# Profile of People Who Inject Drugs in Tehran, Iran

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**Abstract-** The marked shift in the patterns of drug use in Iran, from opium smoking to injecting drug use, has led to serious health-related outcomes. This study was designed to explore characteristics of people who inject drugs (PWID) in Tehran, Iran. Nine hundred and four PWID were recruited from treatment and harm reduction facilities, as well as drug user hangouts in public areas in Tehran. Participants were interviewed using the Persian version of the World Health Organization Drug Injecting Study Phase II questionnaire. The median age at the time of the first illegal drug use, at the time of the first injection and current age was 20, 24 and 32, respectively. In more than 80% of the cases, the first drug used was opium. The transition from the first drug use to the first drug injection occurred after an average of 6.6 and 2.7 years for those who had started drug use with opium and heroin, respectively. Two-thirds of the participants shared injecting equipment within the last 6 months. Difficulty in obtaining sterile needles and thehigh cost of syringes were reported as the major reasons for needle/syringe sharing. Approximately 80% of community-recruited PWID reported difficulties in using treatment or harm reduction services. Self-detoxification and forced detoxification were the most common types of drug abuse treatment in alifetime. Despite a dramatic shift in drug policy in Iran during the past few years, wider coverage of harm reduction services, improvement of the quality of services, and education about such services are still necessary.



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## Introduction

Injecting drug use is considered as an international public health threat that can lead to serious health-related outcomes such as the transmission of blood-borne viruses resulting from risky behaviors among people who inject drugs (PWID). It has been estimated that approximately 15.9 million people may inject drugs worldwide (1), of whom around 260,000 live in Iran (2).This is around one-fifth of those with illicit drug use disorder, who have been estimated to be at least 2.1% of the population aged 15 to 64 (3). As a previously producer country, and a major drug transit country, opium use has historically been prevalent in Iran. Opium is usually used by non-injecting routes and the users have a more stable lifestyle in comparison to users of other illicit opioids and synthetic drugs (4-6). However, the pattern of drug use has substantially changed during the past few decades. One of the most important changes is the increase in injecting drug use, which has been associated with various health consequences (7,8). In Iran, needle/syringe sharing is considered as one of the most commonrisky behaviors among PWID (9,10). PWID constitute the majority of the population infected with HIV/AIDS (2,11,12) and hepatitis C virus (13,14). Injecting drug use is associated with overdose and death, as well (15,16).

The data already available on socio-demographics characteristics of PWID in Iran do not reveal a clear picture. Moreover, despite the increase of harm reduction services in Iran, there exists limited knowledge about the service use of PWID. Finally, rapid changes in the patterns of drug use need to be monitored and studied more frequently and more comprehensively. Access to more extensive data on drug use and stronger analysis of the problem can help address new challenges more effectively.

The present work is a part of a larger study investigating the characteristics, risk behaviors, risk factors, and the prevalence of hepatitis C, hepatitis B, HIV infections, and service use of PWID in Tehran, the capital of Iran. Results pertaining to the socio-

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demographic profiles, patterns of drug use, unsafe injection, drug overdose, and service use of PWID are presented herein.

## Materials and Methods

### Participants and sampling method

We used study protocol for World Health Organization (WHO) Drug Injecting Study-Phase II (17), which was carried out in 13 countries and moderately adopted it, according to our national situation and considerations.

The study sample consisted of 904 current PWID recruited between June 2006 and March 2007. Current injecting drug use referred to having a history of injecting drug use in the previous two months. Those under 15 years old and those who were confused and were unable to participate in the interview were excluded. In order to recruit a relatively representative sample of PWID in Tehran, we used hybrid sampling plan and selected the sample from two groups of thecommunity (n=453) and service users (n=451), with the assumption that approximately half of PWID in Tehran had contact with drug abuse treatment or harm reduction services.

We purposefully selected community-recruited PWID from five areas of Tehran with high rates of drug use. The trained interviewer team, which included an ex-drug user, approached those injecting drug users who were using drugs in the public places, such as parks and ruined buildings through ethnographic observations, and used peer referral and snowballed samplings for recruiting other PWID.

Service user (non-community) PWID were selected from three drug treatment centers and two Drop-in-Centers (DICs) located in different areas in Tehran. The treatment centers provided methadone maintenance treatment (MMT), while DICs mainly provided other types of harm reduction interventions, including needle and syringe program (NSP) and harm reduction education. PWID was recruited based on consecutive admissions during thestudy period and should have been admitted to treatment within the last 50 days. Individuals who were participating in other treatment plans and services during the last six months were excluded from the study.

### Field work

We selected field workers from medical doctors and other health personnel with experience in providing drug treatment and harm reduction services. Some of the field workers were chosen among ex-users who were working in the centers. We trained the recruited field workers through a two-day workshop and provided them with an interview guide. Finally, two psychiatrists with public health orientation precisely supervised and followed up the field work on a regular basis.

### Instruments

In the present study, the Questionnaire for WHO Drug Injecting Study Phase II (Version 2b) was used. The questionnaire was translated and modified based on sociocultural considerations. The questionnaire was internally validated by three psychiatrists; after some amendments, it was pretested on five PWID. The questionnaire was finalized based on the results. Participants' blood samples were also tested for antibodies to blood-borne viruses mentioned in other papers (13,18).

Social class was assessed according to the job of the head of household and was classified to low class (long-term unemployment, having temporary or illegal jobs), working class (including simple or semi-skilled workers), middle class (including skilled workers, white-collar occupations, or owners of small businesses/farms) and high class (professional and academic jobs, owners of large businesses/farms, directors of governmental organizations).

### Ethical considerations

The research protocol was approved by the Ethical Committee of Tehran University of Medical Sciences, Iran. Research objectives and process were explained to the participants and informed consent was obtained. Participation in the interview was completely voluntary and non-participation did not affect their service use. To keep the anonymity of the participants, questionnaires were filled out without asking for participants` names; the questionnaires were also distributed by assigning a numeric code to each participant. The participants were also able to withdraw from the interview and skip any question they desired during the interview.

### Statistical analysis

Statistical analysis was done using SPSS for windows (16.0; 2007 SPSS Inc., Chicago, Illinois, US). Descriptive analyses include frequency, median, mean and standard deviation. Bivariate analysis was conducted using a*chi*-square test for binomial and *t*-test for quantitative variables.

## Results

### Socio-demographic profile

A total of 904 PWID (866 males and 38 females)

participated in the study. Table 1 demonstrates socio-demographic characteristics of the sample population. Although the participants' ages ranged from 16 to 65 years [mean±standard deviation (SD): 33.9±9.4; median: 32], 42.9% of the participants were aged between 26 and 35 years old. The mean (±SD) years of education was 7.7 (±3.5), with amedian of 8 and a mode of 9 years. Forty participants (4.5%) were illiterate and 35 persons (3.9%) had acollege education. Half of the participants (452) were single and one-fifth of them were divorced, separated, or widowed. More than 80% of the subjects with marital history had children.

**Table 1. Demographic characteristics of the PWID sample in Tehran**

| Variable (N) | | n (%) |
|---|---|---|
| **Gender (904)** | **Male** | 866 (95.8) |
| | **Female** | 38 (4.2) |
| **Age (902)** | **≤20** | 23 (2.5) |
| | **21-25** | 160 (17.7) |
| | **26-30** | 217 (24.1) |
| | **31-35** | 170 (18.8) |
| | **> 35** | 332 (36.8) |
| **Years of full time education (898)** | **≤5** | 273 (30.5) |
| | **6-8** | 205 (22.9) |
| | **≥9** | 418 (46.5) |
| **Current marital status (902)** | **Legally married** | 254 (28.2) |
| | **Temporary marriage (Sigheh)** | 10 (1.1) |
| | **Widowed** | 16 (1.8) |
| | **Separated** | 65 (7.2) |
| | **Divorced** | 105 (11.6) |
| | **Single** | 452 (50.1) |
| **No. of biologic children (445)** | **0** | 86 (19.3) |
| | **1** | 140 (31.5) |
| | **2** | 107 (24.0) |
| | **>2** | 112 (25.2) |
| **Years of stay in capital city, Tehran (902)** | **<5** | 34 (3.8) |
| | **5-9** | 30 (3.3) |
| | **≥10** | 836 (92.9) |
| **Living alone (897)** | | 375 (41.8) |
| **Place of residence in L6M (894)** | **Fixed residence** | 544 (60.9) |
| | **Temporary shelter** | 126 (14.1) |
| | **Unsheltered** | 224 (25.1) |
| **Area of home (524)** | **≤50 meters** | 188 (35.9) |
| | **51-100 meters** | 289 (55.2) |
| | **101-150 meters** | 37 (7.1) |
| | **> 150 meters** | 10 (1.9) |
| **Main source of income in L6M (877)** | **Illegal income** | 269 (30.7) |
| | **Temporary work** | 286 (32.6) |
| | **Passive income** | 114 (13) |
| | **Active** | 208 (23.7) |
| **Current social class (892)** | **Low class** | 574 (64.3) |
| | **Working class** | 138 (15.5) |
| | **Middle class** | 173 (19.4) |
| | **High class** | 7 (0.8) |
| **Social class of the family of origin (896)** | **Low class** | 86 (9.6) |
| | **Working class** | 394 (44.0) |
| | **Middle class** | 391 (43.6) |
| | **High class** | 25 (2.8) |
| **History of imprisonment (899)** | | 637 (71.0) |

L6M=Last six months

Almost all subjects were Iranian, and only one percent of the sample population was Afghani, Bengali, Iraqi, etc. More than 90% of the sample had lived in Tehran for more than 10 years. Three hundred and fifty participants (39.2%) were homeless and had lived in streets, parks, abandoned buildings, or temporary shelters, such as rooms rented on a daily basis or night shelters provided by the government, in the previous six months. More than 90% of the participants who had a fixed address lived in a house smaller than 100 $m^2$ area. More than 40% of the subjects lived alone at the time of data collection. In the previous 6 months, the income of 63.3% of the sample was through temporary jobs or criminal activities. The most common illegal sources of income were drug dealing (40.9%) and street begging (29.5%). Most subjects (64.3%) considered their socioeconomic status as low. However, less than 10% described the socioeconomic status of their family of origin as low. The family of origin of the sample population mostly belonged to the working class or to the middle class.

Four hundred and fifty-three subjects were recruited from the community, while 451 participants were selected from drug treatment and harm reduction centers. There were no significant differences in terms of age and gender between these two groups. However, there were significant differences between PWID selected from the communities and service users in some socioeconomic factors, including marital status (being married 19.8% versus 36.4%), having fixed place to live (43.5% versus 78.4%), living alone (56.2% versus 27.6%), temporary jobs and illegal activities as source of income (78.7% versus 49.9%), currently belonging to upper or middle class (13.2% versus 27.1%), families of origins belonging to upper or middle class (39% versus 54.2%).

**Patterns of drug use**

Age of onset of smoking ranged between 5 and 34 years (mean±SD: 16.3±3.5, median: 16). At the time of the study, 97.6% of the participants smoked 2 to 40 cigarettes per day (mean±SD: 19.9±8.9). A total of 638 participants (70.6%) had a history of alcohol use in their lifetime. Age at first alcohol use ranged from 3 to 40 years (mean±SD: 16.7±3.4, median: 17). A total of 112 individuals (17.7%) had consumed alcohol in the previous six months. Heavy drinking (six or more drinks in a row) in the last six-month was reported by 11 individuals (1.2% of the total sample). Moreover, 402 individuals (44.5%) reported cannabis smoking in the previous six months.

Age at first illicit drug use, excluding alcohol and cannabis, ranged between 10 and 44 years (mean±SD: 19.7±3.9, median: 20). The first drug of use of most of the individuals (734) was opium, with the mean age of onset at 19.5 (±3.8). The next most common drug of first use was heroin, with a mean age of initiation of 20.7 (±4.4). Duration of drug use (the period between first illicit drug use and the interview) was between 1 and 47 years, with an average of 14.3 (±8.9) (Table 2).

The age of first injection drug use was between 13 and 61 (mean±SD: 25.7±7.1, median: 24). Figure 1 shows the age distribution of first use of cigarette, alcohol, illegal drugs, and injection drug use.

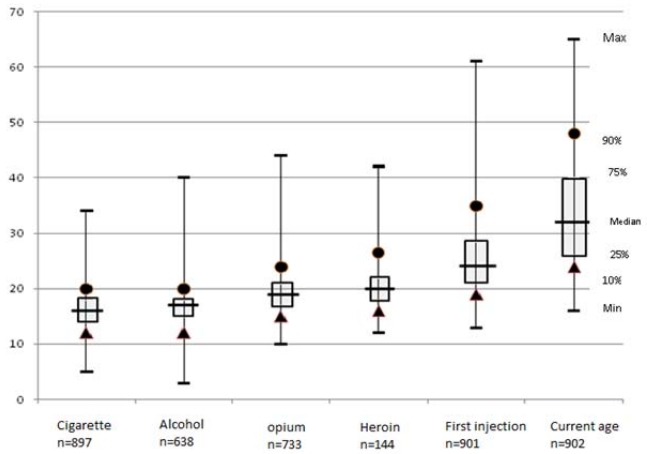


**Figure 1.** Age distribution of first use of cigarette, alcohol, illegal drug (opium or heroin)/ injecting drug use and current age among PWID

**Table 2. Drug* use patterns and injection behavior among the PWID sample in Tehran**

| Variable (N) | | n (%) |
|---|---|---|
| Age at first drug use (903) | ≤20 | 587 (65.0) |
| | 21-25 | 257 (28.6) |
| | 26-30 | 43 (4.8) |
| | >30 | 16 (1.8) |
| Years of drug use (895) | <5 | 101 (11.3) |
| | 5-10 | 249 (27.8) |
| | >10 | 545 (60.8) |
| Age at first drug injection (901) | ≤20 | 128 (14.2) |
| | 21-25 | 440 (48.8) |
| | 26-30 | 169 (18.8) |
| | >30 | 164 (18.2) |
| Years of injecting drug use (892) | ≤2 | 226 (25.3) |
| | >2 | 666 (74.7) |
| Main route of drug administration in L2M (901) | Injection | 718 (79.7) |
| | Non-injection | 47 (5.2) |
| | Both routes equally | 136 (15.1) |
| Frequency of any drug injection in L6M (901) | ≥2 times in a day and almost every day | 689 (76.3) |
| | Almost once daily | 156 (17.3) |
| | 1 to 6 times a week | 30 (3.3) |
| | < 3 times a month | 28 (3.1) |
| Any sharing behavior in L6M (900) | No | 211 (23.4) |
| | Sharing needle/syringe | 575 (63.9) |
| | Sharing other injection equipment | 114 (12.7) |
| History of injection in prison (635) | | 196 (30.9) |
| History of sharing needle/syringe in prison (186) | | 137 (73.7) |
| Cleaning shared needle/syringe before sharing in L6M (575) | Never | 186 (32.7) |
| | Sometimes | 254 (44.2) |
| | Always | 133 (23.1) |
| Methods for cleaning needle/syringe before sharing in L6M (407) | Water | 224 (60.2) |
| | Boiling water | 97 (23.9) |
| | Soap/ cleaning detergents | 26 (6.4) |
| | Bleaching agents | 28 (6.9) |
| | Alcohol | 11 (2.7) |
| Sharing behavior in thelast injection (901) | | 227 (25.2) |
| Place of thelast injection (901) | Own home/partner's home | 383 (42.5) |
| | Relative/friends/others' home | 161 (17.9) |
| | Shooting gallery/drug dealers' home | 38 (4.2) |
| | Open area for injection | 67 (7.4) |
| | Street/ parks abandoned home/public toilet/… | 245 (27.2) |
| | Car | 6 (0.7) |
| | Shelter/residential center | 1 (0.1) |

* "Drug" refers to any illicit substance, except cannabis
L6M=Last six months; L2M=Last two months

The mean age of first drug use among PWID from community and service users were 19.4 and 20.1, respectively; the corresponding values for first injecting drug use were 24.7 and 26.6. The differences were statistically significant.

The transition from first drug use to first drug

injection occurred after an average of 6.6 years (±6.0) for those whose first drug of use was opium, 2.8 years (±4.4) for those whose first illegal drug use was heroin or kerack of heroin [crystalized form of heroin (19)], and 8.6 years (±5.1) for those whose first illegal drug use was Shireh (the condensed extract of remnants of smoked opium). In 90% of the participants, heroin/kerack was the first drug of injection. Norjisak (an injectable vial consisting of heroin, steroids, and other components), opium, and buprenorphine were also reported as the first drugs injected. Table 3 represents types of drugs at first use and first injection. Duration of drug injection ranged between 1 and 38 years (mean±SD: 8.4±7.6). A total of 226 participants (25.4%) had been injecting drugs for less than 2 years.

**Table 3. Drug of use in first use, first injection and current injection in the PWID sample in Tehran**

| Type of substance | First drug of use n (%) (N=900) | First drug of injection n (%) (N=901) | History of injection in L6M n (%)(N=904) |
|---|---|---|---|
| **Heroin/kerack** | 144 (16.0) | 808 (89.7) | 726 (80.3) |
| **Opium** | 734 (81.1) | 28 (3.1) | 226 (25) |
| **Shireh/sookhteh** | 16 (1.8) | 0 | 28 (3.1) |
| **Tranquilizers (barbiturates/ banzodiazepines)** | 3 (0.3) | 0 | 149 (16.5) |
| **Cannabis** | 1 (0.1) | 0 | 0 |
| **Buprenorphine/Temgesic** | 1 (0.1) | 23 (2.6) | 107 (11.8) |
| **Norjisak** | 1 (0.1) | 37 (4.1) | 14 (0.2) |
| **Morphine** | 0 | 5 (0.6) | 24 (7.3) |
| **Tramadol** | 0 | 0 | 66 (7.3) |
| **Amphetamine** | 0 | 0 | 40 (4.4) |
| **Methadone** | 0 | 0 | 21 (2.3) |
| **Codeine derivatives** | 0 | 0 | 21 (2.3) |
| **Promethazine** | 0 | 0 | 15 (1.7) |
| **Pethidine** | 0 | 0 | 1 (0.01) |

The respondents were asked about the experience of their first injection; 36.8% reported that their first injection was done by a friend, 7.9% by drug dealers, 3.6% by a sexual partner, and 36.2% by themselves. A total of 819 participants (90.6%) did their first drug injection in Tehran, 1.2% in Hamedan, 1% in Karaj and Kermanshah, and the rest of the sample did their first drug injection in other 29 cities of the country. Ninety-four participants (10.4%) had first injected drugs by a shared needle/syringe; 54 subjects (6%) did not remember if they had used shared needle/syringe at their first injection. Four hundred and three participants (44.6%) reported that they had heard about HIV/AIDS by the time of thefirst injection. Of these, 375 individuals (93.1%) believed that injecting drug use brings no or little risk of HIV transmission for themselves.

As shown in Table 3, heroin was the main drug of injection within the last six months (80.3% of the participants). Opium, tranquilizers, and buprenorphine were other common drugs of injection. Moreover, a few participants reported that they had been injecting morphine, tramadol, stimulants, theresidue of smoked opium (sookhteh), condensed residue of smoked opium (shireh), methadone, and codeine-containing drugs.

The frequency of injection during the last six months ranged from 1 to 12 times per day (mean±SD: 2.5±1.2). Approximately 80% of the participants reported injection as their primary route of drug use in the previous two months. Compared to service user PWID, more community-recruited PWID reported drug injection as their primary way of drug use (67.5% versus 91.8%).

**Unsafe injection**

A total of 689 participants (76.6%) had a history of injection with unsterile equipment within the previous six months; most of these cases had used shared needles/syringes. The unsterile injection was significantly higher among PWID in the community group compared to those in the service users group (81.6% versus 71.5%). Furthermore, 25.2% had shared injection equipment in their last injection.

More than 30% of those who were injecting with a used needle/syringe had not ever cleaned them before injection. Of those reporting that they cleaned the used syringes, only 28 participants (6.9%) used bleaching agents for this purpose. PWID with a history of shared injection reported the following reasons for their behavior: unavailability of sterile needles/syringes (55.7%), trusting the methods of cleaning (47.9%), believing that the injection partners is uninfected (39.8%), difficulty in access to new needles/syringes (35.2%), cost of syringes (17.4%), peer pressure to share

needles/syringes (11.8%), and imprisonment with no access to sterile needles/syringes (11%).

More than 70% of the participants (635) had a history of imprisonment; of these, 196 (30.9%) had injected drugs in prison, while 137 (21.6%) had shared injecting equipment in prison.

Three hundred and ninety-four participants (43.9%) reported selling, renting, or lending their used needles/syringes to others during the past six months. Apart from close friends, used needles/syringes were mostly given to strangers. A total of 207 individuals (23.4%) reported that at least one person had experienced drug injection because of their suggestion. Two hundred and forty-three participants (27.1%) had helped someone else with their first drug injection during the previous six months, of whom 132 persons had helped more than one person.

Three hundred and ninety-six individuals (44.2%) reported experiencing drug overdose with theloss of consciousness in their lifetime, of which 212 participants reported more than one episode of overdose. Heroin followed by combined diazepam and heroin injection were the most common causes of overdose (90.9% and 7.6%, respectively). Moreover, 561 individuals (63%) had witnessed overdose in other PWID; of these, 13.5% had witnessed more than five cases of overdose. Only 33(5.9%) witnessing someone overdose had taken the person to the hospital, and only 13 (2.3%) had injected opioid antagonists to the person. Five hundred and seventeen individuals (58.5%) knew at least one person who had died because of overdose.

**Service use**

To precisely investigate the utilization of HIV prevention and drug treatment programs and services, the analysis was limited to the community-recruited PWID. Service use of community-recruited PWID is described below.

Addiction treatment service use:From the total community sample, 293 (64.7%) reported a history of drug treatment. The most common methods for drug treatment were reported to be self-detoxification without any assistance, followed by mandatory detoxification. Table 4 presents the methods used for drug treatment by community-recruited PWID in their lifetime.

**Table 4. Drug treatment and utilization of HIV prevention services in the community sample of PWID in Tehran**

| Variable (N) | | n (%) |
|---|---|---|
| **Attempt for drug treatment in lifetime (453)** | | 293 (64.7) |
| **Type of out/inpatient treatment in lifetime (293)** | **Self-detoxification without assistance** | 186 (63.5) |
| | **Forced detoxification without medication in residential settings** | 158 (53.9) |
| | **Traditional/ herbal medicine** | 124 (43.2) |
| | **Self-help group** | 63 (21.5) |
| | **Detoxification with clonidine** | 42 (14.3) |
| | **Methadone** | 5 (1.7) |
| | **Acupuncture** | 2 (0.7) |
| | **Ultra-rapid opioid detoxification** | 2 (0.7) |
| **Reasons for not using drug treatment services (354)** | **Any problem to use drug treatment services at the time of interview (453)** | 354 (78.1) |
| | **Treatment services are available but not affordable** | 260 (72.6) |
| | **Not aware of appropriate services** | 135 (38) |
| | **Fear of being reported to the police** | 116 (32.4) |
| | **Treatment services are available but not met the needs** | 53 (15.0) |
| | **No trust to/ interest in therapists** | 44 (12.3) |
| | **Afraid of registration as drug addicts** | 20 (5.6) |
| | **Treatment services are not available/ accessible** | 17 (4.8) |
| | **Long waiting list** | 6 (3.7) |
| **History of contact with HIV prevention services by type of service in L6M (453)** | **Any contact** | 184 (40.6) |
| | **Needle and Syringe provided** | 129 (28.5) |
| | **Mass media** | 77 (17) |
| | **Street outreach** | 72 (15.9) |
| | **Campaign-posters or pamphlets** | 43 (9.5) |
| | **Group counseling and/or education** | 29 (6.4) |
| | **Individual counseling and/or education** | 27 (6) |
| | **Condoms provided** | 18 (4) |
| | **Bleach provided** | 0 |
| **History of HIV counseling and testing (453)** | **Pretest counseling** | 28 (6.2) |
| | **Testing** | 24 (5.3) |
| | **Receiving test result** | 22 (4.9) |
| | **Posttest counseling** | 9 (2.0) |

From 453 community-recruited PWID, 34 individuals (7.5%) had been receiving drug treatment during the previous six months; however, only five of them were receiving drug treatment at the time of the study, of which three individuals were under herbal therapy, while the other two were attending self-help groups.

A total of 354 community-recruited PWID (78.1%) declared that they had difficulties in utilizing drug treatment services. High costs and non-affordability were the main reason for not using the services (Table 4).

HIV prevention services:From 453 community-recruited PWID, 182 (40.6%) reported to have been exposed to HIV/AIDS prevention programs during the past six months (Table 4). In the sample group, 303 (66.9%) and 129 (28.5%) individuals had received their sterile syringes in the previous six months from thepharmacy as well as needle and syringe programs (NSP), respectively. Interestingly, drug dealers were the main source of new syringes for 40 PWID (8.8%).

Only 75 of the respondents (16.6%) reported to have been receiving needles more than once a week (Table 5). Twenty-two individuals reported having returned their needles to NSP services after their last injection. Fear of police was mentioned by 81 (17.9%) community-recruited PWID as the reason for not utilizing HIV prevention services.

**Table 5. History and frequency of contact with HIV prevention services in the last six months**

| Contact with HIV prevention services | Ever contact n (%) | At least once a week n (%) | Daily contact n(%) |
|---|---|---|---|
| **Street outreach** | 72 (15.9) | 36 (7.9) | 0 |
| **Needle and syringe provided** | 129 (28.5) | 75 (16.6) | 7 (1.5) |
| **Condoms provided** | 18 (4) | 15 (3.3) | 2 (0.4) |

A total of 32 community-recruited PWID (7.1%) had been exposed to HIV testing in their lifetime. Of these, 28 had received pre-test counseling, 24 had been tested, 22 had received the results, and only 9 had received post-test counseling. A total of 10 cases had received positive results for HIV, of whom five cases were receiving anti-retroviral therapy (ART) during the past six months. Only 33 (7.3%) of the participants in this group were aware of having been vaccinated for hepatitis B, of whom only six had received three doses of vaccination.

## Discussion

The present study assessed the demographic characteristics, patterns of drug use, risky behaviors, and service use among 904 PWID in Tehran. According to our knowledge, this is the largest study investigating various aspects of PWID in both communities as well as service users' settings in different geographic regions in Tehran, the capital of Iran.

### Socio-demographic profile

Assessment of socioeconomic indicators showed that many PWID belonged to vulnerable populations, which supports the findings of previous works (9,20-22). Because of the nature of the study, no causal relationship can be concluded. However, although less than 10% of the sample population indicated that their families of origin belonged to the lower social classes, about two third of them perceived their own social class as low. This suggests the probability of downward drift due to the drug use and its consequences. A review of situation and response of drug and its harms in the Middle East and North Africa (MENA) showed that most of the PWID are in their early 30s, around half have an education of fewer than five years, around one-third do not have stable residence, and at least three-forth have a history of incarceration in their lifetime. It concludes that PWID is considered an extremely disadvantaged population throughout the MENA region (23). Somewhat similar findings have also been reported from various parts of the world, e.g. Melbourne, Australia (24), San Francisco, US (25), and Yunnan, China (26). However, 60% of the participants in this study had fixed residence and lived with their families. More than one-fourth were working and had legal income, and around 30% did not have any history of imprisonment. This shows that there are groups of PWID who have a better socioeconomic status, are integrated into the society, have no illegal activity, and have stable lives. Another study in Tehran also showed that PWID had different typologies, each of which might require different services (27).

Females constituted only 4.2% of our sample. This result is consistent with that of previous studies on drug users in Iran (9,28,29). The studies had shown that females constitute 5% to 10% of drug users and 2% to 5% of PWID in Iran. The low prevalence of drug use among women might be partly as a result of a higher stigma resulted in a "hidden Population" (10).

**Patterns of drug use**

Comparison of the age pattern of our sample (M=33.9) with those of the previous studies demonstrates a stable age pattern of PWID in Iran within the past decades (30-32). Indeed, despite the increase in the prevalence of injecting drug use in Iran, the age pattern of PWID has remained stable (8). Consistent with our study, other studies have also reported an average age at first drug use of around 19 (8,10). This consistency also indicates that the age at first drug use among PWID in Iran has not changed over time. Overall, the age at first drug use among PWID is lower than that among non-injecting drug users, and early onset of drug use is regarded as a predictor of injecting drug use later in life (10,33,34). Those who start drug use earlier are more likely to turn to injecting drug users. Moreover, this study showed that among PWID, the prevalence of smoking, alcohol, and cannabis use is very high and the age of initiating the use of these substances is lower in injecting drug users than in non-injecting drug users (28,35). These results reveal that the identification of adolescents who use licit and illicit abusive drugs might have implications for the early intervention to prevent injecting drug use.

Consistent with previous studies, the main drug used was heroin or its kerack. Most studies from Iran and the Middle East have shown that heroin is the most common drug of injection (23); however, in a study in Darab, Iran, buprenorphine was reported to be the first drug injected (36).

The average time between the first opioid use and the first injection was between 2.8 and 8.6 years, depending on the type of the opioid substance used. Other studies have also reported a range of 6 to 7 years between the first opioid use and the first injection (31,37,38). It shows a good opportunity for theprovision of interventions in order to prevent transition to injecting drug use, such as improving the drug users' control on substance use and increasing their awareness on consequences of injecting drug use (39). Moreover, results indicate that the transition from non-injecting drug use to injecting drug use occurred more quickly for individuals whose first drug was heroin/kerack. This suggests the delaying effect of using opium or its condensed residue (shireh) in initiating injection in comparison to heroin/kerack. Heroin and its kerack have higher potency and are associated with greater dependence (6). Other studies have also shown that increased drug dependence results in an increase in the cost of daily drug use and are also a motivation for injecting drug use (40,41).

It was found that although in a vast majority of the cases the first drug of injection is heroin, many injectors had started using other opioids and non-opioid drugs by injection, as well. This leads to poly-drug injection and a more complex and more severe form of dependence, which might decrease favorable treatment outcomes (42).

Two-thirds of PWID included in this study reported that another person had done their first injection for them. It shows the influence of the social network in theinitiating injection. Preventing current PWID from encouraging others to initiate injection (gatekeeper role) can limit the rate of transition to injecting drug use (43,44). A vast majority of the respondents reported that at the time of their first injecting drug use they had not heard about AIDS, or they believed that there is no HIV risk associated with injection. Educating drug users about health consequences of drug injection and improving their control on the pattern of their drug use might prevent route transition (39).

**Risky behaviors**

Sharing of needles/syringes and other injecting equipment is the riskiest behavior among Iranian PWID leading to the transmission of blood-borne viral infections (7,11,45). More than three-fourth of our participants reported sharing injection equipment within the previous six months. This group of PWID can be divided into two categories: first, the PWID who frequently share injecting equipment, which constitutes 20% of the sample; second, PWID who share injecting equipment with lower incidence. In fact, this group that constitutes the majority of PWID in our sample reported consuming unsterile injecting equipment in the case of unavailability of sterile equipment.

In the meantime, around one-fourth of the participants reported having shared their needles/syringes in their last injection. It means that out of every four injections, one is shared. Therefore, if the estimated number of 260,000 PWID (2) inject an average of 2.5 times per day, 162,500 shared injections occur every day in the country. This number indicates the extent of this harmful behavior.

However, the prevalence of sharing injection equipment among PWID in Iran varies greatly in different PWID populations and settings in which studies have been conducted (such as communities, drug treatment, drop in centers, and prisons) (22,30-32). Furthermore, it has been evidenced that risky behaviors among PWID vary based on demographic characteristics, as well as social structures and networks (46,47).

**Community PWID versus service users**

Results demonstrate that although there are no significant differences in terms of age and gender between community and service user PWID, these two groups are different in terms of socioeconomic characteristics and drug use patterns. PWID service users had higher levels of socioeconomic status; they had started non-injecting and injecting drug use in older ages and had a lower prevalence of unsafe injection in their lifetime compared to community-recruited PWID. These findings suggest that those with a better socioeconomic status and a lower risk profile are more probable to utilize treatment and harm reduction services.

**Service use**

In the study sample recruited from thecommunity, two-thirds reported attempts to stop drug use in their lifetime. This is a common finding in other studies, as well (28,35,48-49). However, most of the attempts were by self-treatment, mandatory treatment in residential centers, or traditional methods. Among science-based treatment methods, self-help groups and detoxification by clonidine were utilized more commonly. Other methods, however, were rarely utilized. More than three-fourth of the participants stated that they had problems in using drug treatment services. The most common problem was the unaffordable costs of services. While Iran is spending considerable funds and resources for mandatory treatment in residential centers, which brings various health consequences and small benefits (50), allocating resources for free or cheap outpatient treatment services can increase the access and utilization of the services in drug users with lower socioeconomic status. Other stated barriers to treatment were being unaware of suitable centers and fear of being reported to the police. These barriers can also be removed by appropriate interventions.

The study showed that around 40% of the PWID recruited from thecommunity had been exposed to HIV prevention services in the previous six months. Only 16.6% of the PWID reported using needle and syringe programs on a regular basis. According to the World Health Organization (51), this figure of coverage rate is very low to be able to control the incidence of HIV and other blood-borne viral infections among PWID. It has been about a decade since Iran adopted harm reduction policy and started providing various harm reduction (HRD) services to PWID. However, the coverage and the quality of services need to be improved.

**Limitations**

Injecting drug users are considered a hard-to-reach population. Therefore, selecting a representative sample of drug users in a geographical area is difficult. However, methods that are more representative are recommended, such as respondent-driven sampling or a hybrid sampling plan using several methods (52,53), as was used in our study. This method was used in order to reach a higher number of PWID and the results may not be generalized to the entire Iranian PWID population. Another limitation is that study participants were interviewed regarding their past circumstances and re-call bias may be an issue.

In conclusion, PWID is a vulnerable group with ahigh rate of risky behaviors. Those who have started using drugs in their adulthood and who are using heroin/kerack are at a great risk of transition to injecting drug use. There are opportunities for preventing the initiation of injecting drug use. Moreover, unsafe injection is still prevalent and is associated with significant health problems. Wider coverage of HRD programs along with improved quality of services, such as greater attention to HRD-based education and counseling and increase in the number of syringes per PWID per year, are highly recommended.

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