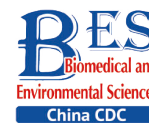


## Letter to the Editor



# A Cascade Analysis of Community Transmission Risks for HIV among People Who Inject Drugs Living with HIV in Iran

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There are 22 times as many people living with HIV in the population of drug users as in the general population. This is because the injection and sexually risky behaviors prevalent in this population. Having multiple sexual partners and maintaining sexual networks with people who inject drugs (PWIDs), can increase the risk of contracting a sexually transmitted infection<sup>[1]</sup>. More than 65% of all HIV-related cases in Iran can be traced back to people who inject drugs (PWID), and the number is estimated to be between 200,000 and 230,000 in Iran overall. Effective prevention, resources allocation and monitoring require an accurate estimate of the population of people who use illicit drugs<sup>[2]</sup>.

The bio-behavioral surveys (BBS) between 2010 and 2014 among PWID in Iran showed that the injection patterns and high-risk behaviors have changed over time. For example, the prevalence of HIV through unsafe sex (without the use of a condom) in injecting drug users with paid or unpaid sex partners was 60.5% in 2010, which increased to 68.7% in 2014. In 2014, while 87.8% of HIV-negative injecting drug users had sex in the previous year, 88% of them were aware that using condoms can reduce the risk of HIV transmission, 35% had access to free condoms, and only 18% used condoms in all of their sexual relationships in the previous month<sup>[3]</sup>.

To our knowledge, there is no data about cascade of prevention measures among HIV-positive injecting drug users in Iran. Therefore, this study aimed to conduct a cascade analysis of knowledge, access, and use of injection and sexual risk harm reduction programs in PWID who live with HIV in

Iran.

PWID in ten major cities in Iran (i.e., Tehran, Shiraz, Kermanshah, Mashhad, Ahvaz, Kerman, Sari, Tabriz, Khorramabad, and Zahedan) were recruited. Participants were recruited from 31 harm reduction facilities (including drop-in centers, shelters, and addiction treatment centers), as well as through outreach programs.

Participants had to meet the following criteria to be included in the study: Be 18 years old, have used injection drugs illegally at least once in the previous year, reside in the cities being studied, and give informed consent. Both the Kerman University of Medical Sciences Ethics Committee (Ethics code: K/93/205) and the Tehran University of Medical Sciences Ethics Committee (Ethics code: IR.TUMS.SPH.REC.1396.3547) reviewed and approved the study protocol.

Indicators concerning the level of knowledge, access, and use of HIV prevention and other services were measured using the data that was gathered from a national survey, BBS 2014.

For enrollment, we inquired about their drug-related practices (including the proportion of those who were aware that injection was a risk factor for HIV acquisition/transmission, had access to needle and syringe program, used sterile syringes in their most recent injection and injections in the previous month). Looking at only HIV-positive PWID who had sex in the previous year, we inquired about their sexual practices (including the proportion of PWID who were aware of the protective effect of condoms on HIV acquisition/transmission, had access to free condoms, and used condoms during the previous sex

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and all sex in the last month). These sexual indicators were further subdivided by PWID's sex with spouse, unpaid sexual partner (other than spouse), and paid sexual partner.

Based on data from the survey and the HIV test results, we analyzed the survey data in five groups: all HIV-positive PWID, HIV-positive PWID who had any sex in the previous year, HIV-positive PWID who had sex with a partner, HIV-positive PWID who had sex with their spouse, HIV-positive PWID who had sex with a non-paying partner, and HIV-positive PWID who had it with a paying partner.

Descriptive statistics and frequencies were calculated for all variables for different categories of HIV-positive PWID. We used a single denominator (one *N* for all cascades). The 95% confidence intervals (*CI*) were also reported for all estimated proportions. Stata version 14 (Stata Corp)<sup>[4]</sup> and Microsoft Excel were used to analyze the data and create the HIV prevention cascade steps.

Of 2,391 PWID enrolled in the BBS study, 215 individuals (7.5%), with 95% *CI* (6.9 to 8.0) were tested positive for HIV and included in our analysis (Table 1).

PWID living with HIV were mainly male (93.5%), aged 35 or above (68.9%), had a single relationship status (71.6%), had completed elementary school or high school (62.3%), were unemployed or worked in unstable jobs (93.9%), reported using heroin as their primary substance in the previous month (94.7%), and had a history of incarceration (83.2%). Table 1 shows these characteristics in detail.

Of the 215 PWID living with HIV, 91% were aware that injecting drugs increases the risk of HIV transmission, 70% had access to free sterile needles and syringes, 61% used sterile needles and syringes during their most recent injection, and 34% used sterile needles and syringes during all previous injection practices (Figure 1A).

Of the 215 PWID living with HIV, 59.5% (128 persons) reported having sex with a partner in the previous year. Of these 128 PWID, 99% knew that using condom could reduce HIV transmission, 41% had access to free condoms, 32% used condom in their last sexual practice, and 11% used condom in all of their sexual practices with their partners in the previous month (Figure 1B).

Only 42.7% (92 persons) of HIV-positive PWID had sex with their partner in the past year; of these 92 PWID, 100% knew that using condom could reduce HIV transmission, 48% had access to free condoms, 5% used condom in their last sexual practice, and 4% used condom in all of their sexual

practices with their spouse in the previous month (Figure 2A).

Only 38.6% (83 persons) of HIV-positive PWID had sex with an unpaid sex partner; of these 83 PWID, 89% knew that using condom could reduce HIV transmission, 42% had access to free condoms, 23% used a condom during their last sex, and 16% used a condom in all sex practices in the last month (Figure 2B).

Only 26% (56 persons) of HIV-positive PWID had sex with a paying partner in the past year; of these 56 PWID, 96% knew that using condom could reduce HIV transmission, 34% had access to free condoms, 30% used condom in their last sexual practice, and 18% used condom in all of their sexual practices with their paying partners in the previous month (Figure 2C).

We found a considerable proportion of PWID living with HIV in Iran were involved in risky injection practices or unsafe sexual behaviors, both of which have the potential to contribute to the ongoing spread of HIV in their community. Lack of access to free sterile syringes was the most common reason for not using sterile needles. A more significant disparity was observed in condom use by the type of partner, with only about 11% of HIV-positive PWID using condoms regularly.

The main reason for not using condoms was a lack of free condom distribution services. All PWID subgroups (spouses, paid sex partners, non-paid sex partners, and men-to-men sex (MSMs)) had limited access to free syringes and condoms. And the problem of limited access to condoms was more severe in the MSM group, with a lower percentage of MSM having access to and using condoms than others. There was a significant gap between PWID knowledge and condom use in all cases. Regarding demographics, younger PWID are more likely to engage in risky sex and share syringes.

Other studies have found that a high percentage of PWIDs have a history of joint injection and unprotected sex and are thus at risk of contracting infections such as HIV<sup>[5]</sup>.

Several studies on the demographic characteristics of these individuals support our findings, indicating that younger PWID who use stimulants are more likely to engage in unsafe sex and share syringes<sup>[6]</sup>. Given that the stigma associated with stimulant use in Iran is lower than that associated with other substances. And the use of stimulant drugs by Iranian youth has increased in recent years<sup>[7]</sup>. To reduce the high-risk behaviors of younger PWID, it is necessary to develop appropriate

harm reduction programs and provide related training with a greater emphasis on this group of PWID.

There are various methods for preventing HIV infection, and interventions are required to ensure that injecting drug users understand the importance of HIV prevention and seek services from service

providers<sup>[8]</sup>. In various ways, the responsible bodies provide injecting drug users with the HIV prevention services they require. This ease of access and correct understanding leads to HIV prevention methods and adherence<sup>[8]</sup>.

Identifying the gap between prevention knowledge and practice is very effective, and

**Table 1.** The demographic characteristics of people who inject drugs (PWID) were HIV positive overall and by type of sexual partners

Demographic characteristics	PWID who were HIV positive (n = 215)	PWID who were HIV positive and had sex in the past year (n = 128)	PWID who were HIV positive and had sex with their spouse (s) in the past year (n = 92)	PWID who were HIV positive had sex with non-paying partner (s) in the past year (n = 83)	PWID who were HIV positive and had sex with paying partner (s) in the past year (n = 56)
Sex					
Male	201 (93.5)	122 (95.3)	89 (97.2)	80 (96.4)	52 (92.9)
Female	14 (6.5)	6 (4.7)	3 (2.8)	3 (3.6)	4 (7.1)
Age categories (years)					
18–19	1 (0.4)	0 (0.0)	0 (0.0)	1 (1.2)	1 (1.8)
20–24	2 (0.9)	2 (1.5)	0 (0.0)	2 (2.4)	1 (1.8)
25–34	64 (29.8)	45 (35.1)	15 (16.3)	3 (39.8)	15 (26.8)
≥ 35	148 (68.9)	81 (63.2)	77 (83.7)	47 (56.6)	39 (69.6)
Current Marital status					
Single	154 (71.6)	67 (52.3)	0 (0.0)	49 (59.1)	36 (64.3)
Married	24 (11.2)	24 (18.7)	92 (100)	16 (19.2)	6 (10.7)
Others (widow, divorced)	34 (15.8)	34 (26.5)	0 (0.0)	18 (21.7)	14 (25.0)
Temporary marriage (Sigheh)	3 (1.4)	3 (2.3)	0 (0.0)	0 (0.0)	0 (0.0)
Education					
Illiterate	7 (3.3)	4 (3.1)	6 (6.5)	5 (6.0)	4 (7.2)
Primary school or less	67 (31.1)	41 (32.0)	28 (30.4)	25 (30.2)	16 (28.5)
Middle/high school/Diploma	134 (62.3)	78 (60.9)	53 (57.6)	50 (60.2)	33 (58.9)
University	7 (3.3)	5 (3.9)	5 (5.5)	3 (3.6)	3 (5.4)
Employment					
Unemployed/unstable job	201 (93.9)	119 (92.9)	75 (82.4)	67 (80.7)	47 (87.0)
Employed/stable job	13 (6.1)	9 (7.1)	16 (17.6)	16 (19.3)	7 (13.0)
Substance type in past month					
Opium/Shire	45 (40.1)	16 (12.5)	1 (8.3)	13 (59.0)	11 (73.3)
Heroin	107 (94.7)	63 (49.2)	9 (11.4)	22 (84.6)	14 (87.5)
crack	36 (31.8)	17 (13.2)	0 (0.0)	9 (40.9)	8 (53.3)
Norgesic	6 (5.3)	3 (2.3)	0 (0.0)	0 (0.0)	0 (0.0)
Crystal/methamphetamine	15 (13.2)	11 (8.5)	0 (0.0)	2 (9.0)	2 (13.3)
History of incarceration					
Yes	179 (83.2)	123 (96.0)	18 (94.7)	35 (92.1)	27 (93.1)

**Note.** Categorical variables are presented as a number and percentage. Data are shown as *n* (%).

selecting appropriate interventions to fill this gap, such as the optimal allocation of the few available medical resources, primarily antiretroviral therapy, is required for the best prevention of individual complications and the achievement of population transmission control. HIV professional networks are critical in the development, optimization, and implementation of support strategies<sup>[9]</sup>.

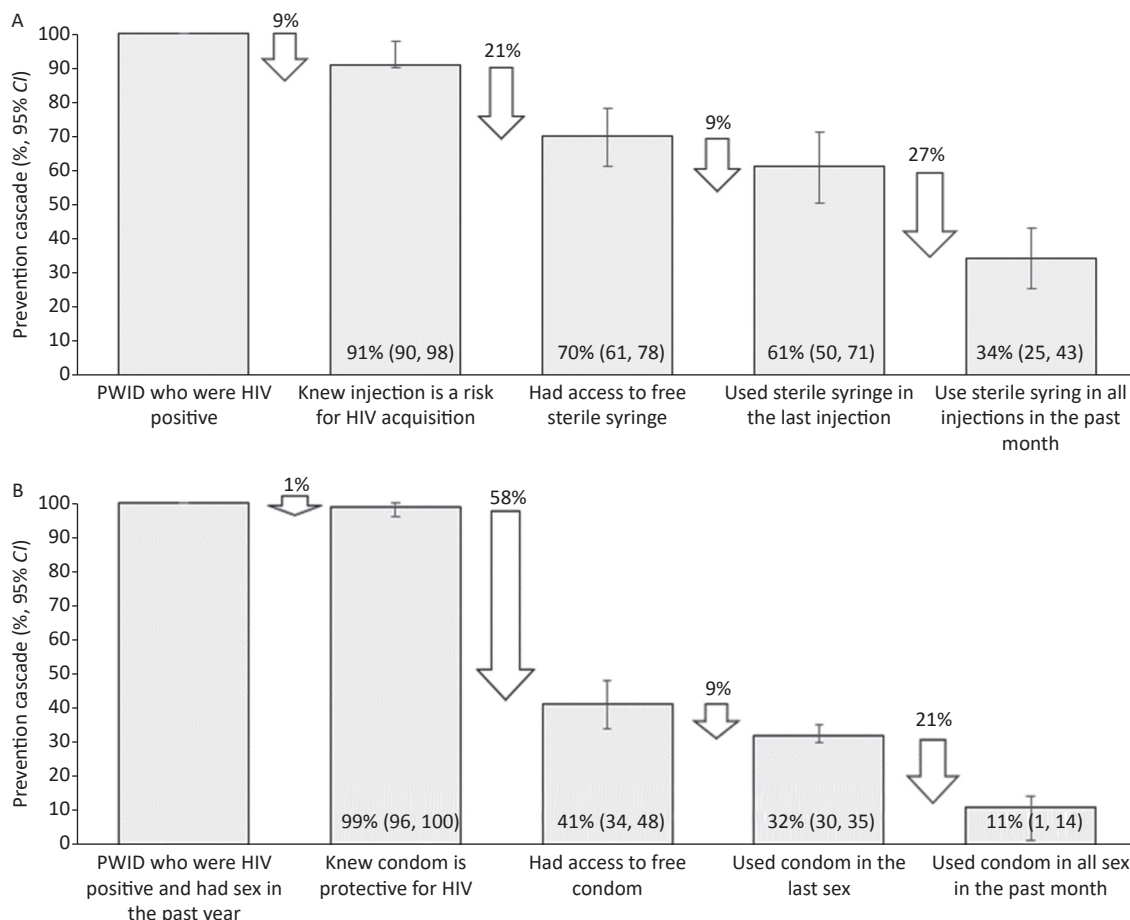
The HIV epidemic in Iran has decreased due to injection drug use but is increasing due to sexual transmission, particularly among the FSM and MSM groups. Extensive interventions to connect these people to health care and standardize care, such as providing high-quality care, have been proposed as factors that can affect access<sup>[10]</sup>.

Even though the HIV prevention services are simple, they should work well with other prevention programs and include the main steps, like education and information, as well as the most critical factors that will affect how well the preventive methods work. So that progress can be measured, these

programs must be standardized and work for this group (PWID).

The main limitations should be considered when interpreting the results of the present study. First, we determined the prevalence of stigmatized behaviors typically underreported, such as sharing syringes and engaging in sexual activity without using a condom. As a result, the actual proportion of HIV-positive PWID potentially responsible for the spread of HIV within the community may be higher than we observed.

This cascade analysis revealed that a concerning high proportion of PWID living with HIV in Iran engaged in risky sexual behaviors or unsafe injection practices, both of which have the potential to contribute to the ongoing spread of HIV in their community. Insufficient access to free syringes, a lack of knowledge and attitude regarding the risk of unsafe sex, and inadequate access to free condoms had the highest gaps in the cascade analysis. These gaps along with other barriers should be addressed



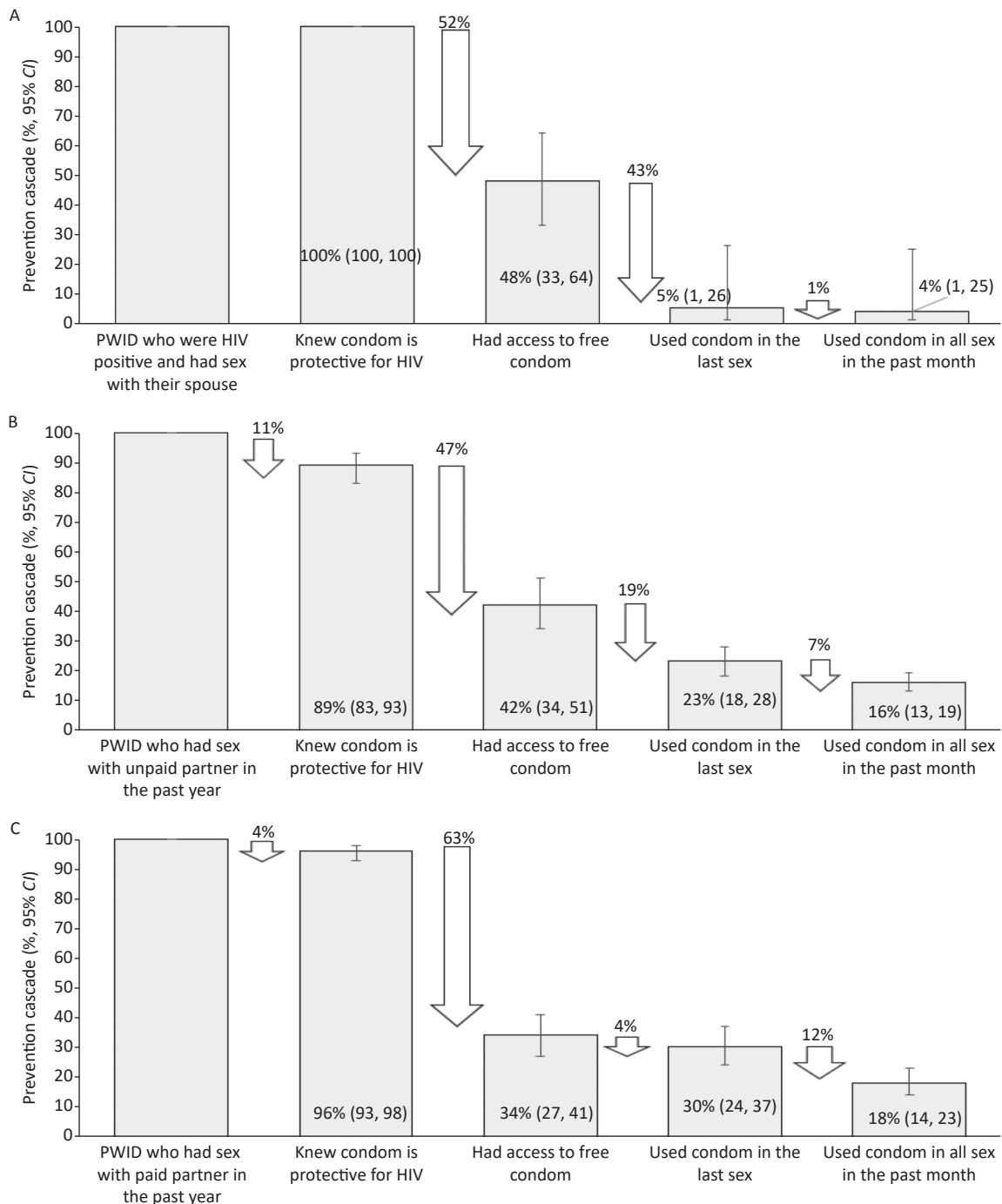
**Figure 1.** HIV prevention cascade among people who inject drug living with HIV. (A) All PWID; (B) PWID who had sex in the past year.

to halt the spread of HIV in the community and improve access to harm reduction services PWID.

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**Ethical Approval** The study protocol was approved by the Tehran University of Medical Sciences Ethics with the Ethics Code using the number IR.TUMS.SPH.REC.1396.3547.



**Figure 2.** HIV prevention cascade among people who inject drug living with HIV. (A) PWID with their spouse, (B) PWID with their unpaid partner, (C) PWID with their paid partner.

**Conflict of Interest** The authors of this article declare that they have no conflict of interests.

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