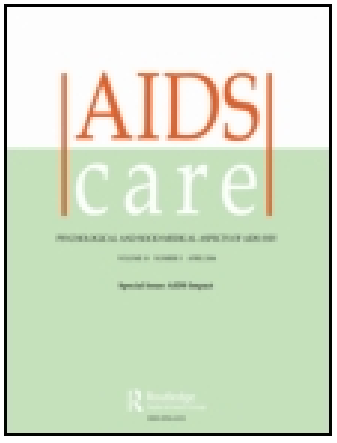

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HIV-1 seroprevalence and risk factors for HIV infection among first-time psychiatric admissions in Uganda

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HIV-1 seroprevalence and risk factors for HIV infection among first-time psychiatric admissions in Uganda

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This study investigated HIV seroprevalence and it's correlates among patients with first-time psychiatric admissions to two national referral hospitals in urban Kampala, Uganda. A structured standardised evaluation was used to assess patients for: Diagnostic and Statistical Manual IV psychiatric diagnosis, socio-demographics, sexual behaviour and HIV status (for those HIV-positive, CDC classification and CD4 cell counts).

The HIV-1 seroprevalence was 18.4% (95% CI, 13.8–23.0%). Factors that were independently associated with HIV-1 seropositivity were female gender and older age (41 + years) and after adjusting for sex and age group, the nature of the current episode (highest among those with first episode of mental illness) and psychiatric diagnoses (highest in the organic affective disorders and delirium, lowest in those with bipolar affective disorder and psychotic syndromes).

These results demonstrate that the prevalence of HIV is high among patients with severe mental illness in Africa and that HIV/AIDS adds to the burden of mental illness in high HIV prevalence countries in sub-Saharan Africa. Both HIV care programmes and psychiatric care clinics should be made aware of the frequent association of HIV infection and mental illness, and adopt important diagnostic and care elements of these complementary disciplines in the training and the day-to-day work of clinicians, nurses and counsellors.

Keywords: HIV seroprevalence; acute psychiatric admissions; risk factors; Africa; Uganda

Introduction

The HIV/AIDS epidemic that has ravaged sub-Saharan Africa for the last two decades has led to an increased burden of psychiatric morbidity (Adewuja et al., 2007; Freeman, Nkomo, Kafaar, & Kelly, 2007; Olley, Seedat, & Stein, 2006; Petrushkin, Boardman, & Ovuga, 2005; Sebit et al., 2003). How much of this has translated into acute psychiatric conditions in the African setting is not known, however, there are indications to point to an increased burden: Mbewe et al. (2006) in Zambia reported evidence for clinical HIV/AIDS in 9% of a case series 160 first-episode psychotic disorder admissions; Collins, Berkman, Mestry and Pillai (2009) in South Africa reported an HIV seroprevalence of 26.5% among psychiatric admissions; and Nakimuli-Mpugu, Musisi, Kiwuwa-Mpungu, and Katabira (2006) in Uganda reported that among 141 acute mania admissions, 42.3% were due to HIV-related mania.

The association between HIV/AIDS and psychiatric disorder is complex and includes that HIV may cause psychiatric disorder, and that psychiatric disorder may increase one's risk of acquiring HIV/AIDS (Collins, Holman, Freeman, & Patel, 2006). Possible mechanisms of how HIV infection predisposes to psychiatric disorders include: the direct central nervous system (CNS) effects of HIV, opportunistic infections and their associated metabolic derangements; the psychological trauma associated with HIV/AIDS; side effects of drugs such as efavirenz; and the activation of a previous mental disorder (Prince et al., 2007). Other factors that have been reported to predispose HIV patients to developing mental disorders include severity of physical symptoms, negative coping style, poor social support, adverse life events, sexual violence and poverty (Adewuja et al., 2007; Kaharuza et al., 2006; Kinyanda, 1998; Olley, Seedat, Nei, & Stein, 2004; Olley et al., 2006).

Vice versa, vulnerability to HIV infection by those with psychiatric disorders has been attributed to: (a) tendency for individuals with severe mental illness (SMI) to have sexual activity in the context of casual rather than long-term relationships; (b) factors associated with SMI, such as lack of planning, poor

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judgement, affective instability, impulsiveness, inaccurate assessment of risk and poor communication skills; (c) the use of drugs and alcohol endemic in many segments of those with serious mental disorders which may further impair an individual's ability to respond safely in high-risk situations; (d) the associated poverty and homelessness which predispose individuals with SMI to exploitation by others, and to trading sex and failure to purchase condoms; and (e) in developing country settings, such as sub-Saharan Africa, lack of community care for people with SMI (Chandra et al., 2003; Collins et al., 2006; Senn & Carey, 2009; Sullivan et al., 1999).

This study set out to investigate the HIV-1 seroprevalence and its correlates among first-time psychiatric admissions to two national referral hospitals in urban Kampala, Uganda.

Methods

A consecutive sample of adults (18 years and above) who were admitted for the first time because of an acute psychiatric illness at the two national tertiary referral hospitals of Butabika (a psychiatric hospital) and Mulago (a general hospital) in Kampala, Uganda, was recruited into this study over a seven-month period (August 2003–February 2004). Patients were excluded if they were found to have alcohol or any other substance of abuse induced psychiatric disorder or if their psychiatric disorder was secondary to epilepsy or head injury. Patients with a previous psychiatric admission were excluded from this study.

As part of the usual standard of care, all first-time psychiatric admissions were subject to a structured standardised psychiatric, physical and laboratory evaluation. Where necessary, additional information was obtained from family members who stayed with the patient or who knew them well. This structured interview was administered by either the attending psychiatrist or the principal investigator (S.M.). The information was assessed for psychiatric disorders using the Diagnostic and Statistical Manual IV (DSM IV) (American Psychiatric Association, 1994). When the patient had mentally improved, a trained counsellor with knowledge in psychiatry did pre-test counselling and obtained consent for further investigations. These included a questionnaire interview to record data on socio-demographic information and self-reported high-risk sexual behaviour. A blood specimen was collected to determine the HIV serostatus of the patient; and for those found to be HIV-positive their CD4 cell counts. HIV-infected patients were assessed for AIDS-defining conditions as outlined in the 1993 revised CDC classification (CDC, 1993).

Statistical analysis

Statistical analysis was undertaken using STATA, logistic regression models were used to assess bivariable and multivariable associations between the dependent variable (HIV seropositivity) and the independent variables with unadjusted and adjusted Odds ratio (OR; adjusted for sex and age group) reported.

Ethical approval

The study obtained ethical approval from the Uganda Virus Research Institute's Science and Ethics Committee and the Uganda National Council of Science and Technology.

Results

Study population

From August 2003 to February 2004, 279 patients were eligible to participate in this study, of whom seven (2.5%) did not consent. Of the remaining 272 respondents, Butabika psychiatric referral hospital contributed 230 (84.5%) while the smaller department of psychiatry at Mulago general referral hospital contributed 42 (15.4%).

HIV prevalence and socio-demographic correlates of HIV-1 seropositivity

The HIV-1 seroprevalence in this study was 18.4% (95% CI, 13.8–23.0%).

Table 1 depicts the demographic characteristics with 156 (57.4%) females and 144 (53.0%) patients in the 25–40 age band. Over 94 (35%) individuals had no or only partial primary education, 83 (30.5%) were unemployed and 108 (39.9%) had never married and were not living with children.

According to Table 1, in the univariate analysis, the socio-demographic factors significantly associated with HIV-1 seropositivity were female gender (OR 4.1, $P < 0.001$), older age (particularly age 41+, OR 9.4, $P = 0.002$), and marital status (being a single parent and being divorced/separated/widowed as compared to never having married and being childless; OR about 5.5, $P = 0.002$).

Educational attainment and occupation were not significantly associated with HIV-1 seropositivity in this study.

Table 1. Socio-demographic factors associated with HIV-1 seropositivity among first-time psychiatric admissions ($N = 272$).

	Percentage of the sample ($N = 272$)		HIV-1 seropositivity ($n = 50$)		Unadjusted OR (95% CI)	*P*-value
	n	%	*n*	%		
Gender						
Male	156	57.4	15	9.6	1.0	<0.001*
Female	116	42.6	35	30.2	4.06 (2.04–8.09)	
Age group						
18–20 years	48	17.6	3	6.3	1.0	
21–24 years	54	19.9	5	9.3	1.53 (0.34–6.84)	
25–30 years	84	30.9	21	25.0	5.00 (1.35–18.53)	0.002*
31–40 years	60	22.1	11	18.3	3.37 (0.86–13.22)	
41 + years	26	9.6	10	38.5	9.38 (1.98–44.29)	
Educational attainment						
None or partial primary	94	34.6	17	18.1	1.0	
Primary level completed	26	9.6	5	19.2	1.08 (0.35–3.28)	
Secondary level incomplete	94	34.6	20	21.3	1.22 (0.59–2.52)	0.72
Secondary level or above	58	21.3	8	13.8	0.72 (0.29–1.81)	
Occupation						
Unemployed	83	30.5	16	19.3	1.0	
Employed unskilled	42	15.4	12	28.6	1.67 (0.70–4.01)	
Employed skilled	26	9.6	4	15.4	0.76 (0.23–2.54)	
Peasant farmer	36	13.2	2	5.6	0.25 (0.05–1.17)	0.02*
Student	35	12.9	2	5.7	0.25 (0.05–1.21)	
Others	50	18.4	14	28.0	1.63 (0.71–3.74)	
Marital status						
Never married, no children	108	39.9	10	9.3	1.0	
Single parent	41	15.1	13	31.7	4.55 (1.73–11.96)	
Married/cohabiting	87	32.1	16	18.4	2.21 (0.94–5.20)	0.002*
Divorced/separated/widowed	35	12.9	11	31.4	4.49 (1.64–12.29)	

*Statistically significant association at ≤0.05.

Correlation between awareness of HIV status, high-risk behaviour and psychiatric illness factors with HIV-1 seropositivity

Table 2 shows that of the 272 psychiatric patients, 246 (90.4%) did not know their HIV status prior to admission and 201 (73.9%) practised high-risk sexual behaviours. The most common types of high-risk sexual behaviours reported included having unprotected sex with multiple sexual partners (31% of participants), unprotected sex with casual sexual partners (28%), sex in exchange for money (5%) and unprotected sex with a partner with known HIV-positive status (6%). The majority 192 (70.6%) reported that this was their first episode of mental illness, with most 159 (58.5%) reporting no family history of mental illness. Prior to seeking psychiatric treatment, the majority 209 (76.8%) had been to either a traditional healer (45.2%) or a spiritual healer (31.6%).

The risk factors significantly associated with HIV-1 seropositivity in the univariate analysis were (Table 2): awareness of one's HIV serostatus (OR 3.2, $P = 0.005$); unprotected sex with a partner with known HIV-positive serostatus (OR 5.5, $P = 0.025$); other high-risk behaviours (including self-report of symptoms suggestive of STI's, such as a genital discharge and ulcers; OR 7.6, $P = 0.025$); and first-episode mental illness (OR 3.0, $P = 0.008$). Family history of mental illness and health-seeking behaviour for the current episode prior to admission were not significantly associated with HIV-1 seropositivity in this study.

Of the above risk factors associated with HIV-1 seropositivity, it was only the nature of current episode (first rather than recurrent episode) that retained significance after adjusting for sex and age group.

Psychiatric diagnoses and HIV-1 seropositivity

Table 3 depicts the psychiatric diagnoses, with the majority either having a bipolar affective disorder 126 (46.3%) or a primary psychotic syndrome (schizophrenia, acute psychotic disorder, schizophreniform disorder and schizoaffective disorder) 87 (32.0%).

Table 2. Correlation between awareness of HIV status, high-risk behaviour and psychiatric illness factors with HIV-1 seropositivity among respondents ($N = 272$).

	Number (%) ($N = 272$)		HIV-positive (%) ($n = 50$)		Unadjusted OR (95% CI)	*P*-value	Adjusted OR (95% CI)[a]	*P*-value
Awareness of HIV status prior to admission								
Knew HIV status	26	9.6	10	38.5	3.21 (1.36–7.60)	0.005*	2.37 (0.91–6.19)	0.08
Did not know	246	90.4	40	16.2	1.0		1.0	
High-risk behaviour								
No reported high-risk behaviour	71	26.1	7	9.9	1.0		1.0	
Multiple sexual partners (unprotected)	83	30.5	15	18.1	2.02 (0.76–5.32)		1.93 (0.70–5.36)	
Casual sexual partners (unprotected)	77	28.3	15	19.5	2.21 (0.83–5.86)		2.21 (0.79–6.18)	
Sex in exchange for money	14	5.1	2	14.3	1.52 (0.28–8.35)	0.025*	0.98 (0.17–5.71)	0.17
Unprotected sex with partner known to be HIV-positive	16	5.9	6	37.5	5.49 (1.43–21.11)		3.40 (0.85–13.63)	
Others[b]	11	4.1	5	45.5	7.62 (1.66–34.89)		6.21 (1.31–29.39)	
Nature of current episode								
First episode	192	70.6	43	22.4	3.01 (1.29–7.02)	0.008*	4.16 (1.67–10.31)	0.007*
Has had previous episodes	80	29.4	7	8.8	1.0		1.0	
Family history of mental illness								
Positive	113	41.5	22	19.5	1.13 (0.61–2.10)	0.70	1.19 (0.61–2.33)	0.62
Negative	159	58.5	28	17.6	1.0		1.0	
Health-seeking behaviour for current episode prior to admission								
Been to traditional healer	123	45.2	20	16.3	1.0		1.0	
Been to spiritual healer	86	31.6	13	15.1	0.91 (0.43–1.96)		0.92 (0.40–2.12)	
Spoken to family members	18	6.6	5	27.8	1.98 (0.64–6.18)	0.31	1.65 (0.46–5.93)	0.65
Just kept at home	15	5.5	3	20.0	1.29 (0.33–4.98)		0.76 (0.18–3.21)	
Others[c]	30	11.0	9	30.0	2.21 (0.88–5.52)		1.83 (0.66–5.10)	

[a]Adjusted Odds Ratio: adjusted for sex and age grouped into five age groups as from Table 1.
[b]Others under high-risk behaviours includes self-report of symptoms suggestive of STIs, such as genital discharge and ulcers.
[c]Others under health-seeking behaviour includes self-medication with off the counter medications.
*Statistically significant association at ≤ 0.05.

Table 3. Clinical diagnoses associated with HIV-1 seropositivity among first-time psychiatric admissions ($N = 272$).

	Number (%) ($N = 272$)		HIV-positive (%) ($n = 50$)		Unadjusted OR (95% CI)	*P*-value	Adjusted OR (95% CI)[a]	*P*-value
Psychiatric diagnoses								
Bipolar affective disorder	126	46.3	17	13.5	1.0		1.0	
Primary psychotic syndromes[b]	87	32.0	13	14.9	1.13 (0.52–2.46)		0.99 (0.42–2.33)	
Major depression	28	10.3	5	17.9	1.39 (0.47–4.16)	<0.001*	0.82 (0.26–2.64)	0.01*
Organic affective disorders[c]	20	7.4	11	55.0	7.84 (2.83–21.7)		4.97 (1.64–15.0)	
Delirium	10	3.7	4	40.0	4.27 (1.09–16.7)		5.05 (1.05–24.3)	

[a]Organic affective disorders includes organic mania and organic depression.
[b]Primary psychotic syndromes include schizophrenia, acute psychotic disorder, schizophreniform disorder and schizoaffective disorder.
[c]Adjusted Odds Ratio: adjusted for sex and age grouped into five age groups as from Table 1.
*Statistically significant association at ≤0.05.

The HIV prevalence was lowest among those with bipolar affective disorder (13.5%). Compared to this group, HIV infection was significantly associated with organic affective disorders and delirium (ORs 7.8 and 4.3, respectively, $P < 0.001$), a relationship that remained significant even after adjusting for both sex and age group.

Psychiatric diagnoses and HIV disease stage

In the 50 patients with HIV, Table 4 shows the relationship between psychiatric diagnoses and CD4 counts and CDC HIV disease staging.

For those who were HIV-positive and had delirium, the majority (50.0%) had CD4 counts of 500+ cells/μL and HIV disease Stages B and C. On the other hand, among those who were HIV-positive and had an organic affective disorder, the majority (72.7%) had CD4 counts of less than 200 cells/μL and HIV disease Stage C.

Discussion

The HIV seroprevalence of 18.4% obtained in this study is much higher than the figure of 8.5% for the Kampala and Southern Uganda region (at the time of the study) where the majority of the patients attending the two study hospitals are drawn from (National HIV Sero-Survey, 2005 as reported in Uganda AIDS Commission, 2006). Although the study sample was not obtained by random sampling, these results suggest that the HIV seroprevalence among first-time psychiatric admissions is higher than that in the general population, a result similarly observed by Collins et al. (2009) among psychiatric admissions in South Africa.

Possible explanations for the association between acute psychiatric admissions and HIV/AIDS include: the age range of peak incidence of HIV infection overlaps with that for schizophrenia and affective disorders in the general population (Busch, 1989); persons with SMI are a high-risk category for HIV infection (Chandra et al., 2003); HIV is known to cause new episode psychotic disorders (Owe-Larsson, Sall, Salamon, & Allgulander, 2009); and lastly, HIV/AIDS is associated with medical complications that may lead to acute psychotic disorders (Owe-Larsson et al., 2009). The exact contribution of each of these mechanisms to the HIV seroprevalence observed in

Table 4. CD4 counts and CDC disease staging by psychiatric diagnoses among HIV-positive first-time admissions to Butabika and Mulago hospitals, Kampala, Uganda ($n = 50$).

	CD4 counts (%)			CDC disease staging categories (%)		
	<200	200–499	500+	A	B	C
Psychiatric diagnoses						
Organic affective disorders	72.7	18.2	9.1	27.3	0.0	72.7
Bipolar affective disorder	29.4	47.1	23.5	52.9	17.7	29.4
Primary psychotic syndromes	30.8	38.5	30.8	38.5	23.1	38.5
Major depression	20.0	60.0	20.0	60.0	20.0	20.0
Delirium	25.0	25.0	50.0	0.0	50.0	50.0

this study could not be determined, since this was a cross-sectional study. However, there were indications that all four mechanisms seemed to play some part in the genesis of this association. In this study, 78.3% of the respondents had a primary psychiatric diagnosis (bipolar affective disorder and primary psychotic syndromes) that was independent of HIV/AIDS. The association between these primary psychiatric syndromes and HIV seropositivity could therefore be inferred to be due to either of the first two mechanisms outlined above. In these two primary psychiatric syndromes (bipolar affective disorder and primary psychotic syndromes), the second mechanism was more preferred given that the HIV seroprevalence rate in both bipolar affective disorder (a rate of 13.5%) and in primary psychotic syndromes (a rate of 14.9%) was higher than that in the general population (a rate of 8.5%). Evidence for the latter two mechanisms include that in this study, HIV prevalence was highest among those with organic affective disorder (55.0%) and delirium (40.0%) suggesting that the association between HIV seropositivity and these two disorders was due to the fact that HIV was a causal agent in these psychiatric syndromes through either it's direct (organic affective disorders) or indirect (delirium) effects on the CNS (Owe-Larsson et al., 2009).

Our study reported a much higher gender differential in HIV prevalence (30.2% among females versus 9.6% among males) compared to the general population of Uganda, where HIV prevalence was 7.3% in females and 6.3% in males. Collins et al. (2009) in South Africa and Nakimuli-Mpugu et al. (2006) in Uganda made a similar observation. While it is recognised that biological differences account for some of this disparity, negative patriarchal cultural practices in Uganda like those in many other developing countries also increase female vulnerability to HIV infection. However, the results of this study seem to suggest that these culture-associated vulnerabilities may even be more heightened among persons with psychiatric illness (Uganda AIDS Commission, 2006).

Other socio-demographic factors associated with HIV seropositivity in this study were being a single parent or divorced and separated or widowed; these categories are predisposed to engage in casual unprotected sexual relationships as is known from studies in the general population (Mbulaiteye et al., 2000), a known risk factor for HIV infection among persons with SMI (Sullivan et al., 1999).

In this study, the age group of 41 years and above had the highest HIV rates of any age group (both males and females were equally represented in this age group), a peak much later than that observed in the general population (Uganda AIDS Commission, 2006). This probably reflects the fact that some of the psychiatric complications of HIV/AIDS tend to occur much later in the course of the HIV disease process (Dube, Benton, Cruess, & Evans, 2005; Owe-Larsson et al., 2009; Working Group on HIV/AIDS of the American Psychiatric Association, 2000).

About three quarters (73.9%) of the respondents in this study admitted to engaging in various high-risk sexual behaviours, this is similar to what has previously been documented elsewhere among persons with SMI (Collins et al., 2006; Senn & Carey, 2009; Sullivan et al., 1999).

Organic affective disorders and delirium were both statistically significantly associated with HIV infection. Given our study design, it was not possible to determine the exact direction of causality between these disorders and HIV/AIDS. However, causality could be inferred from what we know from previous research that these two disorders can be caused by HIV infection (Dube et al., 2005; Lyketsos, Schwartz, Fishman, & Treisman, 1997; Nakimuli-Mpungu et al., 2006; Owe-Larsson et al., 2009; Working Group on HIV/AIDS of the American Psychiatric Association, 2000). In this study, as reported elsewhere, organic affective disorders tended to occur in late stage HIV disease (73% had CD4 counts of <200 cells/μL; Dube et al., 2005; Gallego, Gordillo, & Catalan, 2000; Nakimuli-Mpungu et al., 2006; Owe-Larsson et al., 2009).

On the other hand, delirium in this study seemed to be spread out over the different stages of HIV infection (50% had CD4 counts of 500+ cells/μL; 25% had CD4 counts of 200–499 cells/μL; and 25% had CD4 counts of <200 cells/μL). This is not surprising given the diverse aetiology of delirium in HIV/AIDS that includes: HIV encephalopathy at seroconversion; opportunistic infections; neoplasms; metabolic disturbances; psychoactive substances; and some antiretroviral medications such as high-dose zidovudine (Working Group on HIV/AIDS of the American Psychiatric Association, 2000).

Indirectly supporting the assertion that the relationship between HIV/AIDS and the psychiatric diagnoses of delirium and organic affective disorders was probably causal, this study observed that first-time psychiatric episode and not previous psychiatric episodes were associated with HIV-1 seropositivity. A similar observation could be inferred from earlier work by Nakimuli-Mpungu et al. (2006) who observed that whereas all (100%) of their HIV mania respondents were experiencing a first episode of psychiatric illness, the majority (60.7%) of those with non-HIV-related mania were experiencing a

recurrence (this relationship, however, did not attain statistical significance in their study).

Limitations to this study included the cross-sectional nature of this study which made inferences about the temporal relationship of HIV infection and the psychiatric disorder difficult for most cases. A second limitation of this study is that it is difficult to generalise these results to psychiatric patients in general in this sociocultural environment as it leaves out the majority psychiatric patient sub-populations (psychiatric admissions for repeat episodes and psychiatric outpatients). The third limitation of this study is that the data for this study were collected seven years ago, hence may not reflect the situation as it is today.

However, despite these shortcomings, this study makes an important contribution to our understanding of first-time psychiatric admissions in high HIV seroprevalence settings as is currently pertaining in most of sub-Saharan Africa. In such settings, both general clinicians and mental health workers need to consider HIV/AIDS and it's associated medical complications in their differential diagnosis of first-time psychiatric admissions. Secondly, this study suggests a possible causal relationship between HIV/AIDS and certain types of SMIs (delirium and organic affective disorders in this study), pointing to the contribution of HIV/AIDS to the burden of mental illness in high HIV prevalence countries such as Uganda. This calls the integration of mental health services in HIV care programmes to address this dual co-morbidity.

Thirdly, these study results seem to suggest that persons with SMI in settings such as those pertaining in sub-Saharan Africa may be at increased risk for HIV infection, thus National HIV programmes in such settings should tailor their services to also address the challenge of HIV/AIDS in this high-risk sub-population.

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