AIDS Behav (2017) 21:1054–1058
DOI 10.1007/s10461-017-1723-8

BRIEF REPORT

Correlates of Double Risk of HIV Acquisition and Transmission Among Women who Inject Drugs in St. Petersburg, Russia

Polina Girchenko[1] · Elizabeth J. King[2]

Published online: 9 February 2017

Abstract Russia continues to experience a growing HIV epidemic, and women account for an increasing proportion of new HIV diagnoses in the country. This study aims to provide up-to-date information on factors associated with unsafe sex and drug use behaviors among women who inject drugs in St. Petersburg, Russia. In this community-based sample of 500 women who inject drugs, 64% tested positive for HIV. Women reported the following: 21% reported injection risk, 22% reported sexual risk, and 18% reported double risk. Multivariable analyses using logistic multinomial regression showed that older age is associated with increased risk behaviors. Involvement in transactional sex is associated with injection risk [aOR = 1.59 (1.02, 2.48)] but protective against sexual risk [aOR = 0.11 (0.06, 0.19)]. Exposure to sexual violence is associated with increased injection risk [aOR = 1.78 (1.01, 3.14)] and double risk [aOR = 3.38 (1.50, 7.63)]. These findings indicate the need to address both the unsafe injection and sexual risks among women who inject drugs in Russia.

Keywords HIV risk · Russia · Women · People who inject drugs

Introduction

The HIV epidemic in the Russian Federation continues to grow at an alarming rate [1, 2] and the current social and political context in contemporary Russia offers little hope for stopping this growth. Public health programs that effectively target HIV risk among the populations most susceptible to the virus are lacking. For example, there is a notable lack of harm reduction activities in Russia [3]; opioid substitution therapy is illegal [4]; and, there are very limited public education campaigns promoting safe sexual practices [5]. The HIV response efforts in Russia have undergone changes in recent years. Since the beginning of the HIV epidemic in Russia, the governmental response focused on screening and treatment. The most at-risk populations were criminalized, stigmatized, and did not receive any prevention and intervention activities from the Russian public health authorities. Earlier in the epidemic, the funding for HIV prevention among most at-risk populations, such as harm reduction, was largely by international donors and implemented by non-governmental/community-based organizations. Recent laws are pushing out international donors and funding agencies which has resulted in a fragile situation with civil society and a large absence of HIV prevention and intervention for the most vulnerable populations in Russia. There is also a policy of denial of the epidemic by the Russian government [6]. Given this dire situation in Russia today, it is even more crucial to focus the available prevention activities on the aspects of the epidemic where risk is greatest.

According to official statistics, there were 93,188 new cases of HIV in Russia registered during 2015 [7]. By the end of 2015, just over one million (1,006,388) people had been officially diagnosed with HIV in the country resulting in an HIV prevalence of 541.8 per 100,000 [7]. These official statistics only include people who have been

Polina Girchenko and Elizabeth J. King are co-first authors.

✉ Elizabeth J. King
ejking@umich.edu

[1] Humanitarian Action, St. Petersburg, Russia

[2] University of Michigan School of Public Health, Ann Arbor, MI, USA

diagnosed at least once in official, governmental medical institutions and attended a government AIDS Center [8]. The actual number of people living with HIV is projected to be at least two times higher than these official statistics [8], which not only has implications for estimating the prevalence of HIV in Russia, but also suggests that some people are not aware of their HIV serostatus and/or have not been linked to HIV services. Leading experts in the country have warned that the situation is worsening and that prevention efforts are not addressing the needs of those people who are most at risk for HIV acquisition [5].

According to official data among women aged 30–35 years old in Russia, 1.2% are living with HIV [5]. The proportion of women among people living with HIV has been increasing since 2002, and women currently make up 37% of all registered cases [7]. The population of people who inject drugs in Russia continues to remain most affected by the HIV epidemic [9] with HIV prevalence ranging from 40 [10] to 64% [11]. However, an increasing number of cases are attributable to heterosexual transmission [7, 12, 13]. There is a growing body of research demonstrating that unsafe sexual practices are associated with drug use in Russia [14, 15]. Previous research has shown that there is an overlap between drug use and involvement in transactional sex [16–18]. Unsafe sexual behaviors have been shown to be a risk factor for HIV among women who inject drugs [19]. Male clients of female sex workers have been identified as a bridge population, which threatens to further expand the HIV epidemic to the general population [20–22]. Women who inject drugs and are involved in transactional sex are an important population for understanding both the risk for HIV acquisition and transmission.

In order to effectively address the epidemic, we need to learn more about what prevention programs can do to better target the risk both for acquisition of HIV among the most-at-risk populations and for transmission to drug using and/or sexual partners given the current context of response to the epidemic of HIV in Russia. Taking into account the "double risk" of HIV acquisition and transmission experienced by women who are involved in injection drug use, we chose to focus on this population. The purpose of our study was to examine the factors associated with unsafe sex and drug use behaviors among women who inject drugs in St. Petersburg, Russia.

Methods

Data Collection

Between March and August 2015, we recruited a convenience sample of women aged 18 years or older who were either currently injecting drugs or injected drugs in the previous six months in St. Petersburg, Russia. First, we recruited women who received outreach services through a harm reduction program implemented by Humanitarian Action. Next, we used a snowball strategy by having participants refer other women who inject drugs to participate in the study. Additional participants were recruited by word of mouth as information about the study was disseminated through the community. After recruitment, potential participants were informed of study protocol and provided informed consent for participation. Participants were guaranteed anonymity and no identifying information was collected. Women were ineligible for participation if they were under the influence of drugs or other substances to the extent that they were unable to comprehend and complete the informed consent. Women were also informed that their decision of whether or not to participate in the study would not affect their receiving services from Humanitarian Action.

Once women agreed to participate, trained interviewers conducted all study procedures with the exception of the blood tests, which were performed by a certified nurse. Participants completed face-to-face interviews using a structured questionnaire. They also received rapid HIV testing (Alere Determine HIV1/HIV2; Waltham, MA, USA), which was preceded by pre-test counseling and followed by post-test counseling. In accordance with Russian regulations, women who received a positive HIV test result were referred to a medical facility. Participants were given a mobile telephone card (worth approximately $5) and women who recruited others received an additional $5 card. Secondary analysis of the data collected was done for this manuscript and approved by the University of Michigan Institutional Review Board.

Measurements

Injection risk was defined as self-reported use of someone else's used syringe to inject drugs and/or giving one's own used syringe to someone else for injection during the previous 12 months (yes/no). Sexual risk was defined as not using a condom during the previous vaginal or anal sexual contact (yes/no). The outcome variable "double risk" was constructed out of injection and sexual risk variables and had 4 categories (no risk, sexual risk only, injecting risk only, double risk). The list of potential covariates included age categorized into tertiles; education (categorized as less than high school, high school, some college and post college education); self-reported transactional sex practiced during previous 12 months (yes/no); sexual violence experienced during previous 12 months (yes/no); self-reported knowledge about HIV-status (HIV-positive, HIV-negative, or unknown HIV-status).

Statistical Analyses

To examine factors associated with unsafe sex and drug use behaviors among women who inject drugs, we applied logistic multinomial regression. We first did bivariate analysis. Sexual violence experienced during the previous 12 months and involvement in transactional sex were highly correlated. Despite high collinearity, we decided to keep both variables in the full model given that previous research has shown that both experiencing sexual violence and practicing transactional sex were found to influence risk behaviors. All potential covariates were associated with the outcome in bivariatae analyses with the exception of education. Nevertheless, since education is an important social variable, we included it in the complete model for multivariable analysis. We included all of the potential predictors in the full model and eliminated one-by-one the predictors, which were not associated with the outcome, simultaneously assessing the change in the regression coefficients for the remaining predictors. To obtain a parsimonious final model, we included only covariates that were significantly associated with the outcome. We considered 0.10 to be significant given that the purpose of our analysis was exploratory. We performed goodness-of-fit testing of the final models using deviance and Hosmer and Lemeshow tests. We conducted all data analysis in SAS 9.3 (SAS Institute Inc., Cary, NC, USA).

Results

Five hundred (500) women participated in our study. The majority of our study population was aged 30–35 years. Education-level distribution of our study participants followed education-level distributions among people who inject drugs and specifically, women who inject drugs, found in other studies. More than 50% of the study participants graduated from at least some college or had a higher level of education. Only 11.4% of the women did not finish high school. More than a half of participants in our study had two and more sexual partners during the previous 12 months, and almost 40% had four and more sexual partners during the same period of time. Forty percent of participants reported involvement in transactional sex during the previous 12 months. Almost 12% of study participants experienced sexual violence during the past year. Nearly 40% of the women reported sharing needles, and slightly more than 40% reported sexual intercourse without a condom during the previous 12 months.

When asked about potential risk factors, 21% of the women reported injection risk, 22% reported sexual risk, and 18% reported double risk of HIV infection and transmission during the previous 12 months. As part of the study, 64% of the women tested positive for HIV. Sixty one percent of the women who tested positive already knew their HIV-positive status prior to the testing as part of the study.

In bivariable analyses, involvement in transactional sex during the past 12 months was found to be strongly associated with sexual violence during the same period of time ($p < 0.0001$). And, transactional sex was also found to be associated with using condom during last sexual contact ($p < 0.0001$).

In multivariable analyses (Table 1), older age was significantly associated with increased sexual and injection risks and suggestively with increased double risk, though the p-value did not reach the statistical significance threshold. Belonging to the age category 31–34 years as opposed to the age category younger than 31 years increased the odds of injection risks during last 12 months by 62%. Being in the age category 35 years and older as compared to the age category 31 years and younger increased the odds of sexual risk by 80% among the women in our study.

Involvement in transactional sex significantly increased the odds of injection risk, but at the same time transactional sex significantly reduced the odds of sexual risk and double risk. Experience of sexual violence during the past 12 months showed the strongest effects on risky behaviors. Sexual violence increased the odds of injection risk by 78% and increased double risk by 238% for women who inject drugs in St. Petersburg.

Discussion

The population of women who inject drugs is clearly affected by the HIV epidemic in St. Petersburg. In our study, 64% of participants tested positive for HIV as part of this study, and 61% of participants were aware they had an HIV-positive serostatus. Women who inject drugs have risk for HIV acquisition and transmission due to both injection risk and sexual risk. The majority of participants had two or more sexual partners in the past year, with nearly 40% having four or more partners. Approximately 40% of participants reported either injection risk or sexual risk. And, nearly one-fifth of the participants reported having "double risk", meaning involvement in both injection and sexual risk behaviors for HIV.

Our study results indicate that women who inject drugs and are involved in transactional sex may be at greater risk for HIV acquisition and transmission. Involvement in transactional sex was associated with increased drug use risk. However, involvement in transactional sex was protective against sexual risk and "double risk". Experience of

Table 1 Results of multivariable multinomial logistic regression analysis

Variable	Injection risk vs. no risk (CI 90%)	p-value	Sexual risk vs. no risk (CI 90%)	p-value	Double risk vs no risk (CI 90%)	p-value
Age category						
31–34 years vs younger than 31 years	1.62 (1.0, 2.64)	0.09	0.99 (0.58, 1.69)	0.97	1.58 (0.93, 2.67)	0.15
35 years and older vs. younger than 31 years	1.24 (0.76, 2.05)	0.51	1.80 (1.1, 2.98)	0.05	1.29 (0.74, 2.26)	0.45
Transactional sex, last 12 months	1.59 (1.02, 2.48)	0.07	0.11 (0.06, 0.19)	<0.0001	0.11 (0.06, 0.20)	<0.0001
Sexual violence, last 12 months	1.78 (1.01, 3.14)	0.08	1.03 (0.38, 2.82)	0.95	3.38 (1.50, 7.63)	0.01

Goodness-of-fit

Deviance: $p > \chi^2 = 0.65$

Hosmer and Lemeshow Goodness-of-Fit Test: $p > \chi^2 = 0.81$

Final model's estimates fit the data at an acceptable level

sexual violence was associated with injection drug risk and also "double risk". Knowledge of a positive HIV serostatus did not influence engagement in sexual or drug use risk behaviors.

Our results build on the knowledge about women at risk for HIV in Russia. A recent study of female sex workers in three Russian cities (not St. Petersburg) showed that injection drug use places women involved in sex work at significantly higher risk for HIV, including sexual and structural-level risks [23].The results of our study indicated lower sexual risk than previous studies among women at heightened risk for HIV in St. Petersburg. Previously, not using a condom during the last sexual act was shown to be 67% among women who inject drugs and women whose partners inject drugs [24]. Our study results provide further insight into the current HIV epidemic in St. Petersburg.

Our study demonstrated our ability to recruit a large sample of a very hard-to-reach population. The snowball sampling strategy allowed us to also recruit women who were not already connected to harm reduction services. Nonetheless, there are several limitations to our study that are worth noting. First, the cross-sectional study design does not allow us to assess the cause–effect relationship between our variables. Second, given the snowball sampling approach that started with clients of harm reduction services we cannot draw complete conclusions about how representative these results are of all women who inject drugs in St. Petersburg. Third, we were not able to know for certain which drugs the women are injecting. The drug scene in St. Petersburg is constantly changing and although clients of the harm reduction outreach services often report that they are using heroin and methadone, they themselves are acutely aware that they do not know what these drugs actually consist of. Finally, the exploratory nature of this study limited our ability for a more in-depth analysis of potential risk behaviors. Future research should include more comprehensive measures for injection drug and sexual behaviors.

The results from our exploratory study provide ideas for future explanatory research. More research is needed to explain the mechanisms by which involvement in transactional sex influences unsafe drug using behaviors. Further studies are needed to provide a more complete, in-depth analysis of how the experience of sexual violence influences HIV risk behaviors. Given the high percentage of women who tested positive for HIV in our study, clearly the population of women who injects drugs and are involved in transactional sex warrants further research attention. Moreover, this vulnerable population is in need of HIV prevention and intervention efforts in order to address the epidemic.

Given that the HIV epidemic in Russia is rather unique compared to other countries, it is crucial to understand the HIV risk factors in this cultural and social context. Our study results provide valuable information that should be considered in designing and implementing HIV programs in St. Petersburg. HIV prevention efforts for younger female injection drug users should focus on activities to prevent them from later engagement in sharing needles and unprotected sex. HIV prevention efforts for women who inject drugs that are not involved in transactional sex must also address the importance of safe sexual behaviors. And for women who are involved in transactional sex, there is evidence to suggest that they would benefit from increased efforts to address their injection risk behaviors. All interventions must take into account the high levels of sexual violence experienced by women who inject drugs. It is crucial to include psychological and social support for these women as components of an HIV prevention program, as well as to design interventions to protect these

women from sexual violence. Women who inject drugs in Russia are a particularly vulnerable population in a country that has a growing HIV epidemic and lacks adequate response efforts to address it.

Acknowledgements The authors would like to acknowledge Humanitarian Action outreach workers, the interviewers who disseminated the survey, and most importantly the women who participated in this project by completing the survey. Funding for the project was provided by Positive Action for Children Fund.

Funding This study was funded by Positive Action for Children Fund.

Compliance with Ethical Standards

Conflict of interest Polina Girchenko declares that she has no conflict of interest. Elizabeth King declares that she has no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

1. Pokrovsky VV. Let sleeping dogs lie…, but bail out your friend. Ter Arkh. 2014;86:4–11.
2. Pokrovsky VV. HIV epidemic in Russia and neighbouring countries. J Int AIDS Soc. 2014;17:19502.
3. Burke SE, Calabrese SK, Dovidio JF, et al. A tale of two cities: stigma and health outcomes among people with HIV who inject drugs in St. Petersburg, Russia and Kohtla-Jarve, Estonia. Soc Sci Med. 2015;130(4):154–61.
4. Governmental Order of the Russian Federation from July 30, 1998. No. 681 "List of approved narcological substances, psychotropic substances, and their precursors under the control of the Russian government (revised version)".
5. Pokrovsky VV. With the speed of AIDS. Kommersant. 2015.
6. Gomez EJ, Harris J. Political repression, civil society and the politics of responding to AIDS in the BRICS nations. Health Policy Plan. 2015;31(1):56–66.
7. Federal AIDS Center of the Russian Federation (ed.). Federal AIDS Center factsheet. 2015.
8. Pokrovskaya A, Popova A, Ladnaya N, Yurin O. The cascade of HIV care in Russia, 2011–2013. J Int AIDS Soc. 2014;2:19506.
9. Niccolai LM, Verevochkin SV, Toussova OV, et al. Estimates of HIV incidence among drug users in St. Petersburg, Russia: continued growth of a rapidly expanding epidemic. Eur J Public Health. 2011;21(5):613–9.
10. Fedorova EV, Skochilov RV, Heimer R, et al. Access to syringes for HIV prevention for injection drug users in St. Petersburg, Russia: syringe purchase test study. BMC Public Health. 2013;13:183.
11. Aceijas C, Friedman SR, Cooper HL, Wiessing L, Stimson GV, Hickman M. Estimates of injecting drug users at the national and local level in developing and transitional countries, and gender and age distribution. Sex Transm Infect. 2006;82(3):10–7.
12. Aral SO, St Lawrence JS, Dyatlov R, Kozlov A. Commercial sex work, drug use, and sexually transmitted infections in St. Petersburg, Russia. Soc Sci Med. 2005;60(10):2181–90.
13. Goliusova MD. HIV infection epidemic in Russian Federation and its features at the present stage. Zh Mikrobiol Epidemiol Immunobiol. 2011;6:97–100.
14. Mills HL, White E, Colijn C, Vickerman P, Heimer R. HIV transmission from drug injectors to partners who do not inject, and beyond: modelling the potential for a generalized heterosexual epidemic in St. Petersburg, Russia. Drug Alcohol Depend. 2013;133(1):242–7.
15. Gyarmathy VA, Li N, Tobin KE, et al. Unprotected sex in heterosexual partnerships of injecting drug users in st. Petersburg, Russia. AIDS Behav. 2011;15(1):58–64.
16. Benotsch EG, Somlai AM, Pinkerton SD, et al. Drug use and sexual risk behaviours among female Russian IDUs who exchange sex for money or drugs. Int J STD AIDS. 2004;15(5):343–7.
17. King EJ, Maman S, Bowling JM, Moracco KE, Dudina V. The influence of stigma and discrimination on female sex workers' access to HIV services in St. Petersburg, Russia. AIDS Behav. 2013;17(8):2597–603.
18. Girchenko P, Ompad DC, Bikmukhametov D, Gensburg L. Association between Pregnancy and Active Injection Drug Use and Sex Work among Women Injection Drug Users in Saint Petersburg. Russia. J Urban Health. 2015;92(3):548–58.
19. Wechsberg WM, Krupitsky E, Romanova T, et al. Double jeopardy–drug and sex risks among Russian women who inject drugs: initial feasibility and efficacy results of a small randomized controlled trial. Subst Abuse Treat Prev Policy. 2012;1(7):1.
20. Toussova OV, Shcherbakova I, Volkova G, Niccolai L, Heimer R, Kozlov AP. Potential bridges of heterosexual HIV transmission from drug users to the general population in St. Petersburg, Russia: is it easy to be a young female? J Urban Health. 2009;7:121–30.
21. Niccolai LM, Odinokova VA, Safiullina LZ, et al. Clients of street-based female sex workers and potential bridging of HIV/STI in Russia: results of a pilot study. AIDS Care. 2012;24(5):665–72.
22. Niccolai LM, Shcherbakova IS, Toussova OV, Kozlov AP, Heimer R. The potential for bridging of HIV transmission in the Russian Federation: sex risk behaviors and HIV prevalence among drug users (DUs) and their non-DU sex partners. J Urban Health. 2009;86(Suppl 1):131–43.
23. Wirtz AL, Peryshkina A, Mogilniy V, et al. Current and recent drug use intensified sexual and structural HIV risk outcomes among female sex workers in the Russian Federation. Int J Drug Policy. 2015;26(8):755–63.
24. Abdala N, Hansen NB, Toussova OV, et al. Correlates of unprotected sexual intercourse among women who inject drugs or who have sexual partners who inject drugs in St. Petersburg, Russia. J Family Plan Reprod Health Care. 2013;39(3):179–85.