

Seroprevalence of HBV, HCV and HIV infection among intravenous drug users in Shahr-e-Kord, Islamic Republic of Iran

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الانتشار المصلي لفيروس التهاب الكبد (بي) و(سي) وفيروس الإيدز بين متعاطي المخدرات حقناً بالوريد في شهر كُرد، جمهورية إيران الإسلامية
رضا إيماني، علي كريمي، رضا روزبهاني، أكبر روزبهاني

الخلاصة: أجريت هذه الدراسة في عام 2004 لتقييم معدل انتشار العدوى بفيروس التهاب الكبد من النمطين (بي) و(سي)، وفيروس العوز المناعي البشري بين 133 من متعاطي المخدرات حقناً، ممن يعالجون في مركز طوعي للتأهيل في شهر كُرد، ولتحديد عوامل الاختطار لهذه المجموعة. ولقد تم تحريّ العينات المصلية للعدوى بفيروس الإيدز، و التهاب الكبد (بي) و(سي)، ووجد أن أحد المشاركين فقط (0.8%) إيجابي لفيروس الإيدز، و 15 (11.20%) إيجابيون لالتهاب الكبد (سي)، و 8 (6.0%) إيجابيون لمستضد التهاب الكبد (بي). ولوحظ ترابط يُعتدّ به إحصائياً بين الاستخدام المتبادل للحقن، وبين العدوى بفيروس التهاب الكبد (بي) و(سي)، وفيروس الإيدز.

ABSTRACT This study was conducted in 2004 to evaluate the prevalence of hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency (HIV) virus infection in 133 injecting drug users (IDUs) attending a voluntary rehabilitation centre in Shahr-e-Kord, and to identify risk factors for these infections in this group. Serum samples were screened for HBV, HCV and HIV infection. Only 1 participant (0.8%) was HIV positive, 15 (11.2%) were HCV positive and 8 (6.0%) were positive for HBV surface antigen. There was significant correlation between using shared syringes and infection with HIV, HCV and HBV.

Séroprévalence des infections VIH, VHB et VHC chez des toxicomanes par voie intraveineuse à Shahr-e-Kord (République islamique d'Iran)

RÉSUMÉ Cette étude a été menée en 2004 dans l'objectif d'évaluer la prévalence des infections par le virus de l'hépatite B (VHB), le virus de l'hépatite C (VHC) et le virus de l'immunodéficience humaine (VIH) chez 133 toxicomanes par voie intraveineuse fréquentant un centre de désintoxication associatif de Shahr-e-Kord, et de cerner les facteurs de risque de ces infections dans ce groupe. Un dépistage des infections VIH, VHB et VHC a été réalisé sur les échantillons de sérum. Seul un participant (0,8 %) était positif au VIH, 15 (11,2 %) étaient positifs au VHC et 8 (6,0 %) étaient positifs aux Ag HBs. Il existait une corrélation significative entre le partage de seringues et les infections par le VIH, le VHC et le VHB.

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Introduction

Injecting drug users (IDUs) constitute a group frequently exposed to a number of viral infections since they frequently engage in high risk behaviour [1]. Hepatitis C virus (HCV), hepatitis B virus (HBV) and human immunodeficiency virus (HIV) share the common features of having a lipid envelope and being transmitted by blood contact [2]. Consequently, sharing injection equipment such as needles has been implicated as one of the most significant risk factors in the transmission of these infections in IDUs [3–5]. The prevalence of bloodborne hepatitis is usually higher among IDUs than in comparable non-IDU groups in the population [6].

There is some evidence indicating high prevalence rates of bloodborne infections among IDUs in different parts of Asia [7–9]. Epidemiological data indicate that IDUs represent the largest at-risk group for HCV infection [10]. Both HCV and HBV infections are of major public health concern: infected individuals carry a substantial risk of chronic liver disease, 5%–10% for HBV and > 50% for HCV. Moreover, individuals infected with HBV, and to a lesser degree HCV, may transmit the virus to their sexual partners, and in the case of females to their offspring [6,10]. It is now recognized as being extremely important to prevent HCV infection among groups at high risk of HIV infection as it frequently progresses to chronic hepatitis, cirrhosis and eventually hepatocellular carcinoma [6,10].

HIV infection is one of the most important public health concerns. A variety of specific risk factors of HIV infection in humans such as needle sharing and number of drug injections have been identified. Significant outbreaks of HIV infection among IDUs have occurred in about half the countries in North Africa and the Middle East, notably

in the Islamic Republic of Iran, where 65% of reported HIV cases have been attributed to injecting drug use [11]. A recent study showed the most common route of infection in IDUs was via shared syringes [12]. The proportion of IDUs in different parts of the Islamic Republic of Iran varies, but no data were available for Shahr-e-Kord: people tend to conceal their addiction from others because it is considered very serious and reprehensible, and quite shameful in our culture.

In order to implement appropriate prevention measures, it is important to identify specific risk factors for HBV, HCV and HIV infection among IDUs based on epidemiological data. In view of the limited data on the epidemiology of bloodborne viral infections among IDUs in our country, this study was undertaken to assess the prevalence of HBV, HCV and HIV infections and their respective risk factors among this group in Shahr-e-Kord, a city in the south west of the Islamic Republic of Iran with a population of about 400 000.

Methods

The study sample comprised all those (133 IDUs) who enrolled in the State Welfare Organization of Iran, a voluntary rehabilitation centre, from July 2004 to October 2004. All were informed about the study and agreed to participate. This rehabilitation centre is unique in this city. Its services are available to addicted people to help them to overcome their addiction using medical and psycho-social methods.

The sample size and estimated IDU rate were adequate for such studies ($P = 0$, $\alpha = 0.05$, $d = 0.05$ gives calculated sample size of 144). The sex ratio was, however, skewed because of cultural and other limitations on females.

In this centre, serum samples from IDUs were tested for HCV and HIV specific antibodies and HBV surface antigen (HBsAg).

Serum samples were screened in the research laboratory of Shahr-e-Kord University of Medical Sciences for HBsAg, HCV and HIV specific antibodies by enzyme-linked immunosorbent assay (Organon Teknika HTLV-1/II Vironostika). All HIV positive samples were confirmed by Western blot (GeneLabs Diagnostics Ltd).

Information on demographics and HCV, HBV- and HIV-related risk behaviours was obtained from each participant through an interviewer-assisted questionnaire. Data were collected on sociodemographic status, history of incarceration and using shared syringes. Statistical analysis and data merging were carried out using SPSS, version 10. Results were regarded as significant at $P < 0.05$. Descriptive results were presented as frequencies, ratios and 95% confidence intervals. Correlation between different factors was evaluated using the chi-squared test.

Table 1 Distribution of males and females in the study sample according to anti-HIV, anti-HCV and anti-HBsAg status

Infection	Total		Males		Females	
	No.	%	No.	%	No.	%
HCV+	15	11.3	15	11.5	0	–
HCV–	118	88.7	116	88.5	2	100.0
HBsAg+	8	6.0	8	6.1	0	–
HBsAg–	125	94.0	123	93.9	2	100.0
HIV+	1	0.8	1	0.8	0	–
HIV–	132	99.2	130	99.2	2	100.0

HCV = hepatitis C virus; HBsAg = hepatitis B surface antigen; HIV = human immunodeficiency virus.

Results

The study sample comprised 131 (98.4%) males and 2 (1.5%) females, with a mean age of 31.3 (standard deviation 7.1; range 18–65) years.

Seroprevalence of anti-HCV, HBsAg and anti-HIV

The prevalence of anti-HCV, HB_sAg and anti-HIV in IDUs is shown in Table 1. Of the 133 IDUs studied, 15 (11.3%) were HCV positive, 8 (6.0%) were HB_sAg positive and 1 (0.8%) was HIV positive. Neither of the 2 females was positive for anti-HCV, anti-HIV and HBsAg.

Analysis of individual risk factors

The mean age of HCV positive and HBV positive IDUs was 33.4 and 31.1 years, respectively. The mean age of those with HCV, HBV and HIV was 31.0, 31.3 and 31.4 years respectively.

Many of the HCV+, HBV+ and HIV+ IDUs used shared syringes and had a history of ≥ 1 previous incarceration (Table 2). Using the chi-squared test, there was significant correlation between using shared syringes and infection with both HCV and HBV ($P < 0.05$).

Discussion

IDU is a key factor in the transmission of bloodborne pathogens. It has been shown that both injection-related risk factors, duration of injecting drugs, type of drug injected and direct and indirect sharing of injection are conducive to the spread of HIV, HBV, and HCV among IDUs [13].

It has been reported that 65% of the known and reported HIV cases in the Is-

Table 2 HBV-, HCV- and HIV-related risk behaviours in injecting drug users in Shahr-e-Kord

Antibody	Ever shared syringe/needle				Previous incarceration			
	Yes (n = 26)		No (n = 107)		Yes (n = 47)		No (n = 86)	
	No.	%	No.	%	No.	%	No.	%
HCV+	8*	30.8	7	6.5	8	17.0	7	8.1
HCV-	18	69.2	100	93.5	39	83.0	79	91.9
HB _s Ag+	5*	19.2	3	2.8	4	8.5	4	4.7
HB _s Ag-	21	80.8	104	97.2	43	91.5	82	95.3
HIV+	1	3.8	0	0.0	1	2.1	0	0.0
HIV-	25	96.2	107	100.0	46	97.9	86	100.0

*P < 0.05.

HCV+ and shared syringe/needle P = 0.002.

HBsAg+ and shared syringe/needle P = 0.007.

HCV+ and previous incarceration P = 0.105.

HBsAg+ and previous incarceration P = 0.269.

HCV = hepatitis C virus; HBsAg = hepatitis B surface antigen; HIV = human immunodeficiency virus.

Islamic Republic of Iran have been attributed to injection drug use [11]. Also prevalence of HIV in IDUs in Fars province has been estimated at 30% [12]. Taking this into consideration, it is possible that in our study, the first prevalence study of bloodborne infections among IDUs in Shahr-e-Kord, we may have underestimated the prevalence of HIV infection. Nevertheless, our results also showed that the number of IDUs who shared syringes/needles was lower than the number who did not share: this could be an alternative explanation for the low rate of HIV infection.

The relatively low rate of HBV infection we found compared with the rates found (5%–61.4%) in some other studies [14–17] could be due to the use of the HBsAg test. Using this test, only 6.2% of the cases were positive (Table 1). Since any exposure to hepatitis B virus would have resulted in a positive test for anti-HBc (antibody to hepatitis B core antigen) [16], it is possible more samples may have tested positive using this test.

In our study, HCV prevalence rate was 11.2%, which was much lower than that reported (33%–96.8%) from countries such as Italy, Syria and Taiwan [17–21] and also lower than in a previous study from Fars province (78%) [12]. Again, this difference may have been due to technical limitations which could have led to underestimation of this infection. In spite of this difference, the IDU population in our province is at high risk for HCV infection and its sequelae.

We identified history of syringe sharing as an important determinant of HBV, HCV and HIV infection as there was significant correlation between sharing syringes and infection with HIV, HCV and HBV. This corroborates the findings of previous studies indicating that use of shared syringes by IDUs render them at high risk of these infections [22–24]. Our findings provide further confirmatory evidence indicating that this behaviour is the main risk factor for these infections.

In spite of the low prevalence of the 3 main bloodborne infections found in this

study, owing to increasing number of IDUs in Iran [25], harm reduction programmes are needed to halt the spread of HIV, HBV and HCV infection. In particular, the capacity

of syringe-exchange programmes to refer participants to drug treatment programmes and facilitate access to health and social services needs to be increased.

References

- Burattini M et al. Correlation between HIV and HCV in Brazilian prisoners: evidence for parenteral transmission inside prison. *Revista de saúde pública*, 2000, 34(5):431–6.
- Battjes RJ et al. Heterosexual transmission of human immunodeficiency virus among intravenous drug users. *Journal of infectious diseases*, 1990, 162(5):1007–11.
- Buavirat A et al. Risk of prevalent HIV infection associated with incarceration among injecting drug users in Bangkok, Thailand: case-control study. *British medical journal*, 2003, 326(7384):308–11.
- Samuel MC et al. Association between heroin use, needle sharing and tattoos received in prison with hepatitis B and C positivity among street-recruited injecting drug users in New Mexico, USA. *Epidemiology and infection*, 2001, 127(3):475–84.
- Stark K et al. History of syringe sharing in prison and risk of hepatitis B virus, hepatitis C virus and human immunodeficiency virus infection among injecting drug users in Berlin. *International journal of epidemiology*, 1997, 26(6):1359–66.
- Ichimura H et al. Prevalence of blood-borne viruses among intravenous drug users and alcoholics in Hiroshima, Japan. *International journal of STD & AIDS*, 1995, 6:441–3.
- Shrestha DM et al. Hepatitis B and C infection among drug abusers in Nepal. *Journal of tropical gastroenterology*, 1996, 17:212–3.
- Singh S, Prasad R, Mohanty A. High prevalence of sexually transmitted and blood-borne infections amongst the inmates of a district jail in Northern India. *International journal of STD & AIDS*, 1999, 10:475–8.
- Zhang C et al. High prevalence of HIV and hepatitis C virus coinfection among injection drug users in the southeastern region of Yunnan, China. *Journal of acquired immune deficiency syndromes*, 2002, 29(2):191–6.
- Saha MK et al. Prevalence of HCV and HBV infection amongst HIV Seropositive intravenous drug users and their non-injecting wives in Manipur, India. *Indian journal of medical research*, 2000, 111:37–9.
- Nassirimanesh B. [*Health, HIV/AIDS in Iran*]. Tehran, Ministry of Health and Medical Education, 2002 [in Farsi].
- Razzaghi EM et al. Profiles of risk: a qualitative study of injecting drug users in Tehran, Iran. *Harm reduction journal*, 2006, 3:12.
- Tortu S et al. Women's drug injection practices in East Harlem: an event analysis in a high-risk community. *AIDS and behavior*, 2003, 7(3):317–28.
- Christensen PB, Krarup HB. Outbreak of hepatitis B among injecting drug users in Denmark. *Journal of clinical virology*, 2004, 22(1):133–41.
- Fuglsang T, Fouchard J, Ege P. [Prevalence of HIV, hepatitis B, and C among drug users in the city of Copenhagen]. *Ugeskrift for læger*, 2000, 162:3860–4 [in Danish].

16. Shrestha, SM et al. Hepatitis B and C infection among drug abusers in Nepal. *Tropical gastroenterology*, 1996, 17:212–3.
17. Chang CJ, Ko YC, Liu HW. Serum alanine aminotransferase levels in relation to hepatitis B and C virus infections among drug abusers in an area hyperendemic for hepatitis B. *Digestive diseases & sciences*, 2000, 45(10):1949–52.
18. Fingerhood MI, Jasinski DR, Sullivan JT. Prevalence of hepatitis C in a chemically dependent population. *Archives of internal medicine*, 1993, 153:2025–30.
19. Thomas DL et al. Correlates of hepatitis C virus injection drug users. *Journal of medicine*, 1995, 74:1206–11.
20. Santolamazza M et al. Multiple viral infections in a group of intravenous drug users: hepatitis B virus exposure is the risk factor. *European journal of gastroenterology and hepatology*, 2001, 13(11):1347–54.
21. Othman BM, Monem FS. Prevalence of hepatitis C virus antibodies among intravenous drug abusers and prostitutes in Damascus, Syria. *Saudi medical journal*, 2002, 23(4):393–5.
22. Stein MD, Maksad J, Clarke J. Hepatitis C disease among injection drug users: knowledge perceived risk and willingness to receive treatment. *Journal of drug and alcohol dependence*, 2001, 61:211–5.
23. Bird AG et al. Study of infection with HIV and related risk factors in young offender's institution. *British medical journal*, 1993, 307:228–30.
24. Garfein RS et al. Viral infections in short-term injection drug users: the prevention of the hepatitis C, hepatitis B, human immunodeficiency and human T-lymphotrophic viruses. *American journal of public health*, 1996, 86(5):655–61.
25. Mokir A. Brief overview of the status of drugs in Iran. *Archives of Iranian medicine*, 2002, 5:184–90.

HIV prevention and care among injecting drug users in the Islamic Republic of Iran. A review of best practice

The above-mentioned document reviews the implementation of harm reduction programmes, care and support services for people living with HIV/AIDS, and the attempts to reach and deliver services to hidden populations of injecting drug users in the Islamic Republic of Iran. It is intended for programme managers and policy-makers in all countries in order to share the Iranian experience as a model for a comprehensive approach to introducing and scaling up harm reduction. In addition to identifying harm reduction programme elements and their implementation, the document can also be a useful resource for advocacy.

The document is available on line at: http://www.emro.who.int/asd/pdf/hiv_review_iran.pdf.