Epidemiology of hepatitis B, hepatitis C and HIV infections among intravenous drug users in Jerusalem, Israel

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Abstract

The demography and drug use practices in Israel are changing partly due to immigration. Objectives: Study the prevalence of blood borne viruses among intravenous drug users (IDU) and non-IDU and compare to previous surveys done at the same centers. Methods: A cross-sectional survey of all 233 illicit drug users attending two drug rehabilitation centers in Jerusalem. Antibodies to HBV, HCV and HIV were measured and questionnaires related to drug use and sexual practices given.

Results: 200 (85.8%) were males. Most cases (210 - 90%) were of Mediterranean origin, 23 (10%) of East European origin. 87 (37.3%) were IDU and more frequent in individual from East European origin (78.3%) than Mediterranean origin (32.9%) (p<0.0001). East European origin drug users comprised 20.6% of all injectors, but only 3.4 % of non-injectors (p<0.001). Compared to an earlier survey, the fraction of IDU almost doubled. We found an HCV prevalence of 24.5% (55.5% among IDU, 6.3% in non-IDU, p<0.001); HBV: 32.2% (38.3% among IDU, 29.1% in non-IDU - NS); HIV: 1.3% (3.4% among IDU, 0% in non-IDU). Exposure to HCV and HBV was significantly related to the intensity of drug injections (p<0.0002).

Conclusion: Despite that the number of IDU almost doubled between the studies, the level of blood born viruses (HBV and HCV) stayed alsmost similar. Drug use patterns in Jerusalem in 1995-1996 suggested a shift towards IDU, mostly among individuals of East European origin. This may contribute to high rates of HCV and HBV infections in the future within this population group.

Keywords: Intravenous drug use, Israel, Former Soviet Union, HCV infection, HBV infection, HIV infection.

Introduction

Injection drug use is a well recognized risk factor for the acquisition of the blood borne viruses such as hepatitis C, hepatitis B, HIV and HTLV-1 and 2 (1-7). In a previous survey conducted in Jerusalem in 1989 among all 300 drug users followed at two drug
treatment centers, a prevalence of 54% of HCV and 26% of HBV antibodies was detected among intravenous drug users (IDU). HIV infection was not found (8,9). The “starter” for the current study, conducted six years later in the same treatment centers, was the recent influx to Israel of immigrant drug users from the former Soviet Union (FSU), the paucity of information from Israel about drug abuse patterns in this population and the emergence of a major HIV epidemic among IDU in the FSU (10). Results from this local survey were analysed in the framework of establishing a pilot syringe exchange program in Israel, which is described elsewhere (11).

**Methods**

A cross-sectional survey of all 233 illicit drug users who attended two drug rehabilitation centers in Jerusalem in the period January 1995-March 1996 was performed. One center is a drug free program, the other a Methadone maintenance program center. Most IDU (some 80%) were treated at the Methadone center. 52.9% of those who ever injected drugs and 92.9% of those who were currently injecting drug were treated at the drug free program. A questionnaire of 36 variables (questionaire available upon request) was elaborated. Demographic, drug habit and sexual information were collected through a directed and supervised interview from all the participants, following informed consent.

**Laboratory methods**

Hepatitis B seropositivity was defined as positive anti HBs and/or anti HBe on Elisa assays (Sorin). HCV seropositivity was defined as a positive sample obtained by two commercial Elisa assays (Sorin and Abbott). HIV antibodies were detected by a third generation commercial Elisa assay (Abbott) (tested positive twice) and confirmed by a Western Blot.

HCV seropositivity was measured by commercial assays (Amplicor, Roche). HCV infectivity was defined as a positive reaction by HCV PCR in HCV sero-positive samples.

**Intensity of injections**

Intensity of injections was defined as the number of injections/day X years of injections, expressed in years (injection years).

**Statistical analysis**

Data were analyzed using the SPSS 9 statistical package. Student’s t-test was used for univariate analysis. Logistic regression was used for multivariate analysis.

**Results**

Out of the 233 individuals, 200 (86%) were males and 33 (14%) females. The mean age for the group was 38.4 years (range 20-66 years; SD= 7.6). Israeli Jews comprised 79% and Arabs (Israelis and non-Israelis) comprised 21%. Most of the individuals (90%) originated from North Africa (and other Mediterranean countries) or from Middle East (Israel and Arab Palestinian Authority). The remaining 10% originated from East Europe (Russia, Ukraine, Poland).

Demographic and blood born viruses data were almost similar between the two cohorts (1989 versus 1995), excepted an almost doubling of the fraction of IDU in the 1995 compared with the 1989 cohort (19% to 37%, see table 1) and the presence of three HIV positive cases in the 1995 cohort study.

Of the 233 subjects, 87 (37.3%) were intravenous drug users. Most East European descendants (18/23, 83.3%) were IDU, compared to only 33.5% (69/210) of individuals of Mediterranean origin (p<0.0001). Male/female ratio in the group of IDU was similar to the one in the group of non-IDU. Similarity between these two groups was also found concerning the age of starting drug abuse (16.6 years old in IDU versus 16.1 years old in non-IDU; p=NS). Risky sexual behaviour was common in both groups (IDU vs. non-IDU): Extra-marital encounters were reported by 66.7% and 48%, respectively (p=NS). Bisexual relations or frequenting prostitutes were reported by 27.6% and 12.3%, respectively (p=0.03).
Table 1. Demographic of patients and exposure to blood borne viruses: 1989 and 1995 surveys in Jerusalem drug rehabilitation clinics, Israel

<table>
<thead>
<tr>
<th></th>
<th>1989 survey</th>
<th>1995 survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Numbers</td>
<td>300</td>
<td>233</td>
</tr>
<tr>
<td>Males</td>
<td>169 (90)</td>
<td>200 (86)</td>
</tr>
<tr>
<td>Females</td>
<td>19 (10)</td>
<td>33 (14)</td>
</tr>
<tr>
<td>IDU</td>
<td>57 (19)</td>
<td>87 (37)</td>
</tr>
<tr>
<td>Non IDU</td>
<td>243 (81)</td>
<td>146 (63)</td>
</tr>
<tr>
<td>Mediterranean origin</td>
<td>284 (95)</td>
<td>210 (90)</td>
</tr>
<tr>
<td>European origin</td>
<td>16 (5)</td>
<td>23 (10)</td>
</tr>
<tr>
<td>HIV+</td>
<td>0 ( of 181) *</td>
<td>3 (1.3)</td>
</tr>
<tr>
<td>HBV+</td>
<td>31%(of 181) *</td>
<td>72 (32)</td>
</tr>
<tr>
<td>HCV+</td>
<td>18%(of 181) *</td>
<td>54 (24)</td>
</tr>
<tr>
<td>HCV+ among IDU</td>
<td>54%</td>
<td>55%</td>
</tr>
</tbody>
</table>

IDU: Intravenous Drug Users.

Intensity of injections (in injection years; IY) were not significantly different when comparing between males and females (28.6 IY vs. 21.0 IY), between individuals from Mediterranean and European origins (29.1 IY vs. 20.8 IY), nor between Jews and Arabs (30.8 IY vs. 11.0 IY).

Exposure to blood borne viruses: HCV antibodies were detected among 54 individuals (out of 223 tested; 24.2% : 55.5% among IDU, 6.3% in non-IDU; p<0.0001). HCV PCR + was detected in 50% of all HCV seropositives individuals. HBV antibodies were detected in 72 individuals (out of 222 tested; 32.4% : 38.3% among IDU, 29.1% in non-IDU; p=NS). HIV antibody were detected in 3 individuals (out of 233 tested, 1.28%, all among IDU). This prevalence figures were similar to those detected in the 1989 cohort (see table 1). HBV was most significantly higher when considering IDU vs. non IDU. Among IDU, HCV was not significantly higher when considering the country of origin: East Europeans (15/18, 83%) vs. Mediterraneans (42/69, 61%) (p=NS).

IDU with HBV positive or HCV positive had a significantly higher intensity of injection than IDU HBV negative or HCV negative (see table 2). Concerning HBV positive individuals, they were older than the HBV seronegatives (p<0.02) (see table 3). This was also correct when only non-IDU were analyzed (p< 0.001). We did not find age strong correlation in HCV seropositive drug abusers (see table 4).

Table 2. Intensity of injections and exposure to blood borne viruses (N=87)

<table>
<thead>
<tr>
<th></th>
<th>HBV</th>
<th>HCV</th>
<th>HIV1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection/ day x years</td>
<td>Injection/ day x years</td>
<td>Injection/ day x years</td>
<td></td>
</tr>
<tr>
<td>15.2 y.</td>
<td>7.8 y.</td>
<td>27.4 y.</td>
<td>Seronegative</td>
</tr>
<tr>
<td>47.1 y.</td>
<td>43.8 y.</td>
<td>105 y.</td>
<td>Seropositive</td>
</tr>
<tr>
<td>0.002</td>
<td>0.002</td>
<td>* cannot be calculated</td>
<td>p values</td>
</tr>
</tbody>
</table>

Table 3. Age of patients and the risk of HBV infection

<table>
<thead>
<tr>
<th>HBV serology</th>
<th>No. of patients</th>
<th>Age, mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>(+)</td>
<td>72</td>
<td>41.8</td>
</tr>
<tr>
<td>(-)</td>
<td>150</td>
<td>36.7</td>
</tr>
<tr>
<td>Total</td>
<td>222</td>
<td>38.3</td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>&lt;0.02</td>
</tr>
</tbody>
</table>

Table 4. Multivared analysis: Risk factors for infection by Hepatitis C & B among Jerusalem drug users 1995-1996, Israel

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hepatitis C sero+:OR (95%CI)</th>
<th>Hepatitis B sero+:OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.05 (0.3-2.5)</td>
<td>1.14 (0.5-3.0)</td>
</tr>
<tr>
<td>Sex (F/M)</td>
<td>1.04 (0.5-2.0)</td>
<td>0.6 (0.3-1.3)</td>
</tr>
<tr>
<td>Ever injecting drugs</td>
<td>0.1 (0.06-0.22)</td>
<td>0.8 (0.5-1.1)</td>
</tr>
<tr>
<td>Intensity of drug injections</td>
<td>6.2 (0.6-13.5)</td>
<td>3.1 (1.9-17.7)</td>
</tr>
<tr>
<td>Unsafe sexual encounters</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Geographic origin (Mediterranean/E.Europe)</td>
<td>NA</td>
<td>0.6 (0.3-1.5)</td>
</tr>
</tbody>
</table>

NA: Risk estimates statistics can not be compute.
Concerning HBV, no gender difference was observed. The intensity of drug injections was strongly associated as a separate risk factor for HCV and HBV (OR of 6.2 and 3.1, retrospectively (see table 4).

**Discussion**

The aim of this survey was to characterize a population of illicit drug users in Jerusalem, its drug abuse patterns and exposure to blood borne viruses and to compare results with a similar survey done some six years earlier. The impetus for the survey was the mass immigration to Israel from the FSU (12) and the major outbreak of HIV infection among IDU in the FSU (10). With this in mind we analysed exposure to blood borne virus, both according to the pattern of drug abuse and to the geographical origin of the patients. The main result of this study was that the level of blood borne viruses stayed almost the same when comparing the two cohorts, despite that the number of IDU cases almost double between the two studies.

The second important result was that the increase in IDU cases was almost only among individuals originated from FSU. Still a high level of HBV was found. Therefore, the demographic data of the present survey are of high value, due to the known risk of blood born viruses transmission. It was therefore recommended to stay vigilant and to closely follow this high risk group population (IDU originated from FSU).

Lastly, limitation exist, and these data are probably not reflecting the national data. The lack of generalisibility is due to the fact that in Jerusalem, the population mix is different than the national mix. Secondly, these data came from drug centers, and may not represent the overall population of IDU. However, when considering the establishment of a pilot syringe exchange program in Israel (11), these (yet) unpublished data were also taken into consideration.

The demographics of the present cohort is quite similar to the sample from 1989. Then and in the current survey, a close association between IDU and HCV infection was noted (see table 1) with no increase in the prevalence of HCV among IDUs over the span of six years. High HCV prevalence among IDU may be taken in the context of published reports on HCV infection among IDU (13-16) and does not therefore represent a new epidemic among Israeli IDU’s.

We however noted that the fraction of IDU of the total cohort has increased from 19% in the 1989 (8,9) to 37% in 1995 with most IDUs of East European origin. An increase in the number of IDUs originating in the FSU has been consistently reported in recent years by a large drug rehabilitation center in Northern Israel (.17) Similar pattern has been observed in NYC, a popular site for FSU immigration (18). In Israel, FSU immigrants have also been implicated in the changing pattern of alcohol abuse (19,20). High prevalence of HCV has been detected in a group of alcoholics in Northern Israel, suggesting the coexistence of IDU and alcoholism in at least a part of that group (21). Such a coexistence alcoholism/IDU has been demonstrated in the Bronx alcoholics (United States), where the prevalence of HCV has been high (22). Yet, further data and analysis are needed in order to correctly approximate the issue of alcohol consumption among IDU in Israel.

The current report, although including only a small number of East European drug users (n=23), points to the extremely high prevalence of IDU in that group and to the associated high prevalence (83%) of infection by HCV. Such a high prevalence of HCV infection has also been reported among IDU in the FSU itself(23,24).

We found three cases of HIV positivity among the 1995 population sample, compared to none in the previous survey. This may be an indicative of an early phase of the HIV epidemic among the drug injectors tested. Considering the concomittent HIV epidemic among IDU in FSU (25), it is strongly suggested to closely monitor the HIV epidemic in Israel, in particular among IDU (26,27). Thus, although not yet supported by our 1995-6 cohort, further spread of HIV is likely to occur among injection drug users if the current immigration pattern to Israel from the FSU continues. Repeated surveys in the same drug treatment centers in Jerusalem are needed to monitor the evolving HIV epidemic among IDUs.

Unlike HCV and HIV, HBV is endemic in the Mediterranean region (28,29) and as observed in the current group of non- IDUs and in 1989 (8,9)(see
HBV exposure can reach a substantial prevalence among Mediterranean descendants. This high prevalence may actually be due to perinatal acquisition of the virus rather than to contact with contaminated blood (28). As such, the HBV prevalence observed among the injection drug users (30.2%) can either be due to acquisition by injections or by the perinatal route or to both.

In summary, despite that the number of IDU almost doubled between the two studies, the level of blood born viruses (HBV and HCV) stayed almost similar. Nevertheless, IDU started to be extremely common among drug addicts originating from FSU. In our survey, few HIV positive cases have been found. Nevertheless, considering the recent HIV epidemic among IDU in FSU, it is suggested to closely monitor individuals at risk for HIV, especially IDU.

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**References**


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