



OPEN History of injection drug use in the month preceding incarceration in Iranian prisons

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This study aimed to investigate the prevalence and pattern of injecting drug use (IDU) in Iranian incarcerated people one month before their imprisonment. This cross-sectional study used data from the national Bio-Behavioral Surveillance Surveys conducted from a random sample of people incarcerated in 33 prisons covering the major geographical areas of Iran in 2017 ($n = 5,785$). A multivariable logistic regression model was used to determine factors related to IDU one month before imprisonment. The lifetime prevalence of IDU among Iranian incarcerated people was 12.2% (95% confidence interval [CI] 11.4, 13.1), of whom 19.2% (95% CI 16.3, 22.3) injected in the month before imprisonment. Among incarcerated people with a lifetime history of IDU, the average age at which they started IDU was 24.5 ± 5.9 years, and the mean injection duration was 36.8 months (95% CI 33.5, 40.1). Friends were the initial influence for starting IDU in 67.7% of cases. Additionally, 58.6% of incarcerated people with a history of IDU used a new syringe/needle for injections in the month before imprisonment. Participants over 40 years old were less likely to inject in the month before incarceration than the 18-to-29-year age group (adjusted odds ratio [AOR] 0.37, 95% CI 0.19, 0.73). A history of previous imprisonment (AOR 2.17, 95% CI 1.27, 3.70) and having a tattoo (AOR 1.75, 95% CI 1.15, 2.68) showed significant positive associations with IDU in the month before imprisonment. The study found that one in eight persons detained in Iran had a history of IDU, of whom one in five injected in the month before incarceration with higher rates among persons with younger age, tattoos, and previous incarceration. Implementing targeted prevention programs within prisons, including better access to rehabilitation and needle exchange programs, is recommended to reduce the risks of infectious disease transmission including HIV and HCV.

Keywords Injecting drug use, Imprisonment, Iran

Incarceration rates among people who inject drugs (PWID) are relatively high^{1,2}. Some people in incarceration continue injecting drug use (IDU) during their prison term, while the majority stops IDU^{3,4}. However, resuming IDU after release can result in health and social welfare problems such as reoffending, recidivism, unemployment, mental health issues, and increased mortality rates due to opioid overdose⁵⁻⁷.

Individuals who continue IDU while incarcerated are considered at high risk for human immunodeficiency virus (HIV) infection⁸ due to poly-drug use, sharing injection equipment, and tattooing⁹. These practices are associated with the spread of infectious diseases that are prevalent in prisons, including HIV, hepatitis C virus (HCV), and hepatitis B virus (HBV)¹⁰. These high-risk behaviors have been exhibited by incarcerated people in Iran, both before and during their incarceration, as well as engaging in unprotected sex and alcohol consumption^{11,12}.

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In 2022, approximately one million new HCV infections were reported globally¹³, with 43.6% linked to unsafe injecting among PWID. There are approximately 14.8 million PWID worldwide, representing 0.29% of the global adult population aged 15–64 years¹⁴. The prevalence of HCV among PWID exceeds 40%, equating to about 5.6 million individuals living with HCV¹⁵, with 44.8% of these cases found in the Eastern Mediterranean Region¹⁶. The Middle East has a high prevalence of HCV, particularly among PWID, due to increased drug transit of opium and heroin through Afghanistan and neighboring countries¹⁷. Iran, with approximately 186,000 HCV patients, has a prevalence rate of about 0.6% as per a recent systematic review^{18,19}. Although this rate is lower than in many neighboring countries, it has significantly risen among groups at high risk such as PWID, signaling a serious concern for health policymakers²⁰. Notably, approximately one-third of substance-induced deaths among PWID result from opioid overdoses²¹.

Factors influencing risky behaviors among PWID before and during imprisonment include their injection history, frequency of injection, prior use of shared syringes, and younger age at first injection²². Therefore, it is essential to explore the patterns of substance use among PWID²³ in the period immediately before incarceration. Unfortunately, research on the prevalence of IDU in this period is limited. One Australian study in 2016 found 29% of incarcerated persons injected in the several months before their imprisonment²⁴. A 2024 meta-analysis reported a pooled lifetime prevalence of IDU in Iran at 16%²⁵, but there were no data regarding the prevalence of this behavior before entering prison.

Concerning incarceration, Iran ranks fifth in Asia and tenth globally in terms of the proportion of its population in incarceration, at approximately 189,000 incarcerated people in 2024, of whom 3.1% were women²⁶. The high level and frequent cycle of entering and exiting incarceration affects public health, as released individuals often return to communities of drug users, family, and friends¹. Additionally, health problems are more common among incarcerated people upon entry into prison than in the general population. Thus, gathering relevant information on their risk behaviors is crucial at the time arrest, when in-prison interventions may be implemented. The primary objective of this study was to assess the prevalence of IDU one month before imprisonment among Iranian incarcerated people. A secondary aim was to identify the patterns of IDU and factors related to IDU immediately before incarceration.

Methods

Overall study design and study population

The national Bio-Behavioral Surveillance Survey (BBSS) was carried out among incarcerated individuals in Iran in 2017 to measure the HIV prevalence and characterize associated high-risk behaviors. The design and methodology of the study have been detailed in earlier publications with key procedures briefly summarized here¹¹. Data were collected from 33 prisons, covering the major geographical areas of Iran²⁷. The surveys recruited 5,785 incarcerated persons using a multi-stage random sampling approach. Participants were required to be at least 18 years old and incarcerated for at least one week at the time of the study.

Measures

Gender-matched research assistants conducted face-to-face interviews in private rooms within the prison facilities. Interviews were conducted in Farsi, the language spoken by all participants. Data were gathered through a standardized BBSS questionnaire, which included information on demographic characteristics, injection drug use history, previous incarceration, and HIV/STI related risk behaviors²⁷. The outcome variable in this secondary analysis of the BBSS data was self-reported injection drug use within the one month before being incarcerated. First, participants were asked if they had ever injected non-prescription drugs. Those answering yes were asked, “Have you used injectable drugs in the month before your incarceration?” Covariates of interest included demographic factors such as age at the time of the interview (18–29 vs. 30–40 vs. >40 years), educational level (less than high school vs. equal or higher than high school), and marital status (single, divorced/widowed vs. married). Additional covariates included a history of previous incarceration (yes vs. no), duration of previous incarceration (months), alcohol consumption (yes vs. no), presence of tattoos (yes vs. no), condom use during the last sexual encounter (yes vs. no), age at first injection, the first person they injected with (parents vs. partner/sexual partners vs. friends vs. alone vs. other), the total length of time they had been injecting drugs, and the location of their last injection (inside prison, outside before being incarcerated, or outside during leave). They also reported how often they injected in the month before their imprisonment.

Statistical analysis

We used to proportion and means (\pm standard deviation [SD]) to report variable distributions. We compared the characteristics of incarcerated people who engaged in IDU in the month prior to incarceration to those who did not in bivariable logistic regression models. Relevant covariates, those with a p-value of less than 0.2, were included in a multivariable logistic regression model, which was subsequently refined through backward elimination. Crude and adjusted odds ratios (AOR), along with their 95% confidence intervals (95% CI), were reported. Stata 14.2 (Stata Corporation, College Station, Texas) was used for statistical analyses. A p-value of less than 0.05 was considered statistically significant.

Ethical considerations

All participants provided verbal informed consent. No incentives or special privileges were given for participation. The protocol was reviewed and approved by the Ethics Committee of Kerman University of Medical Sciences (Ethics code: K/93/207), which had a prisoners' advocate as a member. Study data were anonymous, and no access to prison health system records was granted.

Results

Table 1 presents the characteristics of Iranian incarcerated people sampled in the BBSS in 2017. Of the 5,785 overall, 5,435 (94.0%) were men, with a plurality in the 30–40-year-old age category ($n=2,746$, 47.7%). Additionally, 3,419 individuals (59.1%) had a prior incarceration. The lifetime prevalence of IDU was 12.2% (95% CI 11.4, 13.1) ($n=705$), of whom 19.2% (95% CI 16.3, 22.3) injected in the month before being incarcerated ($n=132$).

Results of the bivariate and multivariate logistic regression analyses are presented in Table 2. Individuals aged 30 to 40 years had lower odd of IDU in the month before incarceration (AOR 0.67, 95% CI 0.40, 1.13) compared to those aged 18 to 29 years. Those over 40 years old were also less likely to inject in the month before incarceration than the 18-to-29-year age group (AOR 0.37, 95% CI 0.19, 0.73). That is, those age 18–29 years had the highest prevalence of IDU (29.7%) in the month prior to incarceration. Additionally, those with a history of prior incarceration had significantly higher odds of IDU (AOR 2.17, 95% CI 1.27, 3.70) compared to those without such a history. Participants who had tattoos were also more likely to engage in IDU in the month preceding imprisonment (AOR 1.75, 95% CI 1.15, 2.68). There were no statistically significant differences in the odds of IDU among incarcerated people who consumed alcohol or those who used condoms during their last sexual encounter. Of note, no incarcerated female had injected in the month prior to detention.

Table 3 describes the patterns of IDU. The average age at which Iranian incarcerated people began injecting drugs was 24.5 ± 5.9 years. The mean duration of injection was 36.8 ± 44.4 months. Friends were the individuals with whom they first started IDU for 474 (67.7%), while 205 individuals (29.3%) reported starting alone. Additionally, 68 (53.1%) PWID injected more than once per day in the month leading up to their incarceration, while 37 individuals (28.9%) injected drugs once per day. Furthermore, 75 individuals (58.6%) indicated that they used a new syringe or needle for the last injection in the month before prison, while 38 participants (29.7%) used their own previously used syringe or needle. One (0.8%) incarcerated person reported using a syringe or needle found on the floor or in a trash can for injections.

Discussion

Our study indicates that one in eight persons entering incarceration in Iran have a history of IDU, of whom one in five had were injecting within one month of their incarceration. The latter finding suggests many persons detained are currently injecting and therefore at risk for continuing injection while in prison and/or resuming IDU upon release. Our findings corroborate the high level of IDU in Iran generally and among persons in the incarceration system specifically. A notable study by Moazen et al. reviewed the prevalence of pre-prison IDU across 40 countries²⁸, highlighting Iran as one of the nations with elevated levels of IDU, varying from 2–42%^{29–32}. Furthermore, a study indicated that among incarcerated individuals in Iran, those living with HCV displayed elevated rates of pre-incarceration IDU, particularly among those who were also positive for HBV,

| Variables | N (%) |
|---|-----------------|
| Sex | |
| Male | 5,435 (94.0) |
| Female | 350 (6.1) |
| Age group (years) | |
| 18–29 | 1,514 (26.3) |
| 30–40 | 2,746 (47.7) |
| >40 | 1,503 (26.1) |
| Education level | |
| High school and higher | 3,977 (68.9) |
| Less than high school | 1,795 (31.1) |
| Current marital status | |
| Married | 2,565 (44.4) |
| Divorce/widowed | 1,342 (23.2) |
| Single | 1,875 (32.4) |
| History of previous incarceration | |
| No | 2,362 (40.9) |
| Yes | 3,419 (59.1) |
| Lifetime history of drug injection | |
| No | 5,065 (87.8) |
| Yes | 705 (12.2) |
| Prevalence of injecting drug use one month before prison ($n=688$ respondents) | |
| No | 556 (80.8) |
| Yes | 132 (19.2) |
| Mean length of previous incarceration (months) | 3.45 ± 3.61 |

Table 1. Characteristic of incarcerated people in the Bio-Behavioral surveillance survey, Iran, 2017 ($n=5,785$).

| Variables | Prevalence of injecting drug use one month before prison N (%) | Crude OR | P value | Adjusted OR* | P-value |
|--|---|-------------------|---------|-------------------|---------|
| Age group (year) | | | | | |
| 18–29 | 30 (29.7) | 1 | | 1 | |
| 30–40 | 76 (19.9) | 0.59 (0.36, 0.96) | 0.035 | 0.67 (0.40, 1.13) | 0.137 |
| > 40 | 24 (12.1) | 0.32 (0.18, 0.59) | <0.001 | 0.37 (0.19, 0.73) | 0.004 |
| Education level | | | | | |
| High school and higher | 36 (21.7) | 1 | | - | - |
| Less than high school | 96 (18.4) | 1.22 (0.80, 1.89) | 0.348 | - | - |
| Current marital status | | | | | |
| Married | 71 (23.1) | 1 | | 1 | |
| Divorce/widowed | 25 (14.8) | 0.58 (0.35, 0.96) | 0.033 | 0.70 (0.40, 1.19) | 0.183 |
| Single | 36 (17.1) | 0.69 (0.44, 1.07) | 0.099 | 0.82 (0.52, 1.47) | 0.416 |
| History of previous incarceration | | | | | |
| No | 28 (34.2) | 1 | | 1 | |
| Yes | 104 (17.2) | 2.49 (1.51, 4.13) | <0.001 | 2.17 (1.27, 3.70) | 0.004 |
| Mean length of previous incarceration (months) | 2.61 ± 3.46 | 0.97 (0.91, 1.04) | 0.393 | - | - |
| Tattoo | | | | | |
| No | 48 (24.4) | 1 | | 1 | |
| Yes | 84 (17.1) | 1.56 (1.04, 2.33) | 0.030 | 1.75 (1.15, 2.68) | 0.009 |
| Alcohol consumption ever | | | | | |
| No | 46 (16.9) | 1 | | 1 | |
| Yes | 68 (22.9) | 0.68 (0.45, 1.03) | 0.072 | - | - |
| Use a condom in the last sex | | | | | |
| No | 92 (19.8) | 1 | | 1 | |
| Yes | 27 (16.2) | 1.28 (0.80, 2.05) | 0.301 | - | - |

Table 2. Characteristics of incarcerated people injecting drugs one month before entering prison, Iran, 2017 (N = 5,785). * Adjusted for variables with a p-value < 0.2 in the crude model.

with a prevalence rate of 41.8%³³. In 2024, the prevalence of IDU within Iranian prisons was reported to be 16% (95% CI 12.6, 19.7)²⁵. In Australia, a study found that irregular IDU in prison during the 30 days prior to a three-month follow-up was 23%, and a regular IDU use was observed at 48%²⁴.

Few studies specifically examined the prevalence of IDU one month before incarceration, which is likely to more closely correspond to current use. A prospective cohort study in England found that up to 64% of PWID in prison had injected drugs prior up to the date of their incarceration³⁴. Notably, the large majority (93%) expressed a desire to cease injecting while in prison, with nearly a quarter citing the absence of needle exchange programs as a reason for this intention. However, when hypothetically asked whether they would continue to inject drugs in prison if needle exchange programs were accessible, one-third of participants (33%) indicated they would³⁴. Overall, it can be concluded that the prevalence of IDU among Iranian incarcerated individuals in the month preceding incarceration is relatively high, highlighting an urgent need for the implementation of targeted interventions within prisons with expanded access in the surrounding communities.

We also found significant associations with injection in the month prior to incarceration. First, persons incarcerated with younger age were more likely to report IDU one month prior to imprisonment. A longitudinal study conducted in 2018 also found that younger individuals were more likely to restart and continue IDU after incarceration³. Furthermore, among those with repeated incarcerations, younger age was associated with higher odds of any injection, weekly injection, and sharing needles or syringes³. Other studies confirm these findings, demonstrating that the prevalence of high-risk injecting behaviors is greater among young people, both in the community and in prison^{9,35,36}. Taken together, there is great need for targeted strategies to prevent HIV and HCV infections, including treatment as prevention, specifically prioritizing younger individuals in prison. Second, in addition to younger age, a prior history of incarceration was identified as a significant predictor of IDU in the month prior to imprisonment. Third, we found having tattoos was significantly associated with IDU in the month prior to incarceration. The study conducted by Jafari et al. has also demonstrated that the prevalence of IDU increases in conjunction with the presence of other high-risk behaviors, including tattooing³⁸. Although Iran has a relatively low prevalence of tattoos generally^{28,39}, this factor should not be overlooked, as unsterile tattooing is a notable route for the transmission of multiple infectious diseases. Finally, we note another Iranian study by Moradi et al. in 2015 also identified male gender, unmarried status, and a history of previous incarceration as significant risk factors for lifetime drug use³⁷.

Our analysis of IDU patterns in the month prior to incarceration revealed that most individuals used injecting drugs at least once a day or more frequently. Additionally, participants typically used new syringes or their own previously used syringes. A longitudinal study involving Australian incarcerated people found that individuals were significantly less likely to initiate IDU after incarceration, whereas they were more likely to have injected

| Variables | Mean (SD) / n (%) |
|---|-----------------------------------|
| Age at first injection (year) | 24.5 ± 5.9 (95% CI 24, 25) |
| Total duration of injection (months) | 36.8 ± 44.4 (95% CI 33.51, 40.13) |
| The first person you injected with | |
| Parents | 4 (0.6) |
| Partner/sexual partners | 11 (1.6) |
| Friends | 474 (67.7) |
| Alone | 205 (29.3) |
| Other | 6 (0.9) |
| The last injection location | |
| Inside prison | 40 (5.7) |
| Outside before incarceration | 642 (91.6) |
| Outside on leave | 19 (2.7) |
| Frequency of drug injections in the month prior to incarceration | |
| Once per month | 8 (6.3) |
| 2–3 times per month/about once a week | 8 (6.3) |
| 2 to 3 times per week | 7 (5.5) |
| Once per day | 37 (28.9) |
| More than once per day | 68 (53.1) |
| The type of syringe used in the last injection in the month before incarceration | |
| New syringe or needle | 75 (58.6) |
| My own used syringe or needle | 38 (29.7) |
| A syringe or needle used by another person | 14 (10.9) |
| Syringe or needle used on the ground or inside trash can | 1 (0.8) |
| Using preparation tools (spoon, pump, filter, etc.) with others during the last injection month before imprisonment | |
| Yes | 45 (34.9) |
| No | 84 (65.1) |

Table 3. Pattern of injection drug use among Iranian incarcerated people, 2017. Percentages are among those responding to the question.

drugs prior to entering prison³. Furthermore, among those who injected, participants were less likely to inject on a weekly basis but more likely to share needles or syringes.

Limitations

We recognize that this study has limitations. The first limitation is its cross-sectional design, which precluded the identification of causal associations between the variables. A second limitation was the reliance on self-reported data, which may lead to underestimation in the prevalence of stigmatized and illegal behaviors particularly in the prison setting. To help mitigate this bias, face-to-face interviews were conducted in private rooms and participants were assured of the anonymity of the questionnaires. A third limitation was recall bias, as some questions required participants to recall past information. To address this, the questionnaire specified more recent timeframes for many behaviors. While the sample may not be fully representative of all persons incarcerated in Iran, strengths of the study include the random multi-stage cluster sampling method and the large geographic coverage of the prisons included. Lastly, an important limitation is related to the time of data collection. The study data are from 2017, and there were notable interruptions such as the COVID-19 pandemic that impacted updating the BBSS. Nonetheless, we feel the factors identified here help set a baseline for future assessments. Moreover, dissemination of the available data can improve understanding of HIV risk among imprisoned individuals in Iran and guide the development of interventions to mitigate the harms of IDU within prisons and surrounding communities.

Conclusions

This study highlights the significant prevalence of IDU among incarcerated individuals in Iran, emphasizing the urgent need for effective interventions. The identified factors, such as younger age and prior incarceration, suggest that specific populations are at higher risk and require tailored strategies. To address these challenges, it is crucial to implement comprehensive prevention programs aimed at younger individuals, focusing on education about the risks associated with IDU. Additionally, enhancing access to rehabilitation services will be vital in supporting individuals with a history of drug use and reducing the likelihood of reoffending. Establishing needle exchange programs within prison facilities can play a critical role in minimizing the transmission of infectious diseases among those who continue to inject drugs while incarcerated. Such initiatives not only protect the health of incarcerated individuals but also contribute to public health efforts by reducing the overall burden of drug-related diseases in the community. In conclusion, a multifaceted approach that combines prevention,

rehabilitation, and harm reduction strategies inside and outside prisons is essential to effectively combat IDU and its associated risks in the Iranian prison population and the surrounding communities.

Data availability

The data analyzed in the study are available from the corresponding author upon reasonable request.

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Author contributions

MD, RSF and HSH contributed to the design of the study. WM and RSF supervision of the manuscript. HSH, SM, FT, MSB, NN, AAH and MSH were responsible for data collection. MD, RSF and WM performed statistical analysis. MD wrote the manuscript. The authors read and approved the final manuscript.

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Declarations

Competing interests

The authors declare no competing interests.

Ethics approval and consent to participate

The study was approved by the ethics committee of Kerman University of Medical Sciences. All methods were carried out by relevant guidelines and regulations.

Consent for publication

Not applicable.

Additional information

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