Prevalence of HIV infection in psychiatric patients attending a general hospital in Tamil Nadu, South India

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Abstract An anonymous, unlinked study was conducted to detect antibodies to HIV-1 or HIV-2 infections in 1,160 consecutive, newly registered, adult psychiatric outpatients at a general hospital in South India to determine whether psychiatric patients presenting to general hospitals are a population at high risk for HIV infection and should be routinely screened. The seroprevalence of HIV infection (12/1160; 1.03%; 95% CI = 0.4–1.6%) did not approximate rates expected of a high-risk group compared to the national (0.7%) or regional community (1.8%) prevalence. It did not differ significantly from HIV seroprevalence in non-psychiatric patients (233/35450; 0.7%; 95% CI = 0.57–0.74%) who were systematically screened (relative risk = 1.57; 95% CI = 0.88–2.80) during the same period, but was greater than the seroprevalence in healthy blood donors (0.5%; p = 0.02; relative risk = 2.15 95% CI = 1.17–3.95). Non-psychiatric patients were also more likely to be HIV infected than blood donors (p = 0.02; relative risk = 1.37; 95% CI = 1.05–1.78). These findings have implications for HIV testing policies among psychiatric and non-psychiatric patients presenting to general hospitals in India.

Introduction

Studies from the USA and Europe reveal that people with serious mental illness have an increased prevalence of HIV infection ranging from 3.1 to 23% (Avins et al., 1994; Ayuso-Mateos et al., 1997; Cournos & McKinnon, 1997; Cournos et al., 1991; Empfield et al., 1993; Mahler et al., 1994; Naber et al., 1994; Rosenberg et al., 2001; Sacks et al., 1992; Silberstein et al., 1994; Stewart et al., 1994; Susser et al., 1993; Volavka et al., 1991). Psychiatric patients are hence considered a population at risk for HIV infection (Stephen & Catalan, 1995).

In contrast, reports from Asia (Chen, 1994; Igarashi et al., 1994) and Africa (Acuda & Sebit, 1996; Mungherera et al., 1993) did not reveal significantly higher HIV seroprevalence rates among psychiatric patients than in the general population. Studies from the Middle East...
al-Haddad et al., 1994; Dan et al., 1992) revealed marked variations in HIV prevalence among patients attending drug rehabilitation clinics. From these reports it appears that HIV prevalence in psychiatric patients reflects population prevalence, prevalence and patterns of co-morbid substance use, sexual risk behaviour, and whether systematic or purposive sampling was used.

**HIV/AIDS in India**

Although the estimated adult population prevalence of HIV infection in India is relatively low at 0.7%, with a population of one billion, India is host to the second largest population of people living with HIV/AIDS in the world, next to South Africa (UNAIDS, 2000). There is considerable diversity in the spread of HIV within the country, with the highest prevalence seen in the mid-western state of Maharashtra, the southern states of Tamil Nadu, Karnataka and Andhra Pradesh, and the northeastern state of Manipur. Injecting drug use predominates as the route of infection in Manipur, while heterosexually transmitted infections predominate in the rest of the country (MAP Network, 1999).

Data on the seroprevalence of HIV among psychiatric patients in India are limited to that from a state mental hospital among patients purposively tested mainly due to identified risk factors or AIDS-related conditions (Chandra et al., 1996, 1999). The reported rates of 2.1–3.4% are considerably lower than figures in psychiatric patients from Europe and the USA. Pending systematically obtained information on the prevalence of HIV infection among psychiatric patients in other settings in India, it may be premature to conclude that psychiatric patients in India are a population at increased risk for HIV infection.

We conducted this investigation to ascertain the prevalence of HIV infection among psychiatric outpatients attending a general hospital in south India. We primarily sought to establish whether psychiatric patients, or particular sub-groups, presenting to general hospitals are at higher risk of HIV infection compared to the population. We also sought to evaluate whether psychiatric patients are at higher risk for HIV infection than non-psychiatric patients and blood donors attending the same hospital. Finally, we evaluated differences in seroprevalence estimates among patients routinely screened as opposed to purposively tested on clinical indication or due to the presence of risk factors for HIV infection. We hoped that these results would help determine whether psychiatric patients attending general hospitals in India should be offered HIV testing routinely.

**Methods**

**Setting**

The Christian Medical College & Hospital at Vellore is an 1,800 bed, private, non-profit, teaching and general hospital in the southern state of Tamil Nadu. The hospital provides primary through tertiary care, caring for about 900,000 outpatients and 60,000 inpatients yearly. The earliest report of HIV-1 infection in the country originated from this institution (Simoes et al., 1987). Subsequently, the presence of HIV-2 infection was documented among patients attending this hospital (Kannangai et al., 1999).

**Sample**

Blood samples collected for another study unrelated to HIV (on days that study personnel were available) from consecutive, consenting adults (> 18 years of age), freshly registered as
outpatients at the Department of Psychiatry between 1 April 1999 and 1 May 2000, were screened for antibodies to HIV-1 and HIV-2. Due to the variability of HIV seroprevalence in the country, we selected only samples from patients normally residing in the southern states of Tamil Nadu, Kerala, Karnataka and Andhra Pradesh, which are (with the exception of Kerala) at the epicentre of the epidemic. Clinical diagnoses were made following semi-structured clinical interviews in accordance with ICD-10 guidelines (WHO, 1992), and were confirmed in each instance by a consultant psychiatrist. Each patient’s age, gender, economic status, occupation, state of residence and clinical diagnosis were extracted from study forms, coded and irreversibly de-linked from identifying details. Blood samples from each patient were given matching code numbers that enabled subsequent linking of HIV results to demographic details. The institution’s research and ethics committee cleared this study.

Sample size estimation

While the national prevalence of HIV infection in adults is estimated to be 0.7%, a study using proportionate to population cluster sampling in three rural areas of Tamil Nadu established a community prevalence of HIV infection among 1981 people aged 15–45 years of 1.8% (Thomas et al., 2002). A conservative estimate of adult HIV prevalence of 1% was therefore chosen. We reasoned that if psychiatric patients were especially vulnerable to HIV infection, an estimate of seroprevalence that would justify targeted intervention would require a prevalence of at least three times the population prevalence. Using 3% prevalence and an absolute precision of 1%, and the formula $4pq/d^2$ (where $p$ = expected prevalence, $q = 1 - p$, and $d = absolute precision$), a minimum sample of 1,106 was considered sufficient.

HIV antibody testing

Blood samples were screened for antibodies to HIV-1 and HIV-2 using a rapid particle agglutination test (Capillus HIV-1/HIV-2, Cambridge Diagnostics, Ireland) that has a sensitivity of 99%, and a specificity of 98.9% (Ramalingam et al., 2002). All samples that were reactive or weakly reactive were tested with two different enzyme immunoassay (ELISA) kits of equivalent performance approved by the World Health Organization and the National AIDS Control Organization, and by immunoblot (INNOLIA HIV-1/HIV-2 AbSp, Innogenetics, Belgium). Samples reactive by immunoblot, which has performance characteristics similar to the Western Blot (Zaaijer et al., 1998), were considered positive.

Statistical analysis

We compared HIV seroprevalence in psychiatric patients with HIV prevalence rates in samples tested during the same period at the Department of Virology from patients of various departments of the hospital who were screened routinely before procedures, or were tested due to identified risk factors (sexually transmitted diseases, high risk sexual behaviour, infected partner, drug abuse), or on clinical indication. We also compared HIV seroprevalence rates in prospective voluntary blood donors tested at the hospital during the same time frame, and with national and community prevalence estimates.

Data were analyzed using the Statistical Package for Social Scientists (SPSS), version 6.0 (SPSS Inc.) and Epi Info version 5.01 (Centres for Disease Control, 1993). We used the chi-square test (or Fisher’s exact test when expected frequencies in a cell were less than five) to compare HIV seroprevalence between diagnostic and demographic groups and between
psychiatric and non-psychiatric patients. We report relative risk estimates with 95% confidence intervals for these comparisons.

Results

During the study period, 4,370 new adult outpatients from the four southern states were seen at the Department of Psychiatry, of whom 1,455 (26.5%) were registered on the days that the study was conducted. Blood samples obtained from 1,160 of the 1,455 eligible patients (79.7%) were screened for HIV. Among those studied, 57.2% were male, the mean age was 34.8 years (SD = 12.4, range = 18–86 years), and 56.4% were from economically disadvantaged backgrounds. Eighty-four per cent of the patients were from Tamil Nadu. Non-consenting patients did not significantly differ from consenting patients on age (mean = 34.2 years, SD = 14.4, p = 0.47), sex (60% male, p = 0.32), economic status (54% lower, p = 0.37) or diagnoses (ICD-10 F00–39 = 80%, p = 0.68).

Of the 1,160 blood samples tested, 48 were reactive or weakly reactive by the rapid test. Of these, 12 were confirmed positive by immunoblot for antibodies to HIV-1. Both immunoassays were also positive in all 12 samples. No sample was positive for HIV-2. The seroprevalence for HIV in this sample of psychiatric outpatients was (12/1160) 1.03% (95% CI = 0.4–1.6%).

The distribution of positive results with demographic variables is shown in Table 1. Male sex was the only demographic factor associated with HIV infection. Men accounted for 57.2% of the sample and 91.7% of those with HIV infection and were eight times more likely than women to be HIV-positive. Patients between the ages of 30–49 accounted for 46.8% of the total sample and 75% of the positive results with a seroprevalence of 1.7% in this age range. Occupations conventionally associated with higher HIV risk were not over-represented in this sample of HIV infected individuals.

The sole or main diagnosis in accordance with ICD-10 (World Health Organization, 1992) for the sample and the HIV prevalence in diagnostic sub-groups are detailed in Table 2. No specific diagnostic sub-group had an elevated HIV seroprevalence relative to the sample as a whole. However, HIV infection was present only in people with diagnoses of organic mental disorders, substance use disorders, psychotic disorders or mood disorders.

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>HIV-positive (%)</th>
<th>p</th>
<th>Relative risk</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>663</td>
<td>11 (1.7)</td>
<td>0.03a</td>
<td>8.25</td>
<td>1.07–63.66</td>
</tr>
<tr>
<td>Female</td>
<td>497</td>
<td>1 (0.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td>0.09b</td>
<td>3.41c</td>
<td>0.93–12.53</td>
</tr>
<tr>
<td>18–29</td>
<td>462</td>
<td>2 (0.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30–39</td>
<td>335</td>
<td>5 (1.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40–49</td>
<td>208</td>
<td>4 (1.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50–86</td>
<td>155</td>
<td>1 (0.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic status</td>
<td></td>
<td></td>
<td>0.31d</td>
<td>2.32</td>
<td>0.63–8.53</td>
</tr>
<tr>
<td>Lower</td>
<td>654</td>
<td>9 (1.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle or upper</td>
<td>504</td>
<td>3 (0.6)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

aχ² with continuity correction = 4.56; df = 1; bχ² with continuity correction = 2.81; df = 1 cRelative risk calculations compared combined age groups 30–49 versus the rest; dχ² with continuity correction = 1.03; df = 1.
Table 3 compares the HIV prevalence in this sample of psychiatric patients with the seroprevalence among non-psychiatric patients tested at the hospital during the same period. The seroprevalence in psychiatric patients in this study did not differ significantly from non-psychiatric patients who were screened for HIV infection before procedures. Patients purposively tested on clinical indications or due to the presence of elicited risk factors had significantly greater rates of HIV infection than those routinely screened. The prevalence of HIV infection was significantly greater in psychiatric patients than in voluntary blood donors screened at this hospital during the same period. The prevalence of HIV infection was also significantly elevated in non-psychiatric patients screened relative to voluntary blood donors ($\chi^2 = 5.52, \text{df} = 1, p = 0.02, \text{relative risk} = 1.37, 95\% \text{ CI} = 1.05-1.78$).

Table 3. HIV seroprevalence in adult psychiatric and non-psychiatric patients and blood donors tested during the period of the study

<table>
<thead>
<tr>
<th>Speciality</th>
<th>n</th>
<th>HIV-positive (%)</th>
<th>p</th>
<th>Relative risk</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-patients routinely screened</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood bank donors</td>
<td>15187</td>
<td>73 (0.5)</td>
<td>0.02$^d$</td>
<td>2.15</td>
<td>1.17-3.95</td>
</tr>
<tr>
<td>Patients screened before procedures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combined specialties</td>
<td>35450</td>
<td>233 (0.7)</td>
<td>0.17$^e$</td>
<td>1.57</td>
<td>0.88-2.80</td>
</tr>
<tr>
<td>Patients tested due to identified risk factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychiatry$^b$</td>
<td>66</td>
<td>4 (6.1)</td>
<td>0.01$^f$</td>
<td>4.60</td>
<td>1.91-11.09</td>
</tr>
<tr>
<td>STD Clinic$^c$</td>
<td>506</td>
<td>83 (16.4)</td>
<td>0.000$^g$</td>
<td>3.24</td>
<td>2.90-3.63</td>
</tr>
<tr>
<td>Medical specialties</td>
<td>3521</td>
<td>676 (19.2)</td>
<td>0.000$^h$</td>
<td>1.38</td>
<td>1.35-1.41</td>
</tr>
</tbody>
</table>

$^a$Compared with prevalence in Psychiatric outpatients in this study N = 1160; HIV positive = 12 (1.03%); 
$^b$Tested after pre-test counselling from among new and old outpatients and inpatients; 
$^c$Sexually transmitted diseases clinic; 
$^d$\(\chi^2\) with continuity correction = 5.36; df = 1; 
$^e$\(\chi^2\) with continuity correction = 1.87; df = 1; 
$^f$Fishers exact test, two-tailed; 
$^g$\(\chi^2\) with continuity correction = 151.91; df = 1; 
$^h$\(\chi^2\) with continuity correction = 228.18; df = 1.
Discussion

Methodological issues

The study design did not permit us to assess risk behaviours in those screened and to link risk behaviours to psychiatric diagnoses. Although psychiatric diagnoses made on the first outpatient visit are subject to revision, as new information becomes available or as the illness evolves, the data obtained herein on diagnoses permits tentative conclusions to be drawn on the association between HIV infection and diagnostic sub-groups. The design also did not permit us to identify psychiatric patients presenting to medical or surgical specialities, but it is unlikely that psychiatric patients were included in the sample of non-psychiatric patients in sufficient numbers to influence prevalence estimates substantially.

Are psychiatric patients a population at risk for HIV infection?

The prevalence of HIV infection in this sample of psychiatric outpatients was 1.03% (95% CI = 0.4–1.6%), which is not significantly different from the national prevalence of 0.7% and lower than the 1.8% prevalence obtained in a community sample from Tamil Nadu. The prevalence did not reach the 3% prevalence postulated as that expected in a high-risk group given the population prevalence. However, such comparisons are spurious due to the differences in sample characteristics and sampling time frames and a more appropriate comparison would be with other patient groups tested at this hospital during the same period. The HIV prevalence in psychiatric patients did not significantly differ from that in non-psychiatric patients (0.7%) routinely screened. However, this may be due to a Type II error, as a sample size of around 6,000 psychiatric patients would be necessary to demonstrate a statistically significant difference between the two groups, should one exist. The prevalence in both psychiatric and non-psychiatric patients was significantly higher than that in healthy blood donors (0.5%). We conclude that while patients (both psychiatric and non-psychiatric) presenting to general hospitals are likely to have higher HIV prevalence rates than some segments of the general population, psychiatric patients presenting to this hospital may not constitute a specific population at significantly higher risk of HIV infection than other patients. The relevance of extrapolating the findings of this study from a general hospital in the private sector to the rest of the country relates to the distribution of health care spending in India. Private spending on health care accounts for about 78% of total health spending in India, and as a share of national income is among the highest for developing countries (World Bank, 1997). However, further studies from other settings in India are required before firm conclusions are drawn.

Most HIV seroprevalence studies in psychiatric patients have not compared HIV infection rates with rates in other patient populations. A large surveillance study in the USA (Janssen et al., 1992) reported that psychiatric patients ranked seventeenth among 22 diagnostic groups in HIV seroprevalence among 9,286 of 195,829 patients who tested positive in 20 hospitals. The only other study that compared HIV seroprevalence between psychiatric and non-psychiatric patients (Mungherera et al., 1993) found the rates to be similar. This raises doubts about the utility of labelling psychiatric patients in particular as a high-risk population as opposed to considering any patient, irrespective of diagnosis, with a history of high-risk behaviour as needing counselling and testing for HIV. Mental illness is associated with considerable stigma in this, as in other countries, and labelling psychiatric patients as a
high-risk group for HIV could result in double stigmatization of an already marginalized population.

Are sub-groups of psychiatric patients at higher risk of HIV infection?

Although no specific diagnostic sub-group had a significantly elevated HIV seroprevalence relative to the sample as a whole, the diagnosis-specific seroprevalence was greater than 2% among patients with dementia (5.3%), acute psychosis (2.3%), unspecified non-organic psychosis (3.3%) and alcohol dependence (2.8%). Alcohol dependence is well recognized as a behavioural co-factor for HIV infection (Avins et al., 1994; Chandra et al., 1999; Mbulaiteye et al., 2000) and people with alcohol dependence constitute a population whose HIV status is often undetected (Mahler et al., 1994). Injecting drug use and male homosexual behaviour, apart from multiple partner heterosexual contact, accounted for much of the risk behaviours associated with HIV infection in studies from the USA and Europe. Homosexual behaviour is estimated to account for only a small fraction of HIV infections in India (UNAIDS, 2000). Injecting drug abuse was not widely prevalent in our sample and the three patients with opiate dependence were uninfected. Samples taken from other settings such as state mental hospitals might include higher proportions of injecting drug abusers. The results of sentinel surveillance for HIV in selected populations in India (UNAIDS/WHO, 2000) reveal that HIV seroprevalence ranged from 41.4–68.4% among intravenous drug abusers in the northeastern state of Manipur. However, HIV prevalence was considerably lower among intravenous drug users in the cities of Calcutta in the eastern state of Bengal (3.5%) and Bangalore in the southern state of Karnataka (1.2%). In the capital city of Delhi in north India, only 0.9% of opioid dependent patients attending a state-run de-addiction clinic were HIV infected (Desai et al., 2001). This underscores the need for seroprevalence studies in psychiatric patients from different parts of the country and in different populations of the mentally ill previously identified as at risk for HIV infection elsewhere, such as those with co-morbid substance use disorders and the homeless mentally ill (Empfield et al., 1993; Susser et al., 1993, 1998).

Implications for HIV testing policies in India

The Centres for Disease Control (1993) has recommended that hospitals with an HIV-seroprevalence rate of at least 1% or an AIDS diagnosis rate of 1 or more per 1,000 discharges should strongly consider adopting a policy of offering HIV counselling and testing routinely to patients aged 15–54 years. The national testing policy of the National Aids Control Organization proscribes mandatory or routine testing of patients (NACO, 1995), but the majority of hospitals in the private sector within the country routinely screen patients before surgical procedures in the interests of hospital infection control and due to fears of the risk of occupational exposure to HIV infection. Routine screening of large numbers of patients would strain resources to provide adequate counselling services and result in patients being tested without their knowledge or consent (Tharyan et al., 1999).

The results of our study suggest that it would be more pragmatic to enquire about risk factors routinely in all patients, not just psychiatric patients, and offer counselling and testing only to those with risk behaviours or with clinical indicators of HIV-related disease. We also recommend further blinded seroprevalence studies from other centres in India and the Asian sub-continent, to describe regional variations in HIV seroprevalence in psychiatric patients and to monitor trends in HIV seroprevalence over time.
Acknowledgements

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References


