Characteristics of High-Risk Sexual Behaviors for Human Immunodeficiency Virus Infection Among Iranian Drug Abusers

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Illustration

Objectives: This study was conducted to estimate the prevalence and the associated factors of high-risk sexual behaviors among drug abusers referred to a methadone clinic in Gorgan, the capital of Golestan province in the northeast of Iran, to help health care decision makers on designing interventional programs.

Methods: In this cross-sectional study, 400 drug abusers referred to our methadone clinic were evaluated for high-risk sexual behavior. A logistic regression model was fitted for the association between independent variables and high-risk sexual behavior.

Results: Approximately a quarter of patients (25.5%) had high-risk sexual behavior among which 47% had not used a condom in their last sexual contact. Drug abusers who had poor economic status had a lower chance of high-risk sexual behavior than those with good economic status (adjusted odds ratio [AOR] = 0.35, 95% confidence interval [CI] = 0.13–0.96). Also, 1-year increase in age reduced the chance by 6% (AOR = 0.94, 95% CI = 0.91–0.98). Heroin abusers, compared with opium abusers, had a duplicated chance of having high-risk sex (AOR = 2.11, 95% CI = 1.12–3.96).

Conclusion: According to this study, high-risk sexual behavior in the drug abusers referred to methadone clinic was associated with younger age, good economic status, and heroin addiction. Hence, in interventional planning, more attention should be paid to young drug abusers, patients with good economic status, and heroin addicts as well.

Drug abusers are at a higher risk of developing human immunodeficiency virus (HIV) infection than the general population due to 2 main reasons: high-risk injection behavior and high-risk sexual behavior (Arasteh et al., 2008). Transmission of HIV infection due to high-risk sexual behavior is an important concern among drug abusers, especially those who use sex as a trade to obtain drugs or money. Furthermore, the predominance of high-risk injection behavior in intravenous drug users (IDUs) mostly results in neglecting the sexual transmission of HIV infection. High-risk sexual behaviors include unprotected intercourse (without using a condom), a sexual relationship in exchange for receiving drugs or money, and having multiple casual sexual partners (Arasteh et al., 2008; United Nations Office on Drugs and Crime [UNODC], 2005).

According to the report by the Centers for Disease Control and Prevention (2010), by the end of spring 2010 a total of 21,435 patients with HIV infection and AIDS were recognized in Iran, with intravenous drug abuse (69.9%), unknown (19.3%), and sexual transmission (9.1%) as the most common routes of infection transmission. Moreover, the rate of heroin and opium abuse in Iran is the highest in the world 1 of every 17 Iranians and 20% of Iranians aged 15 to 60 years are drug abusers (Razzaghi et al., 2006). On the basis of government estimates, there are about 1.8 million drug abusers in Iran among whom 9% to 16% are IDUs (Razzaghi et al., 1999); this proportion is considerably increasing in recent decades (Rahimi et al., 2002).

Although shared injecting equipment is the route of infection transmission in most drug abusers, in some regions sexual behavior is the primary cause of infection transmission among IDUs (Welp et al., 2002). In addition there is some evidence of an association between HIV epidemic in IDUs and non-IDUs and the spread of HIV epidemic to the general population through networks of sexual relationships (Lowndes et al., 2003).

The association between drug abuse and sexual behavior is complicated, as it is more difficult to estimate the rate of HIV transmission through the interaction between drug abuse and injection behaviors.
and sexual behavior than the use of shared injecting equipment alone; in addition, different drugs have varying effects on sexual behaviors (Chawla et al., 2005). A significant association is observed between cocaine, crack, amphetamine, and ecstasy drug abuse and HIV-related high-risk sexual behaviors such as multiple casual sexual partners and having sexual contact without using a condom. It is believed that heroin decreases sexual activity and arousal; however, there is evidence that heroin-addicted individuals are involved in sexual activities. In a study in London on IDUs, who were mostly addicted to heroin, it was shown that 80% of the study population had sexual activity during the past 6 months, among whom 68% and 34% had sex without using a condom with their permanent and casual sexual partner, respectively, whereas approximately 10% were HIV infected (UNODC, 2005). It is demonstrated that severity of addiction to opium compounds is often correlated with increased high-risk sexual behavior, sex trade, and decreased use of a condom (Chawla et al., 2005). Sexual partners of IDUs are not necessarily IDUs, so sexual contact is the predominant route of infection transmission. In a study of 516 IDUs and their sexual partners in London, 62% of sexual partners were not IDUs (Chawla et al., 2005).

Human immunodeficiency virus–related high-risk sexual behaviors in drug abusers is not adequately studied in Iran; as a result, this study aimed to estimate the prevalence of high-risk sexual behaviors and the associated factors among drug abusers referred to a methadone clinic in Gorgan, the capital of Golestan province in the northeast of Iran, with more than 400,000 inhabitants, to help health care planners in designing interventional programs.

**MATERIALS AND METHODS**

After the ethics committee of Tehran University of Medical Sciences approved the study protocol, 400 drug abusers referred to a methadone clinic in Gorgan were recruited in a cross-sectional study via convenience sampling from October 2008 to August 2009. Study population consisted of drug abusers whose addiction was confirmed after a full evaluation by the clinic psychiatrists. Patients who could not answer the questions due to mental retardation, other psychiatric disorders, or speech difficulties were excluded. Patients were assured of their information being secured, and informed consent was obtained; all the subjects participated in the study.

A self-designed questionnaire was prepared by researchers in accordance to the research objectives. Content validity of the questionnaire was confirmed using experts’ opinions (psychiatrists and experts working on drug abuse programs). In a pilot study on 26 subjects, a test-retest analysis with an interval of 10 to 14 days provided an excellent reliability with a $\kappa$ coefficient of 0.86 and a correlation coefficient of 0.88. The questionnaire consisted of information on demographics (age, sex, ethnicity, successful academic years, etc), history of drug abuse, type of the drug and the dominant route of administration (smoking, oral use, injection, and inhalation), and sexual activity during past 12 months before the interview. The patients were asked about their permanent and casual sexual partners, condom use, and sex in exchange for receiving or paying money or drugs. High-risk sexual behavior was defined as illicit sex with someone other than the permanent sexual partner, that is, causal sexual partner.

To estimate the economic status of each patient, per capita income was used along with properties or family welfare facilities (including personal car, air conditioner, personal computer, washing machine, and vacuum cleaner). With regard to expert opinion and the socioeconomic status of regional people, patients’ economic status was evaluated.

Subjects were categorized in the following 3 groups according to per capita income: an income less than 750,000 rials (Rs, 10,000 Rs was equal to US $1 at the time of the study), between 750,000 to 2,500,000 Rs, and more than 2,500,000 Rs, which were considered as poor, intermediate, and good, respectively. To prevent incorrect information about income, two third of economic score was dedicated to Welfare facilities and one-third to income. For the income score, a score of 5 was given to poor, 10 to intermediate, and 15 to good groups; to measure the property score, for each of 5 welfare facilities, 6 scores were dedicated. The final economic status score was calculated as two third of property score plus one third of income score. Considering social conditions, cutoff points were defined as follows: patients earning less than 750,000 Rs per month with at most 2 welfare facilities were categorized as poor group (ie, the highest score was $17 = 6 \times 2 + 5$); those earning more than 250,000 Rs per month with at least 4 welfare facilities were classified as good group (ie, the lowest score was $39 = 6 \times 4 + 15$); and subjects with a score between 17 and 39 were considered as intermediate group. For obtaining a better precision in this classification, economic status of people under the coverage of support provided by Imam Khomeini Relief Foundation and Welfare Organization was considered as the gold standard of a poor economic status, as these people are believed to be of poor economic status according to the supporting organization criteria.

Data were analyzed using SPSS version 15, and $\chi^2$ test (for qualitative variables), $t$ test, univariate, and multivariate logistic regression models were used. The results are presented as crude and adjusted odds ratio (OR) with 95% confidence interval (CI). For crude OR, independent variables were separately entered in the regression model, whereas for adjusted OR, only those variables with a value of $P < 0.20$ were recruited in an enter regression model. The value of $P < 0.05$ was considered as statistically significant.

**RESULTS**

Among the total 400 patients evaluated in this study, there were 349 (87%) men, 270 (67.5%) married, and 341 (85.25%) urban residents, 246 (61.5%) with poor economic status. Among subjects of 3 ethnic groups who are residents of the area and have different culture and socioeconomic status (namely, Sistani, Turkmen, and Fars, which are operationally defined by their native language and/or pronunciation), 363 (90.8%) study subjects belonged to Fars ethnicity. Two hundred sixty-five (66.25%) and 50 (12.5%) subjects were opium consumers and IDUs, respectively. The mean age of these patients was 34.4 ± 10.93 years, mean successful academic years were 7.4 ± 4.1, and the mean age at the onset of drug abuse was 20.1 ± 7.07. Distribution of independent variables among the 2 study groups (with and without high-risk sexual
behavior) is shown in Table 1. As is shown in the table, there is a significant difference between the 2 groups in economic status, the type of drug abused, the route of drug administration, age, and the age at the onset of drug abuse ($P < 0.05$).

Sexual activity was reported by 89.5% of the patients; the mean age at first sexual activity was 20.18 ± 4.8, whereas it was lower in women (16.3 ± 4 in men vs 20.8 ± 4.6 in men). Most subjects (71.8%) were sexually active (having sexual activities during the past 12 months before interview) and 13.3% had more than 1 sexual partner (multiplicity of sexual partners); the mean number of sexual partner was 1.5 in the sexually active group. Approximately a quarter of subjects (25.5%) reported casual sex, which was 87% in single subjects and 4% in married subjects.

Considering condom use in sexually active addicts, 69.4% had not used a condom in the last sexual relationship, which was significantly lower in women (67.2% in women vs 83.3% in men; $P = 0.02$). On the contrary, 47% of individuals who had a casual sexual partner did not use a condom in their last sexual contact. Condom use in the past 12 months before the interview among the subjects was 63.6% never, 21% occasionally, 9.56% often, and 5.4% always used condoms. We also found out that 46.7% of single subjects and 77% of married subjects did not use a condom in the last sexual relationship. According to this study, 6 men (1.7%) had homosexual relationship and 1 had experienced such relationship during imprisonment.

Table 2 demonstrates the results for univariate (crude OR) and multivariate (adjusted OR [AOR]) regression analysis. In univariate analysis, lower age, lower age at the onset of drug abuse, good economic status (in comparison with poor economic status), heroin abuse (in comparison with opium abuse), and the route of injection (in comparison with the smoking route) increased the chance of having high-risk sexual behavior. In multivariate model, poor economic status reduced the chance of high-risk sexual behavior in comparison with good economic status (AOR = 0.35, 95% CI = 0.13–0.96). Also, 1-year increase in age reduced the chance by 6% (AOR = 0.94, 95% CI = 0.91–0.98). Heroin abuse, compared with opium abuse, duplicated the chance of having high-risk sex (AOR = 2.11, 95% CI = 1.12–3.96).

**DISCUSSION**

In this study, 25.5% of drug abusers had a sexual partner other than their permanent one. The prevalence of sex with a nonpermanent partner among drug abusers in north-west China and Indonesia were estimated more than that of our study (Pisani et al., 2003; Zhang et al., 2007). The high prevalence reported by our study, and the 2 mentioned, is probably caused by choosing IDUs as the target population of the study. In a study by Arasteh et al. (2008) on IDUs referred to methadone clinic of New York, the prevalence of sex with a nonpermanent partner was estimated to be 24%, a little less than that reported in our study.

It is demonstrated that drug abuse increases high-risk sexual behaviors. Up to now, epidemiologic studies are mostly performed on IDUs; as a result, the effect of drug abuse on infection transmission is undoubtedly estimated as less than the reality (Chawla et al., 2005). Several studies about high-risk sexual behavior in drug abusers have targeted high-risk groups such as IDUs as the population study; however, we evaluated drug abusers, both IDUs and non-IDUs, who were referred to methadone clinic.

According to our findings, 87% of single and 4% of married drug addicts had sex with a nonpermanent partner. In the study of rapid situation assessment (RSA) of drug abuse in Iran between 1998 and 1999, of the 1500 individuals referred to outpatient drug addiction treatment centers, addicted prisoners, and street addicts, the prevalence of high-risk sexual behavior among single (70%) and married addicts (33%) was respectively lower and higher than our study, probably due to 10-year difference in the time of the study and the difference in the study population compared with our study (Razzaghi et al., 1999). Compared with our study, another study in Vietnam reported a lower prevalence among single addicts (63%) and a higher among married ones (24%); however, snowball sampling was used in this study, leading to more availability of those with high-risk behaviors (Nguyen et al., 2001). The
TABLE 2. The Effect of Different Variables on High-risk Sexual Behavior Among Drug Abusers Referred to Gorgan Methadone Clinic

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>High-risk Behavior</th>
<th>Univariate Crude OR (95% CI)</th>
<th>Multivariate Adjusted OR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD)</td>
<td>Yes 29.13 (8.059)</td>
<td>No 36.20 (11.20)</td>
<td>0.91 (0.89–0.94)</td>
<td>0.001</td>
</tr>
<tr>
<td>Age at onset of drug abuse, mean (SD)</td>
<td>Yes 8.39 (3.91)</td>
<td>No 7 (4.11)</td>
<td>0.90 (0.87–0.94)</td>
<td>0.94 (0.91–0.98)</td>
</tr>
<tr>
<td>Gender</td>
<td>Male 26.6% 73.4%</td>
<td>Female 17.6% 82.4%</td>
<td>1.69 (0.79–3.61)</td>
<td>0.4 (0.4–2.1)</td>
</tr>
<tr>
<td>Economic status</td>
<td>Poor 21.5% 78.5%</td>
<td>Intermediate 29.2% 70.8%</td>
<td>0.32 (0.14–0.77)</td>
<td>0.25 (0.09–0.68)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Fars 27 73</td>
<td>Turkmen 30 70</td>
<td>4.71 (0.40–54.82)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Sistani 0 100</td>
<td>Others 8.3 91.7</td>
<td>4.06 (0.51–31.92)</td>
<td>—</td>
</tr>
<tr>
<td>Type of drug</td>
<td>Opium 82.6 17.4</td>
<td>Heroin 43.2 56.8</td>
<td>3.62 (2.25–5.82)</td>
<td>2.11 (1.12–3.96)</td>
</tr>
<tr>
<td>Route of administration</td>
<td>Injection 48.9 51.1</td>
<td>Oral 18.9 81.1</td>
<td>2.98 (1.55–5.69)</td>
<td>1 (0.53–1.91)</td>
</tr>
<tr>
<td>Smoking</td>
<td>24.3 75.7</td>
<td>—</td>
<td>1*</td>
<td>1*</td>
</tr>
</tbody>
</table>

*This category is the baseline for odds ratio estimation.

TABLE 3. Comparison of Prevalence of High-risk Sexual Behavior in Different Studies According to Target Populations (IDU/Mixed) and Type of Sampling

<table>
<thead>
<tr>
<th>Type of Sampling</th>
<th>Prevalence of High-risk Sexual Behavior, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>This study—singles (Golestan)</td>
<td>87</td>
</tr>
<tr>
<td>Sari—male addicted prisoners (2001)</td>
<td>82</td>
</tr>
<tr>
<td>Iran—single RSA UNDCP (1998–1999)</td>
<td>70.7</td>
</tr>
<tr>
<td>Iran—nonsingle RSA UNDCP (1998–1999)</td>
<td>33.3</td>
</tr>
<tr>
<td>This study—total (Golestan)</td>
<td>25.5</td>
</tr>
<tr>
<td>Hong Kong—addicts at methadone clinic in a highly prevalent area (2005)</td>
<td>10.1</td>
</tr>
<tr>
<td>This study—nonsingles (Golestan)</td>
<td>4</td>
</tr>
<tr>
<td>Vietnam—single drug abusers in a highly prevalent area (1999)</td>
<td>Snowballing 63</td>
</tr>
<tr>
<td>South Thailand—IDUs at drug addiction treatment centers (2000)</td>
<td>Snowballing 53</td>
</tr>
<tr>
<td>Northwest China—IDUs at detoxification centers (2007)</td>
<td>29</td>
</tr>
<tr>
<td>Indonesia—IDUs (2003)</td>
<td>Snowballing 29</td>
</tr>
</tbody>
</table>

prevalence of high-risk sexual behavior in different studies has been compared with this study in Table 3, based on the study population (IDUs and mixed) and sampling method (random and nonrandom), respectively.

Our findings demonstrated that 69.4% of drug abusers and 47% of those who had sex with a nonpermanent partner did not use a condom (unprotected sex) in their last sexual contact, which was higher than the findings of other studies in New York, Spain, northwest China, Hong Kong, and Baltimore (Arasteh et al., 2008; Bell et al., 2006; Li et al., 2009; Perez Gonzalez et al., 1999; Zhang et al., 2007). Although the studies in Spain, Hong Kong, and Baltimore, MD, were performed on both IDUs and non-IDUs, in New York and northwest China, IDUs were studied alone. The high prevalence of unprotected sex in this study might be attributed to the absence of effective interventions on safe sex.

In this study, unprotected sex was reported in 46.7% of the single individuals and 77% of the married individuals; in the RSA study in Iran between 1998 and 1999, this prevalence was higher in both single and married ones (68% in the single group and 80% in the married group), to some extent, this finding was attributed to the study population, which included addicted prisoners and street addicts as well; the other possible justification is the time difference of 10 years between this study and ours, as nowadays more availability of information has led to some changes in individuals’ behavior (Razzaghi et al., 1999).
condom) in the single and married subjects was respectively higher and lower than this study, probably attributed to both the time of the study and the snowball sampling (Nguyen et al., 2001).

Homosexuality among men is another HIV-related high-risk sexual behavior, which is a social and religious stigma in Middle East countries and considered a crime. Epidemiologic studies about this high-risk behavior are rare in the Middle East; however, it is demonstrated that AIDS epidemic has affected this population (UNAIDS, WHO, 2009). An increase in unprotected sexual activity among homosexual men is reported by the studies conducted in North America and Europe (Fendrich et al., 2010). Moreover, homosexual men tended to experience more high-risk sexual behavior than heterosexual men (Browne et al., 2009). In our study, 1.7% of men had experienced homosexual partners. Consistent to our findings, 1.5% of male IDUs in a study in Indonesia had a history of homosexual relationship; however, only IDUs were included in the study population (Pisani et al., 2003). In a study by Mir-Nasseri et al. (2008) on IDUs referred to some of the drug addiction treatment centers and some prisons in Tehran, homosexual relationship was reported in 18% of the males; as mentioned, this discrepancy is due to target population of the study including IDUs and addicted prisoners. The prevalence of homosexuality in a study in the United States in 2005 was higher than our study; however, the target population of that study included IDUs. Homosexual men in that study tended not to use condoms during sex with a casual sexual partner (Mansergh et al., 2008).

Our results suggest that the main influential factors of high-risk sexual behavior are younger age, good economic status, and heroin addiction. A study in 1995 in Canada on 582 IDUs found a higher prevalence of unsafe sexual behavior in heroin abusers, which was consistent with our results (Myers et al., 1995). Another investigation in China during 2007 about female sex workers addicted to injection drug use suggested that economic pressure resulted in improper condom use and unsafe sex (Gu et al., 2008). The study of Gu et al. had some differences from ours, for example choosing a more vulnerable group and snowball sampling method.

This study did not show any association between sex or ethnicity and high-risk behavior (defined as sex with someone other than permanent sexual partner). In addition, although the univariate analysis showed a significant association between younger age at the onset of drug abuse and the route of injection with high-risk sexual behavior, it was not significant in the multivariate analysis. Unlike our study, Noruzi et al. (2008) in a case-control study during 2008 in Tehran about the IDUs found out that sex with someone other than a permanent sexual partner was more in IDUs; however, their sampling method was snowball sampling.

As our data were based on self-reports, the probability of recall bias and social desirability bias to affect the results is inevitable. However, studies have shown that self-reports by drug abusers attending research studies are enough valid and reliable compared with those seeking clinical services (Weathersby et al., 1994). However, as this hospital is the only referral therapeutic and educational hospital in the province that provides drug abusers with methadone therapy, the findings of the study have important analytic conclusions, which lead us to consider AIDS prevention approaches for drug abusers in our health care planning.

CONCLUSIONS

Designing and implementing studies on inaccessible patients who tend to have more high-risk behaviors (using snowball sampling method) and also performing HIV infection detection tests to compare the prevalence of this infection among groups with high-risk behaviors are suggested. Furthermore, providing safe sex consulting services along with barriers such as condoms for patients referred to drug addiction treatment centers is of great help in changing high-risk behavior in this group.

It is very difficult to reduce drug-related high-risk sexual behavior (Paul et al., 1993). As it is shown in this study that high-risk sexual behavior is associated with younger age, good economic status, and heroin abuse, conducting preventive programs targeting the youth and people with good economic status along with delivery of counseling and health services to drug abusers, especially heroin abusers and the young addicts, is suggested.

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