The Relative Contributions of Psychiatric Symptoms and AIDS Knowledge to HIV Risk Behaviors Among People With Severe Mental Illness

Karen McKinnon, M.A., Francine Cournos, M.D., Richard Sugden, M.A., Jeannine R. Guido, M.A., and Richard Herman, M.A.

Background: This study was designed to determine whether psychiatric symptoms and acquired immunodeficiency syndrome (AIDS) knowledge predict human immunodeficiency virus (HIV) risk behavior among people with severe mental illness.

Method: We interviewed 178 psychiatric patients to determine Axis I diagnosis, level of functioning, severity of psychiatric symptoms, knowledge about AIDS, sexual risk behaviors in the previous 6 months, and drug injection since 1978. Severity of psychiatric symptoms was rated on the Positive and Negative Syndrome Scale within the classification of positive, negative, cognitive, excited, and depressed/anxious symptoms.

Results: Ninety-two patients (51.7%) reported being sexually active in the previous 6 months. Of sexually active patients for whom data were available, 44 (47.8%) of 92 had multiple sex partners; 32 (35.2%) of 91 used drugs during sex; 27 (29.7%) of 91 traded sex for drugs, money, or other goods; and 50 (58.1%) of 86 never used condoms. Thirty-one patients (17.5%) had drug-injection histories. The median AIDS knowledge score was 23 (82.1%) of 28. Although AIDS knowledge was negatively correlated with cognitive and negative symptoms and positively correlated with excitement, knowledge alone did not predict any risk behavior. However, when AIDS knowledge was taken together with age and excited symptoms, the odds of being sexually active versus abstinent were three times higher among patients with better AIDS knowledge and twice higher among patients with greater excited symptoms. Having multiple sex partners was nearly three times as likely among patients with greater positive symptoms. Trading sex was more than three times as likely among patients with schizophrenia than among those with other diagnoses and more than five times as likely among those with more excitement symptoms.

Conclusion: Patients, particularly those who were sexually active, were well informed about AIDS. Specific psychiatric conditions, including the presence of positive and excited symptoms and a diagnosis of schizophrenia, predicted certain sexual risk behaviors and must be the focus of innovative prevention efforts.

(J Clin Psychiatry 1996;57:506–513)

Received April 2, 1996; accepted Aug. 9, 1996. From the Columbia University College of Physicians and Surgeons (Mss. McKinnon and Guido, Dr. Cournos, and Mr. Herman), the New York State Psychiatric Institute (Ms. McKinnon, Dr. Cournos, and Messrs. Sugden and Herman), and the Washington Heights Community Service (Ms. McKinnon, Dr. Cournos, and Messrs. Sugden and Herman), New York, N.Y.

Supported by National Institute of Mental Health grant MH46251 and the New York State Office of Mental Health. Technical assistance was provided by the Center for Mental Health Services, Substance Abuse and Mental Health Services Administration.

Reprint requests to: Karen McKinnon, M.A., New York State Psychiatric Institute, 722 West 168 Street, Unit 112, New York, NY 10032.

It has been widely assumed that cognitive impairment and other aspects of severe mental illness undermine the ability to use information about acquired immunodeficiency syndrome (AIDS) to practice safe behaviors.[1–6] However, no published study has tested these assumptions by examining the relationship between psychiatric symptoms, AIDS knowledge, and human immunodeficiency virus (HIV) risk behaviors.

Although there is little evidence that knowledge by itself reduces risk behaviors,[7] appropriate knowledge may be prerequisite to any health behavior change,[8–10] and education about HIV transmission remains the most widely recommended way to prevent new infection.[11–14]

A disturbing number of people with severe mental illness are already HIV-infected. Seroprevalence studies show that 4.0% to 22.9% of psychiatric inpatients in some urban areas have the virus.[15–20] Patient surveys reveal that 1% to 24% have a history of drug injection,[21–29] and during the previous 6 to 12 months, 44% to 73% were sexually active[15,23,24,27,30,31]; 30% to 62% of sexually active patients had multiple partners[22,24,27,29,32,33]; 15% to 45% used drugs during sex[23,32]; and 12% to 69% traded sex for drugs, money, or other goods.[22,23,31,32] Condom use is not commensurate with such high levels of risk: only 24% of intercourse episodes in the past month reported by outpatients were protected,[29] and more than 50% of sexually active inpatients and outpatients reported never using condoms in the past 6 to 12 months.[22,27]

In the few studies examining knowledge about AIDS among specific psychiatric patient groups, including inpatients,[2,28] outpatients,[1,4,23,34] and day-treatment patients

with comorbid substance abuse diagnoses,[22] correct responses to AIDS knowledge questionnaires ranged from 70% to 80%. Although this accuracy rate appears comparable with that found in the general population,[35] two studies associated lower AIDS knowledge scores with schizophrenia spectrum diagnoses,[7,28] and another study, with greater risk activity.[34] However, these associations were not found in other studies,[4,22] and the role of specific aspects of psychiatric illness was not examined. Thus, the relative contributions of psychiatric symptoms and AIDS knowledge to unsafe behavior among people with severe mental illness have not been investigated.

To learn whether psychiatric symptoms and AIDS knowledge predict HIV risk behavior, we administered an AIDS knowledge interview to people with severe mental illness whose psychiatric diagnoses, symptoms, and HIV risk behaviors we documented by using standardized instruments with demonstrated reliability. We tested the hypothesis that cognitive function would be negatively correlated with AIDS knowledge. We also sought to determine whether cognitive, positive, negative, excited, and depressed/anxious symptoms, when taken together with AIDS knowledge, would predict six behaviors: injecting drugs, being sexually active, having multiple sex partners, using drugs during sex, trading sex, and failing to use condoms. We wanted to learn whether the likelihood of (1) drug injection increased with negative, depressed/anxious, and positive symptoms; (2) sexual risk activity increased with positive and excited symptoms and decreased with greater negative and depressed/anxious symptoms; and (3) all risk activity decreased with greater AIDS knowledge.

METHOD

Participants

We recruited participants from four New York City treatment sites for people with severe mental illness: a day-treatment program, an acute admissions inpatient unit, a specialized inpatient ward for the undomiciled, and a transitional unit that prepared inpatients for release into the community. Patients with a primary diagnosis of substance abuse or central nervous system dysfunction due to a general medical condition are excluded by administrative mandate from admission to the treatment sites. These sites were selected to obtain both a range in geographic distribution of AIDS case rates and a sample of patients who are ethnically diverse and representative of people in treatment for the most persistent and severe mental illnesses.

Procedures

At each site, we asked all patients between the ages of 18 and 59 years who were evaluated by their primary clinician as being capable of consenting to research and who spoke English to participate in the study. After fully explaining all study procedures, we obtained written informed consent from patients; those who completed the assessment battery were paid $15 for their participation.

Measures

All questionnaires were administered in English in face-to-face interviews by trained bilingual researchers who translated as necessary when a patient's primary language was Spanish. We assessed AIDS knowledge with a 28-item true/false questionnaire that covered basic facts about transmission and prevention.[36] This questionnaire was adapted from Kelly et al.[23] to include questions about the fatality of the virus, significance of an antibody test, transmission by casual contact, safety of donating versus receiving blood, risk of sharing needles to inject drugs, and degree of protection sexual abstinence affords. In addition, the interview battery consisted of the Structured Clinical Interview for DSM-III-R[37] (SCID) to obtain an Axis I diagnosis and a Global Assessment of Functioning (GAF) score (range, 0 = persistent danger to self or others to 90 = absent or minimal symptoms); the Positive and Negative Syndrome Scale[38] (PANSS), which measures severity of 30 psychiatric symptoms (each on a scale from 1 = absent to 7 = extreme); the Sexual Risk Behavior Assessment Schedule[39] (SERBAS), an extensive interview with demonstrated reliability among inpatients and outpatients[40]; and an adapted Parenteral Drug Use High-Risk Behavior Questionnaire[41] (PDU), which elicits drug-injection practices in the past 6 months and since 1978, the year HIV began to spread in the U.S. population.[42] We obtained demographic data from patient charts and corroborated them in interviews.

Data Analysis

In addition to testing the strength of correlation between psychiatric symptoms and AIDS knowledge (Pearson r), we sought to develop a prediction model by using multiple logistic regression analysis, which requires dichotomous categorical variables. Continuous variables (age, number of previous hospitalizations, GAF score, PANSS score, total AIDS knowledge score) were dichotomized above and below median values. Level of education was dichotomized as completed high school or equivalency diploma versus less than high school education. Ethnicity was dichotomized as African-American versus non-African-American because a previous study at the same sites[15] found disproportionately elevated HIV infection rates among African-American patients. SCID diagnosis was dichotomized as schizophrenia versus other, on the basis of previous findings that people with schizophrenia had less AIDS knowledge compared with those in other diagnostic groups[7,28] and frequent sexual risk activity.[32]

Psychiatric symptoms were categorized by using the reliable and valid five-factor classification[43–45] of the

PANSS: cognitive (conceptual disorganization, difficulty with abstract thinking, disorientation, poor attention, mannerisms/posturing; score range, 5–35); positive (delusions, unusual thought content, grandiosity, suspiciousness/persecution; range, 4–28); negative (emotional withdrawal, passive/apathetic withdrawal, lack of spontaneous conversation, poor rapport, blunted affect, active social avoidance; range, 6–42); excited (excitement, poor impulse control, hostility, tension; range, 4–28); or depressed/anxious (anxiety, guilt feelings, depression, somatic concerns, preoccupation; range, 5–35).

Univariate comparison of HIV risk behaviors was conducted by chi-square analyses. Variables significant by chi-square test at $p < .05$ were tested for relative risk of drug injection since 1978 and five sexual behaviors in the past 6 months, all of which were dichotomized as *any* versus *none*: sexual activity, multiple sex partners, drug use during sex, sex trading, and condom use. Unadjusted odds ratios (ORs) and confidence intervals (CIs) were used to estimate relative risk for each of these behaviors. Where unadjusted odds ratios showed significant associations between an independent variable and a risk behavior, adjusted odds ratios were derived from the regression analysis to estimate the relative risk of that behavior for each factor,[46] controlling for the effects of all others entered stepwise into the equation.

RESULTS

Descriptors

Sample characteristics. We obtained written informed consent from 203 (76.9%) of 264 eligible patients. Of these, 3 patients dropped out before any interview, and 17 were released from the hospital before administration of the AIDS knowledge interview, leaving 183 completed interviews. Interviewers rated the sexual risk behavior responses of 4 patients as unreliable because of severe cognitive deficits, impaired memory, or borderline I.Q., and excluded those of 1 other patient whose primary language was neither English nor Spanish and who did not understand the questions. We excluded from statistical analysis all data from these 5 patients, resulting in a total sample of 178 patients.

Following institutional review board confidentiality protocols, we collected limited demographic and clinical data from the medical records of all patients eligible for the study to compare participants and nonparticipants. Patients who did not consent to participate in the study were not significantly different than participants in gender or number of previous psychiatric hospitalizations. The mean ± SD age of nonparticipants was 39.72 ± 11.16 years, which was significantly older than that of participants (36.38 ± 9.05) ($t = 2.15$, $df = 95.25$, $p = .03$).

Participant characteristics. Seventy-three patients (41.0%) were interviewed while in day treatment, 61 (34.3%) were on the community preparation unit, 28 (15.7%) were on the homeless unit, and 16 (9.0%) were on the acute admissions unit. Across sites, patients were comparable clinically, with no significant differences in number of previous hospitalizations, level of functioning (GAF score), diagnosis (schizophrenia vs. other), or HIV risk behaviors. Patients were therefore combined.

Men comprised 64% of the sample, and the ethnic distribution was representative of the units from which patients were recruited, with approximately one third each African-American, Hispanic, and white/other.

The most prevalent SCID diagnosis was schizophrenia (49.4%), followed by other psychoses (29.2%), bipolar disorder (11.8%), major depression (7.3%), and other Axis I disorders (2.3%). The chronicity of the sample was evident: of the 174 patients for whom the number of previous psychiatric hospitalizations could be ascertained, the median was four (range, 2–28); only 13 (7.5%) had none; 27 (15.5%) had one; and 134 (77.0%) had multiple previous hospitalizations. The median GAF score was 40 (range, 1–70), indicating substantial impairment in reality testing, communication, thinking, or mood.

Psychiatric symptoms. Patients appeared to be well stabilized at the time of the interview. Median PANSS scores for symptom clusters were as follow: cognitive = 11 (range, 4–23); positive = 6 (range, 3–21); negative = 14 (range, 6–29); excited = 5 (range, 4–15); and depressed/anxious = 7 (range, 4–20). Higher scores in the cognitive and negative domains are consistent with the most prevalent diagnoses, schizophrenia and other psychotic disorders, which account for nearly 79% of the sample.

AIDS knowledge. The total number of questionnaire items correctly answered indicated adequate knowledge about AIDS. Of 28 questions, the median number of correct answers was 23 (range, 11–28), or 82% correct. Seven patients (3.9%) had perfect scores. Despite the overall high degree of knowledge, 91 patients (51.1%) incorrectly believed that HIV could be spread through casual contact. For example, 66 patients (37.1%) thought it would be unsafe to be in the same room as someone with AIDS. Excluding casual contact items, the median number of correct answers for the subset of 12 items that tested knowledge of the actual routes of HIV transmission rose to 11 (range, 5–12), or 92% correct. Fifty-three patients (29.8%) had perfect scores on this subset. The subset of casual contact items was not significantly associated with any clinical characteristic or risk behavior.

HIV risk behavior. Ninety-two (51.7%) of 178 patients reported being sexually active in the previous 6 months. Of the sexually active patients for whom data were available, 44 (47.8%) of 92 had multiple sex partners; 32 (35.2%) of 91 used drugs during sex; 27 (29.7%) of 91 traded sex; and 50 (58.1%) of 86 never used condoms in

Table 1. Associated Clinical Characteristics, AIDS Knowledge, and HIV Risk Behaviors Among 178 Psychiatric Patients*

	Total		Below Median AIDS Knowledge Score		Injected Drugs[a]		Sexually Active[b]		Multiple Partners[b,c]		Used Drugs During Sex[b,c]		Traded Sex[b,c]		Never Used Condoms[b,c]	
Measure	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Total	178	100.0	84/178	47.2	31/177	17.5	92/178	51.7	44/178	47.8[c]	32/91	35.2[c]	27/91	29.7[c]	50/86	58.1[c]
SCID Axis I diagnosis																
Schizophrenia	88/178	49.4	50/88	56.8[e]	14/87	16.1	42/88	47.7	25/42	59.5[d]	21/41	51.2[e]	20/41	48.8[f]	22/39	56.4
All others	90/178	50.6	34/90	37.8	17/90	18.9	50/90	55.6	19/50	38.0	11/50	22.0	7/50	14.0	28/47	59.6
GAF score																
< 40	75/178	42.1	40/75	53.3	16/75	21.3	37/75	49.3	20/37	54.1	17/36	47.2[d]	14/36	38.9	22/35	62.9
≥ 40	103/178	57.9	44/103	42.7	15/102	14.7	55/103	53.4	24/55	43.6	15/55	27.3	13/55	23.6	28/51	54.9
PANSS symptoms score																
Cognitive																
< 11	82	47.1	14	17.3[f]	11	36.7	51	55.4[d]	23	52.3	14	43.8	9	33.3	28	56.0
≥ 11	92	52.9	67	82.7	19	63.3	41	44.6	21	47.7	18	56.3	18	66.7	22	44.0
Positive																
< 6	78	44.8	33	40.7	10	33.3	44	47.8	15	34.1[e]	16	50.0	12	44.4	24	48.0
≥ 6	96	55.2	48	59.3	20	66.7	48	52.2	29	65.9	16	50.0	15	55.6	26	52.0
Negative																
< 14	86	49.4	27	33.3[f]	13	43.3	53	57.6[d]	24	54.5	19	59.4	11	40.7	29	58.0
≥ 14	88	50.6	54	66.7	17	56.7	39	42.4	20	45.5	13	40.6	16	59.3	21	42.0
Excitement																
< 5	78	44.8	43	53.1[d]	17	56.7	33	35.9[e]	12	27.3	11	34.4	6	22.2[d]	19	38.0
≥ 5	96	55.2	38	46.9	13	43.3	59	64.1	32	72.7	21	65.6	21	77.8	31	62.0
Depressed/anxious																
< 7	66	37.9	29	35.8	12	40.0	31	33.7	13	29.5	8	25.0	6	22.2	16	32.0
≥ 7	108	62.1	52	64.2	18	60.0	61	66.3	31	70.5	24	75.0	21	77.8	34	68.0
AIDS knowledge score																
< 23	84/178	47.2	…	…	14/84	16.7	30/84	35.7[f]	16/30	53.3	16/29	55.2[e]	16/29	55.2[f]	17/27	63.0
≥ 23	94/178	52.8	…	…	17/94	18.3	62/94	66.0	28/62	45.2	16/62	25.8	11/62	17.7	33/59	55.9

*Abbreviations: GAF = Global Assessment of Functioning, PANSS = Positive and Negative Syndrome Scale, SCID = Structured Clinical Interview for DSM-III-R. N may vary due to missing information.
[a]Since 1978.
[b]During the previous 6 months.
[c]Percent of sexually active.
[d]$p \leq .05$.
[e]$p \leq .01$.
[f]$p \leq .001$.

the past 6 months. Of the 177 patients for whom drug-injection histories since 1978 were available, 31 (17.5%) reported this behavior.

Correlates of AIDS Knowledge

AIDS knowledge and psychiatric symptoms. Total knowledge score was significantly associated with cognitive symptoms ($r = -.6481$, $p < .01$) as expected, as well as with negative symptoms ($r = -.4485$, $p < .01$) and excitement ($r = .1739$, $p < .05$), but not with positive symptoms ($r = -.0173$) or depression/anxiety ($r = .1192$).

Factors Associated With HIV Risk Behavior

Patient characteristics, AIDS knowledge, and risk behavior. Gender, ethnicity, marital status, treatment site, and number of previous psychiatric hospitalizations showed no significant association with any risk behavior. Similarly, median AIDS knowledge scores were not significantly related to unprotected versus protected sexual activity or type of sexual activity (oral vs. vaginal vs. anal intercourse).

Table 1 shows associations between six HIV risk behaviors, AIDS knowledge, and clinical characteristics of patients. Univariate analysis revealed the following significant associations: injecting drugs was associated only with age ($\chi^2 = 11.07$, df = 1, $p = .0009$); being sexually active was associated with age ($\chi^2 = 9.95$, df = 1, $p = .002$), cognitive symptoms ($\chi^2 = 5.41$, df = 1, $p = .02$), excitement ($\chi^2 = 6.33$, df = 1, $p = .01$), negative symptoms ($\chi^2 = 5.23$, df = 1, $p = .02$), and AIDS knowledge ($\chi^2 = 16.25$, df = 1, $p = .0000$); having multiple partners was associated with psychiatric diagnosis ($\chi^2 = 4.24$, df = 1, $p = .04$) and positive symptoms ($\chi^2 = 6.38$, df = 1, $p = .01$); using drugs during sex was associated with level of education ($\chi^2 = 4.34$, df = 1, $p = .04$), psychiatric diagnosis ($\chi^2 = 8.44$, df = 1, $p = .004$), level of functioning ($\chi^2 = 3.80$, df = 1, $p = .05$), and AIDS knowledge ($\chi^2 = 7.47$, df = 1, $p = .006$); and trading sex was associated with level of education ($\chi^2 = 4.77$, df = 1, $p = .03$), psychiatric diagnosis ($\chi^2 = 13.06$, df = 1, $p = .0003$), excitement ($\chi^2 = 6.76$, df = 1, $p = .009$), and AIDS knowledge ($\chi^2 = 13.27$, df = 1, $p = .0003$). Condom use was not associated with any demographic or clinical characteristic or AIDS knowledge.

Table 2. Predictors of HIV Risk Activity Among 178 Psychiatric Patients*

Factor	Sexually Active[a] Adjusted OR (95% CI)	p	Multiple Partners[a,b] Adjusted OR (95% CI)	p	Traded Sex[a,b] Adjusted OR (95% CI)	p
Age	3.36 (1.69 to 6.69)	.0006	…	…	…	…
Axis I diagnosis	…	…	…	…	3.50 (1.26 to 9.69)	.016
Positive symptoms	…	…	2.86 (1.20 to 6.81)	.0177	…	…
Excitement symptoms	2.00 (1.01 to 3.89)	.05	…	…	5.23 (1.77 to 15.45)	.0027
AIDS knowledge	3.12 (1.42 to 6.83)	.0045	…	…		

*N may vary due to missing information.
[a]During the previous 6 months.
[b]Among sexually active patients.

Factors That Increase the Relative Risk of HIV-Related Behaviors

The relative risk (unadjusted ORs with 95% CI) of drug injection was increased in patients aged 36 years or older (OR = 4.27, CI = 7.13 to 10.54). The relative risk of being sexually active was increased in patients under the age of 36 (OR = 2.63, CI = 1.43 to 4.81) and for those with fewer cognitive symptoms (OR = 2.05, CI = 1.12 to 3.75), higher excitement scores (OR = 2.17, CI = 1.18 to 4.00), fewer negative symptoms (OR = 2.01, CI = 1.10 to 3.69), and greater AIDS knowledge (OR = 3.49, CI = 1.88 to 6.47). The relative risk of having multiple partners was increased by a diagnosis of schizophrenia (OR = 2.40, CI = 1.04 to 5.59) and more positive symptoms (OR = 2.95, CI = 1.26 to 6.91). The relative risk of using drugs during sex was increased by a lower level of education (OR = 2.57, CI = 1.05 to 6.32), a diagnosis of schizophrenia (OR = 3.72, CI = 1.50 to 9.22), and less AIDS knowledge (OR = 3.54, CI = 1.40 to 8.94). The relative risk of trading sex was increased by less education (OR = 2.86, CI = 1.10 to 7.45), a diagnosis of schizophrenia (OR = 2.14, CI = 2.14 to 16.01), more excitement symptoms (OR = 3.41, CI = 1.30 to 8.93), and less AIDS knowledge (OR = 5 71, CI = 2.14 to 15.20).

These significant unadjusted odds ratios determined which variables to test as predictors of each risk behavior. To estimate the relative risk of that behavior, controlling simultaneously for the effects of all associated patient characteristics, we obtained adjusted odds ratios, that are shown in Table 2.

Predictors

Drug injection. Because age was the only factor that increased the likelihood of having a drug-injection history, adjusted odds ratios were not required.

Sexual activity. Taking into account the simultaneous contribution of age, cognitive disorganization, excitement, negative symptoms, and knowledge about AIDS, the likelihood of being sexually active was increased by more than threefold in patients under the age of 36, by twofold for those with a higher excitement score, and by threefold for those with an AIDS knowledge score ≥ 23.

Multiple sex partners. After controlling for the simultaneous contribution of a diagnosis of schizophrenia and positive symptoms, only positive symptoms increased the likelihood of having multiple partners, by nearly threefold.

Drug use during sex. After simultaneously controlling for the independent contributions of level of education, a diagnosis of schizophrenia, and AIDS knowledge, none of these factors increased the likelihood of using drugs during sex.

Sex trading. When the simultaneous contribution of level of education, psychiatric diagnosis, excitement, and AIDS knowledge was considered, a diagnosis of schizophrenia contributed to a 3.5-fold increase and a higher excited symptoms score contributed to a more than fivefold increase in the likelihood of trading sex.

DISCUSSION

We sought to delineate the relative contributions of knowledge about AIDS and specific psychiatric symptoms to six behaviors associated with HIV risk by examining all three factors together in a group of people in treatment for severe mental illness.

Our findings confirmed several hypotheses about the relationship between specific psychiatric symptoms, knowledge about AIDS, and HIV risk behaviors among people with severe mental illness. AIDS knowledge worsened with cognitive dysfunction, and sexual risk behavior increased with positive and excited symptoms. However, negative and depressed/anxious symptoms did not predict sexual risk behavior, and there were no psychiatric predictors of drug injection. In addition, we did not find that HIV risk behavior decreased with greater knowledge about AIDS.

With a median correct response rate of 82%, our study demonstrates that a large group of adults with severe mental illness in public hospital treatment settings in New York City possesses adequate knowledge about HIV and AIDS. As with the general population, however, knowing the facts does not necessarily translate to risk-free behavior. In this study, psychiatric patients evidenced possible exposure to HIV through a history of drug injection (18%) and recent

sexual activity (52%). Sexually active patients reported sex with multiple partners (48%), drug use during sex (35%), sex trading (30%), and lack of condom use (58%).

Of these risk behaviors, only the likelihood of being sexually active was predicted by AIDS knowledge. The prediction model does not establish that knowledge causes sexual activity, but rather that the likelihood of being sexually active is greater among patients with better AIDS knowledge. This suggests that people with severe mental illness who are sexually active may have more motivation than abstinent patients to learn about the risks of sexual activity or are more likely to attend to information relevant to being sexually active.

Regardless of AIDS knowledge, some sexual behaviors were predicted by a patient's psychiatric condition: being sexually active, having sex with more than one partner, and trading sex were predicted by specific clinical characteristics of patients. Being sexually active versus abstinent was predicted by the excitement symptom cluster. In the presence of these symptoms, even at low levels, the likelihood of being sexually active doubled. For some patients, both being sexually active and having excited symptoms may be intermittent states. This suggests that patients may be taught to enhance their preparedness to behave more safely by recognizing the link between being in an excited state and the increased likelihood of sexual contact. Contrary to speculation in the literature, a diagnosis of bipolar disorder (12% of our sample) was not related to being sexually active; the excitement cluster, therefore, has more utility as an HIV risk assessment tool.

Having multiple sex partners was nearly three times as likely among patients with greater positive symptoms. Because these symptoms may involve beliefs that override the use of rational information, increasing knowledge alone is unlikely to be an effective HIV prevention strategy during acute phases of illness. New intervention models are needed to increase patients' abilities to protect themselves from HIV infection when their positive symptoms reach even a relatively low threshold. Having sex with more than one partner in the previous 6 months was not predicted by excitement, and bipolar disorder did not differentiate the patients' likelihood of engaging in this risk behavior.

Trading sex was more than three times as likely among patients with a diagnosis of schizophrenia than among those with other Axis I diagnoses and more than five times as likely among those with greater excited symptoms. These two clinical features predict sex trading independently as well as when they appear together. Positive symptoms were not related to this risk behavior, which suggests that factors related to having a diagnosis of schizophrenia, other than such hallmark symptoms as delusions and unusual thoughts, contribute to bartering sex for money, drugs, food, rent, or other goods. An economic incentive, which we did not assess, may play a decisive role. Drug dependence may also increase the likelihood of sex trading among people with severe illness, as it does in the general population.[47] In this study, we did not find a link between drug use (any kind that occurred during sex or injection that occurred in the past) and any clinical factor we measured, including diagnosis.

Condom use, one of the most critical HIV risk reduction strategies, was not practiced at all by more than half of the sexually active men and women in this study. It was not predicted by knowledge about AIDS, psychiatric diagnosis, or severity of symptoms, suggesting that factors we did not measure, such as cultural and social norms,[48] may influence self-protection. Environmental conditions, including the availability of condoms in treatment settings and the treatment staff's attitudes toward condom distribution, may play an enormous part in patients' ability to put their knowledge into practice. Staff or policymakers may be more comfortable providing information than providing condoms to patients. A recent survey of 296 outpatient programs licensed and certified by the state of New York showed that whereas 60.1% provide educational material to patients, only 27.7% provide condoms, and 25.4% provide risk reduction skills training (Satriano J, Cournos F, McKinnon K, et al. 1996. Unpublished data). Providers may view patients as less competent and less like the general population than they actually are. In fact, this study shows that people with severe mental illness have information and that processing that information is not the problem. It would be unfortunate if, after successfully disseminating the message to patients that condoms can prevent AIDS, providers failed to offer concrete help to this impoverished population by ensuring access to condoms.

In this study, some fallacies about AIDS were found to persist among certain psychiatric patients, particularly about casual contact, but psychiatric symptoms did not explain incorrect answers to casual contact items. Similar misinformation has been found among nonpsychiatric groups.[49] As with the general population, the most common error was overestimating the risk from casual contact, which would not be expected to contribute to increased risk behavior; in our study, it did not contribute to decreased risk behavior either.

Only one demographic characteristic of patients was predictive of HIV risk behavior. Age was independently related to drug injection and being sexually active. Patients aged 36 years or older were more than four times as likely as younger patients to have injected drugs since 1978. Because initiation of drug injection typically occurs by the mid-twenties,[50] some younger patients may not have reached the age at which injecting would begin. The lower rate of injection among younger patients may also reflect successful HIV prevention messages[26] and the trend to use drugs such as heroin in noninjectable forms (e.g., intranasal) that confer lower HIV transmission risk.[51]

Age under 36 years contributed a greater than threefold increase in the likelihood of being sexually active in the past 6 months compared with those aged 36 or older. This is consistent with findings in the general population.[52]

Limitations

We obtained consent from 77% of patients who were eligible for this study and had capacity to give informed consent. Differences between nonparticipants and participants may have affected our findings in two important ways: nonparticipants were significantly older than participants, which may have led us to underestimate the rate of drug-injection histories and overestimate the proportion of sexually active patients.

The majority of patients in our sample were interviewed while in public mental health care settings in New York City and had a diagnosis of schizophrenia with evidence of chronic psychiatric illness but relatively well-stabilized symptoms. Our findings, therefore, may not be generalizable to patients outside urban treatment sites, in acute-care settings, or to people with severe mental illness who are not treated in a public mental health care system. A larger sample of patients with bipolar disorder might yield different results. In addition, we excluded all data from 4 patients whose sexual risk behavior reports were unreliable because of cognitive deficits, impaired memory, or borderline I.Q. Although these patients represent less than 2% of eligible patients, those whose symptoms are extremely severe may differ from participants in our study.

Regional differences may exist in AIDS knowledge. For example, 23% of outpatients in the Midwest did not believe that using condoms can help prevent AIDS.[23] In our study, 9% of patients held this belief. Data were collected in both regions in the early 1990s and may underestimate what patients know at any point in time thereafter.

Since patients we interviewed had not injected drugs recently, future studies should select samples with a greater proportion of active drug injectors to learn whether specific psychiatric symptoms and AIDS knowledge predict this activity.

We carefully examined the effects of clinical factors and knowledge about AIDS on specific sexual and drug use risk behaviors. We did not ask patients whether they knew their HIV status, nor did we inquire about their attitudes, beliefs, or social norms, all of which may contribute to behaviors associated with HIV transmission.

CONCLUSION

This study demonstrates for the first time that being sexually active, having multiple sex partners, and trading sex are directly related to particular psychiatric conditions, regardless of patients' AIDS knowledge. The clinical features implicated in these risk behaviors include a diagnosis of schizophrenia and positive and excited symptoms. We would not conclude from this study that people with severe mental illness should be considered a "risk group" since the clinical predictors of risk that we identified are not found among all psychiatric patients, must reach a certain threshold of severity, and are related to particular risk behaviors in which not all patients engage.

This study has helped to clarify the role AIDS knowledge plays in several key HIV risk behaviors in a large group of psychiatric patients. Although we found evidence that certain psychiatric symptoms are associated with poorer AIDS knowledge, this association does not appear to contribute to increased HIV risk behavior. As in the general population, adequate knowledge is not sufficient to change behavior. Assuming that psychiatric patients take risks because they do not know any better is a disservice to them and underestimates their competence.

Even though adequate AIDS knowledge does not ensure avoidance of risk behaviors, knowing the facts about HIV transmission may facilitate risk reduction. Moreover, an AIDS knowledge questionnaire is a nonthreatening way in which to introduce the topic of HIV risk with patients and can be used as a first step in a risk-prevention program that also improves patients' recognition of their personal risk and enhances their skills to protect themselves and others from acquiring the fatal virus.

REFERENCES

1. Aruffo AF, Coverdale JH, Chacko RC, et al. Knowledge about AIDS among women psychiatric outpatients. Hosp Community Psychiatry 1990;41:326–328
2. Baer JW, Dwyer PC, Lewitter-Koehler S. Knowledge about AIDS among psychiatric inpatients. Hosp Community Psychiatry 1988;39:986–988
3. Horwath E, Kramer M, Cournos F, et al. Clinical presentations of AIDS and HIV infection in state psychiatric facilities. Hosp Community Psychiatry 1989;40:502–506
4. Steiner J, Lussier R, Rosenblatt W. Knowledge about and risk factors for AIDS in a day hospital population. Hosp Community Psychiatry 1992; 43:734–735
5. Graham LL, Cates JA. How to reduce the risk of HIV infection for the seriously mentally ill. J Psychosoc Nurs Ment Health Serv 1992;30:9–13
6. Carmen E, Brady SM. AIDS risk and prevention for the chronically mentally ill. Hosp Community Psychiatry 1990;41:652–657
7. Knox MD, Boaz TL, Friedrich MA, et al. HIV risk factors for persons with serious mental illness. Community Mental Health Journal 1994;30: 551–563
8. Zimbardo P, Ebbesen EB. Influencing Attitudes and Changing Behaviors. Reading, Mass: Addison-Wesley; 1970
9. Hecker BI, Ajzen I. Improving the prediction of health behavior: an approach based on the theory of reasoned action. Academic Psychology Bulletin 1983;5:11–19
10. Becker MH, Joseph JG. AIDS and behavioral change to reduce risk: a review. Am J Public Health 1988;78:394–410
11. Coates TJ, Temoshok L, Mandel J. Psychosocial research is essential to understanding and treating AIDS. Am Psychol 1984;39:1309–1314
12. Stall RD, Coates TJ, Hoff C. Behavioral risk reduction of HIV infection among gay and bisexual men: a review of the results from the United States. Am Psychol 1988;43:878–885
13. Kelly JA, St. Lawrence JS, Hood HV, et al. Behavioral intervention to reduce AIDS risk activities. J Consult Clin Psychol 1989;57:60–67

14. Rotheram-Borus MJ, Koopman C. Sexual risk behaviors, AIDS knowledge, and beliefs about AIDS among runaways. Am J Public Health 1991;81:208–210
15. Cournos F, Empfield M, Horwath E, et al. HIV seroprevalence among patients admitted to two psychiatric hospitals. Am J Psychiatry 1991; 148:1225–1230
16. Volavka J, Convit A, Czobor P, et al. HIV seroprevalence and risk behaviors in psychiatric inpatients. Psychiatry Res 1991;39:109–114
17. Sacks MH, Dermatis H, Looser-Ott S, et al. Seroprevalence of HIV and risk factors for AIDS in psychiatric inpatients. Hosp Community Psychiatry 1992;43:736–737
18. Empfield M, Cournos F, Meyer I, et al. HIV seroprevalence among homeless patients admitted to a psychiatric inpatient unit. Am J Psychiatry 1993;150:47–52
19. Meyer I, McKinnon K, Cournos F, et al. HIV seroprevalance among long-stay psychiatric inpatients. Hosp Community Psychiatry 1993;44: 282–284
20. Silberstein C, Galanter M, Marmor M, et al. HIV-1 among inner city dually diagnosed inpatients. Am J Drug Alcohol Abuse 1994;20:101–131
21. Sacks MH, Perry S, Graver R, et al. Self-reported HIV-related risk behaviors in acute psychiatric inpatients: a pilot study. Hosp Community Psychiatry 1990;41:1253–1255
22. Hanson M, Kramer TH, Gross W, et al. AIDS awareness and risk behaviors among dually disordered adults. AIDS Education and Prevention 1992;4:41–51
23. Kelly JA, Murphy DA, Bahr R, et al. AIDS/HIV risk behavior among the chronically mentally ill. Am J Psychiatry 1992;149:886–889
24. Kalichman SC, Sikkema KJ, Kelly JA, et al. Use of a brief behavioral skills intervention to prevent HIV infection among chronic mentally ill adults. Psychiatric Services 1995;46:275–280
25. Sacks MH, Silberstein C, Weiler P, et al. HIV-related risk factors in acute psychiatric inpatients. Hosp Community Psychiatry 1990;41:449–451
26. Horwath E, Cournos F, McKinnon K, et al. Illicit drug injection among psychiatric patients without a primary substance abuse diagnosis: implications for HIV risk. Psychiatric Services 1996;47:181–185
27. Cournos F, McKinnon K, Meyer-Bahlburg HFL, et al. HIV risk activity among persons with severe mental illness: preliminary findings. Hosp Community Psychiatry 1993;44:1104–1106
28. McDermott BE, Sautter FJ, Winsread DK, et al. Diagnosis, health beliefs, and risk of HIV infection in psychiatric patients. Hosp Community Psychiatry 1994;45:580–585
29. Kelly JA, Murphy DA, Sikkema KJ, et al. Predictors of high and low levels of HIV risk behavior among adults with chronic mental illness. Psychiatric Services 1995;46:813–818
30. Susser E, Valencia E, Conover S. Prevalence of HIV infection among psychiatric patients in a New York City men's shelter. Am J Public Health 1993;83:568–570
31. Susser E, Valencia E. HIV risk behaviors among homeless mentally ill men. Presented at the 9th International Conference on AIDS; June 6–11, 1993; Berlin, Germany. Abstracts (PO-D04-3549) 9:809
32. Cournos F, Guido J, Coomaraswamy S, et al. Sexual activity and risk of HIV infection among patients with schizophrenia. Am J Psychiatry 1994; 151:228–232
33. Kalichman SC, Kelly JA, Johnson JR, et al. Factors associated with risk of HIV infection among chronic mentally ill adults. Am J Psychiatry 1994; 151:221–227
34. Zafrani M, McLaughlin DG. Knowledge about AIDS [letter]. Hosp Community Psychiatry 1990;41:1261
35. Hardy AM. National health interview survey data on adult knowledge of AIDS in the United States. Public Health Report 1990;105:629–634
36. Cournos F, McKinnon K, Currie C. AIDS Knowledge Interview for Psychiatric Patients. New York, NY: New York State Psychiatric Institute; 1990
37. Spitzer RL, Williams JBW, Gibbon M, et al. Structured Clinical Interview for DSM-III-R (SCID). Washington, DC: American Psychiatric Press; 1990
38. Kay SR, Opler LA, Fizbein A. The Positive and Negative Syndrome Scale (PANSS), Rating Manual. Toronto, Canada: Multi Health System; 1990
39. Meyer-Bahlburg HFL, Ehrhardt AA, Exner TM, et al. Sexual Risk Behavior Assessment Schedule (SERBAS). New York, NY: HIV Center, New York State Psychiatric Institute; 1990
40. McKinnon K, Cournos F, Meyer-Bahlburg HFL, et al. Reliability of sexual risk behavior interviews with psychiatric inpatients. Am J Psychiatry 1993;150:972–974
41. Williams JBW, Rabkin J, Remien R. Parenteral Drug Use High-Risk Behavior Questionnaire. New York, NY: HIV Center, New York State Psychiatric Institute; 1989
42. Conant MA. Speculations on the viral etiology of acquired immune deficiency syndrome and Kaposi's sarcoma. J Invest Dermatol 1984;83:57S–62S
43. Lindenmayer JP, Bernstein-Hyman B, Grochowski S. A new five factor model of schizophrenia. Psychiatr Q 1994;65:299–322
44. Bell MD, Lysaker PH, Milstein RM, et al. Concurrent validity of the cognitive component of schizophrenia: relationship of PANSS scores to neuropsychological assessments. Psychiatry Res 1994;54:51–58
45. Lindenmayer JP, Grochowski S, Hyman RB. Five factor model of schizophrenia: replication across samples. Schizophr Res 1995;14:229–234
46. Fleiss JL. Statistical Methods for Rates and Proportions. New York, NY: John Wiley & Sons; 1981
47. Gossop M, Griffiths P, Powis B, et al. Severity of dependence and route of administration of heroine, cocaine and amphetamine. British Journal of Addiction 1992;87:1527–1536
48. Selik RM, Castro KG, Pappaiouanou M. Racial ethnic differences in the risk of AIDS in the United States. Am J Public Health 1988;78:1539–1545
49. LeBlanc AJ. Examining HIV-related knowledge among adults in the US. J Health Soc Behav 1993;34:23–36
50. Battjes RJ, Leukefeld CG, Pickens RW. Age at first injection and HIV risk among intravenous drug users. Am J Drug Alcohol Abuse 1992;18: 263–273
51. Des Jarlais DC. The first and second decades of AIDS among injecting drug users. British Journal of Addiction 1992;87:347–353
52. Seidman SN, Rieder RO. A review of sexual behavior in the United States. Am J Psychiatry 1994;151:330–341