Seroepidemiology of Human Immunodeficiency Virus in Illicit Substance Users in Ahvaz, Iran: 2005-2006

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ABSTRACT

Background: A high seroprevalence rate of human immunodeficiency virus (HIV) infection has been reported among Iranian illicit substance users (ISUs).

Objectives: The aim of this study was to evaluate the prevalence of HIV and its risk factors in this population.

Patients and Methods: A total of 228 ISUs were included in this cross-sectional study, which was conducted in Ahvaz, southern Iran, from 2005 to 2006. The study population was randomly selected from available ISUs in prisons and addiction treatment centers. Subjects were tested for the presence of anti-HIV antibodies using the enzyme linked immunosorbent assay (ELISA) method. Drug use behaviors associated with HIV transmission (i.e., high-risk behaviors) and their current sexual risk behaviors were examined.

Results: Sixty two (27.2%; 95% CI: 22.5% - 31.8%) of the 228 men were HIV positive. The prevalence of HIV positivity in injecting, inhalant and oral users was 50.2%, 10.4%, and 7.6%, respectively. HIV was positive in heroin, crack and opium users with a rate of 96.2%, 83.3%, and 1.4%, respectively. Among the HIV infected cases, the vast majority had engaged in high-risk behaviors, including sharing needles (72%), the majority of the injectors had also had unprotected sex with women (67.7%), or with men (22.6%).

Conclusions: Illicit substance usage is associated with an increased risk of exposure to HIV and this results in a high prevalence of HIV infection. Heroin injecting, sexually transmitted diseases (STD), having sex with multiple partners, unprotected sex, a long period in prison, early adulthood, and family contact with HIV infected cases, are considered to be the main risk factors for HIV infection.

Implication for health policy/practice/research/medical education:
The results of this study are useful for health policy in HIV control.

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1. Background

HIV has been threatening the lives and health of people all over the world in recent years. Use of intravenous drug is one of the main risk behaviors for the transmission of HIV (1, 2). As a result, there is a high prevalence (up to 30%) of this infection among intravenous drug users (IDUs) (3, 4). Similarly, the heterosexual spread of HIV associated with IDUs in the USA and Europe has shown great variations (5). Glesser et al. reported a significant increase of HIV infected homosexuals and female IDUs in Frankfurt am Main, and other big German cities during 1999 - 2000 (6). However, transmission of this disease depends enormously on individual behavior, i.e. personal habits that are subject to changes and variations in social circum-
stances, beliefs, lifestyles and the availability of information (7, 8), hence, patterns of seroprevalence may also change (9). There has been limited data on HIV infections reported from illicit substance users (ISUs) attending drug addiction treatment centers in Ahvaz, Iran. Since the first report of an HIV infection in 1999 among prisoners in Kermanshah, a western province of Iran, a high prevalence of HIV infection has been reported in IDU prisoners by Iranian CDC and several researchers during HIV surveillance in prisons (10).

2. Objectives

No studies have been conducted among the ISUs for HIV infection in Ahvaz. Therefore, the present study was conducted to determine the prevalence and risk factors of HIV infection in ISUs among the IDUs attending drug addiction treatment centers in Ahvaz.

3. Patients and Methods

A total of 228 ISUs were included in this cross-sectional study, which was conducted in Ahvaz, southern Iran, from 2005 to 2006. This study was part of an approved proposal funded by the Jundishapur Infectious and Tropical Disease Research Center, affiliated to the Jundishapur University of Medical Sciences. The study population was randomly selected from available ISUs in prisons and addiction treatment centers.

After a thorough physical examination, the subjects completed a questionnaire including; personal information, cigarette smoking, alcohol consumption, imprisonment, duration of time spent in prison, past history of sexually transmitted diseases (STD), sexual behavior, viral hepatitis, HIV infection in his partner or his family and variables related to addiction, such as kind of drug and route of administration.

A blood sample was taken from each participant to be tested for antibodies against HIV. Inclusion criteria were; residency in prison or drug treatment center. Exclusion criteria were; a history of blood or blood products transfusion, operative surgery and receiving anti-retroviral drugs. Antibodies to HIV were detected by an enzyme linked immunosorbent assay (ELISA) and confirmed by a western blot test. Data were analyzed in SPSS 15 (SPSS Inc., Chicago, IL) using; chi-square test, Fisher’s exact test and odds ratio with 95% confidence interval (CI). A p-value less than 0.05 was considered statistically significant.

4. Results

All cases studied were male and had a mean ± SD age of 34.1 ± 6.1 (range: 18 - 54) years. Of the 228 cases, 62 (27.2 %; 95 % CI: 22.5 % - 31.8 %) were HIV positive. The prevalence of HIV positivity in injecting, inhalant and oral drug abusers was; 50.2 %, 10.4 %, and 7.6 %, respectively. There was a significant difference in the positive rates between injecting and non-injecting users (P < 0.0001). HIV was positive in heroin, crack and opiate users at a rate of; 96.2 %, 83.3 %, and 1.4 %, respectively. Other results regarding their personal characteristics; coinfection with hepatitis viral infections, HIV infection in partner/family member, route of addiction and type of substance which is used, are shown in Tables 1, 2 and 3. As shown in Table 1, there was no significant difference in age except in the under 25 year group, or level of education, however, there was a significant difference in place of residence between HIV positive and negative cases (P < 0.0001). Those with a history of HIV infection in family members or sexual partners had a higher prevalence rate of HIV positivity than the others (Table 2).

Positive history of HIV infection in the sexual partner or a family member was 22.2 %, and 17 %, respectively. The mean ± SD number of cigarettes smoked per day in HIV-positive and negative subjects were 6.2 ± 2.6, and 5.4 ± 3.1, respectively. The mean ± SD amount of alcohol drunk per day in the two groups was 57.3 ± 29.7, and 63.1 ± 31.3 ml, respectively. As shown in Table 3, there was a significant difference in the type of substances abused between HIV positive and negative individuals (p < 0.0001). The prevalence of HIV positive in the prison and addiction treatment centers was 15.8 %, and 13.3 %, respectively, but a history of imprisonment in HIV positive cases was higher than in the HIV negative cases (93.3 % vs. 75.3 %).
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5. Discussion

The present study revealed that the prevalence of HIV infection was particularly high in the ISUs of Ahvaz, with a rate of 27.2 % for the total ISU population and 50.2 % for IDUs. This finding is higher than the prevalence of HIV infection in seroprevalence studies on HIV among ISUs in many other parts of the world (11-18). Kang et al. in their study on prisoners in New York showed a prevalence rate of 5 %, and in Puerto Rico there was a 53 % prevalence rate of anti HIV-antibodies in IDUs (14). Tang et al. also reported a high prevalence of HIV-antibodies among IDUs (17). De la Fuente et al. in a seroepidemiological study on HIV in different population groups, found that the prevalence of HIV-infection in IDUs was 39.6 % - 47.1 % which was higher than in the total population of ISUs (8.7 %) (11). Other reports from Malaysia, Italy and Pakistan suggest a high prevalence of HIV infection (ranging between 5

Table 2. Coinfection of HIV and Viral Hepatitis in the Study Population

| HIV Positive, No. (%) | HIV Negative, No. (%) | P value<sup>b</sup> |
|-----------------------|-----------------------|---------------------|
| Positive history of HIV in family member | 4 (6.4) | 1 (0.6) | 0.02 |
| Positive history of HIV in partner | 4 (6.4) | 1 (0.6) | 0.02 |
| Viral infection: HBsAg positive | 11 (17.7) | 5 (3.0) | 0.0003 |
| Anti HCV<sup>a</sup> positive | 35 (56.4) | 14 (8.4) | < 0.0001 |
| Total | 62 (100) | 166 (100) | |

<sup>a</sup> Abbreviations: HIV, Human immunodeficiency virus; HCV, Hepatitis C virus

<sup>b</sup> P value < 0.05 is considered significant

Table 3. Addiction Status, Behaviors and Used Substances in Study Population

| HIV Positive, No. (%) | HIV Negative, No. (%) | P value<sup>b</sup> |
|-----------------------|-----------------------|---------------------|
| Cigarette smoker | 62 (100) | 138 (83.1) | 0.0001 |
| Alcoholic | 21 (33.9) | 33 (19.9) | 0.02 |
| Route of drug administration | | | |
| IV<sup>a</sup> | 52 (83.8) | 57 (34.3) | < 0.0001 |
| Inhalation | 5 (8.1) | 43 (25.9) | 0.001 |
| Oral | 5 (8.1) | 61 (36.7) | < 0.0001 |
| Kind of drugs | | | |
| Heroin | 51 (82.2) | 2 (1.2) | < 0.0001 |
| Crack | 5 (8.1) | 1 (0.6) | 0.006 |
| Opiate | 1 (1.6) | 68 (40.9) | < 0.0001 |
| Total | 35 (100) | 193 (100) | |

<sup>a</sup> Abbreviations: HIV, Human immunodeficiency virus; IV, Intravenous

<sup>b</sup> P value < 0.05 is considered significant

Coinfection with hepatitis C virus (HCV) and hepatitis B virus (HBV) was observed in HIV positive cases at the rate of 56.4 % and 17.7 %, respectively (P < 0.05). Risk factors of HIV infection are shown in Table 4. The most important risk factors based on odds ratio (OR, 95 % CI) are: heroin injection, STD, high risk sexual behavior, imprisonment, HIV infection in family or partner and early adulthood.

Table 4. Risk Factors of HIV Infection in Illicit Substance Users in Ahvaz, SW Iran

| HIV Positive (No:62) | HIV Negative (No:166) | P value | Odds Ratio 95 % CI |
|---------------------|-----------------------|---------|-------------------|
| Age, y | | | 2.89:1.47-5.68 |
| <25 | 21 (33.9) | 25 (15.1) | 0.002 |
| >25 | 41 (66.1) | 141 (84.9) | |
| Residency | | | |
| Urban | 56 (90.3) | 103 (62.1) | < 0.0001 |
| Rural | 6 (9.7) | 63 (37.9) | 0.001 |
| Imprisonment | 58 (93.5) | 125 (75.3) | 4.76:1.63-13.91 |
| Prison, y | | | |
| >5 | 34 (54.8) | 63 (37.9) | < 0.0001 |
| <5 | 24 (32.2) | 152 (37.3) | < 0.0001 |
| STD | 30 (48.4) | 33 (19.9) | 3.78:2.02-7.07 |
| Sex behavior | | | |
| Sex with multiple partner | 42 (67.7) | 40 (24.1) | < 0.0001 |
| Condom misuse | 49 (79.1) | 103 (62.1) | 0.01 |
| Past history of HIV in family/partner | 4 (6.4) | 1 (0.6) | 0.02 |
| Admin Route | | | |
| Injection | 52 (83.8) | 57 (34.3) | < 0.0001 |
| Non injection | 10 (16.2) | 109 (65.7) | |
| Kind of subst | | | |
| Heroin | 51 (82.2) | 2 (1.2) | < 0.0001 |
| Others | 11 (17.8) | 164 (98.8) | |

Randomized Controlled Trial (RCT)
to 45\%) in ISUs (13, 15, 16). Although the seroprevalence of HIV in ISUs is higher than in the general population, the rate varies between different countries and even within countries. This difference may be contributed to by various factors such as: socio-economic status, life style, environmental sanitation, geographical variation, sexual behaviors, route of administration, type of substance and differences in assays for anti-HIV antibodies.

In the present study, the prevalence rate of HIV infection in non-injectors ranged between 7.6\% and 10.4\%, which is significantly higher than in other parts of the world. It is unknown to us why non-injecting ISUs have such a high rate of HIV antibodies. We believe that the high risk sexual behavior of ISUs in the study region, and possibly other routes of HIV transmission (non-injecting) such as; unprotected sex or tattooing, may be contributing to this condition.

We found no association between the presence of anti-HIV antibodies and the age of ISUs except in people below the age of 25 years. Previous published studies suggested that early adulthood was significantly associated with anti-HIV antibodies (12, 13, 18). The correlation of HIV with age may reflect the fact that HIV infection was acquired in adolescence and the HIV antibody has a lifelong persistence. However, our study population with similar poor sexual health practices, regardless of age, is at a similar risk of infection.

This study showed that there was an association between the presence of an HIV infection and variables such as; place of residence, imprisonment, smoking, alcohol consumption, duration of stay in prison, sexual behaviors, type of drugs, route of administration, and condom misuse. Some of these findings are in agreement and some contradict previous reports (2-7, 9-11, 13, 14, 16, 17). We believe that although some of these variables may be true risk factors of HIV infection (e.g. early adulthood, IDU, STD, having sex with multiple partners, unprotected sex, long time in prison and family contact with a HIV infected case), since our study population was at a similar risk for all of these factors, we could not determine a statistically significant difference between the HIV positive and HIV negative cases.

Our study showed that HIV seropositivity was related to the type of substance abused (P < 0.05), it was also related to the route of administration (P < 0.05). IDUs had a higher prevalence rate of HIV infection than non-IDUs (47.7\% vs. 15.2\%). Different routes of exposure have different risk levels, i.e. viremia levels in the blood differ. Perhaps it is worth noting that these findings are consistent with what has been found previously. In this present study the prevalence rate of HIV infection among non-injectors (7.6\%) was higher than in the general population (0.02\%) (19), and our findings are virtually consistent with that of Vasmani et al. and de la Fuentle et al. (11, 18). This finding may reflect the possibility that injection may not be the only route of transmission of HIV in the study region, and ISUs (mostly prisoners) with high risk sexual behaviors such as; homosexuality, misuse of condom and frequent sexual infections could also be infected by HIV. In this study, coinfection with the hepatitis B virus (HBV) or hepatitis C virus (HCV) was associated with a higher rate of HIV infection. Our previous studies and reports from other parts of the world, suggest a high rate of coinfection of HIV, HCV and HBV (19-21). We believe that the high frequency of high risk practices such as; the sharing of injection equipment, unprotected sex and imprisonment, exposes this population to HBV and HCV as well as HIV.

Positive past medical history in family members or partners of the HIV positive cases was significantly different from the HIV negative cases (4.8\% - 6.4\%, 6.2\% vs. 0.6\%) and this had a confounding effect on our results. However, in our study, the high prevalence of anti-HIV antibodies observed in that group of patients was shown to be due to the confounding effects of variables related to sexual behavior or imprisonment.

In the present study, oral users (Table 3) were at lower risk of infection with HIV in comparison with injectors and inhalators. The reason for the difference is clear between oral users and injectors (7.5\% vs 96.3\%), but not so clear for the difference between inhalers and oral users. We suppose that this is because in the study region, opium is the most frequently used substance via the oral route, the lower rate of awareness induced by opium, may result in a reduced rate of unprotected sex in oral users.

This study suggests that illicit substance usage is associated with an increased risk of exposure to HIV and results in a high prevalence of HIV infection in these people. Oral ISUs are at a lower risk of HIV infection than IDUs or inhalers. IDU, STD, having sex with multiple partners, unprotected sex, long time in prison, early adulthood and family contact with an HIV infected case, may be considered to be the main risk factors for an HIV infection.

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