Short Communication

HIV Prevalence and Risk Behavior Among Injection Drug Users and Their Sex Partners in Two Russian Cities

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Abstract

The HIV epidemic in Russia remains concentrated mostly among injection drug users (IDUs). Little is known about the extent to which sexual partnerships are the bridge between IDUs and the general population and create the potential for generalizing the epidemic. IDUs in two Russian cities, Novosibirsk and Ivanovo ($N=593$), were recruited via respondent-driven sampling. A modified one-step snowball strategy was used to recruit IDU's sex partners who do not themselves use drugs (PIDU, $N=82$). Sexual behaviors of all participants were assessed using an interviewer-administered questionnaire. All participants provided blood specimens for HIV and hepatitis C virus (HCV) testing. HIV and HCV prevalence among IDUs was 34.0% and 44.4% in Ivanovo and 3.8% and 54.3% in Novosibirsk. HIV prevalence among PIDUs was 6.8% in Ivanovo and 8.7% in Novosibirsk. In both cities large proportions of IDUs reported sexual partnerships with non-IDUs—49.7% in Ivanovo vs. 62.7% in Novosibirsk ($p \leq 0.001$) and fewer than one in four IDUs reported constant condom use in such partnerships. This pilot study shows that two IDU populations with a significantly different HIV prevalence both form sexual partnerships with non-IDUs and practice unsafe sexual behavior within such types of partnerships. However, the proportion of PIDUs who form partnerships with other non-IDUs that therefore could lead to a generalization of the epidemic is very different between the two cities and this difference needs to be considered when estimating the spread of HIV into the general population. Unsafe sexual behavior and HIV testing should be specific targets for prevention activities for IDUs and their sex partners in Russia.

INJECTION DRUG USERS (IDUs) account for approximately 75% of the more than 650,000 HIV infections with known ways of transmission that have been registered through 2011 in Russia.^{1,2} In recent years, however, both the number of new cases of diagnosed infection and the proportion of cases attributable to heterosexual transmission have increased.² Many of these infections may have occurred among non-IDU partners of IDUs (PIDUs).³ Should sufficient PIDUs form subsequent partnerships with other non-IDUs, the resultant bridging could increase the likelihood of a generalized epidemic.^{4,5} Identification of IDU status as the source of heterosexually transmitted HIV is not a part of routine HIV surveillance, but data from several studies provide evidence for the potential for a generalization of the epidemic in Russia. This evidence includes two studies of IDUs in nine cities showing that as many as half of the IDUs have PIDUs;^{3,6} one-third of non-IDU HIV⁺ patients in Saint Petersburg reported drug-injecting sex partners⁷; and 15% of St. Petersburg PIDUs

were infected with HIV.³ However, previous studies did not take into account the significant territorial variability of the IDU and HIV epidemic in Russia and/or have been focused mainly on connections between IDUs and PIDUs, whereas to assess the extent to which sexual partnerships are a bridge between IDUs and the general population, the proportion of PIDUs who go on to form partnerships with other non-IDUs must be reliably measured.

The purpose of this study was to describe the bridging potential between IDUs and the general population through PIDUs with regard to regional variation.

IDUs and *a fortiori* their non-IDU sex partners are considered to be hard to reach populations for which no sampling frame exists, and due to several factors including involvement in illegal activity, stigma, and, specifically for PIDUs, non-awareness of being at risk for HIV led to their underrepresentation at health care centers.^{8–10} We recruited and collected behavioral and serological data from IDUs and PIDUs in two

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Russian cities—Ivanovo, 250 km northeast of Moscow, and Novosibirsk, in central Siberia. Ivanovo is one of the regions of Russia most affected by HIV.¹¹ Novosibirsk until 2007 was among the Russian regions with a low HIV prevalence and incidence but now is among the regions with the highest rate of new HIV diagnoses in Russia.¹¹ The role of IDUs and their noninjecting sex partners has yet to be substantiated in either region through active surveillance.

IDUs were recruited during March–August 2010 using respondent-driven sampling (RDS).^{12,13} Initial participants ($n=11$ in Ivanovo, $n=10$ in Novosibirsk) were recruited by local fieldworkers from their network of contacts, and from narcology, harm reduction, and AIDS advocacy service organizations. The eligibility criteria for IDUs were having injected any drugs during the 30 days prior to the survey and being 16 years old or older. Three hundred IDUs in Ivanovo and 293 IDUs in Novosibirsk participated. To recruit PIDUs, a modified one-step snowball strategy was used. Each IDU reporting one or more contactable PIDUs in the prior 12 months was given a coupon to distribute to that partner, for a maximum of three partners. Responding PIDUs were eligible to participate if they came with a valid coupon and were 16 years old or older. Data from participants who reported being sexually inactive during the previous 12 months, those who reported a history of drug injecting, and those of a different sex from the IDU sex partner mentioned were excluded from further analysis. In all, 23 PIDUs in Novosibirsk and 59 in Ivanovo were recruited and were deemed eligible to participate. All IDU and PIDU participants completed an interviewer-administered questionnaire covering sociodemographic characteristics, substance use, and HIV-related behavior and knowledge. Participants provided blood specimens for testing for antibody to HIV and hepatitis C virus (HCV).

Participation in the study for both target groups was anonymous. All respondents gave written informed consent prior to the study with the opportunity to use a false signature. No identifiable personal information was collected. All the participants received incentives for participation and/or recruitment (personal care and food items). Ethical approval was obtained from the IRBs at St. Petersburg State University, St. Petersburg Pasteur Institute, and Yale University.

Survey and serology data are presented in Table 1. The majority of IDUs sampled in both cities were male, although the proportion was greater in Ivanovo (75.7% vs. 67.9%, $p\leq 0.05$). IDUs in Ivanovo were older (mean age 26.0 vs. 24.7 years, $p\leq 0.001$) and more likely to have had any professional education (complete vocational school, specialized secondary education, incomplete or complete higher education) (75.3% vs. 57.7%, $p\leq 0.001$). HIV prevalence was greater among Ivanovo IDUs (34.0% vs. 3.8%, $p\leq 0.001$), although HCV prevalence was less (44.0% vs. 54.3%, $p\leq 0.01$). None of 11 HIV-positive IDUs in Novosibirsk and only 22 of 102 in Ivanovo (21.6%) reported having been tested and informed of their HIV-positive status.

Large proportions of sexually active IDUs reported sexual partnerships with non-IDUs, although the proportion was higher in Novosibirsk (50.0 vs. 62.1, $p\leq 0.001$). Fewer than one in four IDUs reported using a condom in all sexual contacts in such type of partnerships within the past 12 months. In both cities, in the majority of cases in which IDUs reported having a PIDU, the IDU had only one such partner during the prior 12 months.

PIDUs recruited to the study were mostly females (84.7% in Ivanovo and 78.3% in Novosibirsk), had a higher level of education than the IDUs (only in Novosibirsk), and were less likely to have experienced incarceration (only in Ivanovo). Compared to IDUs, PIDUs used fewer psychoactive substances overall, including alcohol (Ivanovo: 6.8% vs. 46.9%; $p\leq 0.001$; Novosibirsk: 17.4% vs. 38.1%, $p\leq 0.05$) and non-injected illegal drugs (Ivanovo: 0.0% vs. 24.8%; Novosibirsk: 4.3% vs. 31.9%). The HIV prevalence among PIDUs in Ivanovo was significantly less than the 34.0% observed among IDUs ($p\leq 0.001$). The PIDU HIV prevalence in Novosibirsk (8.7%) was greater than in Ivanovo but not significantly different from that in the IDU population. None of the PIDUs who tested positive had been previously informed of a positive HIV test result. The prevalence of HCV among PIDUs was significantly less than among IDUs but was relatively high (Ivanovo: 16.9% vs. 44.0%; $p\leq 0.001$; Novosibirsk: 21.7% vs. 54.3%; $p\leq 0.01$). Just over half the PIDUs in Novosibirsk (52.2%) reported having at least one non-IDU sex partner during the past 12 months, although most reported only one. Among Ivanovo PIDUs, only 6.8% had a non-IDU sex partner during that time. Consistent condom use within such partnerships in both cities was low.

Our study shows common demographic and behavioral characteristics across the two IDU populations despite the great distance and difference in HIV prevalence between them. In both locations IDUs commonly form partnerships with non-IDUs and in the majority of cases they do not practice safe sex, demonstrating the potential for bridging of the epidemic. This is more the case for the Novosibirsk sample, where half of the PIDUs were potential bridges, reporting both IDUs and non-IDUs among their sex partners, than for Ivanovo, where only one in 10 PIDUs were potential bridges. Based on the proportion of IDUs and their sex partners reporting sexual connections with non-IDUs and the mean number of such partners, simple arithmetic calculations, which assume that in the absence of evidence to the contrary the sample approximates the population from which the sample is derived, reveal that for every 100 IDUs in Ivanovo there are about 70 linked PIDUs and about 14 PIDUs sex partners from the general population. For Novosibirsk the corresponding estimates are much greater: 118 and 95, respectively. We could assume that in those cities the size of those populations that are at risk for HIV due to sexual contacts with IDUs is comparable to the size of the IDU population, which in Russia is estimated as 1–2% of the population.¹⁴

Characteristics of the study participants could vary from that of the underlying population through biases introduced by RDS and snowball sampling including self-selection among potential study participants. The relatively high HCV prevalence among PIDUs could be considered as indicative of possible underreporting of their history of injection drug use. Nevertheless, to our knowledge, this study is just the second successful attempt in Russia to recruit a sample from a hard-to-reach population of PIDUs.³

This study presents insights on the HIV monitoring and evaluation as well as the prevention and treatment system in the Russian Federation. On the monitoring and evaluation level we recommend that systematic inclusion of indicators of sexual contacts with non-IDUs accompany surveys of IDUs. We demonstrate that there can be different patterns in sexual connections among IDUs and non-IDUs across Russia that

TABLE 1. SOCIODEMOGRAPHICS, SUBSTANCE USE AND ABUSE, SEXUAL BEHAVIOR, AND HIV AND HEPATITIS C VIRUS PREVALENCE AMONG INTRAVENOUS DRUG USERS AND PARTNERS OF INTRAVENOUS DRUG USERS IN IVANOV AND NOVOSIBIRSK

	<i>Ivanovo</i>		<i>Novosibirsk</i>	
	<i>IDU (N=300)</i>	<i>PIDU (N=59)</i>	<i>IDU (N=293)</i>	<i>PIDU (N=23)</i>
	n (%)	n (%)	n (%)	n (%)
Males	227 (75.7) †††† **	9 (15.3) ††††	199 (67.9) †††† **	5 (21.7) ††††
Age				
Mean±SD; median	26.0±4.3; 25 †††† ****	23.5±4.5; 23 †††† ++	24.7±4.3; 25 ****	25.7±3.7; 25 ++
Education				
Completed secondary school	72 (24.0)	12 (20.3)	122 (41.6)	1 (4.3)
Any professional educated	226 (75.3)	46 (78.0)	169 (57.7)	22 (95.7)
No data	2 (0.7) ****	1 (1.7) +	2 (0.7) †††† ****	0 (0.0) †††† +
Employed	188 (62.7) *	42 (71.2)	203 (69.3) *	19 (82.6)
Experience of imprisonment	56 (18.7) ††††	0 (0.0) †††† ++	47 (16.0)	2 (8.7) ++
Alcohol consumption, past year				
<2–3 times a week	128 (52.2)	55 (93.2)	156 (57.1)	19 (82.6)
≥2–3 times a week	115 (46.9)	4 (6.8)	104 (38.1)	4 (17.4)
No data	2 (0.8) †††† *	0 (0.0) ††††	13 (4.8) † *	0 (0.0) †
Noninjection drug use, past month	61 (24.8) ††††	0 (0.0) ††††	66 (31.9) ††	1 (4.3) ††
Sexually active, past year	260 (86.7) ††††	59 (100.0) ††††	264 (91.0) ††	23 (100.0) ††
Number of partners among those sexually active Mean±SD; median	2.1±2.5; 1	1.2±0.8; 1	6.0±14.1; 3	2.2±2.9; 1
Non-IDU sex partners, past year (among those sexually active)				
Mean±SD; median	0.8±1.4; 1	0.2±0.7; 0	1.3±3.8; 1	0.8±0.9; 1
0	109 (41.9)	54 (91.5)	82 (31.1)	11 (47.8)
At least 1 possible	10 (3.8)	0 (0.0)	54 (20.5)	0 (0.0)
1 certain	119 (45.8)	1 (1.7)	75 (28.4)	8 (34.8)
>1 certain	21 (8.1)	3 (5.1)	53 (20.1)	4 (17.4)
No data	1 (0.4) **** ††††	1 (1.7) †††† ++++	0 (0.0) **** ††	0 (0.0) †† ++++
Consistent condom use with non-IDU partner, past year	27 (19.3)	1 (25.0)	32 (25.0)	4 (33.3)
HIV seropositive	102 (34.0) †††† ****	4 (6.8) ††††	11 (3.8) ****	2 (8.7)
HCV seropositive	132 (44.0) †††† **	10 (16.9) ††††	159 (54.3) ††† **	5 (21.7) †††
HIV–HCV coinfection	57 (19.0) **** ††	4 (6.8) ††	11 (3.8) ****	1 (4.3)

Significant differences between IDUs across the two cities: * $p \leq 0.1$; ** $p \leq 0.05$; *** $p \leq 0.01$; **** $p \leq 0.001$.

Significant differences between PIDUs across the two cities: + $p \leq 0.1$; ++ $p \leq 0.05$; +++ $p \leq 0.001$.

Significant differences between IDUs and PIDUs within a city: † $p \leq 0.1$; †† $p \leq 0.05$; ††† $p \leq 0.01$; †††† $p \leq 0.001$.

IDU, intravenous drug user; PIDU, partner of intravenous drug user; HCV, hepatitis C virus.

need to be explored in greater depth to better understand and model bridging of the epidemic and to develop specific prevention strategies. Despite these regional differences, the study shows the urgent need for HIV testing among IDUs and HIV prevention especially focused on safe sex behavior. Specific strategies for HIV prevention focused on sexual behavior and HIV testing should be developed for the sex partners of IDUs who do not inject drugs themselves.

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