

Letters to the Editor

Associations Among HTLV-I, HTLV-II, and HIV in Injecting Drug Users in Salvador, Brazil

To the Editor: HIV, HTLV-I, and HTLV-II were identified in the period between 1979 and 1985. These retroviruses are transmitted through sexual contact, blood transfusion, sharing of contaminated injecting equipment, and from mother to child. HTLV-I is the causal agent of T-cell leukemia/lymphoma and HTLV-I-associated myelopathy/tropical spastic paraparesis (HAM/TSP). In contrast, there is no clear evidence of diseases associated with HTLV-II.

Brazil is a continental country with various geographic, climatic, and sociodemographic characteristics. For example, during the Portuguese colonization of Brazil, a large number of people were brought from Africa to work as slaves, mainly in agricultural and mining sectors located predominantly in the northeast region. Conversely, in the beginning of this century, the southern region of the country was the destination of a significant number of people migrating from Europe and Asia.

The presence of HTLV-I and its related diseases has been amply demonstrated in Brazil (1,2). However, HTLV-II was identified mainly among native Brazilians living in the Amazonian Basin (3). It has been shown that HTLV-I prevalence is 0.41% in a nationwide survey of blood donors, and the city of Salvador, with the highest prevalence of 1.35%, appears to be the epicenter of this infection (4). No HTLV-II infection was detected in this study; however, the presence of HTLV-II in blood donors does exist, since a seroprevalence of 0.03% was demonstrated in São Paulo (5). Other studies conducted in Brazil demonstrated the presence of these infections in selected groups (6-8).

These results prompted us to study the prevalence of HIV, HTLV-I, and HTLV-II among injecting drug users (IDUs) in Salvador, the capital of the state of Bahia. This city is located in the Northeastern region of Brazil and has ~2.5 million inhabitants, most of whom are of African and Portuguese descent (9).

A cross-sectional study using a snowball sampling technique was performed from August 1994 to September 1996 (Projeto Brasil-Salvador) in the historical district of the city (Pelourinho). This district is surrounded by areas of marginality, prostitution, drug use, and drug traffic. The snowball technique provides a study sample based on referrals made by individuals who shared characteristics or know others who have characteristics considered in the investigation (10). Drug dealers and drug users were contacted in the streets of Pelourinho by trained research assistants and were invited to act as mediators between potential participants and investigators.

After obtaining informed consent, 216 asymptomatic IDUs were interviewed by trained research assistants who looked for "tracks" or broken veins to confirm drug practices of the candidate. The questionnaires were adapted from the World Health

Organization Multicity IDUs study (11). Questions on demographics, sexual behavior, and drug use practices were obtained. Sera were screened for HIV-1/2 and HTLV-I/II antibodies by enzyme-linked immunosorbent assays (ELISA; Abbott HIV-1/2 3rd generation EIA Plus, Delkenheim, Germany, and Cambridge [rp_{21c} enhanced], Cambridge Biotech Corp., Worcester, MA, U.S.A., respectively) and confirmed by Western blot (HIV-1, Cambridge Biotech Corp., and GLD HTLV Blot 2.4, Genelabs, Science Park Drive, Singapore, respectively). The GLD HTLV Blot 2.4 also discriminates HTLV-I and HTLV-II infections. The HTLV-I/HTLV-II coinfections were confirmed by nested polymerase chain reaction (PCR) (12) and Amplicor PCR Diagnostic HTLV-I and II (Roche, Diagnostic System, Branchburg, NJ, U.S.A.). Evidence of the presence of *Treponema pallidum* infection was initially evaluated by serum reactivity to nontreponemal cardiolipin antigen (VDRL Behring, Marburg, Germany). VDRL-positive samples were further tested by *T pallidum* indirect immunofluorescence (FTA, Behring). Univariate statistics were used to analyze the data.

Table 1 presents the prevalence of retrovirus infection and selected demographic variables. Overall, the prevalence of HTLV-I/II was 35.2% (76 of 216). We found 55 (25.5%) individuals infected with HTLV-I, 19 (8.8%) infected with HTLV-II, and 107 (49.5%) infected with HIV-1. HTLV-I was identified in 72.4% of HTLV-positive IDUs. The prevalence of coinfection was 22.2% and 10.6% for HTLV-I/HIV-1 and HTLV-II/HIV-1, respectively. Two male individuals, 16 and 44 years of age, were infected with HTLV-I, HTLV-II, and HIV-1. None had serologic evidence of syphilis, as demonstrated by the absence of specific *T pallidum* antibodies. Of the total sample, 177 (81.9%) were male and 39 (18.1%) were female. The majority (49.5%) were between 21 and 34 years of age. Univariate analysis demonstrated that female gender (odds ratio [OR] = 3.03; 95% confidence interval [CI], 1.49-7.03) and older age range (35-66 years; OR = 4.43; 95% CI, 2.05-9.57) were associated with HTLV-I infection but not with HTLV-II infection. HIV-1 seropositivity (OR = 6.72; 95% CI, 3.23-14.00) and syphilis (OR = 3.93; 95% CI, 3.08-11.42) were strong risk factors for HTLV-I infection. Multivariate analysis did not change the direction of these associations.

The results of this investigation demonstrated very high prevalence of HTLV-I, HTLV-II, and HIV-1 among IDUs in Salvador, Brazil. Furthermore, our data showed a higher prevalence of HTLV-I than HTLV-II, which differs from previous observations in the United States and Europe, where HTLV-II is more frequent than HTLV-I among IDUs. This observation probably reflects the high endemicity of HTLV-I in this area of Brazil. In addition, this is the first demonstration of HTLV-I, HTLV-II, and HIV-1 coinfection in the northeast region of Brazil. The observed HTLV-I/HIV-1 or HTLV-II/HIV-1 coinfections may have a potential impact on the outcome of these infections, as recently demonstrated (13); natural history studies will be important in clarifying this. In addition, infected IDUs may play an important role in the dissemination of these

TABLE 1. Human retrovirus infection and selected demographic variables among injecting drug users, Projeto Brasil-Salvador, Brazil, 1994-1996

Variable	N (216)	%
Single infection		
HTLV-I	55	25.5
HTLV-II	19	8.8
HIV-1	107	49.5
Coinfection		
HTLV-I/HIV-1	48	22.2
HTLV-II/HIV-1	23	10.6
HTLV-I + HTLV-II/HIV-1	2	0.9
Gender		
Males	177	81.9
Females	39	18.1
Age at enrollment		
15-20	80	37.1
21-34	107	49.5
35-55	29	13.4

retroviruses to the general population. It will be necessary to carry out further studies to better understand the dynamics of retrovirus transmission, such as sexual and drug use behavior interaction, to formulate efficient prevention measures.

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HTLV-I/II Seropositivity in Populations at High Risk for HIV-1 Infection in Cordoba City, Argentina

To the Editor: In Argentina, recent epidemiologic studies in Buenos Aires suggest the presence of HTLV-I/II in blood banks and in the population at risk for HIV-1 infection, with seroprevalence of 4% in injection drug users, 0.5% in homosexual men, and 0.1% in blood donors (1-4). However, neither blood nor blood derivatives are screened for these agents in our country, and no serosurveillance analyses have been made to determine regional prevalence.

The current seroepidemiologic survey was carried out in Cordoba City (the capital of Cordoba Province), population 1.2 million), the largest Mediterranean city in Argentina, to assess the extent of HTLV-I/II seropositivity. A total of 312 serum samples, collected from 1985 to 1995 from HIV-1-positive individuals and from subjects exposed to HIV through blood transfusion, were screened for HTLV-I/II antibodies. All specimens were tested by Serodia HTLV-I particulate agglutination (PA) assay (Fujirebio, Tokyo, Japan) and by an indirect immunofluorescence assay (IFA) using the HTLV-I and HTLV-II transformed human T-cell lines MT-2 and Mo-T (5). Positive samples were also tested by Western blot (WB; Problot HTLV-I, Fujirebio, Inc., Japan) (6). We interpreted WB results by the following criteria: positive, presence of gp46 (*env*) band and one or more *gag* bands (p19, p24, p53); negative, absence of bands; and indeterminate, presence of any bands that did not fulfill the positive pattern.

All of the serum samples that were negative by PA proved to be negative by IFA. Of 10 PA-reactive sera, 6 were confirmed to be HTLV-I-positive and 1 was confirmed to be HTLV-II-positive using IFA. Of 6 HTLV-I-positive samples on IFA, 5 were confirmed positive by WB, but 1 sample was not tested (Table 1). The IFA HTLV-II-positive sample was indeterminate, with a weak reaction to the p24 and p19 HTLV-I proteins.

IFA is accepted as a confirmatory test for anti-HTLV-I/II antibodies; however, in view of the less than optimal sensitivity