Eur Child Adolesc Psychiatry (2007)
16:236–242 DOI 10.1007/s00787-006-0595-7

ORIGINAL CONTRIBUTION

Ana Margareth Siqueira Bassols
Rafael Alberto Santos
Luis Augusto Rohde
Flávio Pechansky

Exposure to HIV in Brazilian adolescents: the impact of psychiatric symptomatology

Accepted: 26 October 2006
Published online: 2 January 2007

A.M.S. Bassols, MD (✉) · R.A. Santos, MD
L.A. Rohde, MD · F. Pechansky, MD
Serviço de Psiquiatria da Infância e Adolescência
Hospital de Clínicas de Porto Alegre
Federal University of Rio Grande do Sul
Rua Ramiro Barcelos 2350
Porto Alegre, 90035-003 RS, Brazil
E-Mail: abassols@terra.com.br

Abstract *Objectives* To examine associations between psychiatric symptomatology and HIV-positive status in adolescents who sought HIV testing at a public health center in Brazil. *Method* In a cross-sectional study, 388 adolescents assessed for their HIV status were also evaluated for psychiatric symptomatology using the Symptom Checklist-90-R (SCL-90-R). The impact of potential confounding variables such as risk behaviors was ascertained using the Brazilian version of the Risk Assessment Battery (RAB). *Results* Overall seropositivity rate was 6.2%. Seropositives had significantly higher scores in all dimensions of psychiatric symptomatology in the SCL-90-R ($P < 0.05$ and effect sizes > 0.5 in all dimensions). In multiple analyses, with the inclusion of 3 composite variables (sex-risk, drug-risk, and psychiatric symptomatology), only psychiatric symptoms were associated with positive HIV status (OR = 1.88, CI95% = 1.06–3.34; $P = 0.032$). *Conclusions* Our findings suggest that amongst young people asking for HIV testing in Brazil, seropositivity is associated with psychological symptoms and that screening for the latter would therefore be appropriate in this context.

Key words HIV – adolescence – psychiatric symptoms – sexual behavior – drug use

Introduction

The struggle against AIDS (Acquired Immune Deficiency Syndrome) started in the 1980s and the disease has become pandemic, particularly in developing countries. Until the end of 2003, 40 million children and adults were living with HIV/AIDS worldwide. There were about 14,000 new HIV infections per day in 2003; of those, more than 95% were in low and middle income countries, and almost 2,000 occurred in children under 15 years of age [31].

Especially for youngsters, the UNAIDS/WHO report [30] emphasizes the need for preventive efforts, since recent data from several countries have demonstrated an increase in the incidence of risky behaviors, low frequency of condom use, and higher rates of sexually transmitted diseases (STDs) in this specific group.

Evidence from different sources document that young people with serious mental disorders presents high risk for HIV infection [1]. There were frequent reports of depression, anxiety, bipolar disorder, and sexual abuse trauma in samples of North-American seropositive adolescents. Many of these conditions preceded HIV infection itself, and were amplified in its impact by the positive result of the HIV test [15].

It is important to note that due to the high association between mental health problems, drug use/

abuse and sex risk behaviors, it is extremely difficult to disentangle the isolated effects of mental health problems in the pathways ending into HIV infection. Thus, adolescents with psychiatric symptoms might be at a greater risk for HIV infection due to a greater prevalence of sexual relations, multiple partners and sexual abuse [22]. Ramrakha et al. [26] identified a higher probability of risky sex associated with diagnoses of mental disorders at the age of 21. Depression, drug addiction or anti-social personality increased the chances for risky sexual behavior, sexually transmitted diseases, and early sexual life in that sample. In addition, personality traits—such as impulsiveness and sensation seeking [20, 33]—may predispose adolescents to early sexual debut, drugs and other illegal behaviors. Marijuana, cocaine, and other drugs have been associated with a greater rate of sexual relations, multiple partners and low use of condoms [18]. Donenberg and Pao [11] in a recent review with a focus on child and adolescent risk factors associated with HIV/AIDS, showed their significant mental health implications.

Little is known about the relation between sexual risky behaviors and psychiatric disorders that reach their peak during adolescence with important implications for public health. Fleitlich and Goodman [12] suggest that a great share of Brazilian adolescents need special care for their high prevalence of mental disorders. Since HIV infection is spreading quickly in the young population of developing countries, it is of surprise the scarcity of research to assess the role of mental health problems for the development of HIV infection in the context of drug use patterns and sex risk behaviors in these countries. For instance, there is very little research analyzing the connections between mental health problems, drug abuse, or STDs in Brazil [27]. Thus, the main objective of this study was to investigate the association between psychiatric symptomatology and HIV infection in a sample of young people from a developing country, controlling for the impact of risky behaviors involving sex and drugs. Our main hypothesis was that HIV+ adolescents would show higher psychiatric symptomatology compared to HIV− adolescents, even when other risky situations were controlled.

Method

Sample

The sample was comprised of consecutive adolescents aging 13–20 years-old assessed in an anonymous testing site for HIV and STDs in the city of Porto Alegre during one year. Porto Alegre is the capital of the southernmost state of Brazil with a population of 1,800,000 inhabitants. The only exclusion criteria were the lack of cognitive conditions or altered conscience state that would prevent interview (assessed clinically), and involuntary attendance to the center (e.g., sent by the court). This sample is not representative of the whole population of adolescents from the city. Due to difficulties in the system of referral/assessment of this Public Health Clinic, we could not obtain the exact number of individuals who were potentially screened for the study. The Clinic's information is that there is an universe of about one thousand adolescents (13–20 years old)/year that search for anonymous HIV tests.

The study was conducted with the adolescents' tacit consent—only those who accepted to participate (n = 402) answered the forms. Subjects were informed of the goals of the study and filled out the questionnaires anonymously. The study was approved by the Ethics Committee and Institutional Review Board at the Hospital de Clínicas de Porto Alegre (approved as an IRB by the Office for Human Research Protections, United States of America-IRB 00000921).

Design

This is a cross-sectional study. The study factor was the presence of psychiatric symptoms. The outcome was HIV status. Potential confounders included demographics (age, gender, marital status, employment, family income, and schooling) and sex risk behaviors for HIV and drug use patterns in the last 30 days and throughout life.

Procedures and instruments

Data were collected by trained interviewers who were blind for the respondent's serostatus. Standard pretest counseling data was performed by the center's permanent staff. Adolescents answered questionnaires individually. Interviewers were trained in a pilot study with data collection of 19 cases, which were excluded from final analyses. These pilot cases were used to calibrate the standards for data collection and the development of the database. Instruments included:

(a) SCL-90-R- The Symptom Checklist-90-R [8, 9, 16] is a standard instrument that allows for detection of psychiatric dimensions of symptomatology in the week prior to the interview in the following areas: somatization, obsessive compulsive, interpersonal, depression, anxiety, hostility, phobia, paranoid ideation, and psychosis. It is a screening instrument for global psychological discomfort, discriminating between cases and non-cases [9].

(b) RAB—Risk Assessment Battery [21]. The RAB is a self-applied questionnaire translated into Brazilian Portuguese [24, 25]. It assesses drug and sexual behaviors throughout life, in the previous six months and during the month prior to data collection, as well as basic demographics data. The instrument comprises 38 questions. Questions about the age of sexual initiation, pregnancy, and/or previous abortions were added to the RAB.

(c) ELISA (Enzyme Linked Immunosorbent Assay) test and confirmatory tests to evaluate HIV serology. All blood samples were tested using two ELISA essays with different antigens. The exams with a positive, indeterminate or discordant result were confirmed using the Indirect Immunofluorescence technique—IFI. Indeterminate Immunofluorescences were confirmed by the Western Blot test.

The database was subjected to systematic internal analyses, when questionnaires were individually checked, retyped and compared by an external observer.

Data analyses

Quantitative data were described by means and standard deviations, and qualitative data by absolute and percentile frequency. Odds ratios (OR) were calculated with their respective confidence intervals of 95% and their significance was determined by the chi-square test. Fisher's exact test was used for low frequencies. Relations among quantitative data were evaluated by the Student's *t* test and the magnitude of associations was determined by the effect size. All tests were two-tailed. The level of significance was set at 5% and the data were analyzed using SPSS version 11.0.

After bivariate analyses, we performed multiple logistic regression analyses. To avoid excessive testing (Type I Error) and collinearity, we entered three composites: psychiatric symptomatology (overall score in the SCL-90-R), sex-risk (based on all individual variables along lifetime, for both genders, that were associated with positive HIV status in bivariate analyses for a $P < 0.2$: sexual relation with male partners without condom + sexual relation with an injection drug users (IDU) partner + money in exchange for sexual relation + sexual debut < 12 years old + never wore condom in sexual relation) and drug-risk (based on the following individual variables: illicit drug use+ been in drug-using/drug-selling places; those presenting a $P < 0.2$ in bivariate analyses). Two demographic variables (low schooling and family income) were associated to positive HIV status for a $P < 0.2$. Since they were highly associated, only low schooling was kept in these multivariate analyses to avoid collinearity.

Results

The sample comprised 402 youngsters who filled the instruments. About 14 cases were lost, from whom no HIV test results could be obtained. The overall HIV-positive status of this sample was 6.2%, based on 388 respondents. Mostly, the sample was comprised of young, predominantly female subjects, with little schooling (50.9% did not complete elementary school) and income. Although a positive serostatus was significantly associated with low schooling ($P = 0.03$; OR = 7.8, CI95% = 1.1–59.3), no other significant difference was detected between positive and negative HIV adolescents regarding demographic variables (gender, age, family income, marital status, and job status).

With regard to psychiatric symptomatology, seropositive adolescents showed significantly higher scores in all dimensions of the SCL-90-R (see Table 1). The

Table 1 Psychiatric Symptomatology and its association with HIV serostatus

Variables	HIV status				Difference between means (CI95%)	*P*	ES*
	Positive		Negative				
	n	mean ± SD	*n*	Mean ± SD			
SCL-90 dimensions							
Somatization	24	1.29 ± 0.85	357	0.74 ± 0.66	0.54 (0.27; 0.82)	0.005	0.82
Obsessive-compulsive	24	1.43 ± 0.85	358	0.92 ± 0.75	0.51 (0.20; 0.83)	0.001	0.67
Interpersonal	24	1.37 ± 0.80	358	0.95 ± 0.76	0.42 (0.10; 0.74)	0.010	0.55
Depression	24	1.74 ± 1.01	358	0.93 ± 0.81	0.81 (0.37; 1.24)	0.001	0.98
Anxiety	24	1.24 ± 0.86	358	0.69 ± 0.71	0.55 (0.18; 0.91)	0.005	0.76
Hostility	24	1.45 ± 1.09	358	0.89 ± 0.90	0.56 (0.10; 1.03)	0.020	0.61
Phobia	24	1.01 ± 0.78	358	0.49 ± 0.61	0.53 (0.19; 0.86)	0.003	0.84
Paranoid ideation	24	1.42 ± 0.97	358	0.88 ± 0.79	0.54 (0.13; 0.96)	0.012	0.67
Psychotic	24	1.28 ± 1.01	358	0.70 ± 0.74	0.59 (0.16; 1.02)	0.010	0.76
Overall SCL-90 score	24	1.39 ± 0.79	347	0.81 ± 0.66	0.58 (0.24; 0.92)	0.002	0.87

* ES: Effect size

Table 2 Sex risk practices along lifetime and its association with HIV seropositivity

	Positive *n* (%)	Negative *n* (%)	Total *n* (%)	OR (CI 95%)	*P*
Sexual relation					
Male and female sex	*n* = 24	*n* = 364	*n* = 388		
With male partners without condon	19 (79.2)	198 (54.4)	217 (55.9)	3.2 (1.1–10.0)	0.031[a]
With female partners without condon	4 (16.7)	95 (26.1)	99 (25.5)	0.6 (0.2–1.8)	0.432[a]
With prostitutes	1 (4.2)	14 (3.8)	15 (3.9)	1.1 (0.1–7.8)	0.999[b]
For money	3 (12.5)	16 (4.4)	19 (4.9)	3.1 (0.7–12.7)	0.105[b]
Sexual partner (IDUs)	*n* = 24	*n* = 364	*n* = 388		
	2 (8.3)	9 (2.5)	11 (2.8)	3.6 (0.0–19.6)	0.143[b]
Sexual initiation < 12 years	*n* = 24	*n* = 352	*n* = 376		
	6 (25.0)	30 (8.5)	36 (9.6)	3.6 (1.2–10.5)	0.019[b]
Used Condon	*n* = 21	*n* = 339	*n* = 360		
Always	1 (1.5)	67 (98.5)	68 (18.9)	1	0.079[a]
Almost always	6 (4.3)	134 (95.7)	140 (38.9)	3.0 (0.4–67.5)	
Almost never	7 (8.5)	75 (91.5)	82 (22.8)	6.3 (0.7–138.7)	
Never	7 (0.1)	63 (0.9)	70 (19.4)	7.4 (0.9–165.6)	

Data presented as frequency (percent). [a]χ^2 Yates; [b]Fisher's Exact Test; OR: Odds ratio; IDU: Injection drug users

overall SCL-90-R score was significantly higher in positive HIV adolescents ($P < 0.01$; Effect size = 0.87).

Regarding sexual risk factors throughout life, positive HIV status was significantly associated with early sexual initiation (before 12 years of age) ($P = 0.02$), and sexual intercourse with a male partner without condoms ($P = 0.03$). Other variables not significantly associated with HIV seropositivity, but included in the SEX composite in the multivariate analyses ($P < 0.2$) were: sexual relation with an injection drug user (IDU) partner, money in exchange for sexual relation, and never wore condom in sexual relation. Infrequent condom use was high for both groups (Table 2). As for sex risk practices in the six months prior to the study, adolescents who reported having received money for sex showed a higher association with seropositivity ($P < 0.01$), the same happening with those who had sexual relations with a possible seropositive partner ($P < 0.001$).

The overall prevalence of drug use (Table 3) in the month prior to data collection was high in both groups. The most frequently reported drugs used were alcohol, marijuana, snorted cocaine, and inhalants. HIV positives used significantly more illicit drugs ($P = 0.01$). Specifically, recent marijuana ($P < 0.05$), amphetamines ($P < 0.01$), and solvents uses ($P < 0.001$) were significantly higher in positive HIV adolescents. Attendance to drug-using/drug-selling places showed statistically significant association with seropositive status ($P < 0.04$).

Findings from multivariate logistic regression analyses can be found in Table 4. When schooling and the three composites (psychiatric symptomatology, sex-risk and drug-risk) were included in the final model, only the SCL-90 overall score was significantly associated with seropositivity ($P = 0.032$; OR = 1.88, CI 95% = 1.06–3.34). The sex-risk composite reached borderline significance ($P = 0.06$; OR = 1.63, CI 95% = 0.98–2.70).

Discussion

We were able to document that psychiatric symptomatology was significantly associated with HIV seropositivity in a sample of adolescents from a developing country even adjusting for other relevant risk behaviors. To the best of our knowledge, this is the first study comparing adolescent HIV serostatus and psychiatric symptoms in the context of risk behaviors in a developing country with high rates of HIV infection.

Table 3 Risk behavior through drug use previous to the sampling and its association with HIV seropositivity

	Positive *n* (%)	Negative *n* (%)	Total *n* (%)	OR (CI 95%)	*P*
Past six months					
Injection drug use (IDU)	*n* = 24	*n* = 362	*n* = 386		
	1 (4.2)	7 (1.9)	8 (2.1)	2.2 (0.1–18.4)	0.405[b]
Drug selling hang-out Frequency	*n* = 24	*n* = 362	*n* = 386		
	10 (41.7)	77 (21.3)	87 (22.5)	2.6 (1.0–6.6)	0.039[a]
Illicit drug use	*n* = 24	*n* = 364	*n* = 388		
	13 (11.4)	101 (88.6)	114 (100)	3,08 (1.39–7.09)	0.012[a]

Data presented as frequency (percent). [a]χ^2 Yates; [b]Fisher's Exact Test; OR: Odds ratio

Table 4 Multiple logistic regression analyses for composite risk factors and HIV seropositivity

	P	OR	IC (95%)
Schooling	0.276	–	–
<9 years	1.00	–	–
9–11 years	0.157	4.46	0.56–35.48
12 or more	0.382	4.38	0.55–34.89
SEX-RISK*	0.060	1.63	0.98–2.70
DRUG-RISK**	0.205	1.42	0.82–2.46
SCL-total	0.032	1.88	1.06–3.34

* SEX-RISK = Subjects fulfilling at least one of the following conditions: sexual relation with male partner without condom, injection drug user (IDU) sexual partner, sexual relation for money, sexual initiation <12 years old, never used condom; **DRUG-RISK = subjects fulfilling at least one of the following conditions: being in drug-selling places or illicit drug use

Voluntary HIV testing is uncommon among young people, and UNAIDS [30] has reported adult seroprevalence of 0.6% in Latin America. The high seroprevalence found in this sample may be due to the fact that a significant fraction of this group had a greater perception of risk than the general population, which may have motivated them to look for a test center. It seems that they represent a highly selected group of young people that voluntarily choose to find out their serologic status, maybe motivated by media.

Although the preponderance of HIV infection in adolescent females did not reach statistical significance in our study, data published by the Brazilian Ministry of Health show an increase in the proportion of infected adolescent females compared to male adolescents, from 0.6 in 2001 to 0.7 in 2004 [3, 5], pointing to younger women as the group where the epidemic most spreads in the country.

It is important to note that HIV infection and psychiatric symptoms and/or disorders have a complex relationship. In samples of adults, there are several evidences documenting the link between HIV infection and psychiatric disorders. For example, Kelly et al. [17] found elevated lifetime rates of major depression in HIV-positive men in a cross-sectional study comparing HIV-negative and HIV-positive homosexual/bisexual men in Australia. In the HIV-positive men, psychiatric disorder was significantly associated with the presence of lifetime psychiatric disorder prior to HIV infection diagnosis. In adults too, Thompson et al. [29] provided evidence that patients with serious mental illness had higher rates of participation in risk behavior for HIV infection than those in the general community. However, data from samples of adolescents are scarce. Severely mentally ill youths are at elevated risk for human immunodeficiency virus infection, but little is known either about acquired immunodeficiency syndrome (AIDS) risks behaviors in adolescents who seek outpatient mental health services or the links between psychiatric problems and particular high-risk behaviors [10]. Our findings suggesting higher psychiatric symptomatology in positive HIV adolescents are in agreement with previous report from the literature [1, 6, 14, 22]. In addition, the association was kept even after adjusting for the impact of other relevant risk factors such as sex risk behaviors and drug use. Moreover, this association was verified in a complete different culture than those previously assessed.

Sex risk behaviors were marginally associated to positive HIV status in multivariate analyses. Among sex risk behaviors, early sexual initiation seems to be a relevant factor for HIV infection. Most teenagers reported sexual debut between 12 and 16 years of age and those who started before 12 were at even greater risk for HIV infection. Delaying sexual initiation has an extra advantage of protecting adolescents from STDs and unwanted pregnancies. Whaley [32] suggests the joint approach to both AIDS and unwanted pregnancy would favor care for female adolescents with regard to these aspects. In addition, the infrequent use of condoms and carelessness in preventing pregnancy detected in this study is in agreement with reports from other studies [2, 14]. More than 80% of the adolescents reported sex without condoms. Despite nationwide media campaigns, the information is not used to guide adolescents' conduct even in those who perceive themselves as belonging to a high risk group. It is possible to speculate that lack of schooling, altered perception generated by drug use and/or psychiatric symptoms may make these subjects feel invulnerable. Attention to HIV education and prevention in adolescents has been inappropriately scant; strategies to encourage safer behavior are urgently needed.

Although non-injectable drug use was associated with positive HIV in bivariate analyses, the significance disappears in the context of psychiatric symptomatology, low schooling and sex risk behaviors. It is important to note that marijuana use in the month previous to data collection was lower in this sample than those reported in other studies with Brazilian adolescents [13]. Since other investigators reported that mental health disorders like depression [4, 7], bipolar disorder, conduct disorder and ADHD might be risk factors for substance use disorders [19, 28], drug abuse might be a intermediate factor in the pathway between mental health problems and HIV infection.

Limitations

The findings of this study should be understood in the context of some methodological limitations. First, the generalization of our findings to other geographic or socioeconomic groups is restricted due to the low schooling and income of our sample. Second, for lo-

gistic reasons it was not possible to test the subjects for IQ. Third, the sample was collected at a free testing site. This fact could have generated a greater rate of seropositivity as opposed to non-clinical samples. Fourth, the screening instrument chosen for the assessment of psychiatric symptoms (SLC-90-R) does not cover all psychiatric disorders, although it is a broad-band instrument [8, 9, 16]. As stated by Myers and Winters [23], most scales do not provide all the psychometric data desired in selecting the best scale. Moreover, it is important to note that all SLC-90-R psychiatric dimensions were significantly associated with the HIV status. Fifth, the small sample size of positive HIV adolescents might have prevented the detection of some clinically relevant associations. Finally, only an association (not causal relationship) between psychiatric symptoms and HIV status might be inferred from this study due to the cross-sectional design.

Clinical implications

Health professionals dealing with policies for prevention of HIV infection in young people in developing countries are quite familiar with social and environmental risk factors, but much less trained in the recognition of the impact of mental health problems on seropositivity. Thus, our findings suggesting an association between psychiatric symptoms and positive HIV infection indicate that among young people asking for HIV testing in Brazil, seropositivity is associated with psychological symptoms and that screening for the latter would therefore be appropriate in this context.

In addition, longitudinal studies are needed to identify specific roles of psychiatric symptoms, sex risk behavior, and drug use in the pathway ending in HIV infection during adolescence, especially in developing countries.

Disclosure: Dr. Rohde is on the speakers' bureau or is a consultant for Bristol-Myers Squibb, Eli-Lilly, Janssen-Cilag, and Novartis. Other authors have no potential conflict of interest.

Acknowledgements The authors wish to thank Statistician Vania Gomes Hirakata for performing analyses and database management.

References

1. APA. American Psychiatric Association (2000) Work group on HIV/AIDS: practice guideline for the treatment of patients with HIV/AIDS. Am J Psychiatr 157 (Suppl):1–62
2. Béria J, Oliveira OMF, Carret MLV (1998) Adolescentes e DST/AIDS: pesquisa formativa em um estudo de intervenção. In: Béria J, ed Ficar, transar...: a sexualidade do adolescente em tempos de AIDS. Porto Alegre Tomo Editorial pp 37–54
3. Brasil. Ministério da Saúde (2004) Dados epidemiológicos Brasil (Tabelas). Bol Epidemiol AIDST 1:29–32
4. Bukstein OG, Glancy LJ, Kaminer Y (1992) Patterns of affective comorbidity in a clinical population of dually diagnosed adolescent substance abusers. J Am Acad Child Adolesc Psychiatry 31:1041–1045
5. Castellón L (2002) Risco Anunciado: mulheres já somam metade dos casos da doença no planeta. Isto é 1731:1746
6. Chandra PS, Desai G, Ranjan S (2005) HIV and psychiatric disorders. Indian J Med Res 121:451–467
7. Clark DB, Pollock N, Bukstein OG, Mezzich AC, Bromberger JT, Donovan JE (1997) Gender and comorbid psychopathology in adolescents with alcohol dependence. J Am Acad Child Adolesc Psychiatry 36:1195–1203
8. Derogatis LR. (1977) SCL-90: administration, scoring and procedures manual. Johns Hopkins University, Baltimore
9. Derogatis LR (2000) Symptom Checklist – 90–Revised (SCL-90-R). In: American Psychiatric Association: handbook of psychiatric measures. American Psychiatric, Washington, pp 81–84
10. Donenberg GR, Emerson E, Bryan FB, Wilson H, Weber-Shifrin E (2001) Understanding AIDS-risk behavior among adolescents in psychiatric care: links to psychopathology and peer relationships. J Am Acad Child Adolesc Psychiatry 40:642–653
11. Donenberg GR, Youths Pao M (2005) HIV/AIDS: psychiatry's role in a changing epidemic. J Am Acad Child Adolescent Psychiatry 44:8
12. Fleitlich BW, Goodman R (2001) Social factors associated with child mental health problems in Brazil: cross sectional survey. Br Med J 323:599–600
13. Galduróz JCF, Noto AR, Carlini EA (1997) IV Levantamento sobre o uso de drogas entre estudantes de 1 e 2 graus em 10 capitais brasileiras. São Paulo: CEBRID
14. Hein K, Dell R, Futtermann D, Rotheram-Borus MJ, Shaffer N (1995) Comparison of HIV + and HIV – adolescents: risk factors and psychosocial determinants. Pediatrics 95:96–104
15. Henderson R, Colgrove J, Lusk H (1998) A survey of the mental care needs of HIV positive adolescents and young adults. Int Conf AIDS 12:485
16. Holi MM, Sammallahti PR, Aalberg VA (1998) A Finnish validation study of the SCL- 90. Acta Psychiatr Scand 97:42–46
17. Kelly B, Raphael B, Judd F, Perdices M, Kernutt G, Burrows GD, et al (1998) Psychiatric disorder in HIV infection. Aust N Z J Psychiatry 32:441–453
18. Lowry R, Holtzman D, Truman BI, Kann L, Collins JL, Kolbe LJ (1994) Substance use and related sexual behaviors among US high school students: are they related? Am J Public Health 84:1116–1122

19. Mannuzza S, Klein RG, Bessler A, Malloy P, LaPadula M (1993) Adult outcome of hyperactive boys: educational achievement, occupational rank, and psychiatric status. Arch Gen Psychiatry 50: 565–576
20. Martin CA, Kelly TH, Rayens MK, Brogli BR, Brenzel A, Smith WJ, et al. (2002) Sensation seeking, puberty, and nicotine, alcohol and marijuana use in adolescence. J Am Acad Child Adolesc Psychiatry 41:1495–1502
21. Metzger DS (1993) The risk assessment battery (RAB) validity and reliability. Sixth Annual Meeting of the National Cooperative Vaccine Development Groups for AIDS. Alexandria
22. Moscicki AB, Millstein SG, Broering J, Irwin CE Jr (1993) Risks of human immunodeficiency virus infection among adolescents attending three diverse clinics. J Pediatr 122: 813–820
23. Myers K, Winters NC (2002) Ten-year review of rating scales. I: overview of scale functioning, psychometric properties, and selection. J Am Acad Child Adolesc Psychiatry 41(2):114–122
24. Pechansky F, Hirakata V, Metzger D (2002) Adaptation and validation of a questionnaire about risk behaviors for AIDS among drug users. Rev Bras Psiquiatr 24:130–136
25. Pechansky F (1998) Um estudo sobre situações de risco para contaminação pelo vírus HIV em usuários de drogas da cidade de Porto Alegre (thesis). Porto Alegre: Universidade Federal do Rio Grande do Sul
26. Ramrakha S, Caspi A, Dickson N, Moffit TE, Paul C (2000) Psychiatric disorders and risky sexual behavior in young adulthood: cross sectional study in birth cohort. Br Med J 321:263–266
27. Scivoletto S, Tsuji RK, Abdo CHN, Queirós S, Andrade AG, Gattaz W (1999) Relação entre consumo de drogas e comportamento sexual de estudantes de 2 grau de São Paulo. Rev Bras Psiquiatr 21:87–94
28. Tapert SF, Baratta MV, Abrantes AM, Brown SA (2002) Attention dysfunction predicts substance involvement in community youths. J Am Acad Child Adolesc Psychiatry 41(6):680–686
29. Thompson SC, Checkley GE, Hocking JS, Crofts N, Mijch AM, Judd FK (1997) HIV risk behaviour and HIV testing of psychiatric patients in Melbourne. Aust N Z J Psychiatry 31:566–576
30. UNAIDS. Latin America and the Caribbean fact sheets. Available at http://www.unaids.org [accessed 2002 January]
31. UNAIDS/WHO. Aids epidemic update. Available at http://www.unaids.org [accessed 2003 December]
32. Whaley AL. Preventing the high-risk sexual behavior of adolescents: focus on HIV/AIDS transmission, unintended pregnancy, or both? J Adolesc Health [online journal] 1999. Available at http://www.64.4.14.250/cgi-bin/dasp/offhm.asp?_lang = BR [accessed 2001 May]
33. Zuckerman M (1994) Behavioral expressions and biosocial bases of sensation seeking. New York: Cambridge University Press