatric Hospital - South Africa

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

Supervisor: DCJ Hoffman

**Johannesburg, September 2015**

# DECLARATION

I, **Masase G Beke**, declare that this research report is my own work. It is being submitted for the degree Master of Medicine in the speciality of Psychiatry at the University of the Witwatersrand, Johannesburg. It has not previously been submitted for any degree or examination at this or any other university.



MG Beke

**30 September, 2015**

# DEDICATION

To my children:

Aku

Dzifa

*and*

Mawuli

# ABSTRACT


**BACKGROUND**

Human Immunodeficiency virus infection remains a fearsome health condition and South Africa remains the epicentre of the pandemic. The relationship between HIV and psychiatric disorders is clearly established. Patients in mental institutions fit into the definition of key populations due to the higher incidence of the condition in relation to the general population. Whereas the prevalence in the general population has been thoroughly researched over the years, the magnitude and distribution of HIV/AIDS in psychiatric patients is not consistently studied and little is known about the sub-group of forensic patients in South Africa. The aim is to determine the prevalence of HIV and describe the socio-demographic characteristics of inpatients in a forensic unit in a psychiatric hospital in South Africa.

**OBJECTIVES**

The objectives of this research study are:

- To describe the socio-demographic characteristics of the forensic inpatients.
- To describe the psychiatric disorders of forensic inpatients.
- To describe the types of crime necessitating admission to the forensic unit.
- To ascertain the HIV seroprevalence of forensic inpatients.

**METHODS**

A cross-sectional study design was employed. Data was extracted retrospectively from inpatient records on socio-demographic characteristics and health status, including HIV status, using a standardised data collection tool. The study population consisted of all adult patients admitted at Sterkfontein Hospital from 01 January 2007 - 31 December 2011 on forensic grounds, in terms of Section 42 of the Mental Health Act 17 of 2002, with a concomitant psychiatric disorder and undergoing care at the forensic unit. Ethical clearance was obtained from the Human Research Ethics Committee of the University of the Witwatersrand and the Hospital Research Committee.

**RESULTS**

A total of 137 subjects were studied. The study subjects comprised of mainly males (92%), a large number of unmarried people (84.7%) and people who were unemployed (89.8%) at the time of admission. The mean age was 36 years with 75% of the inpatients aged less than 43 years on admission.

Two diagnoses accounted for over 80% of the patients with an Axis l diagnoses, namely: schizophrenia (49.1%) and psychosis secondary to GMC (31.2%). Axis II diagnoses were made in 67 patients and the conditions were mainly Mental Retardation (MR) and Anti-social Personality Disorder (ASPD), both accounting for 94.2% of the diagnoses made.

Multiple crimes were committed by 21% of study subjects and serious offences included: rape (45.3%); assault with grievous bodily harm (32.9%); theft (19.7%) and murder (19%). These accounted for almost 90% of the crimes that led to admission.

Serological test for HIV were done on 124 (90%) of the patients and the HIV seroprevalence proportion was 21.8%. The highest prevalence of 37.5% was found in patients with bipolar mood disorder followed by mood/psychosis secondary to GMC and psychosis NOS at 35.3%. However, there was no statistically significant association between HIV status and Axis I diagnoses. Further analysis also revealed no statistically significant association, at $p<0.05$, between HIV status and Axis II diagnosis, gender, age, marital status, educational status, employment status, access to disability grants and substance use. However, previous crime was statistically significantly associated with HIV status.

**CONCLUSION AND RECOMMENDATION**

The seroprevalence of HIV in the Sterkfontein Hospital Forensic Unit is higher than the general population and justifies recognition of forensic psychiatric patients as a key population. With the exception of previous crime, there is no clinical (DSM Axis I and II diagnoses) nor socio-demographic factor associated with HIV status.

Furthermore, HIV test was not done for 10% of the patients. Efforts should be made to make an early diagnosis among all patients, and manage the condition appropriately, with treatment offered to all eligible patients.

Policies and procedures should be formalised to obtain 100% diagnostic testing of all patients. A comprehensive programme of action should be instituted and maintained to prevent transmission within the institution and break the cycle of transmission within the general society.

**Key words:** HIV/AIDS, prevalence, forensic psychiatry, mental disorders, state patients

# ACKNOWLEDGEMENTS

My sincere gratitude to my supervisor, Dr DCJ Hoffman, for his support throughout the long journey of conducting this study. His patience, wisdom and prompt response at every stage contributed tremendously to the completion of this study.

The role played by the Head of the Forensic Unit at Sterkfontein Hospital, Prof U. Subramaney, is gratefully acknowledged. She mentored me, developed my interest in forensic psychiatry and guided me in the critical stages of conceptualisation of this study.

My thanks to the management and research review committee of Sterkfontein Hospital for giving me the opportunity to conduct this study, and for providing access to their clinical records.

I would like to acknowledge the assistance of Antoinette Tigar who did the final English language editing of this document.

My family, for your prayers, for being patient, tolerant and supportive at every phase of my career development in the speciality of psychiatry; especially my husband, Andy, my son Mawuli and my daughters, Aku and Dzifa. I wish to register my heartfelt appreciation.

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# LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| AIDS | Acquired Immune Deficiency Syndrome |
| ART | Anti-Retroviral Therapy |
| ASPD | Anti-Social Personality Disorder |
| BDRS | Brief Depression Rating Scale |
| CES-D | Brief Depression Rating Scale of Centre of Epidemiologic Studies |
| CI | Confidence Interval |
| CSW | Commercial Sex Worker |
| GAF | Global Assessment of Functioning |
| HAART | Highly Active Anti-Retroviral Treatment |
| HBV | Hepatitis B Virus |
| HCT | HIV Counselling and Testing |
| HCV | Hepatitis C Virus |
| HIV | Human Immunodeficiency Virus |
| HREC (Medical) | Human Research Ethics Committee (Medical) of the University of the Witwatersrand |
| HSRC | Human Sciences Research Council |
| IHDS | International HIV Dementia scale |
| MITP | Malicious Injury (or damage) to Property |
| MMSE | Mini Mental State Examination |
| MR | Mental Retardation |

| | |
|---|---|
| MSAU | Multi Sectoral Aids Unit-Gauteng |
| MSM | Men Who Have Sex With Men |
| NOS | Not Otherwise Specified |
| NTIES | National Treatment Improvement Evaluation Studies |
| OR | Odds Ratio |
| PLWHA | People Living With HIV/AIDS |
| SANAC | South African National AIDS Council |
| SASSA | South African Social Security Agency |
| SD | Standard Deviation |
| SIP | Substance Induced Psychosis |
| STI | Sexually Transmitted Infection |
| TB | Tuberculosis |
| TBS | '**t**er **b**eschikking **s**telling' Dutch translated as 'disposal to be treated on behalf of the state'. |
| TSH | Thyroid Stimulating Hormone |
| UNAIDS | Joint United Nations Programme on HIV/AIDS |
| USA | United States of America |

# CHAPTER 1: INTRODUCTION

## 1.1 Introduction & Background

Forensic patients constitute a small, often unknown, unnoticed, nondescript population that may nonetheless play an influential role in national efforts to control and combat Human Immunodeficiency Virus (HIV) epidemic.

HIV emerged as an unknown infection that has relentlessly threatened the very fabric of human society. It posed a major threat to human development and impeded efforts to achieve the Millennium Development Goal. It made a devastating impact as a pandemic and is now well established in human populations globally. South Africa is worst hit, assuming a generalised hyper-endemic status at an estimated HIV prevalence by UNAIDS SPECTRUM model at 17.3% in 2005. General population surveys revealed a prevalence of 10.6% in the adult population in 2008 and 12.2% in 2012. The seroprevalence among antenatal attendees was 29.4% in 2007 and 2009, reaching a peak of 30.2% in 2010. South Africa has also earned the description as the epi-centre of the epidemic, with an estimated number of 6.4 million adults and children living with HIV in 2012 [1,2,3,4,5].

Global international collaborations, targeted interventions, resource mobilisation and the provision of ART brought the transmission under control, with the HIV prevalence rate in South Africa stabilised at 29.5% in 2011. The successes in current control can only be sustained when all potential foci of transmission are also fully reached by the interventions. Despite the gains made in the control in the general population, key populations remain affected and bear unusually heavy infection burdens. The term 'key population' refers to population groups that are more vulnerable and more likely to transmit HIV infection such

as men who sleep with men (MSM), transgender individuals, commercial sex workers (CSW), truck drivers and other population sub-groups with high HIV prevalence rates relative to the general population. Key populations have recently received more attention, additional funding and special strategic focus in the response to HIV/AIDS globally and in the South African multi-sectoral strategic response to HIV, TB and STIs [2, 5, 6].

There is evidence that there are still sub-groups in the population that are particularly vulnerable to the infection and have a high burden of the disease, although not fully acknowledged as key populations. Individuals in a correctional setting such as prisoners, people in uniform and mentally ill people have evidenced high prevalence rates compared to the general population. In the early phase of the epidemic (1986), an HIV prevalence rate of 0.3% was found in a study in the Iowa prison system [7]. The prisoners included newly incarcerated inmates, those returning to prison and forensic psychiatric patients. In 1990, Sacks[8] found a 7.1% HIV seroprevalence rate among psychiatric inpatients.

Among inpatient pre-trial patients in a forensic unit in South Carolina, USA, a study in 1991 reported a seroprevalence rate of 5.5%. This was 40 times the rate in the general population[9].

Forensic psychiatric institutions serve as observational, correctional, treatment and rehabilitation facilities for individuals awaiting trial or deemed unfit to stand trial due to their mental status. Such referrals for observation or admission implies in some cases a psychiatric condition at the time the alleged crime was committed that affected the person's ability to appreciate the wrongfulness of the act. Given the HIV prevalence rates described for both correctional services and psychiatric facilities, one can deduce that forensic psychiatric facilities are potentially home for population sub-groups that are likely to have high rates of HIV infection.

Another major threat to the control of the epidemic is the reality of an undesirable yet important issue arising from the HIV epidemic and its management, described as stigma and discrimination. Stigma and discrimination have greatly undermined efforts in prevention, early diagnosis and treatment by the HIV Counselling and Testing Campaign (HCT), as well as treatment initiation, disclosure and adherence to chronic treatment for AIDS. The problem is so real that South Africa's current National Strategic Plan for HIV, STI and TB clearly articulates one out of the four vision statements as: '*Zero discrimination associated with HIV, STIs and TB*.' It has formulated a sub-objective under Strategic Objective 1 as: '*Reduction of HIV and TB related stigma and discrimination.'* [6].

## 1.2 Problem statement

Forensic psychiatric patients with HIV infection bear a heavy burden, described as the triple burden of stigma and discrimination, namely: stigma of HIV, stigma of crime and stigma of mental illness. They are therefore potential victims of exclusion and rejection, which could culminate in abuse of their rights and denial of access to prevention and treatment of HIV.

The relationship between HIV and psychiatric disorders is clearly established. HIV is known to be associated with major psychiatric disorders. Meel[10] described a case report from the Eastern Cape of South Africa of a 29 year old woman living with HIV who developed psychosis. A case series described 38 consecutive cases of Black male patients admitted for acute psychiatric symptoms and HIV infection at the Rand Mutual Hospital in Johannesburg, South Africa. Of these, 31% were diagnosed with dementia; 13% with psychosis without concurrent dementia; 13% with bipolar disorder with mania and 2% with major depression. The major symptomatic presentation was cognitive deficit[11].

In a 6-month follow up study of HIV/AIDS patients in South Africa in 2004, prevalence of at least one psychiatric disorder was 56% at baseline and 48% at 6 months. Depression (34.9%) and post-traumatic stress disorder (14.8%) were the most common psychiatric disorders at baseline[12].

In 2001 Baillargeon *et al* found a number of psychiatric conditions among HIV positive inmates in a correctional setting in Texas, USA. These were: major depression; dysthymia; bipolar disorder; schizophrenia; schizoaffective disorders and non-schizophrenic psychotic disorder[13].

An additional study [14] reporting on the association between psychiatric disorders and HIV infection in the criminal justice system was undertaken in Texas, in 2006. They found an elevated prevalence of psychiatric disorder among those with blood-borne infections: HIV only; HIV/HCV and HIV/HBV. The disorders studied were acute psychotic disorder, major depression, dysthymia, bipolar disorder, schizophrenia, schizoaffective disorder and psychotic disorders. Thus, it revealed a link between psychiatric disorders and HIV infections.

Our knowledge so far seems limited to the fact that patients with mental illness are vulnerable to HIV infection, and patients living with HIV infection are predisposed to mental illness. Current efforts to address the needs of key populations hardly mention the plight of forensic psychiatric patients. Regrettably the magnitude of the problem is not clearly defined. None of the recent studies of HIV/AIDS described the situation as it pertains to forensic psychiatric patients, particularly in resource limited populations such as South Africa. The factors associated with the occurrence of HIV among forensic psychiatric patients, and the way they are managed, have not been fully described in recent literature. Full knowledge of the problem is also hindered by the multiplicity and complexity of factors that interplay in

manifestation of mental illness, HIV infection and acts constituting criminal offence. Whilst progress has been made to contain the HIV epidemic in the general population in South Africa, the time is also opportune to focus on potential foci of high burden as they are potential reservoirs for transmission. Consequently, this constitutes risk of transmission and source not only to fellow inmates, but also to health care workers in the mental health care setting. An appropriate response will require ascertainment of the problem and its magnitude among forensic psychiatric patients[6].

## 1.3 Literature review

The literature for review was identified by searching electronic databases using the following key words: HIV infection, forensic, psychiatric patients. The search was confined to English language journals within the last 20 years, using PubMed and Google Scholar. Electronic databases searched included Medline™. In addition, articles previously cited in some of the articles read were identified.

The studies reviewed confirmed the co-morbidity of HIV and psychiatric disorders, with a high prevalence in some populations. There were factors identified with the co-morbidity as explored through a variety of studies described in this section focusing on the prevalence socio-demographic, lifestyle factors and the methodological issues on research on seroprevalence.

### 1.3.1 Prevalence studies on co-morbidity of HIV and Psychiatric conditions

A number of studies were undertaken to establish the prevalence of psychiatric disorders in HIV positive subjects. Prevalence measured the proportion of psychiatric conditions in a defined population of people living with HIV at a given defined time period.

Adewuya *et al* [15] recruited patients from an HIV care centre in Ilesa, Nigeria. The prevalence rate of psychiatric disorders was 59.1%. They found significantly higher rates for anxiety disorders (34.1%), affective disorders (23.9%), and psychotic disorders (5.7%) in comparison with health controls. The PTSD rate was significantly higher than controls and major depressive disorder was three times higher than control groups.

Sebit *et al* [16] conducted a cross-sectional study in Epworth, a peri-urban community in Zimbabwe, to ascertain the prevalence of HIV/AIDS and psychiatric disorders. They found

that neuro-psychiatric disorders occurred in 71.3% of HIV positive patients. This was three times (OR 3.12), 95% CI (1.64-5.95, p=0.0002) higher than those who were HIV negative. The most common psychiatric symptoms were emotional withdrawal, depressed mood, suspiciousness, apparent sadness, reduced sleep and suicidal thoughts.

A similar study conducted in an urban community in Uganda looked at the prevalence of psychiatric disorders in people living with HIV/AIDS in Kampala[17]. The prevalence of psychiatric disorders was 82.3%. The disorders were mainly non-affective psychoses (17.4%); bipolar affective disorders (17.4%); major depression with melancholic features (10.9%), and suicidal thoughts (13%).

A study among adolescents seropositive for HIV in a primary care setting in Washington, USA found a 53% prevalence of a psychiatric diagnosis[18]. The results by Pao *et al* found that 85% of the sample had a current Axis I disorder with 44% reporting ongoing depressive disorders.

Sno [19] reported on 51 psychiatric inpatient cases with HIV infection from the Netherlands. The most common conditions diagnosed were delirium (n=13), major depressive disorders (n=12), dementia (n=5) and adjustment disorders with depressive or anxiety disorder (n=5).

Baillargeon *et al* examined the association between 6 major psychiatric disorders with HIV mono-infection, HIV/HCV co-infection and HIV/HBV co-infection in a large prison population in the USA. The prevalence of psychiatric disorders in HIV mono-infection was 16.7%; 20.6% in HIV/HCV dual infection and 20.5% in HIV/HBV, with a prevalence of 18.1% in all HIV infections[14].

In South Africa, Thom [20] studied 302 HIV positive patients, in 2004-2005 from various treatment centres in Gauteng and Mpumalanga provinces and found over 30% with a current mental disorder and a lifetime history of mental disorder was 40%.

The studies described above examined the prevalence of psychiatric conditions in people living with HIV, but further reviews were undertaken to describe seroprevalence of HIV in psychiatric populations. HIV seroprevalence measured the proportion of HIV sero-reactive cases in a defined population of people with mental illness, at a defined time period. The HIV prevalence ranged from zero to figures above 50%.

Studies reporting on zero HIV prevalence include a study conducted in Taiwan[21] from 2 large psychiatric institutions in 1994, that revealed zero HIV prevalence among the patients. In the Iowa prison system in 1986, seroprevalence of 0.3% was reported among newly incarcerated inmates and patients, although reactivity was not confirmed by subsequent Western blot tests [7]. In 1991, HIV seroprevalence of 5.2% was reported in new admissions and long stay mentally ill female patients, in 2 public psychiatric hospitals in New York. Also in New York, HIV positivity of 5.5% was found in a population of acute psychiatric inpatients admitted to 2 large psychiatric hospitals in Manhattan and Queens during 1989/1990. In 1990/1991, a study undertaken at the Maryland State Psychiatric Hospital reported 5.8% seroprevalence among 533 chronically ill mental patients. A similar finding of 5.5% seroprevalence was obtained in 1991 from a forensic unit in South Carolina, even though the authors admitted to a possibility of selection bias [9,22,23,24].

The highest reported HIV seroprevalence from the USA among psychiatric inpatients was 16.3% from an inner city hospital in South Bronx, an area known for severe drug abuse and

AIDS problems, which suggested that background or general population factors made a significant contribution[25].

Similarly on the high side of HIV occurrence, the study by Sebit *et al* [16]in Zimbabwe reported a HIV seroprevalence of 59.3%. This cross-sectional study selected a convenience sample from a peri-urban area, Epworth, which is part of the capital city. There was potentially a selection bias, however, because over 50% of the sample already knew their HIV serostatus when recruited.

In addition to the study from a forensic unit, one other reported on court referred cases where they found 3.9% HIV seroprevalence among 53 court referred mentally ill patients in Maryland State Hospital[25].

Of the research on HIV testing in psychiatric settings, a report in 2010 from South Africa by Uys [26], described 12% HIV positive cases among females admitted to an acute ward in a psychiatric hospital complex in the Eastern Cape. The study followed the patients for a year from June 2009 to June 2010.

### 1.3.2 Socio-demographic factors

Socio-demographic factors known to be associated with the dual infection have been studied. Baillargeon *et al*[13] found higher rates of HIV prevalence among males, Blacks and the age group of 30-49 years, whereas no gender differences were found in other studies[23]. The study in Ilesa by Adewuya *et al* identified poor social support and the stage of the illness to be independently associated with psychiatric disorders[15]. A review on HIV infection in psychiatric settings by McKinnon *et al*[28] described infection rates to be three times higher in larger metropolitan areas of the USA, relative to smaller ones (5.0% : 1.7%).

### 1.3.3 Lifestyle including Substance Use

Alcohol dependence and abuse were identified as risk factors for co-morbidity[29,30]. Patients dually diagnosed with psychiatric disorders and substance abuse disorders are an especially high risk group for HIV infection, as described in the National Treatment Improvement Evaluation Study (NTIES)[22,29,30]. Stewart *et al* reported HIV prevalence of 36.4% among female intravenous drug users with an odds ratio (OR) of 15.3. Among male intravenous drug users, the OR was 6.83, with 14.5% prevalence among males in a psychiatric hospital setting[24].

Factors associated with the occurrence of HIV in correctional settings revealed intravenous drug use, unprotected sexual intercourse and infection through blood transfusion[7]. Oley *et al*[12] found high risk sexual behaviour, particularly non-use of condoms.

### 1.3.4 Methodological design

The co-morbidity of HIV and psychiatric disorders attracted clinical studies for describing and analysing the determinants. Most of the studies were cross-sectional in design. The majority of studies were conducted in HIV care settings and psychiatric disorders were reported in a population living with HIV. The reverse approach is to examine the prevalence of HIV in population sub-groups (those with psychiatric disorders). Furthermore, in correctional settings, one would be interested in describing the kinds of crimes perpetrated by individuals with dual diagnosis[22-30].

Most of the studies on seroprevalence described the process of sera collection, storage and testing. Physicians do not request permission to undertake laboratory tests for TB, Syphilis or Thyroid Stimulating Hormone (TSH) in the routine workup of patients. Some of the studies

therefore used the routine blood drawings whereas in a few studies the blood was drawn specifically for the study. However, there is agreement among psychiatrists that written informed consent is required for HIV antibody testing. Methodological issues reported in the studies also highlighted anonymity of the samples[7, 21, 22, 24, 28, 30].

The validity of the measurements is a significant factor in studies of seroprevalence. Tests currently available for measuring HIV positivity have high sensitivity and specificity, unlike the earlier years of HIV research. Glass *et al*[7]reported a study in 1986 that found 3 of the sera tested to be positive by ELISA (Enzyme Linked Immunosorbent Assay) but were found to be negative when the Western Blot Test was conducted.

Most of the studies reported on the use of the Diagnostic and Statistical Manual of Mental Disorders (DSM)[31] for the clinical diagnosis of mental disorder. A few studies used a variety of validated tools for the assessment of mental conditions[21,24,27]. However, some studies relied solely on validated rating scales to reach their diagnosis, such as the MINI International Neuro-psychiatric Interview and the CES-D Brief Depression Rating Scale (of the Centre for Epidemiological Studies)[28,29].

There are important ethical issues that need to be taken care of in the conduct of all studies on human subjects. The principle of autonomy is paramount and applied through informed consent from the study subjects. The South African constitution protects this right and the National Health Act prescribes the informed consent to be written. However, special precautions need to be taken to protect those who are mentally ill. Participation of mentally ill person in research requires competency to do so, sufficient reasons for their involvement and a functional approach is recommended to assess their competency individually on case to case basis [32,33].

### 1.3.5 Conclusion

From this chapter, one can conclude there is heterogeneity in the occurrence of HIV in different sub groups of the population. In the USA, for a similar time period, the HIV rate in the general population was 0.4%, compared to 6.9% in the psychiatric population. HIV rates are reported to be high among populations of mentally ill people in comparison with the general population, yet this is not fully acknowledged, nor does it receive the attention that it deserves. Furthermore, this group is likely to be stigmatised[8,28,34,35].

The increased vulnerability to HIV infection has been attributed (among others) to the symptomatology of mental illness, which include cognitive impairment, poor judgment, impaired appreciation of the risk of transmission of HIV, affective instability, impulsive behaviour, hyper sexuality, and perceived low fear of contracting AIDS. Intravenous drug use and vulnerability to victimisation have also been cited[8, 21, 22,24,36].

The studies have established co-morbidity of psychiatric disorders and HIV. Furthermore this co-morbidity prevails in forensic psychiatric conditions. There were relatively few studies reporting on seroprevalence in forensic psychiatric facilities and none from South Africa. The problem of HIV in this group in South Africa needs to be described, in terms of its magnitude and determinants, in order to mount an effective and appropriate response. Correctional settings and hospitals have been acknowledged as opportune settings for comprehensive prevention, management and control of the HIV epidemic. There is a dire and compelling need to study and describe this population, which is carrying the triple stigma of crime, mental illness and HIV[36,37].

# CHAPTER 2: AIMS AND OBJECTIVES

## 2.1 Aim

The aim of the study is to determine the prevalence of HIV and describe the socio-demographic characteristics of patients in a forensic unit in a psychiatric hospital in South Africa.

## 2.2 Objectives

The objectives are:

a) To describe the socio-demographic and lifestyle characteristics of the forensic inpatients.

b) To describe the psychiatric disorders of the forensic inpatients.

c) To describe the types of crime necessitating admission to the forensic unit.

d) To ascertain the HIV seroprevalence of forensic inpatients.

## 2.3 Relevance of study

The findings of a study of this nature will provide invaluable information that could be used for:

1) Policy formulation on the clinical management and admission protocols of forensic patients.

2) Provision of insight to the programmes to be implemented or revised for the prevention of HIV transmission in forensic psychiatric settings.

3) Provision of insight that would provide guidance for clinical management, and information regarding drug interactions between anti-psychotics, anti-convulsants, mood stabilisers and the variety of anti-retroviral treatments they may be eligible for.

4) Mental disorders and HIV are two conditions that burden the diagnosed patients with either stigma or discrimination, or both. Patients may also be subjected to human rights abuses. Adequate description of the problem would provide accurate, relevant information for human rights activists in advocacy for the cause of these victims.

5) The findings may identify groups at high risk for HIV such as demographic, clinical or crime types that could be used in providing targeted intervention for individuals or groups to improve health and well-being.

# CHAPTER 3: METHODS

## 3.1 Study design

A cross-sectional study was undertaken whereby data was retrospectively collected from forensic psychiatric patients of their characteristics, relevant health status and HIV status.

## 3.2 The setting: Sterkfontein Hospital

Sterkfontein is a specialised psychiatric hospital located in Krugersdorp in Gauteng Province. The provincial administration runs the hospital, which also serves as a teaching hospital for the University of the Witwatersrand Department of Psychiatry. In addition to general psychiatric patients, it treats certified patients and assesses forensic cases. It also cares for 'State Presidents Detainees'.

Individual alleged to have committed a crime are referred to the forensic unit by a court order, in compliance with Chapter 13 of the Criminal Procedures Act (CPA) 51 of 1977, as described in Section 77-79 [38]. This is indicated when;

'*If it appears to the court at any stage of criminal proceedings that the accused is by reason of mental illness or mental defect not capable of understanding the proceedings so as to make a proper defence, the court shall direct the matter be enquired into and be reported on in accordance with the provisions of section 79*'.

The initial admission is for 30 days during which they are observed and investigated as observantees. A psychiatric report is prepared before a formal court appearance (in accordance with international practice [39, 40].

The procedure for managing such conditions pertaining to mental illness is described in Section 78 which states:

*'A person who commits an act or makes an omission which constitutes an offence, and who at the time of such commission or omission suffers from a mental illness or mental defect which makes him or her incapable of:*

*a) appreciating the wrongfulness of his or her act of omission; or*

*b) acting in accordance with and appreciation of the wrongfulness of his or her act or omission.'* [38]

Individuals found unfit to stand trial are referred by the court to the forensic unit as 'state patients' in terms of Section 42 of the Mental Health Care Act 17 of 2002 [41]. On admission, such patients undergo a psychiatric assessment that results in a multi-axial diagnosis and assessment of use of drugs and other substances.

## 3.3 Study population

The targeted population for this study comprises all patients or users referred for admission on forensic grounds with a concomitant psychiatric disorder and undergoing care at Sterkfontein Hospital's Forensic Unit.

### 3.3.1 Inclusion criteria

- Patients must be or above the age of 18 years so as to be eligible to give informed consent in their mother tongue.
- Both genders are included.

## 3.4 Sampling

This is a period sampling of the targeted population. The Inpatients Register at Sterkfontein Hospital had a serial recording of all patients admitted. Patients meeting the inclusion criteria were then identified. Period sampling was effectively done to select all patients admitted from 01 January 2007 to 31 December 2011. All patients admitted during that period were eligible for inclusion in the study.

## 3.5 Definitions

| | |
|---|---|
| Age: | Age on admission to the forensic ward as recorded in clinical notes. |
| Alcohol: | Use of alcohol by patient, as recorded in the clinical notes at the time of admission. |
| Cannabis: | Use of cannabis by patient, as recorded in the clinical notes at the time of admission. |
| Criminal Procedures Act: | The Criminal Procedures Act 51 of 1977 was enacted to amend and consolidate the provisions for procedures and related matters in criminal proceedings. This deals with assaults, violent crimes, murder and rape. Chapters and sections are devoted to individuals who are mentally ill, or with diminished capacity to understand the proceedings and criminal responsibility.[38] |
| Diagnosis: DSM Multiaxial diagnosis | The final diagnosis of the patient after full psychiatric examination and evaluation using the Multi-axial Diagnosis Classification System. |

| | |
|---|---|
| | The system provides a common language and standard criteria for the classification of mental disorders. It consist of five level axes) that provides a full diagnosis as well as factors influencing the condition.<br>The DSM IV classification as published in the **Diagnostic and Statistical Manual of Mental Disorders**, 4th Edition, Text Revision, also known as **DSM-IV-TR** was used in this study<br>The DSM IV diagnosis and all other diagnostic test recorded pertain to the time of admission |
| Disability grant: | This refers to the receipt of a grant administered by the SASSA to individuals in terms of Section 9b of the Social Assistance Act. The said Act provides for a disability grant, if an individual:<br>(a) has attained the prescribed age; and<br>(b) is, owing to a physical or mental disability, unfit to obtain by virtue of any service, employment or profession, the means needed to enable him or her to provide for his or her maintenance [42, 43]. |
| Educational status: | Highest level of formal education attained at the time the alleged crime was committed. |
| Mental Health Care Act: | The Mental Health Care Act 17 of 2002 was enacted to provide for the care, treatment and rehabilitation of persons who are mentally ill to set out different procedures to be followed in the admission of such persons; to establish Review Boards in respect of every health establishment; to determine their powers and functions; to provide for the care and administration of the property of mentally ill persons; |

| | |
|---|---|
| | to repeal certain laws, and to provide for matters connected therewith[41]. |
| Occupation: | Type of work undertaken by patient at the time of admission. |
| Other substances: | Use of other substances by patient as recorded in the clinical notes at th time of admission. |
| Place of residence: | Place of normal residence of patient, whether formal or informal, until admission. |
| Religion: | Religious affiliation whether active or inactive at the time of admission. |
| Sex: | The sex (gender) of the patient as recorded in the clinical notes. |
| State patient: | This refers to an accused person who has been found by a court for unfitness to stand trial because of a mental illness, mental defect, rendering the person incapable of appreciating the wrongfulness of the act or omission or *acting in accordance with and appreciation of the wrongfulness of his or her act or omission* following the prescribed procedures in the Criminal Procedures Act 51 of 1977 Section 77-79 and referred to a mental hospital in terms of Section 42 of the Mental Health Care Act 17 of 2002 [38,41]. |

## 3.6 Measurements

### 3.6.1 Dependent Outcome Variables

**Table 3.1 List of outcome variables**

| Category | Variables | Values |
|---|---|---|
| **HIV serostatus** | HIV status of patient | Reactive<br>Non- reactive<br>Indeterminate<br>Unknown |
| | ARV Treatment status | Yes / No |

### 3.6.2 Independent Variables

**Table 3.2 List of independent variables**

| Category | Variables | Values |
|---|---|---|
| **Diagnostic** | Axis I | Categorical |
| | Axis II | Categorical |
| | Axis III | Categorical |
| | Axis IV | Categorical |
| | Axis V | Numeric |
| | Mini Mental State Examination | Numeric |
| | (MMSE) | Numeric |
| | International HIV Dementia scale | |
| | (IHDS) | |

| | | |
|---|---|---|
| **Charge** | Name of alleged crime.<br>For the purpose of this study, this constitutes crime committed. | Categorical (4) |
| **Demographic** | Age<br>Sex<br>Marital status<br>Educational status | Numeric<br>Categorical<br>Categorical<br>Categorical |
| **Social** | Place of residence<br><br><br>Religion<br>Occupation<br>Disability grant | Formal settlement<br>Informal settlement<br>Yes / No<br>Categorical<br>Yes / No |
| **Habits** | Alcohol<br>Cannabis<br>Other substances | Yes / No<br>Yes / No<br>Yes / No |

## 3.7 Data collection and management

Data collection was undertaken in January – February 2014. The data was extracted from the patients' files onto the data extraction sheet designed for this study. The data was then entered into an MS Access database. The file was saved on one laptop with password protection, to prevent unauthorised access (see Appendix A). Age at admission was calculated using internet application software, Calculator.Net [44].

The software application allowed for entry of date of birth and date of admission. The output generated as age was the number of completed years of life. The calculated age was captured for each study participant into the MS Access database.

## 3.8 Analysis

The data was imported into STATA Statistical Software version 12, and analysed using the same.

Descriptive statistics were analysed and summarised with measures of central tendency and distribution for age. The categorical variables were tabulated with frequencies and percentages.

Prevalence proportion of HIV sero-positivity was calculated for all study population sub-groups by cross tabulation of HIV sero-status with the independent variable of interest. Statistical tests resulted in the calculation of Pearson's chi-squared and resultant p value. Decision making for hypothesis testing was set at a p value of less than 0.05.

## 3.9 Ethical issues

For patients currently admitted, data was extracted from the patient file only after an informed consent was obtained from him/her (see Appendix B). The purpose of the study, the benefits and risks were explained to them in their mother tongue and their permission obtained by signing a consent form. Mental competence of the state patient to grant consent was determined by a clinician (an independent psychiatrist in charge of the ward). Patients were assessed individually for enrolment in the study after clinical assessment of their capacity and competence to give informed consent[32]. Efforts were made to ensure that the

consent obtained was free, voluntary, clear, unequivocal and comprehensive, and guided by other tenets to make it legally valid (as espoused by Van Oosten) [33].

A waiver was obtained through clearance from the Research and Ethics Committee to extract data from the files of patients who were on leave of absence, and also for patients found not competent to give consent. There was no harm directly or indirectly to the patient/s during the data abstraction process. Furthermore, benefits are likely to accrue to the forensic patients from the findings of the study, as it informs improvements that may be provided to state patients[32].

The study required extracting data from the inpatient files at Sterkfontein Hospital. Only the principal investigator had access to the files. There was no name or label to identify a specific patient on data that was extracted for analysis or reporting in the study report.

The records were captured in MS Access and the files and worksheets were password protected. The original data collection forms were locked in a filing cabinet by the principal researcher.

Permission was obtained from the Head of the Psychiatric Department at Sterkfontein Hospital as the custodian of the patient records. Further permission was obtained from the Chief Executive Officer of the hospital.

The protocol was cleared by the HREC (Medical) of the University of the Witwatersrand (see Appendix C) and Sterkfontein Hospital Research Committee (see Appendix D).

# CHAPTER 4: RESULTS

## 4.1 Socio-demographic and lifestyle characteristics of forensic inpatients

The records of 137 forensic patients were retrieved and recorded as study participants. There were four refusals among those from whom an informed consent was requested. This yielded a 97% response rate for files obtained from all the files available at the hospital for the period 2007 to 2011 that met the eligibility criteria. Data on HIV sero-status, which is the main outcome variable in the study, was only available for 124 patients, resulting in an effective response rate of 88%.

The majority of the patients were males (92%). The age on admission to the ward ranged from 18 to 73 with a mean age of 36.1 (SD 10.4). The age ranges were categorised to generate 4 quartiles and their frequencies summarised in Table 4.1. The majority of the patients (27%), were in the 29-34 year category followed by those in the 35 to 42 year category (25%). Thus, 75% of the patients were below the age of 43 years.

The marital status of approximately 85% of the patients was single with only 9% married at the time of admission. Most of the patients (94 = 68.6%), were living in formal settlements with 31.4% living in informal settlements. Information was also obtained on their employment status at the time of admission. Approximately 90% of the forensic patients were unemployed and 68% of all the patients were not beneficiaries of any disability grant. Among those 123 unemployed patients, a third (34.1%) were not receiving any disability grant.

**Table 4.1 Socio-demographic characteristics**

| Characteristic | N=137 | Frequency | Percentage |
|---|---|---|---|
| **Sex** | Female | 11 | 8.0 |
| | Male | 126 | 92.0 |
| **Age** | Below 29 | 31 | 22.6 |
| | 29-34 | 37 | 27.0 |
| | 35-42 | 34 | 24.8 |
| | 43 and above | 35 | 25.6 |
| **Marital status** | Widowed | 1 | 0.7 |
| | Divorced | 7 | 5.1 |
| | Married | 13 | 9.5 |
| | Single | 116 | 84.7 |
| **Residence** | Formal settlements | 94 | 68.6 |
| | Informal | 43 | 31.4 |
| **Employment status** | Unemployed | 123 | 89.8 |
| | Employed | 14 | 10.2 |
| **Disability grant** | No | 94 | 68.6 |
| | Yes | 43 | 31.4 |

The marital status of approximately 85% of the patients was single with only 9% married at the time of admission. Most of the patients (94 = 68.6%), were living in formal settlements

with 31.4% living in informal settlements. Information was also obtained on their employment status at the time of admission. Approximately 90% of the forensic patients were unemployed and 68% of all the patients were not beneficiaries of any disability grant. Among those 123 unemployed patients, 34.1% were not receiving any disability grant.

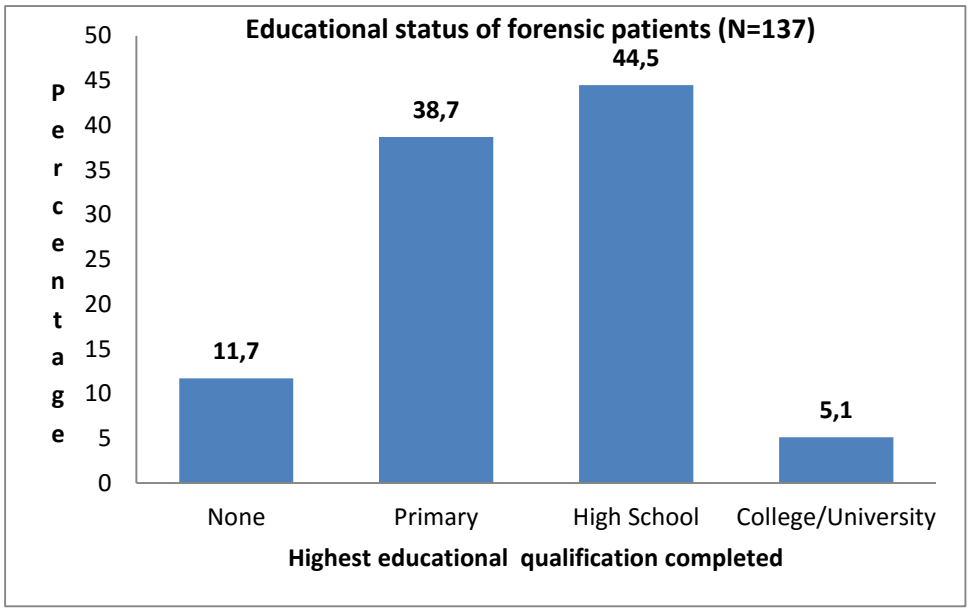



**Figure 4.1 Educational status**

Figure 4.1 reveals the highest educational status of the 137 patients at the time of admission. Over 80% had a primary or high school education whilst 11.7% had no formal education. Tertiary education was least achieved, with college or university education at 2.2% and 2.9% respectively.

### 4.1.1 Substance use by patients

Information was obtained on the lifestyle of patients. This focused on their use of substances known to have adverse effects on health, or legally prohibited, such as alcohol and cannabis, or illicit substances such as cocaine. Table 4.2 describes the distribution of use of these substances.

Alcohol use was admitted by 54.7% of the patients and a similar percentage, 51%, conceded to the use of cannabis, while 12% (N=17) admitted to the use of one or more illicit substances. Information was available on the substances used by 13 patients.

**Table 4.2 Substance use**

| Substance | | Frequency | Percentage |
|---|---|---|---|
| **Alcohol** | No | 62 | 45.3 |
| | Yes | 75 | 54.7 |
| **Cannabis** | No | 67 | 48.9 |
| | Yes | 70 | 51.1 |
| **Other illicit substances** | No | 120 | 87.6 |
| | Yes | 13 | 9.5 |

Figure 4.2 shows graphically the distribution of illicit substances used by patients prior to admission. Cocaine and Mandrax were used by 13 of the patients (46.2% and 30.8% spectively). A wide range of substances, 10 in all, were in use and most of the patients were using more than one substance with a maximum of 4 products being used by 3 of the patients.

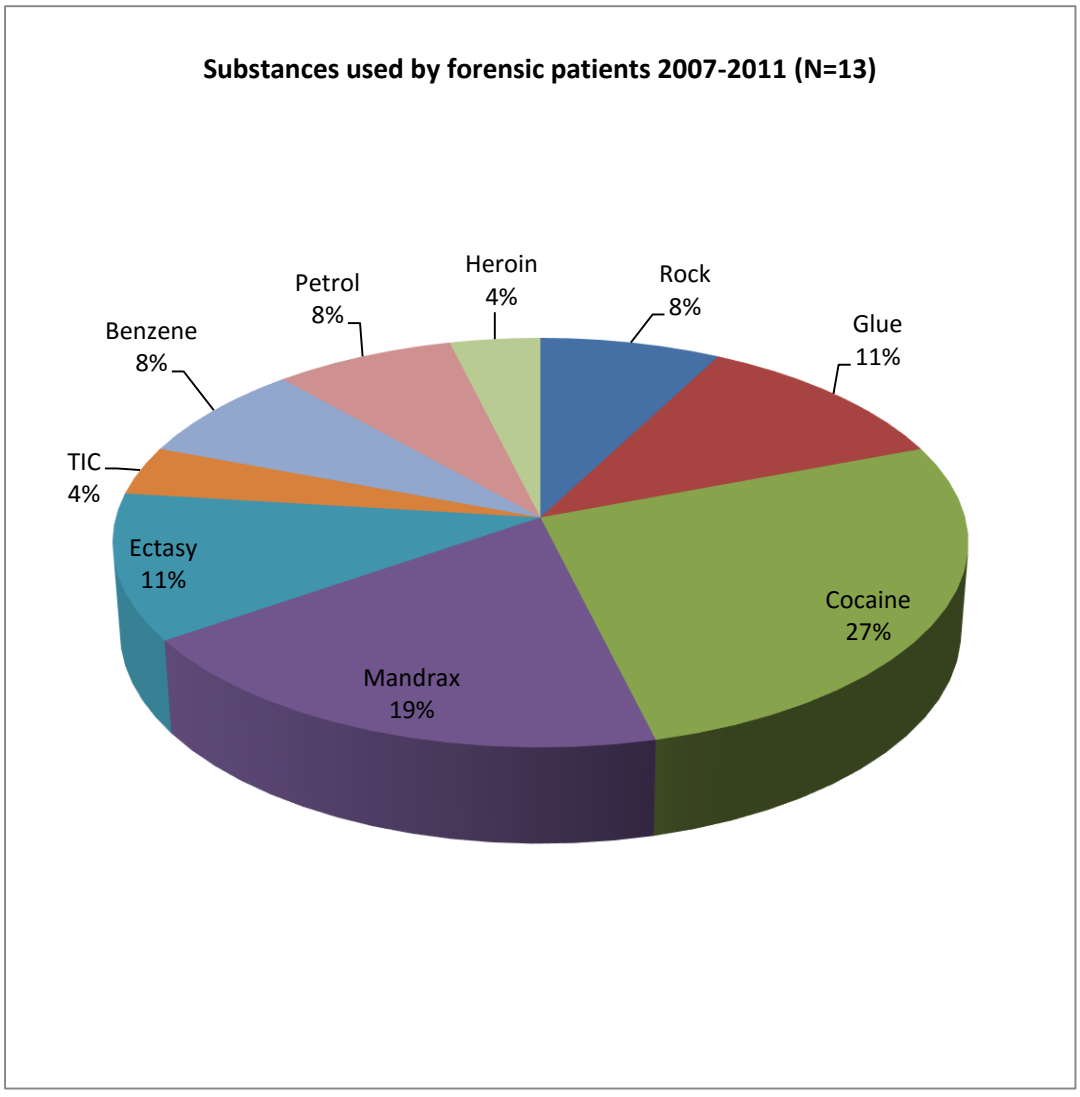



**Figure 4.2 Illicit substance use**

## 4.2 Psychiatric diagnoses of forensic inpatients

### 4.2.1 Axis I

The multi-axial classification system as described in DSM IV-TR was the standard comprehensive diagnostic system in use at Sterkfontein Hospital. The acute clinical diagnosis was deferred in 11.7% of the patients. The Axis I diagnosis was reported for 118 of the patients, presented in Figure 4.3 below. Schizophrenia accounted for almost half (49.1%) of the cases followed by psychosis secondary to a general medical condition for 31.4 % of the cases. The aforementioned conditions accounted for almost 70% of all the cases diagnosed at the forensic unit, and 80% of those with Axis I diagnoses[31, 45].

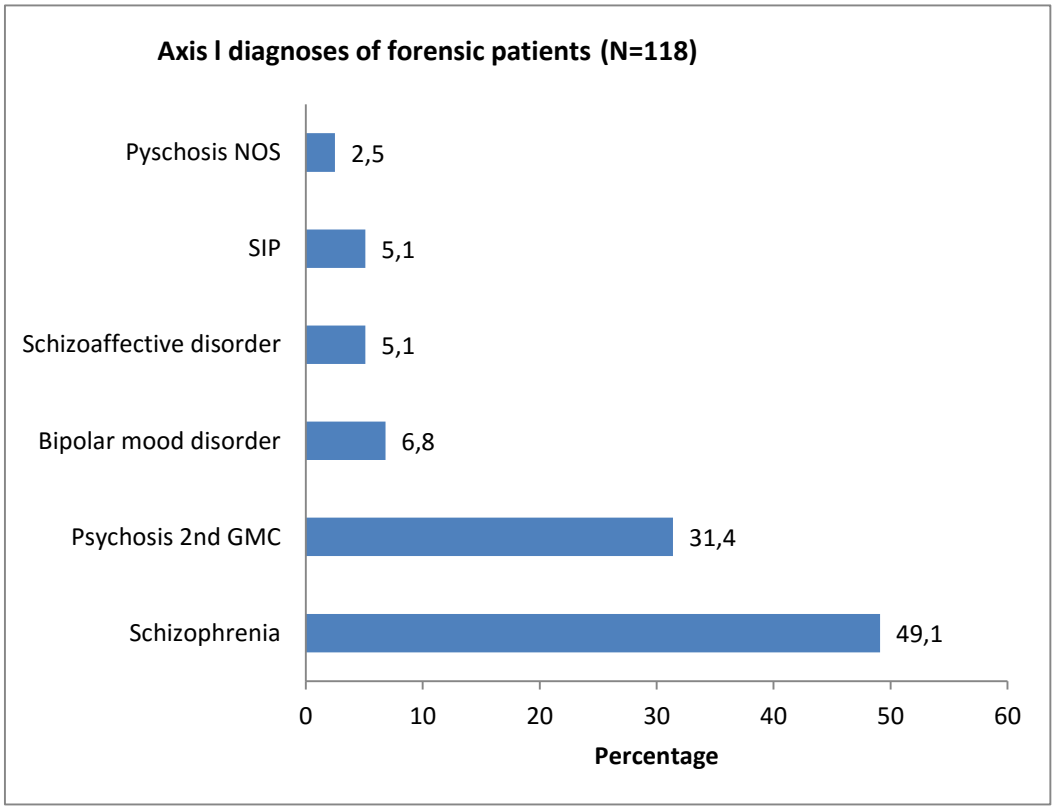



**Figure 4.3 Axis I diagnoses**

### 4.2.2 Axis II

Axis II diagnoses describe personality disorders and intellectual disabilities and often are lifelong problems arising from childhood. This was recorded for 69 of the patients. MR (55%) and ASPD (39%) were the predominant Axis II diagnoses, accounting for over 90% of the Axis II diagnoses made among the forensic inpatients[31, 45].

Figure 4.4 below describes the frequency distribution of the Axis II diagnoses.

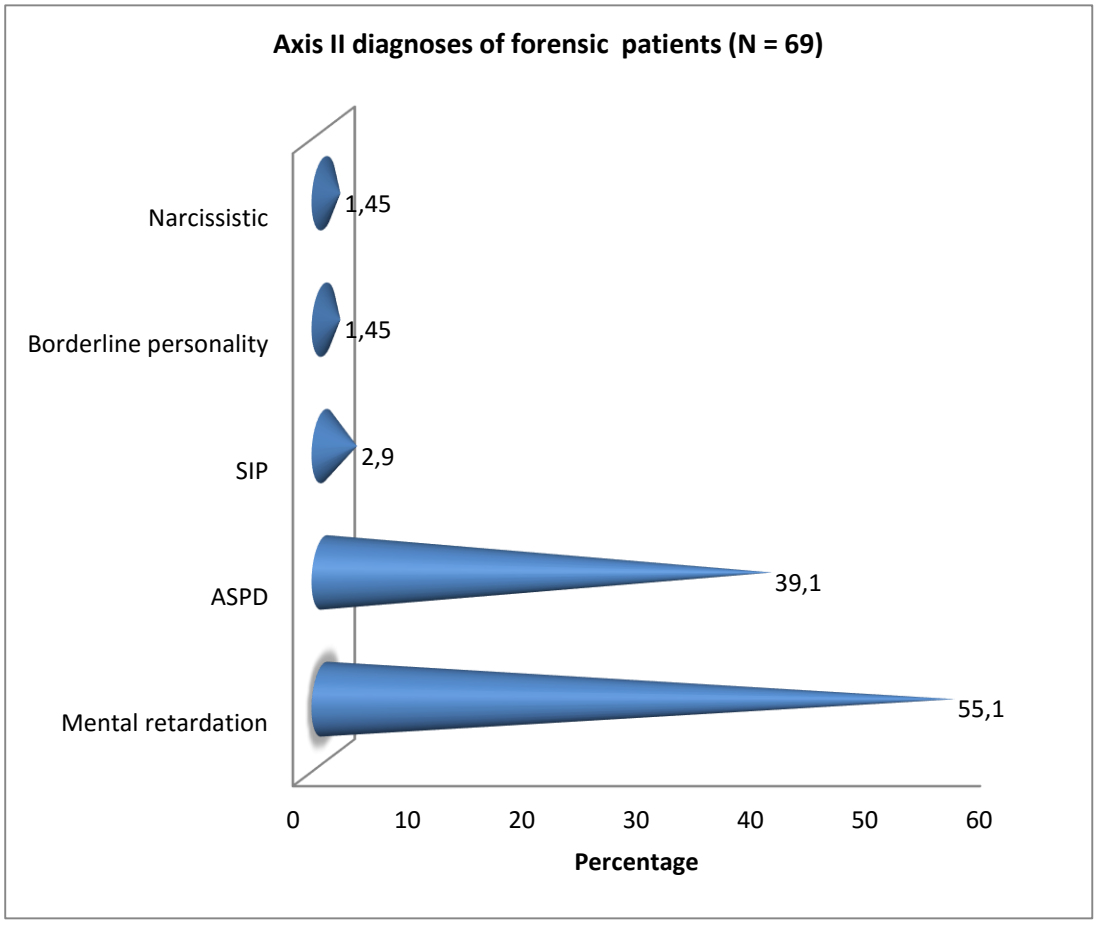



**Figure 4.4 Axis II diagnoses**

### 4.2.3 Axis III

The underlying or co-existing medical condition is described in the Axis III diagnoses, which provide a comprehensive insight into the full medical condition of a patient. This is clearly illustrated by the fact that the second most common Axis I diagnosis was mood disorder, secondary to a general medical condition. The frequency distribution of Axis III diagnoses in 70 of the patients is described in Table 4.3. HIV and head injury account for 21.4% and 14.3% respectively. Temporal lobe epilepsy and epilepsy collectively account for a quarter of the cases with Axis III diagnoses. [31, 44] HIV accounted for 15 (21.4%) of all axis III diagnosis.

**Table 4.3 Axis III diagnoses**

| Axis III diagnoses | Frequency | Percentage |
|---|---|---|
| HIV | 15 | 21.7 |
| Epilepsy | 10 | 14.5 |
| Head injury | 10 | 14.5 |
| Temporal lobe epilepsy | 8 | 11.6 |
| Hypertension | 7 | 10.1 |
| Diabetes mellitus | 4 | 5.7 |
| Dysmorphism | 3 | 4.3 |
| Hypercholestorolaemia | 3 | 4.3 |
| Haematological | 2 | 2.9 |
| Blindness | 1 | 1.4 |
| Deafness | 1 | 1.4 |
| Deep venous thrombosis | 1 | 1.4 |
| Haemorrhoids | 1 | 1.4 |
| Hepatitis B | 1 | 1.4 |
| Kaposi sarcoma | 1 | 1.4 |
| Pansystolic murmur | 1 | 1.4 |
| **Total** | **69** | **100** |

### 4.2.4 Axis IV

Axis IV diagnoses provide for diagnostic labelling of psychosocial and environmental factors that contribute to the mental disorder[31, 45].

**Table 4.4 Axis IV diagnoses**

| Axis IV diagnoses | | Frequency | Percentage |
|---|---|---|---|
| **Defer** | | 4 | 4.8 |
| **Employed** | | 1 | 1.2 |
| **Financial** | | 2 | 2.4 |
| **Hospitalisation** | | 1 | 1.2 |
| **No fixed abode** | | 1 | 1.2 |
| **Poor Support** | Alone | 10 | 12.2 |
| | Poor Support & No fixed abode | 1 | 1.2 |
| **Charge** | Alone | 12 | 14.6 |
| | Charge & Children | 1 | 1.2 |
| | Charge & Death of family members | 1 | 1.2 |
| **Unemployment** | Alone | 34 | 41.4 |
| | Unemployment & Charge | 5 | 6.1 |
| | Unemployment & Financial | 7 | 8.5 |
| | Unemployment & Poor support | 1 | 1.2 |
| | Poor support & No fixed abode | 1 | 1.2 |
| **Total** | | **82** | **100** |

### 4.2.5 Axis V

Axis V diagnosis is made by measuring the Global Assessment of Functioning (GAF) is the fifth stage in the multi axial diagnostic system. The GAF is unique by virtue of its focus on accessing global functioning and quality of life in psychiatric patients. It has been adopted as a component of psychiatric assessment in DSM–IV-TR. The domains for assessment are scored numerically and include social and interpersonal, occupational, and psychological functioning of the individual. The scores are numeric ranging from 0-100. The Axis V or GAF was also recorded for 102 of the patients. The frequency distribution of the GAF score is presented in Table 4.5. There was a bi-modal (39.2%) distribution of scores between 21-30 and 31-40[31,45]. The highest scores of 51-60 was attained by only 5 (4.9%) and the lowest score of 11-20 was recorded for only 2 patients suggestive of presence of hallucinations or delusions which influence behaviour or serious impairment in ability to communicate with others or serious impairment in judgment or inability to function in almost all areas.

**Table 4.5 Global Assessment of Functioning scores (Axis V)**

| GAF score | Frequency | Percentage |
|---|---|---|
| **51-60** | 5 | 4.9 |
| **41-50** | 15 | 14.7 |
| **31-40** | 40 | 39.2 |
| **21-30** | 40 | 39.2 |
| **11-20** | 2 | 1.9 |
| **Total** | **101** | **100** |

A GAF score of 60-51 reflects moderate symptoms, or moderate difficulty in social and occupational functioning such as few friends and conflict with peers. Most of the patients score is indicative of serious symptoms or serious impairment in one of the following: social, occupational, or school functioning,(31-40) or some impairment in reality testing or impairment in speech and communication or serious impairment in several of the following: occupational or school functioning, interpersonal relationships, judgment, thinking, or mood (21-30).

### 4.2.6 Mini Mental State Examination (MMSE)

The MMSE (or Folstein Test)[46,47] consists of a 30-item questions and is used to screen for cognitive impairment. The MMSE is a sensitive, reliable and valid tool to measure cognitive impairment in HIV patients. A limitation of this test is the fact that people with low education or different cultural background may score low points even in the absence of mental impairment and educated people may score high points whist having a mental impairment. The assessment scores range from 0-30. Scores that are equal or greater than 25 indicates normal cognition, even though that does not exclude dementia. The assessment was undertaken and recorded for 38 patients. The frequency distribution of the MMSE scores is shown in Table 4.6. Given the limitation described earlier, only 22 results, recorded for those who have attained high school or tertiary education can be fairly interpreted. Normal scores were recorded for the majority 16 (72.7%), with 4 (18.1%) scoring 18-24 suggestive of moderate impairment and scores of less than 17 indicative of severe cognitive impairment was recorded for only 2(8.9%)[45,46,47].

**Table 4.6 MMSE scores**

| Formal education | University/ College | | High school | | Primary school | None |
|---|---|---|---|---|---|---|
| | No | % | No | % | No | No |
| <18 | 1 | 4.5 | 1 | 4.4 | 3 | 0 |
| 18-24 | 1 | 4.5 | 3 | 13.6 | 6 | 2 |
| >25 | 2 | 9.1 | 14 | 63.6 | 5 | 0 |
| **Total** | **4** | **18.2** | **18** | **81.8** | **14** | **2** |

### 4.2.7 International HIV Dementia Scale (IHDS)

The 23 patients that tested positive for HIV were assessed for HIV-associated dementia using the IHDS. The frequency distribution of their scores is described in Table 4.7. The scores ranged from 6 to 12 with a mode of 5. The median score is 8 with 63% of scores below 8 and 17.4% between 8 and 12. The level of education is significantly associated with the performance of the IHDS. Further development of this test is needed, to account for the effects of education on the cut-off scores used to indicate dementia. This is particularly relevant in resource limited settings where low levels of education are widespread[49,50].

**Table 4.7 IHDS scores**

| IHDS score | Frequency | Percentage |
|---|---|---|
| **6** | 5 | 21.7 |
| **7** | 5 | 21.7 |
| **8** | 5 | 21.7 |
| **9** | 1 | 4.4 |
| **10** | 3 | 13.0 |
| **12** | 4 | 17.4 |
| **Total** | **23** | **100** |

The maximum possible score on IHDS is 12. Patients with a score of 10 or less, as found with 19 (69.5%) of the study participants who had the assessment done should be evaluated further for possible dementia as the test is for screening only.

### 4.2.8 Previous mental health problems and care

A high percentage of the patients, 62% (85/134), had a diagnosis of a previous mental illness. Of the 85 patients with previous history of mental illness, 95% (81/85) did not adhere to previously prescribed treatment for mental illness. This finding was, however, not statistically significant (Pearson chi2 (1) = 0.0752 Pr = 0.784).

## 4.3 Crimes committed by forensic inpatients

The Criminal Procedures Act 51 of 1977 and Section 42 of the Mental Health Act provide guidelines for the admission of patients to Sterkfontein Hospital's Forensic Unit[38,41]. The primary admission criteria was an offence committed by the patient, while 21% of the patients had been charged with multiple offences. Figure 4.5 portrays the distribution of the number of offences committed.

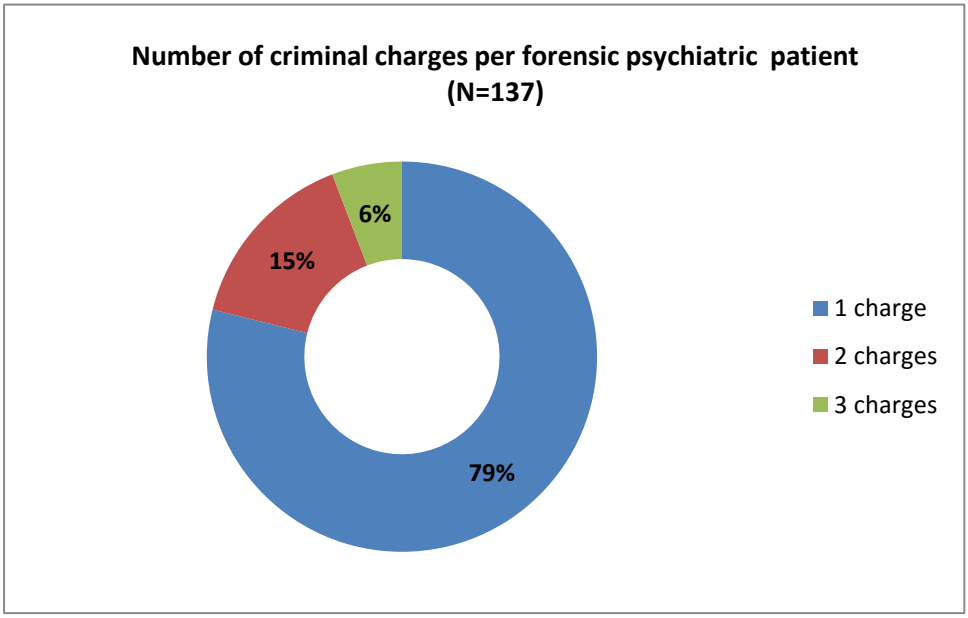



**Figure 4.5 Frequency distribution of the number of criminal charges**

The charges were coded by grouping together attempted and completed offences as one. All offences leading to acquisition of goods not belonging to the patient, such as burglary, robbery and theft, were coded as theft. All offences resulting in damage to property, including arson, were coded as Malicious Injury to Property (MITP). All offences involving physical assault to others or causing grievous bodily harm were coded as Assault-GBH[51,52].

Figure 4.6 below is a bar chart of the frequency of the categories of crimes committed by 137 forensic inpatients.

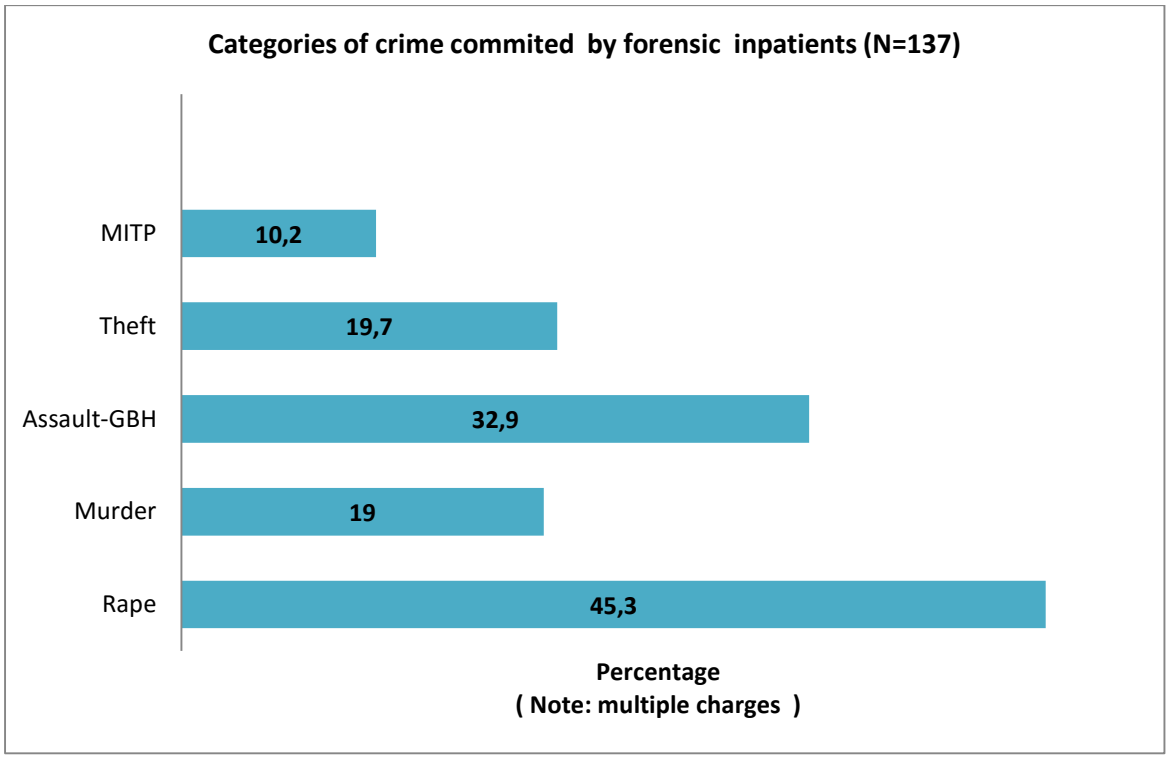



**Figure 4.6 Frequency distribution of crime categories**

Rape is the predominant crime (45.3%) committed by the patients closely followed by Assault–GBH by a third of the patients. Theft and murder were committed respectively by 19.7% and 19% of the patients, as summarised in Figure 4.6.

Cross-tabulation of the offences with previous crime revealed that 24% (N=33) had a history of previous crime. Further analysis was carried out to establish any relationship between crime committed and some socio-demographic variables. Using Pearson's chi-square test of association, it was noted that rape was associated with the patients' educational status and place of residence. Crime was statistically significantly associated with substance use and males. Rape was associated with inpatients with no formal education and residence in

informal settlement. MITP with cannabis use and marital status, and assault-GBH with formal residential areas. Murder was associated with illicit substance use and these aforementioned associations are summarised in Table 4.8

**Table 4.8 Bivariate analysis of crime categories & socio-demographic characteristics**

| **Rape** | **Characteristics** | **Pearson chi$^2$** | **P value** |
|---|---|---|---|
| | Age | 6.1320 | 0.105 |
| | Sex | 1.6310 | 0.202 |
| | Marital status | 7.5613 | 0.056 |
| | Educational level | 10.0942 | **0.018** |
| | Residence | 5.8518 | **0.016** |
| | Employment | 3.5733 | 0.059 |
| | Disability grant | 0.0399 | 0.842 |
| | Alcohol | 1.1124 | 0.292 |
| | Cannabis | 0.6353 | 0.425 |
| | Illicit substances | 1.9665 | 0.161 |
| **Assault-GBH** | **Characteristics** | **Pearson chi$^2$** | **P value** |
| | Age | 4.5450 | 0.208 |
| | Gender | 0.1685 | 0.681 |
| | Marital status | 2.9254 | 0.403 |
| | Educational level | 7.1936 | 0.066 |
| | Residence | 12.7922 | **0.000** |
| | Employment | 2.0801 | 0.149 |
| | Disability grant | 3.6532 | 0.056 |

| | | | |
|---|---|---|---|
| | Alcohol | 0.7471 | 0.387 |
| | Cannabis | 0.1305 | 0.718 |
| | Illicit substances | 0.7639 | 0.382 |

**Table 4.8 Bivariate analysis of crime categories and socio-demographic characteristics**

| **Murder** | **Characteristics** | **Pearson chi$^2$** | **P value** |
|---|---|---|---|
| | Age | 1.2910 | 0.731 |
| | Sex | 0.0049 | 0.944 |
| | Marital status | 0.8530 | 0.837 |
| | Educational level | 2.7693 | 0.429 |
| | Residence | 1.7772 | 0.182 |
| | Employment | 0.9333 | 0.334 |
| | Disability grant | 1.0290 | 0.310 |
| | Alcohol | 0.5979 | 0.439 |
| | Cannabis | 0.0154 | 0.901 |
| | Illicit substances | 6.2198 | **0.013** |
| **Theft** | Characteristics | Pearson chi$^2$ | P value |
| | Age | 2.7048 | 0.439 |
| | Sex | 2.9357 | 0.087 |
| | Marital status | 4.3378 | 0.227 |
| | Educational level | 5.2300 | 0.156 |
| | Residence | 2.5857 | 0.108 |
| | Employment | 0.7742 | 0.379 |
| | Disability grant | 0.0482 | 0.826 |

| | | | |
|---|---|---|---|
| | Alcohol | 0.1136 | 0.736 |
| | Cannabis | 3.2631 | 0.071 |
| | Illicit substances | 2.9795 | 0.084 |

**Table 4.8 Bivariate analysis of crime categories and socio-demographic characteristics**

| MITP | Characteristics | Pearson chi$^2$ | P value |
|---|---|---|---|
| | Age | 2.2451 | 0.523 |
| | Sex | 1.3613 | 0.243 |
| | Marital status | 12.9037 | **0.005** |
| | Educational level | 1.0280 | 0.794 |
| | Residence | 0.7181 | 0.397 |
| | Employment | 1.7749 | 0.183 |
| | Disability grant | 2.5086 | 0.113 |
| | Alcohol | 0.5730 | 0.449 |
| | Cannabis | 4.7112 | **0.030** |
| | Illicit substances | 0.0505 | 0.822 |

## 4.4 HIV seroprevalence in forensic inpatients

A cross-sectional study design lends itself to the calculation of prevalence proportions in the study population. The prevalence proportion in this study is the HIV seroprevalence in defined sub-groups of forensic patients. Data on HIV seroreactivity was available for 124 of the 137 subjects in the study.

This section describes HIV seroprevalence and associated factors using three defining criteria for subgroups of forensic patients namely; socio-demographic characteristics, clinical diagnosis and crime categories and concluding with a section on HIV and antiretroviral treatment.

### 4.4.1 HIV and socio-demographic characteristics

The relationship between HIV seroprevalence and various socio-demographic characteristics of forensic patients were examined using cross tabulations. The HIV prevalence rate was found to be higher among females at 36.4%, relative to males at 20.3%. Table 4.9 summarises the results of the HIV seroprevalence in the various socio-demographic groups within the forensic psychiatric population studied.

HIV seroprevalence rates of over 20% were found in population sub-groups of patients on disability grant, patients without disability grant, unemployed, living in informal settlements, no formal education, attainment of high school education, being single and belonging to the age group 33-47 years.

**Table 4.9 HIV seroprevalence by socio-demographic characteristics**

| Characteristic | | Negative | | Positive | | $Chi^2$ | P Value |
|---|---|---|---|---|---|---|---|
| | | N | % | N | % | | |
| **Sex** | | | | | | **1.5084** | **0.219** |
| | Female | 7 | 63.6 | 4 | 36.4 | | |
| | Male | 90 | 79.7 | 23 | 20.3 | | |
| **Age categories** | | | | | | **3.9716** | **0.265** |
| | <29 | 20 | 76.9 | 6 | 23.8 | | |
| | 29 – 34 | 25 | 90.3 | 8 | 9.7 | | |
| | 35 – 42 | 24 | 70.6 | 10 | 29.4 | | |
| | >43 | 28 | 75.8 | 3 | 24.2 | | |
| **Marital status** | | | | | | **0.4758** | **0.788** |
| | Single | 81 | 77.1 | 24 | 22.9 | | |
| | Married | 11 | 84.6 | 2 | 15.4 | | |
| | Divorced | 5 | 83.3 | 1 | 16.7 | | |
| **Educational status** | | | | | | **6.9893** | **0.136** |
| | None | 10 | 71.4 | 4 | 28.6 | | |
| | Primary | 41 | 87.2 | 6 | 12.8 | | |
| | High school | 39 | 69.6 | 17 | 30.4 | | |
| | College | 3 | 100 | 0 | 0 | | |
| | University | 4 | 100 | 0 | 0 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Residence type** | | | | | | **0.6635** | **0.415** |
| | Formal | 69 | 80.2 | 17 | 19.8 | | |
| | Informal | 28 | 73.7 | 27 | 26.3 | | |
| **Employment status** | | | | | | **0.3481** | **0.555** |
| | Unemployed | 86 | 77.5 | 25 | 22.5 | | |
| | Employed | 11 | 84.6 | 2 | 15.4 | | |
| **Disability grant** | | | | | | **0.0567** | **0.812** |
| | No | 67 | 78.8 | 18 | 21.18 | | |
| | Yes | 30 | 76.9 | 9 | 23.1 | | |

### 4. 4.2 HIV and Substance Use

The prevalence rates were elevated in all sub-groups involved with substance use, with rates over 20% for users of cannabis, alcohol and illicit substances as shown in Table 4.10.

**Table 4.10 HIV and Substance use**

| | **Negative** | | **Positive** | | **Chi2** | ***P* value** |
|---|---|---|---|---|---|---|
| **Substance** | **N** | **%** | **N** | **%** | | |
| **Cannabis** | 48 | 78.7 | 13 | 21.3 | 0.0151 | 0.902 |
| **Alcohol** | 48 | 72.7 | 18 | 27.3 | 2.504 | 0.114 |
| **Illicit drugs** | 12 | 80 | 3 | 20.0 | 0.0315 | 0.859 |

### 4.4.3 HIV and psychiatric diagnoses

A cross-sectional study design lends itself to the calculation of prevalence proportions in the study population. The prevalence proportion in this study is the HIV seroprevalence in defined sub-groups of forensic patients. Data on HIV seroreactivity was available for 124 of the 137 subjects in the study. Table 4.11 presents the seroprevalence by sub-groups of Axis 1 diagnostic groups. The overall HIV prevalence in forensic patients during the period 2007-2011 was 21.8% (CI 14.4 – 20.1).

However, the prevalence ranged from zero in substance-induced psychotic disorder sub-groups to a maximum of 37.5% in the bipolar mood disorder group, followed closely by 35.3% in patients diagnosed with mood/psychotic disorder. Further analysis did not find a statistically significant association between HIV seroprevalence and Axis I diagnosis (Pearson $chi^2(7) = 9.7244$ $Pr = 0.205$).

It is notable that of the 34 patients that were diagnosed with mood/psychosis secondary to GMC, 35.3% were HIV seropositive. Of the 51 patients with schizophrenia, 15 had a GMC and out which 8 were HIV seropositive.

Furthermore, the ORs were estimated for all the Axis I and II diagnostic groups and none were found to be statistically significant. However, the findings showed that the odds of occurrence of HIV for other diagnostic groups in Axis I were less than that for bipolar mood disorder, and the odds of occurrence of HIV for other diagnostic groups in Axis II were less than that for ASPD.

**Table 4.11 HIV seroprevalence in patients with Axis l diagnoses**

| | Seronegative | | Seropositive | | | |
|---|---|---|---|---|---|---|
| | **No.** | **Percentage** | **No.** | **Percentage** | **Chi²** | **P value** |
| **Bipolar mood disorder** | 5 | 64.5 | 3 | 37.5 | | |
| **Mood/Psychosis 2nd GMC** | 22 | 64.7 | 12 | 35.3 | | |
| **Psychosis NOS** | 2 | 66.7 | 1 | 33.3 | | |
| **SIP** | 5 | 100 | 0 | 0.0 | | |
| **Schizoaffective disorder** | 5 | 83.3 | 1 | 16.7 | | |
| **Schizophrenia** | 43 | 84.3 | 8 | 15.7 | | |
| **All Axis 1** | 82 | 76.6 | 25 | 23.4 | 7.1156 | 0.212 |
| **All patients** | **97** | **78.2** | **27** | **21.8 CI 14.4-29.1** | **8.6388** | **0.195** |

borderline personality disorder, to a high level of 34.6% in patients with ASPD. It is noteworthy that patients with MR in Axis II diagnosis have a prevalence rate of 15%. Bivariate analysis did not find a statistically significant association between HIV seroprevalence and Axis II diagnosis.

Analysis of seroprevalence by Axis II diagnosis revealed zero prevalence among those with borderline personality disorder to a high level of 34.6% in patients with ASPD. It is noteworthy that patients with MR in Axis II diagnosis have a prevalence rate of 15%. Bivariate analysis did not find a statistically significant association between HIV seroprevalence and Axis II diagnosis.

Among the patients with MMSE scores, the highest HIV seroprevalence rate was obtained among those with a score of 18-25 (33.3%) followed by 25% in patients with a score less than 18. There was no statistically significant association between HIV seroprevalence and MMSE score.

**Table 4.12 Odds ratio of HIV status and diagnoses**

| | Diagnosis | Unadjusted OR | $Chi^2$ | $P>chi^2$ | 95% Conf. Interval |
|---|---|---|---|---|---|
| **Axis I** | Bipolar mood disorder | 1.000000 | | | |
| | Psychosis 2nd GMC | 0.909091 | 0.01 | 0.9078 | 0.180912 - 4.568225 |
| | Psychosis NOS | 0.833333 | 0.01 | 0.9029 | 0.044346 - 15.659597 |
| | SIP | 0.000000 | 2.25 | 0.1336 | . . |
| | Schizoaffective disorder | 0.333333 | 0.68 | 0.4106 | 0.021301 - 5.216315 |
| | Schizophrenia | 0.310078 | 2.13 | 0.1442 | 0.058789 - 1.635469 |
| | | | | | |
| **Axis II** | ASPD | 1.000000 | | | |
| | Borderline personality disorder | 0.000000 | 0.50 | 0.4795 | |
| | MR | 0.337302 | 2.99 | 0.0837 | 0.092588 - 1.228806 |
| | SIP | 0.000000 | 0.50 | 0.4795 | . . |

The HIV prevalence rate was just over 20% in those with and those without a past history of mental illness. Hence there was no statistically significant association between HIV seroprevalence and previous history of psychiatric illness.

**Table 4.13 HIV seroprevalence by Axis ll diagnoses**

| HIV status | ASPD | | Borderline | | MR | | Total | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| **Negative** | 17 | 65.4 | 1 | 100 | 28 | 84.8 | 46 | 76.7 |
| **Positive** | 9 | 34.6 | 0 | 0 | 5 | 15.5 | 14 | 23.3 |
| **Total** | 26 | 100 | 1 | 100 | 33 | 100 | 60 | 100 |

Pearson $chi^2(3) = 3.7314$ Pr = 0.292

**Table 4.14 HIV seroprevalence by characteristics of mental state**

| | | Negative | | Positive | | Chi² | P Value |
|---|---|---|---|---|---|---|---|
| **Characteristic** | | N | % | N | % | | |
| **Axis V GAF score (N=92)** | | | | | | **6.9320** | **0.327** |
| | 11-20 | 0 | 0 | 2 | 100 | | |
| | 21-30 | 25 | 71.4 | 10 | 28.5 | | |
| | 31-40 | 30 | 85.7 | 5 | 14.3 | | |
| | 41-50 | 10 | 66.67 | 5 | 33.3 | | |
| | 51-60 | 4 | 80 | 1 | 20 | | |
| **MMSE (N= 33)** | | | | | | **4.7533** | **0.314** |
| | <18 | 3 | 75 | 1 | 25 | | |
| | 18--25 | 8 | 67.7 | 4 | 33.3. | | |
| | >25 | 15 | 88.2 | 2 | 11.8 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Past psychiatric history (N=134)** | | | | | | **0.0110** | **0.916** |
| | No | 37 | 78.7 | 10 | 21.3 | | |
| | Yes | 60 | 77.9 | 17 | 22.1 | | |

### 4.4.4 HIV and crimes committed

HIV seroprevalence was high among patients that have committed Assault-GBH at 36%, as revealed in Table 4.15. However, there was no statistically significant association between HIV seroprevalence and crime type. It revealed, though, that patients who had committed a previous crime had a statistically significant association with HIV status with Pearson's $chi^2$ = 5.1530 and p value 0.023.

**Table 4.15 HIV seroprevalence by categories of crime**

| **Characteristic** | | **Negative** | | **Positive** | | **Chi²** | **P Value** |
|---|---|---|---|---|---|---|---|
| | | **N** | **%** | **N** | **%** | | |
| **Category of crime** | | | | | | | |
| | Assault-GBH | 28 | 68.3 | 13 | 31.7 | 3.5482 | 0.060 |
| | MITP | 8 | 72.3 | 3 | 27.3 | 0.2143 | 0.643 |
| | Murder | 18 | 78.3 | 5 | 21.7 | 0.0000 | 0.996 |
| | Rape | 45 | 80.4 | 11 | 19.6 | 0.2723 | 0.602 |
| | Theft | 18 | 75.0 | 6 | 25 | 0.1818 | 0.670 |
| **Previous crime** | | | | | | **5.1530** | **0.023** |
| | No | 78 | 83.0 | 16 | 17.0 | | |
| | Yes | 19 | 63.3 | 11 | 36.7 | | |

The OR of various crime types were estimated and none were found to be statistically significant. However, the results indicate that the odds of occurrence of HIV were increased among patients who have committed theft, MITP and Assault-GBH. Inpatients who committed theft had a 25% increase in the odds of having HIV. Inpatients who committed MITP had a 39% increase in the odds of having HIV. A patient who had committed Assault-GBH is 2.3 times more likely to be HIV positive.

**Table 4.16 Odds ratio of HIV status and crime category**

| Crime category | Unadjusted Odds Ratio | $Chi^2$ | $P>chi^2$ | 95% Confidence Interval |
|---|---|---|---|---|
| **Rape** | 0.794444 | 0.27 | 0.6032 | 0.332948 - 1.895616 |
| **Murder** | 0.997475 | 0.00 | 0.9964 | 0.331317 - 3.003037 |
| **Assault-GBH** | 2.288265 | 3.52 | 0.0606 | 0.939949 - 5.570682 |
| **Theft** | 1.253968 | 0.18 | 0.6711 | 0.440249 - 3.571698 |
| **MITP** | 1.390625 | 0.21 | 0.6448 | 0.340092 - 5.686216 |

Mantel-Haenszel ORs for previous crime was estimated, with adjustments made for rape. The Sex (Gender) and Age categories revealed statistically significant ORs, as summarised in Table 4.17. Patients with previous crime are more than twice as likely to be HIV positive. However, adjustment for all three variables was not statistically significant.

**Table 4.17 Odds ratio of HIV status and previous crime**

| Adjusted | Odds Ratio | Chi 2 | P>chi2 | 95% Confidence Interval |
|---|---|---|---|---|
| **None** | 2.822368 | 5.11 | **0.0238** | 1.102067 - 7.228020 |
| **Rape** | 2.713483 | 5.13 | **0.0235** | 1.103043 - 6.675160 |
| **Sex** | 3.165624 | 5.96 | **0.0146** | 1.191811- 8.408357 |
| **Age** | 2.703816 | 4.84 | **0.0278** | 1.074307 - 6.804963 |
| **Sex & Age** | 2.919615 | 5.38 | **0.0204** | 1.130003 - 7.543479 |
| **Sex & Rape** | 3.095238 | 6.21 | **0.0127** | 1.213412 -7.895506 |
| **Rape & Age** | 2.533637 | 4.12 | **0.0425** | 0.998766 - 6.427242 |
| **Sex, Age & Rape** | 2.598286 | 3.79 | 0.0516 | 0.957421 - 7.051327 |
| **Rape, Sex, Marital status, Education, Residence type, Age, Employment status, Alcohol, Disability grant** | 2.100000 | 0.72 | 0.3947 | 0.365722 - 12.058349 |

### 4.4.5 HIV and treatment

Highly Active Anti-Retroviral Therapy (HAART) is a combination treatment using newly developed drugs, that has been found to be effective in the management of patients living with HIV (PLHIV). There are specific guidelines for their use guided by eligibility criteria in the

public health services. It is also noteworthy that among the 27 HIV positive patients, only 44% are currently receiving HAART.

# CHAPTER 5: DISCUSSION

## 5.1 Socio-demographic characteristics and substance use among forensic inpatients.

Findings of this study concerning socio-demographic characteristics indicated a high proportion of males that are single and unemployed in this study. The demographic characteristics are very similar to findings from a study in 2004-2008 in the Free State Forensic Psychiatric Unit, where the majority of offenders were male (95.8% versus 92%) single (83.8% versus 84.7%) and unemployed (81.5% versus 89.8%)[53] .

The study further revealed that over 50% of the patients in this study use alcohol and cannabis. Whilst cannabis use was 51.1% in this study, the prevalence was 66.7% in the Free State study. Similar findings from the Australian Forensic Institute showed that 65.1% used alcohol, 55.2% used cannabis and 32.3% had used amphetamines in the year prior to the study[54]. In Britain, 85% of mentally disordered patients that were admitted to a high security hospital admitted using cannabis[55]. Cannabis use is found to be relatively low at 22.1% in Finland[56], yet it remained the most frequently used drug among those who had a major mental illness, and who had also committed violent crimes. Regular alcohol use was reported by D'Silva from the British Special Hospitals Study in 2003, where they found 22.5% of inmates using alcohol only and 8.3% using both alcohol and drugs. In contrast, a similar study in Saudi

Arabia, a country that restricts access to alcohol and other drugs, found alcohol use at 9%, cannabis at 4% and khat at 4%[57]. A forensic service from Malawi also reported that 23% of patients used illicit substances and from these, 89.3% were using cannabis[58].

Use of other illicit substances in this study was at prevalence proportion of 9.5%. None of the patients reported using amphetamines. Amphetamine use is 14.7% among forensic psychiatric patients as reported by Kivimies[56] from Finland, and 23% among regular drug users among inmates in Britain's special hospitals. However, 13% of acute psychiatric patients from Stickland, in the Western Cape of South Africa, self- reported amphetamine/methamphetamine as their preferred drug of abuse[59].

None of the studies cited so far reported on the use of flunitrazepam. The abuse of this drug has been reported to be high among criminals and may increase aggression in vulnerable males. Dåderman *et al* suggested that the intake of flunitrazepam may have a link with antisocial behaviour[60]. Substance use remains a reality among forensic psychiatric patients and is found to occur at rates higher than in the general population and among non-forensic patients. The pattern of alcohol, cannabis and other substance use is suggestive of availability and market forces in different geographical areas, leading to exposure and abuse[55].

## 5.2 Psychiatric diagnoses of forensic inpatients

The main Axis I diagnoses among the patients in this study were schizophrenia (49.1%) and psychosis secondary to GMC. There was no case of major depressive disorder. Findings from the Free State Forensic Psychiatric Unit showed schizophrenia accounting for 55.5% of cases and bipolar mood disorder, 9.2%. Details from a Saudi Arabian study had schizophrenia accounting for 78.5% of cases[53, 57].

A study among adolescents admitted to a secure forensic psychiatric hospital in the south of England revealed that depression was uncommon at 7%. A large majority had psychotic disorders or presentations characterised by emotional instability[59]. A study from the Institute of Forensic Mental Health in Melbourne, Australia reported that schizophrenia accounted for 74.6%; drug induced psychosis 1.75%; depression with psychotic features 2.18%; depression 3.06%; ASPD 1.75%, and bipolar affective disorder 1.75% of cases[54]. The Dutch TBS Forensic Service survey in 1990 found 27% of patients with psychotic illness; 30% with dissociative personality disorder; 2% with neuroses and 27% with other personality disorders[62]. A study conducted at 4 sites[66] located in Canada, Finland, Germany and Sweden focused on a target population of people who had committed a criminal offence and were diagnosed with a major mental disorder. Of these, 78% were found to be males diagnosed with schizophrenia, schizoaffective disorder or schizophreniform disorder. A recent study in Canada[64], among male forensic patients convicted of child sexual crimes, showed that schizophrenia was 43.2%; paraphilia 38.6% and depression 4.5%. In 2010, the Swedish National Forensic Psychiatric Register reported 60% of patients as being diagnosed with schizophrenia[66].

Schizophrenia has been a subject of many studies and more often relates the criminal behaviour to aggression and violence than other mental disorders. The study confirms existing evidence linking criminal activity and mental health disorders. A number of researchers cited by Dafern *et al* relate it to symptomatology and essentially aggression[54]. People with major mental health disorders commit crime, and schizophrenia remains a condition of high risk.

Violence has been identified in a number of studies to be a mental health clinical condition highly associated with crime. Moulden *et al* cited Craissati & Hodes in explaining the phenomenon where psychosis may be motivating sexual violence, including command hallucinations, persecutory delusions, sexual delusions and sexual disinhibition [54,65].

We found 13% (18 cases) of epileptic disorder in the study patients, which is much higher than the 2.2% found by Kim *et al*[67] in a study of 761 patients admitted to the National forensic Hospital in the Republic of Korea. Our study did not assess the occurrence of crime relative to the occurrence of a fit in our study. However, the Kim *et al* study suggested that crimes were often committed during the ictericta l period. However, in their conclusion, the authors admitted that in addition to epilepsy, other factors may also come into play for violent crimes to occur [67]. Substance induced psychosis was low at 2.9% and comparable to findings from the Free State Forensic Unit at 3.4%, unlike the study from Stickland Hospital in the Western Cape, where Welch & Pienaar found substance induced psychiatric psychosis at 8% because of the differences in the study population[59].

## 5.3 Crimes committed by forensic inpatients

There are many types of crime and a variety of classifications systems exist for categorising crimes. The most common categories used by the South African Police Service, Statistics South Africa and other agencies interested in security and crime are:

- Contact crimes-crimes against a person
- Contact related crimes
- Property related crimes
- Crimes heavily dependent on police action for detection

- Other crimes [52,69].

Crimes identified in this study falling under the classification of 'violent crime' are murder/attempted murder and theft. The 'social fabric crimes' identified in this study are rape, common assault and assault-GBH.

Violent, social fabric and contact related crimes may increase the likelihood of the transmission of HIV. Blood and other body fluids contain the infectious and transmissible pathogen HIV as a source. Rape or other injuries with an open breach of the integrity of the bodies protective layers may facilitate the transmission of HIV from a source to a susceptible individual.

Crimes reported in this study fall mainly under violent and social fabric crimes. This should be considered within the backdrop of a society notorious for violent crimes. There were 85,401 – 77,691 contact crimes in South Africa in the period under study (2011) with a contact crime ratio of 81,285 per 100,000 in 2007/2008 and 1,152 per 100,000 in 2010/2011. Notable among crimes committed the study population is rape, accounting for 45.3%. The number of sexual crimes ranged from 63,818 in 2007/2008 to 70,514 in 2008/2009. The sexual crime ratio in South Africa during the period of this study ranged from 132.4 per 100,000 (2010/2011) to 144.8 per 100,000 in 2008/2009 for South Africa and 174.0 per 100,000 for Gauteng Province.

The murder crime ratio for South Africa during the period of this study ranged from 31.9 per 100,000 (2010/2011) to 38.6 per 100,000 (2006/2007). It peaked at 38.9 per 100,000 in Gauteng in 2007/2008[67,68].

During the period of this study 18,487 murders were committed in 2007, peaking at 15,940 in 2010/ 2011. In Gauteng, murders reported ranged from 3012 in 2010/2011 to 3963 in 2008/2009[64, 65].

The findings were compared with other studies among psychiatric patients. In the Free State study, rape, assault and murder were dominant crimes[53]. In the Malawi study, murder, assault (including sexual assault) and MITP were the main crimes[56]. In the Saudi Arabian study, 4% of the crimes were murders, 8% sexual crimes and 31% violent crimes[57].

Rape, murder and assault-GBH are crimes that reflect a high degree of wrong decision making, loss of self-control and disinhibition. Hence, the occurrence of these crimes in forensic patients could be the manifestation of the symptomatology of the pathology. Crime was also statistically significantly associated with substance use and gender. In an era that continues to protect women and their rights, with mechanisms in place for reporting and administering justice, cases of rape are more likely to be reported to the authorities and not condoned, regardless of the mental status of the patients. Murder is a capital offence that cannot be ignored. It is therefore not surprising that they account for the majority of criminal cases among forensic patients. These should be seen against a backdrop of increasing human rights awareness and enforcement in South Africa.

However, Akhiwu *et al*[70] noted under-reporting of sexual crimes in their study of sexual assault in Benin City, Nigeria. There are challenges in getting a conviction of rape, so victims are often reluctant to report the cases. Failure to report crimes by care givers may also be an underlying factor in some situations. This was reported in a study that was conducted in England [71] but it may well be generalized to many settings. The study revealed that people

are hesitant to report a case if the suspect is known to have mental impairment. This exposed the underlying frailties and prejudices in our own judgement when reporting an offence. The hypothetical study revealed how healthcare members were reluctant to report to the police, offences committed by people perceived to have intellectual impairment.

The subject of mentally ill sexual offenders has been receiving attention for research, as there is a need for more clarity that could help in the development of expertise and treatment programmes.[72]

Drake and Pathe[72] went further to propose a typology for such studies, that should include:

'(1) those with a pre-existing paraphilia;

(2) those whose deviant sexuality arises in the context of illness and/or its treatment;

(3) those whose deviant sexuality is one manifestation of more generalized antisocial behaviour, and

(4) factors other than the above.'

## 5.4 Seroprevalence of HIV in forensic inpatients

The fact has been established from this study that the HIV prevalence rate in the forensic inpatients at Sterkfontein Hospital is 21.8 %. This is high, relative to findings from other studies of forensic psychiatric units and among general mentally ill populations or hospitals. This is, however, close to the high HIV seroprevalence rate of 23.8% in patients admitted to Harare Central Psychiatric Hospital,[73] and in an acute psychiatric ward in King Edward IV Hospital in KwaZulu Natal Province (South Africa) where HIV prevalence was as high as 29.1%[74].

Prevalence rates below 10% have been observed in some psychiatric populations. The HIV prevalence rate of 5.8% was observed in chronically ill mental patients in 1991 in Maryland USA whereas among the court referred cases, the prevalence was 3.9% [23]. A study in 1990 in New York City found 7.1% prevalence among all psychiatric inpatients[8]. Studies in HIV seroprevalence among psychiatric institutions in Uganda, a country with generalised HIV epidemic, found a prevalence of 11.3% at Butabika Hospital and 18.4% at the Urban Mental Health Institution in Kampala[75]. In the West Indies, a seroprevalence of 23.8% was found among psychiatric inpatients[76].

The HIV prevalence in mental patients is often higher than the prevalence in the general population[8], which is explained by current thoughts about the behavioural factors associated with psychiatric conditions. These conditions predispose them to a higher risk for HIV, such as: poor judgement; hyper sexuality; disinhibition; impulsive behaviour; impaired appreciation of risks, and use of illicit substances [21, 34, 36].

It is not unusual to find higher rates in countries with high prevalence of HIV sero-positivity in the general population. Hence, Chen[21] found zero HIV prevalence in psychiatric patients in Taiwan. This was ascribed to the generally low prevalence and low HIV related risk behaviours in that population.

Similarly in Nitichitawej Hospital (Thailand) in 1988, seroprevalence was 1,85% in mentally ill convicts[77]. In contrast, high levels were found in studies conducted among psychiatric patients in high HIV prevalent countries such as Uganda. Studies from other psychiatric hospitals in South Africa did not reveal such high rates, although they showed an increasing trend in prevalence from 9% in 2000 to 11% in 2010 at Weskoppies Hospital[78,79]. Successive studies conducted in South Africa's general population show a high prevalence of HIV. The

HSRC survey reveals an increase from 10.6% in 2008 to 12.2% in 2012. Other sub-groups in the general population known for such high levels are antenatal attendees. Results of sentinel antenatal seroprevalence survey showed an increase from 29.3% in 2008 to 30.2% in 2010[4]. Corresponding figures for Gauteng Province revealed an increase from 20.9% in 2008 to 30.4% in 2010[6].

Presently there are efforts to combat this trend, such as the establishment of a task team focused on the prevention of HIV infection in pregnant women, mothers and their children, and collaboration with international development partners. Further resources are currently mobilised towards key populations. The findings of this study highlights the need to recognise forensic psychiatric populations as part of the 'vulnerable and at risk' category, which requires intervention and an effective response[4, 5, 6].

The odds of occurrence of HIV were increased among the forensic patients at Sterkfontein hospital with a history of previous crime. This was similar to the findings among prisoners in Sorocaba, Brazil where they found OR for HIV infection for previous incarceration at 1.7 (95% CI 1.07-2.7)[80]. Cross–sectional studies cannot establish causation and one cannot conclude whether previous crime precedes HIV infection or vice versa. However it is likely both conditions may be sharing similar risk factors.

## 5.5 Clinical management of HIV patients

### 5.5.1 HIV testing

In 1989, Arturo Silva *et al* identified that HIV poses severe clinical and legal challenges. In this case study, the issues highlighted included: confidentiality; duty to warn and protect, and clinical reduction of possible dangerous consequences[35].

The findings of 9% of patients not tested for HIV could be attributed to a wide range of factors. In a forensic unit in 1991 in South Carolina (USA), Schwartz *et al* found that differences in testing could be due to admission procedures at different times of arrival of patients for admission [57].

There are other factors such as lack of policy directives, as well as ethical concerns regarding patients' rights and informed consent from individuals who are unable to do so. Current laws permits the testing if granted by the medical manager, provided it is in the interest of medical care for the patient, but this approach is not often used.

In cases of sexual assault, the Sexual Offences Amendment Act provides for a magistrate to compel the accused to disclose his HIV status. Naidoo & Govender[81] deem this law to be a violation of the perpetrator's human rights. The right for informed consent for HIV testing is the current norm. Joska *et al*[82] raised this issue in 2008 and made very useful suggestions, calling for a revision of policy guidelines in the current management of HIV, in light of the high prevalence rate in South Africa. Meel[10] also cited instances of delayed initiation of ART treatment for psychiatric patients. The findings of our study further validate the plea by Singh *et al* for provider-initiated HIV testing of high risk and vulnerable populations[74]. Presently most physicians appear to be cautious if not hesitant to test for HIV. Jonsson and Joska *et al*[82] found only 2 out of 13 psychiatrists in the Western Cape testing routinely for HIV. Van Rensburg and Bracken[83] also reported on a very low HIV testing rate in an acute care setting. Given the new developments such as the quest to reduce the incidence of HIV, new guidelines on HIV management and the availability of effective treatment for HIV, there is a clarion call for a review of policies to facilitate universal access to testing for all, especially forensic psychiatric patients[83,85]. HIV will remain a significant chronic health and social condition,

although there is likelihood that it may be overshadowed by other emergent and fatal public health challenges such as Ebola. It is imperative that action is taken now to establish and lay foundations for the sound management of this condition, by addressing policy barriers to effective management and prevention in the forensic psychiatry setting [59, 60, 78, 82, 83, 84, 85].

### 5.5.2 Other Diagnostic tests

In our study, the IHDS was assessed in 16.7% (23/137) of the study subjects and this constituted 85% of the HIV seropositive patients. This is a reflection of the absence of enforced standardised protocols. In sub-Saharan Africa, Ogurin[50] *et al* found the IHDS to be useful as a sensitive screening tool in Nigerian patients with HIV/AIDS, but insensitive to impairment in asymptomatic HIV positive patients. In the absence of revised policy guidelines, there is no standardised way of assessing best practice and hence promoting organisational learning.

This suggestion is further buttressed by the fact that MMSE scores were obtained for only 27.7% (38/137) patients in our study and 51.9% (14/27) of seropositive patients. Once again it reflects lack of uniformity in the management of the inpatients. It was found that 55.3% (21/38) of our patients tested had MMSE scores beyond 24, which suggests minimal cognitive impairment. In comparison, findings from a study of dementia patients in the Republic of Korea's National Forensic Hospital showed 7 dementia patients with a range of MMSE scores between 16-24[64] signifying a more advanced stage of dementia.

## 5.6 Limitations of the study

This study was limited to variables available in the patient's file, which is a record of a patient's clinical history captured by the clinician on admission. Hence, all data on lifestyle are self-reported and subject to measurement error from the source. Any error in the capture of data from the clinical records to the database, could potentially affect the results of the study. However, efforts were made in this study to minimise the risk and ensure good quality data for the analysis.

WHO recommends classification of violent crimes on the basis of victim–perpetrator relationship and the degree of organised intent, for example: intimate violence; acquaintance or stranger violence; organised violence and self-directed violence. This information was not available on the charge sheet; however, it was not relevant to the purpose of this study.

Misclassification errors may also occur. For example, assault-GBH could involve the use of a firearm by the perpetrator. However, police charge all non-fatal attacks involving use of a firearm as attempted murder.

The study did not seek to find out whether the patients were under the influence of any substance of abuse at the time the offence was committed. Although it serves as useful information, it was not planned as part of this study, hence it is not part of the approved study protocol.

The study generated information that was uniquely applicable to the Sterkfontein Forensic Psychiatric Unit. By design, it cannot be generalised to other settings. Nonetheless, given the parallel findings with Free State Forensic Unit, and the rigor with which this study was conducted, one can use relevant findings to inform policy and planning.

# CHAPTER 6: CONCLUSION

This study produces clear evidence for describing the current status of HIV seroprevalence among

forensic inpatients admitted to Sterkfontein Hospital from 2008 to 2011. It further describes the socio-demographic, clinical and criminal characteristics of these patients.

The major finding in this study was the high prevalence rate of HIV among forensic psychiatric inpatients. Previous history of crime was statistically associated with HIV status. No clinical or socio-demographic characteristic was statistically identified as a significant predictor of HIV seropositivity.

## 6.1 Socio-demographic characteristics of forensic inpatients

The majority of forensic patients in this study were males, single, with over 75% aged less than 47 years. They are more likely to be unemployed and do not receive any social grants from the government. Alcohol and cannabis is used by more than 50% of them and a number of others are likely to be using illicit substances that include cocaine and mandrax.

## 6.2 Clinical diagnoses of forensic inpatients

A wide range of conditions were diagnosed among the patients. Schizophrenia and psychosis, ASPD and MR are the primary Axis I and II diagnoses, accounting for the majority of admissions. The underlying Axis III diagnoses were HIV, head injury and epilepsy.

A GAF score of 21-30 was observed in 39.2% of 102 patients, and 31-40 recorded for another 39.2% of patients on admission. MMSE scores on admission, of those with good educational background was suggestive of severe cognitive impairment in only 2 patients out of the 22 that were reported on. The IHDS median score was 8, with 19(69.5%) requiring further assessment due to scores below 12.

## 6.3 Criminal offences of forensic inpatients

Rape, murder and assault-GBH emerged as the most frequent crimes committed. Crime was statistically significantly associated with substance use and males. Rape was associated with inpatients with no formal education and informal residence, murder with substance use, MITP with cannabis use and marital status, and assault-GBH with formal residential areas. These crimes are all contact crimes or crimes committed directly against another human being.

## 6.4 HIV seroprevalence of forensic inpatients

Information of the HIV sero-status was not available for 9% of the patients in this study. This situation is possible but unlikely to be due to patients who refused to give consent for HIV testing. Otherwise the clinician would have recorded that HIV counselling was done. Whatever the reason may be, the finding reveals a weakness in the system for the overall management of these patients within existing frameworks and guidelines.

The seroprevalence of 21.8% is high, and was found to be extremely high among those diagnosed with ASPD, bipolar mood disorder, mood/psychosis GMC, psychosis NOS, borderline personality disorder and MR. MMSE scores of 38 patients ranged between10-24. Patients with a record of previous crime had greater odds of being HIV positive. There was no

statistically significant association between HIV seroprevalence and any of the socio-demographic, clinical or criminal attributes studied.

It is unfortunate that 67% (N=27) of the patients with HIV positive status were not on HAART, but the reasons were not within the scope of this study. The treatment of HIV has evolved rapidly with new guidelines on its management, new CD4 thresholds and early eligibility of ART, with increasing recognition of the role of treatment as a preventive measure. This calls for further attention.

## 6.5 Missed opportunities

The study also reveals gaps in the delivery of care for forensic patients that may be systemic in nature, thus calling for responses at policy level. Notable among them are failure to test all the patients and gaps in coverage for HAART treatment. This opens the door for discussions and policy review, with regard to the:

- early identification of cases;
- early management with HAART, and
- minimising of the risk of infection to others.

# CHAPTER 7: RECOMMENDATIONS

The recommendations made consist of short term and long term interventions to address the issues arising out of the major findings, which will be of interest to the following stakeholders:

1. Management of Sterkfontein Hospital
2. Provincial Department of Health
3. South African National Aids Council (SANAC)
4. Gauteng Multi-sectoral AIDS Unit (MSAU)
5. Multi-disciplinary teams of mental health care workers
6. HIV advocacy groups

The researcher will make every effort to disseminate these findings.

**SHORT TERM RECOMMENDATIONS:**

1) The multi-disciplinary clinical management team must endeavour to introduce an educational programme on HIV, its transmission and prevention to all users of the mental health facility. This knowledge will be useful should they be exposed to blood or other body fluids, a risky lifestyle or when they get a leave of absence from the hospital.

2) Clinicians at the facility should promote access to comprehensive care and management of PLHIV by reviewing their patients and determining their eligibility for ART in terms of the new treatment guidelines of the National Department of Health, to be implemented from January 2015.

3) Early diagnosis is critical in the successful management of HIV in patients. Until new policy guidelines are developed regarding testing, clinicians should relentlessly make every

effort with patients who are competent to give consent to be counselled. They should be encouraged to know their HIV status, in line with the national strategy of voluntary testing for HIV.

4) Given the evidence from this study, the Medical manager should authorise HIV testing of all forensic psychiatric patients with a previous history of crime, in the absence of informed consent, to be tested for HIV. This suggestion may sound unethical in light of the rights of individual for autonomy but this have been weighed against the rights of victims of crime and it is legally within the mandate of a Medical manager in terms of the Sexual offences amendment Act.

5) All health care workers must continue to familiarise themselves with and adhere to the standard precautions at all times to prevent HIV and other blood borne pathogens, guided by the knowledge that there are no predictors of individuals living with HIV.

**LONG TERM RECOMMENDATIONS:**

1) SANAC should recognise forensic psychiatric patients as a key population that should be given attention and resources, deemed necessary in the light of current control efforts.

2) Clear policy guidelines should be developed at national level to guide practitioners on the standard of care when testing mental health patients in forensic psychiatric units. This will then inform the clinical management protocols of such patients. Given the issues of ethics and legality, and current progress being made in providing access to comprehensive care and treatment for PLHIV, there is a need to revise current policies

and practice. However, the process should be initiated by the professional societies, and consensus reached through a consultative process with all stakeholders. It is imperative to strike a fine balance between human rights, exclusion from access to effective treatment, and prevention of transmission in an environment free of stigma and discrimination.

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# ANNEXURES

## Annexure A: Data Collection Form

| **Date of admission** | Day | Month | Year |
|---|---|---|---|

| **Date** | | **Data captured by** | |
|---|---|---|---|
| **Abstraction done by** | | **Date** | |

A: Demographic

| | **Characteristic** | **Value** | | | | | | | | | | **Comments** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Unique number | | | | | | | | | | | |
| 2 | Date of birth | Day | | Month | | year | | **AGE** | | | | |
| 3 | Sex | Male | | | | Female | | | | | | |
| 4 | Marital status | Single | | Married | | Divorce | | Widow | | Separation | Cohabitation | |
| 5 | Educational status | None | | Primary | | High school | | College | | Degree | | |

B: Social

| | **Characteristic** | **Value** | | | | | **Comments** |
|---|---|---|---|---|---|---|---|
| 6 | Residence | Name | | Formal | | Informal | |
| 7 | Religion | | | | | | |
| 8 | Occupation | | | | | | |
| 9 | Employment | Yes | | No | | | |
| 10 | Disability grant | Yes | | No | | | |

C: Habits

| | **Characteristic** | **Value** | | **Comments** |
|---|---|---|---|---|
| 11 | Alcohol | Yes | No | |
| 12 | Cannabis | Yes | No | |
| 13 | Other substances | Yes | No | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 14 | Other drugs: Name- | Yes | | No | | |
| | Name- | Yes | | No | | |

D: Charge

| | Characteristic | | | | | Comments |
|---|---|---|---|---|---|---|
| 15 | Name of crime/charge | | | | | |
| 16 | Previous criminal record | Yes | | No | | |

E: HIV status

| | Characteristic | Value | | | | | | | Comments | |
|---|---|---|---|---|---|---|---|---|---|---|
| 17 | HIV serostatus on admission | R | | NR | | Indeterminate | | | Unknown | |
| 18 | Date of diagnosis of HIV above | month | | year | | | | | | |
| 19 | HIV serostatus 2012 | R | | NR | | Indeterminate | | | Unknown | |
| 20 | Date of repeat testing | month | | year | | | | | | |
| 21 | ARV treatment status | Yes | | No | | | | | | |

F: Clinical

| | Characteristic | Value | | | | Comments |
|---|---|---|---|---|---|---|
| 22 | Axis I | | | | | |
| 23 | Axis II | | | | | |
| 24 | Axis III | | | | | |
| 25 | Axis IV | | | | | |
| 26 | Axis V | | | | | |
| 27 | MOCA score | | | | | |
| 28 | MMSE score | | | | | |
| 29 | International HIV Dementia Scale (IHDS) | | | | | |
| 30 | Previous history of mental illness | Yes | | No | | |
| 31 | If yes, previous history of compliance to treatment | Yes | | No | | |

## Annexure B: Informed Consent Form

**STUDY: HIV Prevalence and Socio-demographic Characteristics of Patients in a Forensic Unit at Sterkfontein Psychiatric Hospital - South Africa**

**Informed Consent form for State patients in Sterkfontein Forensic Unit eligible for inclusion**

**Name of Researcher: MG Beke**
**Name of Supervisor : Dr DCJ Hoffman**

**This Informed Consent Form has two parts:**

- **Information Sheet to share information about the research with you**
- **Certificate of Consent for signatures if you agree to take part**

**You will be given a copy of the full Informed Consent Form**

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**PART I: Information Sheet**

**Introduction**

I am Dr M Beke, a registrar in psychiatry and currently working at Sterkfontein Hospital. We are undertaking research on HIV, which is very common in this country. I am going to give you information and request you to be part of this research. You do not have to decide today whether or not you will participate in the research. Before you decide, you can talk to anyone you feel comfortable with about the research.

There may be some words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask them from me, the study doctor or the nurses and doctors caring for you.

**Purpose of the research**

HIV is a major problem in South Africa and has infected a number of people. Patients in hospitals - including psychiatric hospitals - may be affected with HIV. We can offer the best plans to manage the problem if we the providers understand the extent of the problem. Hence the study that I want to undertake is to find out to what extent is HIV a problem among patients in the forensic ward at Sterkfontein Hospital.

**Type of Research Intervention**

The study therefore needs me to go through your patient file and record some important information about you.

**Participant selection**

We are studying all State patients that were admitted from 01 January 2007 to 31 December 2011.

**Voluntary Participation**

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive at this hospital will continue and nothing will change. If you choose to participate in this research project, you will be offered the same treatment and care that is routinely offered in this hospital for your condition, and we will tell you more about it later. You may change your mind later and stop participating even if you agreed earlier.

**Risks**

There will be no harm to you if I read your file and copy information from it. Your name will not be recorded and no one apart from me will know that the information is about you.

**Benefits**

If you participate in this research, there will be no direct benefit to you at this stage. However, there is potential benefit to all state patients admitted in this hospital in terms of improvement of care.

**Confidentiality**

The information that we collect from this research project will be kept confidential. Information about you that will be collected during the research will be put away and no-one but me the researcher will be able to see it. Any information about you will have a number on it instead of your name. I am the only one who will know what your number is and I will lock that information up with a lock and key. It will not be shared with or given to anyone.

**Right to Refuse or Withdraw**

You do not have to take part in this research if you do not wish to do so. You may also stop me from using your information in the research at any time you choose. It is your choice and all of your rights will still be respected.

**Who to Contact**

If you have any questions you may ask them now or later, even after the study has started. If you wish to ask questions later, you may contact me through the sister in charge of your ward.

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# HIV Prevalence and Socio-demographic Characteristics of Patients in a Forensic Unit at Sterkfontein Psychiatric Hospital-South Africa

## Certificate of Consent

**I ……..**

**I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.**

**Name of Patient_____**

**Signature of Patient_____**

**Date _____**

**Day/month/year**

**If illiterate**

A literate witness must sign (if possible, this person should be selected by the participant and should have no connection to the research team). Participants who are illiterate should include their thumb-print as well.

**I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.**

**Print name of witness_____ AND Thumb print of participant**

**Signature of witness _____**

**Date _____**

**Day/month/year**

**Statement by the researcher/person taking consent**

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1. That his/her records will be extracted from his/her patient file

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

**A copy of this consent form has been provided to the patient.**

**Name of researcher/person taking the consent: M.G. Beke**

**Signature of researcher /person taking the consent_____**

**Date _____**

**Day/month/year**

## Annexure C: Certificate of Ethical Clearance

M130632

R14/49 Dr Masase G Beke

**HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)**

**CLEARANCE CERTIFICATE NO. M130632**

| | |
|---|---|
| **NAME: (Principal Investigator)** | Dr Masase G Beke |
| **DEPARTMENT:** | Neurosciences/ Psychiatry<br>Sterkfontein Hospital |
| **PROJECT TITLE:** | HIV Prevalence and Socio-demographic Characteristics of Patients in a Forensic Unit at Sterkfontein Psychiatric Hospital - South Africa |
| **DATE CONSIDERED:** | 28/06/2013 |
| **DECISION:** | Approved unconditionlly |
| **CONDITIONS:** | |
| **SUPERVISOR:** | Dr DCJ Hoffman |
| **APPROVED BY:** | Professor PE Cleaton-Jones, Chairperson, HREC (Medical) |

**DATE OF APPROVAL:** 23/07/2013

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

**DECLARATION OF INVESTIGATORS**

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

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

Principal Investigator Signature _____ Date _____

**PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES**

## Annexure D: Permission from Sterkfontein Hospital

# PERMISSION TO CONDUCT RESEARCH AT STERKFONTEIN HOSPITAL

| | |
|---|---|
| **PRINCIPAL RESEARCHER** | |
| FULL NAME | Masase Beke |
| DESIGNATION | Registrar |
| CONTACT NUMBER | 082 551 5572 |
| E-MAIL ADDRESS | Mgbeke@gmail.com |
| **DEPARTMENT** | Psychiatry |
| **HEAD/S OF DEPARTMENT/S** | Prof U Subramaney |

**TITLE OF RESEARCH**

HIV Prevalence and Socio-demographic Characteristics of Patients in a Forensic Unit at Sterkfontein Psychiatric Hospital-South Africa

**OBJECTIVES OF RESEARCH**

(1)To describe the socio demographic characteristic of the forensic in patients

(2)To describe the psychiatric disorders in the forensic in-patients.

(3)To describe the types of crime necessitating referral to the forensic hospital

(4)To ascertain HIV sero-prevalence in forensic in patients.

**STUDY SITE/S** Forensic Unit

**BRIEF OUTLINE OF METHODOLOGY**

Cross sectional descriptive design

Period sampling will be done to select all "state patients" admitted from 01 January 2007 – 31 December 2011. All patients admitted will be eligible for inclusion in the study

Data will be abstracted from the clinical patient record. Analysis will be done using Stata version 12

| | | | |
|---|---|---|---|
| **EXPECTED START DATE** | | **EXPECTED DURATION** | |
| **ETHICS CLEARANCE** | YES | NO | PENDING X |
| **CONFLICTS OF INTEREST** | YES | NO X | DETAILS: |
| **COSTS TO HOSPITAL AND/OR OTHERS** | YES | NO X | |

**SOURCE OF FUNDING** Self

**SIGNATURE OF RESEARCHER & DATE** 4 September, 2012

| | | |
|---|---|---|
| **PERMISSION GRANTED** | YES | NO |

HOSPITAAL
STERKFONTEIN
2012 -10- 09
PRIVATE BAG/PRIVAATSAK X2010
KRUGERSDORP 1740
HOSPITAL

| | | |
|---|---|---|
| **SIGNATURE (CLINICAL HEAD)** | **NAME IN PRINT & DESIGNATION** | **OFFICIAL STAMP & DATE** |

Acting Clinical Head