

# Psychiatric symptoms and disorders in HIV infected mine workers in South Africa

## *A retrospective descriptive study of acute first admissions*

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### ABSTRACT

**Objective:** The social and living conditions of mine workers in South Africa contribute to a rapid transmission of human immunodeficiency virus (HIV) and other sexually transmitted infections. HIV-associated dementia is a serious condition during HIV disease. Several other psychiatric symptoms and disorders, such as psychosis, secondary mania and depression, have also been associated with clinical HIV infection. We describe the onset of psychiatric symptoms and signs in a group of untreated, HIV-infected male mine workers first admitted for psychiatric treatment at the Rand Mutual Hospital in Johannesburg. **Method:** Between 1987 and 1997, 38 consecutive cases were admitted, and their files were retrieved for study in 2006. The subjects were 38 black male mine workers admitted acutely for psychiatric care due to psychiatric symptoms, and subsequently diagnosed with HIV infection. The presenting psychiatric symptoms on admission and diagnoses at discharge were compiled for all patients, not to infer causality but to establish the range of symptoms that the clinician has to deal with. **Results:** The 38 patients presented with a wide range of psychiatric symptoms. The dominating symptoms were those of cognitive deficits, and different psychotic manifestations. 12 of the patients, almost one third of the individuals, were diagnosed with dementia. The patients with dementia exhibited cognitive deficits, and in addition often abnormal behaviour and psychotic symptoms, and several also had symptoms of secondary mania. 5 of the patients presented with delirium. Psychosis, without concurrent dementia, was diagnosed in 5 patients. Bipolar disorder with mania, without concurrent dementia, and major depression was present in 2 patients, respectively. Screening for substance abuse showed that 9 of the patients had ongoing cannabis abuse and 10 had alcohol abuse. Cannabis-induced psychotic disorder was present in 5 patients. **Conclusion:** The findings confirm that patients with a new diagnosis of HIV may present with disorders of thought and/or cognition as well as gross behavioural disturbance, and that psychotic symptoms and secondary mania could be manifestations of the clinical onset of HIV/acquired immune deficiency syndrome (AIDS) infection.

**Key words:** AIDS; Dementia; Delirium; Psychosis; Secondary mania

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### Introduction

Infection with HIV constitutes a major health crisis in many developing countries. Sub-Saharan Africa remains by far the most affected region in the world. Of the estimated 39 million

people infected with HIV worldwide in 2005, sub-Saharan Africa accommodated 25 million or 64%, albeit only 10% of the world's total population.<sup>1</sup> During the same year, Africa accounted for 2.7 million new HIV infections and 2 million deaths due to HIV, and the HIV prevalence in adults in some countries in sub-Saharan Africa was as high as 34%.<sup>1</sup> However, in some areas the trends in HIV infection are peaking and declining. Long-distance truck drivers, commercial sex workers, migrant workers, miners, armed forces and blood transfusion recipients are still the main sources of transmission.<sup>1</sup>

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South Africa has a system of migrant labour that includes the mining industry. The migration of people through southern Africa has contributed to the rapid transmission of HIV infection. This labour system creates a concentration of young men in the mining districts removed from their wives or families for long periods of time. In the 1980s, young men travelled from southern Africa to be lodged in hostels holding thousands of mine workers. Villages of sex workers provided the miners with casual sex. At one point, HIV testing showed that all of these sex workers were infected (Dr. Lennart Eriksson, pers. comm.). After months or years on the mines, during seasonal holidays, or at the end of their contract, the workers returned home to their families in the rural areas, many of them unsuspectingly HIV infected.

Migrant workers, most likely from Malawi, brought HIV to the mines in South Africa. In 1986, 130 Malawian workers on the Rand Gold Mines were reported as the first cases of heterosexually transmitted HIV infection in South Africa.<sup>2</sup> While there were 650 000 mine workers in South Africa in 1990, the number is currently 250 000 (in 2006). One of the principal employers is the Anglo American Corporation presently employing 130 000 in South Africa alone.

The mining industry set up hospitals such as the Rand Mutual Hospital in Johannesburg.

The chief psychiatrist at the Rand Mutual Hospital from 1984 to the closure of the hospital in 1997 was Dr. Lennart Eriksson. In 1987 he encouraged the hospital laboratory to perform the first HIV testing of a Malawi-born mine worker admitted with a neuropsychiatric syndrome characterized by the rapid emergence of cognitive impairment. The patient also presented with a fine tremor and lymphadenopathy. A lumbar puncture confirmed central nervous system (CNS) involvement indicating HIV infection. This case was pivotal in the decision to stop the migration of mine workers from Malawi.

Currently the Anglo American Corporation has a high voluntary HIV testing rate, and an estimated prevalence of 28 000 (23%) for HIV infection within the work force (Dr. Brian Brink, pers. comm., November 2006). During 2002-2006, 4000 employees entered combined antiretroviral and a tuberculosis prophylaxis (antiretroviral therapy, ART + Isoniazid, INH) treatment costing 1000 South African Rand (ZAR) per month per patient, enabling most of them to live a normal life (ibid).

Patients with HIV infection are at an increased risk of psychiatric illness. Both major depressive disorder and subsyndromal depressive symptomatology, as well as anxiety disorder and substance abuse are more prevalent among HIV infected individuals than among the general population.<sup>3</sup> Secondary mania and psychosis might be the first clinical symptom of HIV/AIDS<sup>4</sup>, and HIV-associated dementia is a serious condition during the AIDS stage of HIV disease.<sup>5-8</sup>

The purpose of this study was to describe the psychiatric symptoms and diagnoses of male mine workers, who were admitted acutely for psychiatric assessment and treatment by a psychiatrist at a specific psychiatric ward between 1987 and 1997, and additionally diagnosed with HIV infection. The study did not attempt to prove causality with the HIV infection, but to describe all of the psychiatric symptoms that the clinician needed to deal with at the time of admission of an HIV infected untreated patient.

## Method

The patients in the study group were all male mine workers who were admitted for psychiatric care at the Rand Mutual Hospital between 1987 and 1997. The patients were admitted, treated and discharged by the same attending psychiatrist at the time. The patient files were written by him and retrieved in 2006 at the Clinix Selby Park Hospital, which is currently storing the files after the Rand Mutual Hospital ceased to be an inpatient facility for the mines in the Johannesburg area in 1999. With the kind permission of the Rand Mutual Assurance Company (Dr Arthur Begley, Medical Director, and the hospital administrator Ms Helena Baard), the file archive was made available to us for this study. The study was approved by the Research Ethics Committee of the University of Cape Town.

Altogether 38 consecutive patient files were retrieved of male patients who on discharge were diagnosed with HIV infection. Accompanying this diagnosis were a range of psychiatric diagnoses. The presenting psychiatric symptoms on admission and diagnoses at discharge were compiled for all patients.

The age range of the patients at admission was 21-54 years (mean 32.4). They all originated from different regions of southern Africa, reflected in their languages: Zulu, Xhosa, Shangaan, Afrikaans, Tswana, Sotho, etc. All were poorly educated, ranging from no formal education at all, to a standard schooling between 1 and 10 years. They were all black and heterosexual.

The diagnostic assessments during admission included detailed medical and psychiatric histories, mental status, physical and neurological examinations, standard and additional laboratory evaluations (including computed tomography (CT) brain scans for some patients), consultation with other medical specialists when needed, and neuropsychological testing including Folstein's Mini-Mental State Examination.

The patient files were selected on the sole criterion that the patient had an existing HIV infection concurrent with the psychiatric diagnosis. To make this selection, the patient files were consecutively located in the archive, and the attached patient discharge summaries were studied. Whenever the diagnosis of HIV was registered, the file was retrieved for inclusion in the study. As for the diagnosis of HIV, the tests used were mainly a rapid antibody test commonly complemented with the Eliza and Western Blot tests. The original files provided very few other clinical measures, such as cluster of differentiation 4 (CD4) cell count and CD4/CD8 ratio (performed in 10 patients), protein levels in the cerebrospinal fluid (which indicate the level of immunological suppression; performed in 2 patients), or a note of when the actual diagnosis of HIV infection was first made. The clinical staging of HIV/AIDS in the present study follows the WHO criteria.<sup>9</sup>

The treating psychiatrist made all the diagnoses according to the Diagnostic and Statistical Manual of Mental Disorders, 3rd Edition (DSM-III; 1980)<sup>10</sup> and later on by the 4th Edition (DSM-IV; 1994).<sup>11</sup> The psychiatric symptoms originally described in the patient files have been interpreted to fit the vernacular used in the DSM-IV, and are presented in Table I. For example, commonly occurring symptoms were disorientation, impaired insight

and judgement, and memory deficit or other cognitive deficits, which were interpreted and listed in the table as confusion/cognitive deficit. Various symptoms were included in the commonly applied term of thought disorder, for example delusions, hallucinations and disordered speech. The symptoms in question were usually specified in the patient files. In cases where the symptoms were not explicitly described, an interpretation of the total context during the ward period was made, in accordance with the DSM-IV.

Several psychiatric diagnoses presented in the patient files have been converted in order to fit the vernacular of the DSM-IV and are shown in Table II. For example, the diagnosis of cannabis delusional disorder was renamed cannabis-induced psychotic disorder; organic mental disorder - delirium was renamed delirium; organic mental disorder - dementia was renamed dementia. Different personality disorders were not presented separately in the table, as there were too few of each kind. The diagnosis of living problems refers to the Axis IV diagnosis of psychosocial and environmental problems, as presented in Table II.

Axis III diagnoses were not presented in the table, since the focal point of this study is the psychiatric phenomenology, regardless of etiology. Several somatic and psychiatric conditions can cause confusion and cognitive deficits. The

**Table I: Psychiatric symptoms in 38 patients with HIV on admission**

Psychiatric symptoms	N	%
<i>Psychotic symptoms</i>		
Delusions	22	58
Auditory hallucinations	13	34
Visual hallucinations	5	13
Tactile hallucinations	1	3
Disordered speech/pressured speech	14	37
Grossly disorganized or catatonic behaviour	12	32
Negative symptoms	6	16
<i>Affective symptoms</i>		
Mania	8	21
Hypomania	1	3
Depressive symptoms	5	13
Anxiety	8	21
Aggression/hostility	12	32
Confusion/Cognitive deficit	19	50
Conversion symptoms	2	5
Malingering symptoms	1	3

**Table II: Psychiatric diagnoses at discharge among 38 patients with HIV/AIDS**

Primary psychiatric diagnoses (DSM-IV) at discharge	Days in ward			Prior psychiatric history		Substance abuse				Multiple psychiatric diagnoses	
	n	%	mean	n	%	Alcohol		Cannabis		n	%
						n	%	n	%		
<b>AXIS I</b>											
<i>Schizophrenia and other psychotic disorders</i>											
Schizophreniform disorder	1	3	27	0	0	0	0	0	0	0	0
Cannabis-induced psychotic disorder	5	13	14	0	0	3	60	5	100	5	100
Psychotic disorder not otherwise specified	5	13	14	0	0	0	0	2	40	2	40
<i>Affective disorders</i>											
Major depressive disorder	2	5	14	0	0	0	0	0	0	1	50
Bipolar disorder, manic episode	2	5	15	1	50	0	0	0	0	0	0
<i>Anxiety disorders</i>											
Generalised anxiety disorder (GAD)	1	3	7	0	0	0	0	0	0	1	100
<i>Cognitive disorders</i>											
Delirium	5	13	14	0	0	1	20	0	0	1	20
Dementia, mild to severe	12	32	14	1	8	3	25	1	8	3	25
<i>Substance abuse – see column</i>											
<i>Other</i>											
Conversion disorder	2	5	8	0	0	0	0	0	0	1	50
Adjustment disorder	1	3	13	0	0	0	0	0	0	0	0
Malingering	1	3	10	0	0	0	0	0	0	0	0
<b>AXIS II</b>											
Personality disorder	5	13	10	1	20	3	60	1	20	3	60
<b>AXIS IV</b>											
Psychosocial and environmental problems	2	5	10	0	0	0	0	0	0		

clinical diagnoses of HIV-associated dementia or delirium are based on the exclusion of opportunistic cerebral infections, cerebral tumours, metabolic disturbances, major depression and substance withdrawal or intoxications.<sup>12</sup> However, due to a lack of CT scan and laboratory data (except for HIV test) in most of the patients, the causality with HIV was not definitely proven in these cases, although an association with HIV, or associated opportunistic infection, seems likely.

## Results

Table I lists the psychiatric symptoms on admission and the number of patients presenting them. One half of the patients presented with confusion/cognitive deficit. These patients were usually disorientated, had impaired insight and judgment or presented with memory deficits and other cognitive deficits. A substantial number of the patients also manifested psychotic symptoms. Delusions (mostly persecutory) were the most common psychotic symptom, and were found in 58% of the patients. Auditory hallucinations, disordered speech and grossly disorganized or catatonic behaviour were present in one third of the patients, respectively. Visual hallucinations and negative symptoms were less common (13% and 16% of the patients, respectively). Tactile hallucinations were documented in only one patient.

Affective symptoms were rather common among the patients: 8 patients showed symptoms of mania, one patient showed symptoms of hypomania and five patients showed depressive symptoms.

Aggression or hostile behaviour was documented in one third of the patients. Anxiety symptoms were present in 8 patients. Finally, a few patients were classified as having conversion or malingering symptoms.

Table II lists the psychiatric diagnoses at the time of discharge, and summarizes the data by diagnosis on mean length of stay, prior psychiatric history, substance abuse, and multiple psychiatric diagnoses.

The average length of stay for each subject was 13 days (range 4-28). Most of the patients (84%) had no prior psychiatric history. Six patients had such history: one patient with bipolar disorder and one patient with dementia had one earlier episode of psychosis, respectively; one patient with personality disorder was already diagnosed; and two patients with alcohol abuse and one patient with cannabis abuse were known to have previous episodes of abuse.

Dementia was the most common psychiatric disorder in the study, present in 12 patients (32%). Individuals diagnosed with dementia exhibited mild to severe cognitive deficits according to the neuropsychological testing with MMT. Most of these patients also showed abnormal behaviour (withdrawn, disorganized or agitated; 11 of 12 patients), and psychotic symptoms (10 patients, all of whom had delusions, and rather often also presented with auditory hallucinations, disordered or pressured speech and sometimes visual hallucinations; Table I). Furthermore, 6 of the cases with dementia showed, at least in part during the time at the ward, confusion; 2 patients had obvious neurological deficits; and 4 of the patients showed symptoms of secondary mania. The individuals diagnosed with dementia were not able to return to the mining work, but one was placed to work above ground. In one of the cases, an earlier head trauma might have explained at least part of the

cognitive deficits. Another patient with dementia had advanced alcohol abuse that could, at least in part, explain the cognitive deficits. In the remainder of the patients diagnosed with dementia, an association with HIV disease seems likely.

Five patients were diagnosed with delirium, and exhibited confusion (5 of 5 patients), abnormal behaviour (4 patients, 3 of whom were agitated), psychosis (4 patients) or memory deficits (2 patients). Two of the individuals with delirium had symptoms of secondary mania. In the cases with delirium, the psychiatric symptoms usually improved markedly with anti-psychotic medication during the inpatient period, and 4 of the patients were later able to return to work. In one patient, alcohol abuse might have been the cause of delirium or at least contributed to the symptoms. Another patient had a concurrent pneumonia which might have aggravated the symptoms. In the three remaining cases, an association between the symptoms of delirium and HIV disease seems possible.

Psychotic disorders (without concurrent dementia or delirium) were found in 11 patients (29%). Cannabis-induced psychotic disorder was present in 5 patients, schizophreniform disorder was found in 1 patient, and psychosis not otherwise specified (NOS) was diagnosed in 5 patients. In one of the patients with psychosis NOS there was also a concurrent cannabis abuse. Major depressive disorder, bipolar disorder and conversion disorder were each diagnosed in 2 patients, respectively; generalised anxiety disorder, adjustment disorder and malingering in one patient each. As for the personality disorders, found in 5 patients, they were personality disorder not otherwise specified and paranoid personality disorder.

Substance abuse, predominantly alcohol and cannabis (and nicotine), was common in the studied population, and might have aggravated or caused the psychiatric symptomatology. Screening for these specific substances was undertaken. The standard method was assessing biochemical markers for alcohol (Gamma Glutamyl Transferase, GGT; Mean Corpuscular Volume, MCV) and urinary cannabinoid test for cannabis, respectively. As for the alcohol screening, 89% (n=34) of the patients were tested. In 74% (n=25) of the tested patients, biochemical markers were normal and in 26% (n=9) pathological, suggesting recent alcohol abuse. 89% (n=34) were tested for cannabis and 26% (n=9) of these were found positive. Four patients were using both substances. Five patients were diagnosed with cannabis-induced psychotic disorder (see above).

The patients presenting with at least two (multiple) psychiatric diagnoses were predominantly patients with substance related diagnoses (alcohol or cannabis) and comorbidity with one other psychiatric disorder. A few other examples are as follows: a patient with conversion disorder was also diagnosed with generalized anxiety (GAD); occasional patients with dementia or delirium were also diagnosed with depression (1 patient) or personality disorder (1 patient).

The clinical staging of the HIV/AIDS symptoms among the patients was specified retrospectively according to the WHO classification.<sup>9</sup> Seventeen patients were classified as belonging to clinical stage 1 or 2, whereas 21 patients (55%) were classified as belonging to stage 3 or 4.

The patients were occasionally referred from a medical

ward, and therefore admitted to the psychiatric ward with several concurrent somatic diagnoses. These somatic diagnoses were syphilis (2 patients), AIDS related complex (8), pulmonary tuberculosis (1), pituitary tumour (1), pneumonia (1), anaemia (1), gastritis (1) and uraemia (1). Furthermore, obvious neurological deficits were observed in 2 patients.

In some cases of for example dementia or previous traumatic brain injury, a CT scan of the brain was done, but rather few were performed in relation to the group in total. Hence, potential organic causes for the psychiatric symptoms could not be excluded in several of the cases. 24% (n=9) of the patients were scanned and in 4 of the cases pathological findings of some kind were made. Although the patients with diagnoses of dementia were clinically demented, results from CT scan of the brain examinations were variable. CT scan of the brain was done in 5 cases of dementia, where 3 showed abnormalities congruent with the diagnosis (cerebral atrophy, wide ventricles and sulci). The other 2 were either normal or had findings of other pathology (lesion in pituitary fossa).

As syphilis infection with CNS involvement is a common cause for neuropsychiatric manifestations, screening for syphilis infection is often made within psychiatry.

Accordingly, the patients of this group were subjects of syphilis screening using either Rapid Plasma Reagin (RPR) or Wassermann Reaction (WR) method. Syphilis screening was undertaken for 53% of the patients. Two patients tested positive.

While admitted, all patients were treated with appropriate, essentially antipsychotic medications, respectively: Melleril (thioridazine), Serenace (haloperidol), Modecate (fluphenazine) or Orap (pimozide); in some cases also antidepressants: Surmontil (trimipramine) or Tofranil (imipramine); and/or an anxiolytic medication: Xanax (alprazolam).

Several stressors appeared in the studied group, and were reported by 1 in 4 of the patients. The stressors included financial difficulties, marital conflicts, HIV infection, bad health, alcohol abuse in the family, deceased parents, existential issues, problems at workplace and worries about the future.

As a part of the treatment, most patients were also offered HIV counselling. Despite participation in counselling, 5 of the studied patients expressed a wish to seek additional help from traditional healers at discharge from the hospital, not only for the psychiatric diagnoses but also for the HIV infection. The culturally strongly anchored belief in traditional healing in South Africa is a noteworthy challenge for practitioners treating patients with HIV disease.<sup>13</sup>

## Discussion

The aim of this study was to describe the naturalistic psychiatric symptoms and diagnoses of a group of HIV infected male mine workers not confounded by ART or psychoactive drug treatments.

The dominant psychiatric symptoms among the patients were those of confusion or cognitive deficit, found in half of the patients, and different psychotic and affective manifestations. In accordance with this, around one third of the subjects were diagnosed with dementia (32%). These patients exhibited cognitive deficits, and in addition often abnormal behaviour (withdrawn, disorganized or agitated) and psychotic

symptoms. Also the majority of 5 patients diagnosed with delirium presented with agitation and psychotic symptoms, and several of the cases with dementia or delirium had symptoms of secondary mania. 55% of the patients were classified as WHO clinical HIV stage III or IV. Very few of the patients in the present study had a prior psychiatric history. In most of these subjects, their acute neuropsychiatric manifestations may have been the first symptoms of AIDS, in agreement with a study from Uganda.<sup>4</sup>

It was not possible to determine whether the cause of symptoms in a given patient was a direct biological effect of HIV infection, or a concurrent, unrelated event, or a combination of these.<sup>14</sup> Even though it seems probable that HIV-infection was the cause of dementia and delirium among the majority of patients with these diagnoses, opportunistic infections such as toxoplasmosis, tuberculosis and different viruses, or other causes of the neurocognitive symptoms, had not been screened for and excluded in most of the cases in the present study. Therefore, one cannot assume that HIV was the only CNS infection that may have contributed to the symptoms. DSM-IV stipulates that psychiatric diagnoses such as major depression, bipolar disorder and schizophrenia cannot be assigned if there is evidence that an organic process initiates and maintains the psychiatric symptoms. Psychosis not otherwise specified (NOS), without concurrent dementia, was diagnosed in 5 patients. The psychotic symptoms in at least four of these patients can be interpreted as most likely associated with the HIV infection, although the causality is not certain. For example, a patient with psychosis NOS was later diagnosed with dementia and probable HIV encephalopathy.

Two patients were diagnosed with bipolar disorder with mania; one was already known to be HIV-positive and who formerly had experienced a psychotic episode. Both patients showed uncooperative and disruptive behaviour, pressure of speech and had delusions and auditory hallucinations. They improved dramatically on antipsychotics. According to file notes, they did not suffer from obvious cognitive deficits. It seems likely that the mania in these cases was secondary to HIV disease. In addition, several of the patients diagnosed with dementia and delirium showed such symptoms of secondary mania. It is possible that secondary mania and psychosis are overlapping clinical manifestations of HIV disease and that they are AIDS-defining symptoms, i.e. symptoms of HIV encephalopathy. Yet, other opportunistic infections may have been involved in the present study. In a study of 64 HIV-positive patients with secondary mania in Uganda, it was found that the individuals were irritable and had aggressive and disruptive behaviours (98% of the patients), high rates of cognitive impairment (84%), paranoid delusions (92%), visual hallucinations (93%) and auditory hallucinations (67%).<sup>4</sup> The authors suggested that secondary mania may be used as a clinical indicator to initiate highly active antiretroviral therapy (HAART).<sup>4</sup>

Most patients in the present study were diagnosed with HIV during the inpatient period, and only 8 of the patients were known to be HIV-positive on admission. Therefore, most of the patients had not developed psychological reactions to the HIV diagnosis. Posttraumatic stress disorder (PTSD) was not diagnosed in any individual, and adjustment disorder with depressed mood was presented in only one case. Two patients

were diagnosed with major depression; one of them also presented with early dementia. The other patient had a history of suicidal attempt, and had persecutory delusions and auditory hallucinations. He was given a course of electroconvulsive therapy (ECT) with significant benefit, did not present obvious cognitive deficit, and was subsequently monitored in outpatient care.

Substance abuse was common among the patients studied. 10 patients (26%) were diagnosed with alcohol abuse and 9 patients (24%) with cannabis abuse. Four patients had abuse of both drugs. This implies that there might be an association between substance abuse and HIV infection. However, this can also be a result of a selection bias, as substance abuse was common among miners, particularly cannabis and alcohol. Other studies of HIV infected individuals show lifetime rates of substance use disorders as high as 40-50%.<sup>3</sup>

Cannabis is known to increase the risk of psychosis independent of confounding and transient intoxications effects.<sup>15</sup> 5 patients (13%) in the present study were diagnosed with cannabis-induced psychotic disorder. In a few cases, there was co-morbidity between cannabis abuse and psychosis NOS, dementia or personality disorder (Table II), respectively. In these cases, cannabis was not regarded as the primary cause of the psychiatric symptoms.

Antiretroviral treatment was not available during the study period. Hence, although this study has a limited number of subjects, it can shed light on the psychiatric phenomenology that can arise in untreated HIV infected patients. It should be remembered that patients in the present study were selectively admitted for psychiatric evaluation due to their symptoms. Studies from the developed world in the pre-HAART era have shown frequency rates of HIV-associated dementia ranging from 7 to around 30% in patients with advanced disease.<sup>16,17</sup> In a study of 60 patients with AIDS requiring psychiatric hospitalisation in San Francisco, USA<sup>14</sup>, a primary DSM-III-R diagnosis of dementia (moderate to severe) was found in 30% of the patients, many of them with concurrent organic depression (50%), secondary mania (17%), and delusional syndrome (11%). Furthermore, schizophrenia, brief reactive psychosis, mania, major depression, adjustment disorder with depressed mood (22%), and stimulant-related psychosis were reported among the patients without concurrent dementia. In a recent study, HIV-associated dementia was common in HIV-seropositive Ugandan patients attending an AIDS clinic. 31% of the individuals were diagnosed with mild to severe HIV-associated dementia and further 47% of the individuals had minor cognitive-motor disorder.<sup>17</sup> 28% of the subjects had taken or were taking antiretroviral HIV medication.<sup>17</sup>

Since the introduction of HAART in western countries, raw psychiatric manifestations of HIV/AIDS are rarely seen, and HIV infection has been transformed from an almost uniformly fatal condition to a chronic, manageable disease. However, while the incidence and possibly the severity of HIV associated neurocognitive symptoms has decreased during the era of HAART, the overall prevalence has continued to grow due to the increased survival of HIV infected individuals.<sup>6,18</sup>

Yet, untreated symptomatology is still frequently occurring in the South African region, since a minority of HIV infected individuals receive HAART. As the positive effects of HAART in HIV patients are well documented, and as the use and distribution of HAART is steadily increasing, several of the

psychiatric consequences associated with HIV/AIDS described in this study are likely to be ameliorated. This will be a substantial gain for society from ethical, medical and economical perspectives.

The present study has several important limitations. The study is a retrospective chart review without operationalized research variables, with no matched control group, and with too few patients to permit statistical analysis. There were no follow-up data as the patients were repatriated to their homes at discharge. Furthermore, there is potential bias and misinterpretation when reviewing a colleague's patient files and converting symptoms and diagnosis to fit the DSM-IV terminology. The original files provided few other clinical measures than HIV testing, with a CT scan performed in only some of the patients. This is a well known problem in resource-limited settings in the sub-Saharan region.<sup>17</sup> Therefore, it was not possible to make definite conclusions about causality between HIV/AIDS and the psychiatric manifestations, as all potential differential causes for the symptoms had not been excluded, for example opportunistic infections. Finally, the study includes only male subjects.

### Conclusion

One can expect that HIV/AIDS in the near future will increase the burden of psychiatric and neurological illness in southern Africa, which will consume vast clinical resources.<sup>19,20</sup> The clinical implications of the neuropsychiatric manifestations accompanying the HIV/AIDS epidemic are substantial. In a separate review, we summarized the current understanding of the neuropathology of CNS HIV disease and associated psychiatric symptoms.<sup>21</sup> In cases of acute mania, psychosis or cognitive deficit in previously healthy patients, CNS HIV disease should be considered. Based on our current knowledge, antiretroviral treatment should be instituted immediately in cases when such symptoms are suspected to be HIV associated, and other causes have been excluded. Judging from our findings, confounders such as opportunistic infections, concurrent somatic disease and substance use disorders, will remain a problem for the attending physician in resource-limited settings.

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