International Journal of Drug Policy 23 (2012) 271–278

Contents lists available at SciVerse ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

Review

HIV prevalence amongst injecting drug users in Iran: A systematic review of studies conducted during the decade 1998–2007

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ARTICLE INFO

Article history:
Received 18 May 2011
Received in revised form 25 July 2011
Accepted 6 September 2011

Keywords:
Injecting drug use
HIV/AIDS
Prevalence
Systematic review
Harm reduction
Tehran
Iran

ABSTRACT

Background and objectives: Iran is a country with low HIV prevalence in the general population and concentrated prevalence amongst injecting drug users (IDUs). Various studies have been carried out on HIV prevalence amongst IDUs in Iran and diverse results have been reported. This systematic review intended to find and collect all relevant studies, assess the quality of data and provide estimations on the national prevalence over time.
Methods: A broad search strategy was used, including searching international and local databases, research reports, and extensive personal contacts. All studies of IDUs conducted between 1998 and 2007 including clear description of method and HIV testing and confirmative western blot test were entered and qualitatively assessed. HIV prevalence rates were pooled for gender and stratified into several categories.
Results: Twenty-two studies involving 3916 IDUs were included. Half of the studies had been conducted in Tehran. Ten studies were conducted in prisons, seven in treatment centres and five in the Drop-in-centres or communities. After 2005 the pooled HIV prevalence was 18.4% [95% Confidence Interval (CI) 16.7–20.2] significantly higher than the prevalence rate before 2005 [8.7% (95% CI 7.5–10].
Conclusion: HIV prevalence amongst IDUs has increased over time and has the potential to increase exponentially. Scaling up harm reduction measures, increasing their availability and coverage, and improving the quality of services is highly recommended in order to prevent a future catastrophic epidemic.

Introduction

Iran has faced a serious drug use problem for decades. However, it has encountered a more rapid change in the pattern of drug use in recent years and an increase in injecting drug use (Rahimi-Movaghar & Vameghi, 2011). There is evidence showing that Iran has the highest rate of use of opioids in the world (United Nation Office on Drugs and Crime, 2010). According to the only national survey of drug use, at least 1.2 million people are dependent on illicit drugs, mainly opioids (Yasami et al., 2002). A study conducted on drug users in 2007 has estimated that more than 22 per cent had injected drugs in the previous year (Narenjiha et al., 2009). Therefore, it is estimated that there are more than 260,000 injecting drug users (IDUs) in the country.

Iran is a country with low HIV prevalence in the general population and concentrated prevalence amongst injecting drug users (IDUs). The first case of HIV transmission through injecting drug use was identified in 1989, and until 1995 there were only around 5–10 new such cases identified annually. The first outbreak of the epidemic amongst IDUs was reported in 1996 (Ministry of Health, 2010). So far, injection drug use has been reported in around 70% of the accumulated HIV/AIDS cases (Ministry of Health, 2011). Sharing injection equipment is common amongst IDUs (Razaghi, Rahimi-Movaghar, Amin-Esmaeili, Sahimi Izadian, & Baghestani, 2008; Zamani et al., 2006) and unsafe sex is not rare (Rahimi-Movaghar, Razaghi, Amin-Esmaeili, & Sahimi-Izadian, 2009; Zamani et al., 2005).

Various studies have examined HIV prevalence amongst IDUs in Iran and findings have been diverse. Typically, the results of the most up-to-date study have been accepted as the current HIV prevalence rate, irrespective of the context such as the site or location of the study. We have conducted this systematic review to overcome such limitations and to make an estimation based on all available studies.

Systematic reviews provide the opportunity to highlight the existing information and gaps in the scientific fields as well as qualitative weaknesses of previous research. There have been systematic reviews of HIV prevalence amongst IDUs from China and (Bao &

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doi:10.1016/j.drugpo.2011.09.002

Liu, 2009), Brazil (Malta et al., 2010) as well as a global systematic review (Mathers et al., 2008). However, this is the first systematic review of HIV prevalence amongst IDUs in Iran. Our aim was to collect all relevant studies on IDUs and provide estimations on the national HIV prevalence rate and how that has changed over time. We also wanted to assess the quality of the studies and provide recommendations about how to improve future planning for research on IDUs.

Methods

Search strategy

Our search strategy was compatible with guidelines presented by Khan, Kunz, Kleijnen, and Antes (2003). Comprehensive searches of peer-reviewed literature were conducted via databases including Medline through PubMed, ISI Web of Science, Asian Science Citation Index (ASCI), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Index Medicus of Eastern Mediterranean Region (IMEMR).

Iranian scientific databases were also searched. These included IranMedex, Iranian databank for HIV research, Iranian databank of hepatitis research/conference, the databank for research in mental health in Iran (IranPsych), scientific information databank (SID) and the databank of Iranian research institute for information science and technology (IRANDOC). All Iranian conference proceedings related to HIV/AIDS were also hand searched.

The MeSH terms and text words (and their combinations and truncated synonyms) were adapted as appropriate to search each database by combining the following three sets of terms: (1) English transcription of Iran and its cities with universities of medical sciences and their names, adopted from Farhoudian et al. (2007); (2) terms related to drug use, drug use disorders and the names of illegal drugs used in Iran, as well as terms related to incarceration; and (3) terms related to HIV/AIDS.

Iranian databanks were searched with terms related to HIV/AIDS. The Persian keywords were equivalent to their English words and all probable combinations were considered. Moreover, two of the authors reviewed the reference lists of all retrieved articles and made extensive contacts to find additional studies. We did not have any language or publication status limitations. Authors were contacted in order to access the missing data.

Inclusion criteria

The titles and abstracts of citations obtained through the search strategy were screened and the full texts of potentially eligible studies were obtained. All potentially relevant studies were assessed independently by two reviewers (MAE, ARM) and discrepancies between reviewers were resolved by consensus. Studies were eligible if they fulfilled the following criteria:

1. Cross-sectional, cohort and case-control studies, if the studied sample was representative of a group of injecting drug users.
2. HIV testing was performed and all positive cases were confirmed by Western immunoblot assay (WB).
3. The time of study implementation was in the 10-year period, between 1998 and 2007.

Exclusion criteria

Studies were excluded if they were not primary studies. We also excluded studies conducted on high-risk IDU, such as those conducted in infection wards of hospitals, referral clinical centres for HIV positive patients and tuberculosis patients. Studies were also excluded where key information such as sample size and HIV test results were missing, and where we could not obtain these data by contacting the authors. In cases where several papers reported the results of the same study, the paper with the most detail was selected. The excluded studies are described in Table 1.

Quality assessment and data extraction

To assess the quality of included studies, a simple checklist was generated:

1. Sources and methods of sampling defined clearly
2. Refusal rate provided, refusal rate < 30% or refused cases described
3. Gender specific data provided
4. Injecting or non-injecting drug users' specific data provided
5. Definition of injecting drug use (lifetime/current) provided
6. Year of study implementation reported

Two investigators assessed the quality and extracted the data independently and reconciled differences by consensus. The deficiencies in the quality of studies are presented in Table 2, by displaying the numerals of unfulfilled criterion for each study. However, some missing information was collected by contacting the authors and this is presented in Tables 2 and 3.

The following data were extracted: bibliometric characteristics, year of study implementation, recruitment setting (prison, treatment centres, DICs, etc.), study location (province), method of HIV testing, type of injecting drug use (lifetime/current), sampling method, sample size, refusal rate, age characteristics of participants, HIV test results, gender and gender-specific data.

Statistical analysis

According to the different epidemiologic profiles of male and female IDUs, the HIV prevalence rates were extracted, presented and calculated separately for each gender. In addition, the HIV prevalence rates were pooled for the total sample and stratified by province, recruitment setting, type of injecting drug use and year of study implementation. The confidence interval (95% CI) of the HIV prevalence rate for each study and each stratum was calculated using the binomial distribution model. The findings have also been displayed in forest plots. The analyses were performed using STATA software, version 8 (STATA corporation, college station, TX, USA, 2003).

Results

Overall, 86 studies (40 English and 46 Persian) were potentially relevant. According to the inclusion/exclusion criteria, 31 studies (11 English and 20 Persian) were removed. This left 55 (29 English and 26 Persian) studies for more detailed evaluation. They included 31 peer-reviewed journal article, 20 congress abstracts, two final research reports and two theses. Nineteen studies were excluded because of being duplicates or a subset of a published or unpublished study by the same authors. After extensive personal communication, another 18 studies (9 English and 9 Persian) were excluded, because they did not provide the relevant data (Table 1).

Finally, 18 documents (12 English and 6 Persian) were included in this review. One document (Rahbar, Rooholamini, & Khoshnood, 2004) had reported two separate studies in one paper and two studies (Rahimi-Movaghar, Razaghi, Sahimi-Izadian, & Amin-Esmaeili, 2010; Zamani et al., 2006) were conducted in more than one setting. As the sampling methods were different for each setting, we presented them as separate studies. Overall, the total number of studies included was 22, which provided HIV infection rates

Table 1
Excluded studies and the reasons for exclusion.

Author (s) (year of publication)	Reasons for exclusion
Alaei (2003)	Study on drug dependents and IDU-specific data not provided; missing data on key information; personal contacts unsuccessful
Aminzadeh and Aghazadeh Sarhangi (2007)	Study on hospitalized patients in an infectious diseases ward
Asadi and Marjani (2004)	Study on hospitalized patients in an infectious diseases ward
Astarki, Rouhandeh, and Saki (2008)	Study on drug users and IDU-specific data not provided; personal contacts unsuccessful
Day, Nassirimanesh, Shakeshaft, and Dolan (2006)	HIV test results presented based on drug users' self report
Farahbakhsh, Behzadi, and Behzadi (2006)	Study on hospitalized patients and IDU-specific data not provided; missing data on key information; personal contacts unsuccessful
Ghaleaghaei, Soltani, and Saberinia (2006)	Study on prisoners and IDU-specific data not provided; personal contacts unsuccessful
Haghshenas, Mirmobini, and Babamahmoodi (2000)	Study on prisoners with positive PPD or clinical symptoms of TB
Hajiabdolbaghi et al. (2007)	No injecting drug user found in the sample
Khorvash, Fasihi Dastjerdi, and Emami Naeini (2008)	Study on hospitalized patients in an infectious diseases ward
Mohammad-Alizadeh, Alavian, Jafari, and Yazdi (2005)	HIV test results not confirmed with WB
Mohammadzadeh, Seif Farshid, and Kousha (2006)	Study on prisoners and IDU-specific data not provided; personal contacts unsuccessful
Mojtahedzadeh et al. (2008)	Missing data on key information; personal contacts unsuccessful
Naghshvarian and Amini Lari (2008)	Retrograde study of patient files in a drug treatment centre; large un-known results of HIV testing
Nazer and Farhoudi (2008)	The sample size for HIV testing not provided
Tajbakhsh and Yaghubi (2008)	Study on prisoners and IDU-specific data not provided; missing data on key information; failure of personal communications
Talaie et al. (2007)	Study on intoxicated drug users and IDU-specific data not provided; missing data on key information; personal contacts unsuccessful
Vahdani, Hosseini-Moghaddam, GachKar, and Sharafi (2006)	Study on street children and IDU-specific data not provided

amongst 3916 IDUs. The study characteristics and results are displayed in Tables 2 and 3. All except one – a final research report (Malekinejad et al., 2008) – had been published in peer-reviewed journals.

In two studies (Azarkar, Sharifzadeh, & Miraki, 2007; Khamisipour & Tahmasebi, 2000), comprising 19 and five IDUs, respectively, the gender distribution was not presented and whilst the results were included for calculating pooled prevalence for the whole sample, they could not be used for gender.

In the studies where both genders were included, the total numbers of female and male IDUs were 57 and 1984, respectively, showing a female to male ratio of one to 34.8.

Pooled prevalence of HIV

Pooled prevalence of HIV for the 22 studies was 13.4% (95% CI: 12.4–14.5). Twenty studies had provided the results for men and women separately (Table 3), from which 18 included a male sample. Eight studies were conducted only on men and in the others, male subjects were the majority. Most studied IDUs were in their 30 s. The total sample size of men was 3821, ranging from 20 to 541. The range of HIV prevalence was from zero in one study to 26.6%, and the pooled prevalence of HIV in male IDUs was 13.6% (95% CI: 12.5–14.7).

Ten studies included female IDUs and two were conducted only on females. Most of the studies were conducted on IDUs, from which only a small proportion was female. The other studies were carried out on female prisoners or female drug users, from which a small number included IDUs. The total female sample was 71, ranging from two to 16 across the studies. In six studies, no HIV-positive case was found. The pooled HIV prevalence in female IDUs was 9.9% (95% CI: 4.1–19.3), which was not significantly different from the rate for male IDUs.

Stratified pooled prevalence

Harm reduction services were expanded in Iran from 2005. Therefore, the studies were stratified according to the year of implementation. Sixteen studies were carried out before 2005, whereas the other six were conducted between 2005 and 2007. The total sample for the groups was very close. The pooled prevalence was larger and significantly different for the studies implemented more recently (Table 4).

The studies had been carried out in 11 out of 30 provinces of the country. Half of the 22 studies were carried out in Tehran. The pooled prevalence of HIV infection in studies conducted in Tehran was significantly higher than the prevalence in other parts of the country (Table 4). Six studies were conducted in Tehran in recent years (2005–2007). For a total sample of 1900 current IDUs in Tehran recruited for studies conducted between 2005 and 2007 and from all four settings, the pooled HIV prevalence was 18.4% (95% CI: 16.8–20.3).

A subgroup analysis was performed according to recruitment setting (Table 4). In 10 studies, the participants were recruited from prisons or mandatory residential settings. Drug treatment centres, drop-in-centres (DICs) that were mainly providing harm reduction services, and local communities had been the recruitment setting in seven, two and three studies, respectively. The total sample size was largest for the prison setting and smallest for those recruited from DICs. The pooled HIV prevalence was highest in IDUs recruited from communities and DICs. Participants recruited from drug treatment centres showed the lowest HIV prevalence, which was significantly less than other IDU groups. Fig. 1 illustrates the forest plot of HIV prevalence (and 95% CIs) for each study, by recruitment setting. Studies with a sample size of less than 20 are not shown in the figure.

Eleven studies defined nature of drug use in terms of a 'lifetime history of injection' and eight focused on current drug injection. The total sample size was higher in studies, which were conducted on current IDUs. Different definitions were used for current injecting, such as injecting drug use in the last month (Lawrinson et al., 2008; Malekinejad et al., 2008), in the last 2 months (Rahimi-Movaghar et al., 2010) and presence of injection marks on the body (Jahani et al., 2009). In some studies no definition was provided for current injecting drug use. Pooled HIV prevalence in current IDUs was significantly higher than those with a lifetime history of injection (Table 4).

Discussion

This systematic review showed that HIV prevalence amongst IDUs in Iran has increased significantly in recent years, from 8.7% before 2005 to 18.4% after 2005. HIV epidemics amongst IDUs

Table 2
Study characteristics.

Author (s) (year of publication)	Year of study implementation	Province	Type of IDUs	Recruitment setting	Recruitment method	Age characteristics	Quality (Numerals of unfulfilled criteria)
Malekinejad et al. (2008)	2006–2007	Tehran	Current	Community	RDS, seeds from 4 DICs in different areas	Age range: 20–60	3
Rahimi-Movaghar et al. (2010)	2006–2007	Tehran	Current	An MMT centre	Consecutive admissions	Age range: 16–63 Mean age: 34.2(±9.41)	-
	2006–2007	Tehran	Current	Four DICs	Consecutive admissions	Age range: 16–65 Mean age: 34.3(±9.8)	-
Rahimi-Movaghar et al. (2010)	2006–2007	Tehran	Current	Community	Peer referral and Snowballing in five high risk areas	Age range: 16–63 Mean age: 33.5(± 9.23)	-
Jahani et al. (2009)	2006	Tehran	Current	A compulsory male residential centre	Consecutive admissions	Half were 25–34	-
Ghanbarzadeh and Nadjafi Semnani (2006)	2005	St. Khorasan	Lifetime	A prison-female sample	All volunteers	NK	2, 5, 6
Lawrinson et al. (2008)	2003–2005	Tehran	Current	An MMT centre	All recruited for an effectiveness study at intake	Age range: 21–62 Mean age: 34.8	2, 3, 4, 6
Zamani et al. (2006)	2004	Tehran	Lifetime	A DIC	Consecutive sampling	Age range: 19–55 Mean age in Males: 33.3 (± 8) Mean age in Females: 40	-
Zamani et al. (2006)	2004	Tehran	Lifetime	Community	Consecutive sample by outreach team	Age range: 20–64 Mean age in Males: 33.2(±8.5) Mean age in Females: 45(±7.7)	-
Azarkar et al. (2007)	2004	St. Khorasan	Lifetime	A prison	Stratified random sampling	NK	2, 3, 5
Imani, Karimi, Rouzbahani, and Rouzbahani (2008)	2004	Chahar mahal	Current	A voluntary rehabilitation centre	Census	Age range: 18–65 Mean age: 31.3(± 7.1)	5
Zamani et al. (2005)	2003–2004	Tehran	Life time	One abstinence-based and two MMT centres	Consecutive sampling	Half of men were <30	2
Javadi, Ataei, and Pourahmad (2007)	2003	Isfahan, Chahar mahal, Lorestan	lifetime	Four prisons	Stratified random sampling, male prisoners with drug related crimes	NK	1, 2, 4, 5
Khodadadizadeh, Esmaeili Nadimi, Hosseini, and Shabani shahrbabaki (2006)	2003	Kerman	Current	A drug treatment centre	Convenience non probability sampling-all male clients	Age range: 18–30 Mean age: 24.4(±6.3)	2, 3, 5
Amini, Mahmoodabadi, Lamian, Joulaie, and Mahmoodi Farahani (2005)	2003	Tehran	NK	A compulsory residential centre	NK	Mean age: 29.2	1, 2, 3, 5
Khodabakhshi, Abbassi, Fadaee, and Rabiee (2007)	2002–2003	Golestan	Lifetime	A prison	Randomized sampling, addicted prisoners with positive morphine urine test	Age range: 18–45 Mean age: 29	1, 2, 3, 5
Jahani, Alavian, Shirzad, Kabir, and Hajarizadeh (2005)	2002	Tehran	Lifetime	A prison-female sample	NK	Nk	1, 2, 5
Khani and Vakili (2003)	2001	Zanjan	lifetime	A prison	Census, male prisoner drug addicts	NK	1, 2, 4, 5
Rahbar et al. (2004)	2001	Khorasan-e-Razavi	Lifetime	A prison	Convenience sampling, male prisoners	Mean age: 32.8	3, 5
Rahbar et al. (2004)	1999–2001	Khorasan-e-Razavi	Lifetime	A drug treatment centre	Census, only male sample, medical records	Mean age: 29.3	3, 5
Khamisipour and Tahmasebi (2000)	1999	Bushehr	NK	A drug treatment centre	Nk	NK	1, 2, 3, 5
Mirahmadizadeh, Kadivar, Ghane Shirazi, and Fararooei (2001)	1998	Fars	NK	A male compulsory residential centre	Census	NK	1, 2, 5

Table 3
HIV prevalence amongst male and female IDUS in Iran.

Author (s) (year of publication)	Year of study implementation	Province	Recruitment Setting	Male			Female	
				Tested sample	Number of positive HIV cases	HIV prevalence (95% CI)	Tested sample	Number of positive HIV cases
Malekinejad et al. (2008)	2006–2007	Tehran	Community	541	144	26.6 (22.9-30.6)	2	0
Rahimi-Movaghar et al. (2010)	2006–2007	Tehran	Treatment Centre	151	1	0.7 (0-3.6)	7	1
Rahimi-Movaghar et al. (2010)	2006–2007	Tehran	DICs	276	41	14.9 (10.9–19.6)	15	1
Rahimi-Movaghar et al. (2010)	2006–2007	Tehran	Community	433	50	11.5 (8.7–14.9)	16	2
Jahani et al. (2009)	2006	Tehran	Prison	459	112	24.4 (20.5–28.6)	–	–
Ghanbarzadeh and Nadjafi Semnani (2006)	2005	St. Khorasan	Prison	–	–	–	10	0
Lawrinson et al. (2008)	2003–2005	Tehran	Treatment Centre	59	14	23.7 (13.6–36.6)	2	0
Zamani et al. (2006)	2004	Tehran	DIC	153	35	22.9 (16.5–30.4)	2	1
Zamani et al. (2006)	2004	Tehran	Community	54	13	24.1 (13.5–37.6)	4	1
Imani et al. (2008)	2004	Chaharmahal	Treatment Centre	131	1	0.8 (0–4.2)	2	0
Zamani et al. (2005)	2003–2004	Tehran	Treatment Centre	165	25	15.2 (10.1–21.5)	5	1
Javadi et al. (2007)	2003	Isfahan, Chaharmahal, Lorestan	Prisons	401	56	14.0 (10.7–17.7)	–	–
Khodadadizadeh et al. (2006)	2003	Kerman	Treatment Centre	31	3	9.7 (2.0–25.8)	–	–
Amini et al. (2005)	2003	Tehran	Prison	32	3	9.4 (2.0–25.0)	–	–
Khodabakhshi et al. (2007)	2002–2003	Golestan	Prison	20	4	20.0 (5.7–43.7)	2	0
Jahani et al. (2005)	2002	Tehran	Prison	–	–	–	4	0
Khani and Vakili (2003)	2001	Zanjan	Prison	128	4	3.1 (0.9–7.8)	–	–
Rahbar et al. (2004)	2001	Khorasan-e-Razavi	Prison	101	7	6.9 (2.8–13.8)	–	–
Rahbar et al. (2004)	1999–2001	Khorasan-e-Razavi	Treatment Centre	222	0	0	–	–
Mirahmadizadeh et al. (2001)	1998	Fars	Prison	464	6	1.3 (0.5–2.8)	–	–
Pooled	–	–		3821	519	13.6 (12.5–14.7)	71	7

Table 4
Subgroup analysis of pooled prevalence of HIV in total studied IDUs (male and female).

Variables		No. of studies	Sample size	Pooled prevalence (%)	95% CI
Place of study	Tehran	11	2380	18.7	17.1–20.3
	Other cities	11	1536	5.2	4.2–6.5
Type of IDU	Current	8	2125	17.4	15.8–19.1
	Lifetime	11	1276	11.5	9.8–13.4
Year of study implementation	≥2005	6	1910	18.4	16.7–20.2
	<2005	16	2006	8.7	7.5–10.0
Recruitment setting	Community	3	1050	20	17.6–22.4
	DICs	2	446	17.5	14.1–21.3
	Prison	10	1626	11.8	10.3–13.5
	Treatment centre	7	796	5.8	4.3–7.6
Total		22	3916	13.4	12.4–14.5

tend to manifest themselves very differently in different areas. The infection rate may rise from zero to 50–60% within 1–2 years, as documented in St. Petersburg in Russia, Imphal in India and Ruili in China (World Health Organisation, 2004). Extremely rapid transmission, with incidence rates of 10/100 to 50/100 person–years at risk, have been reported amongst many IDU populations (Des Jarlais & Semaan, 2008). In Iran the coverage of harm reduction interventions, including substitution treatment and needle syringe programmes, which were introduced in 2002 and were expanded from 2005, was still low in 2007. High risk behaviours amongst IDUs were still common in 2007. The study conducted in Tehran in 2006–2007 found that 64% of IDUs had shared injection paraphernalia in the previous 6 months (Razaghi et al., 2008). In addition, the majority of IDUs showed frequent displacements and incarcerations and formed large social networks (Narenjiha et al., 2009; Razaghi et al., 2008). Therefore, there is still a high probability for the future rise of HIV prevalence amongst IDUs and careful monitoring of the situation and enhancement of harm reduction efforts seem necessary. There is evidence showing that the high coverage of harm reduction activities has led to HIV epidemics amongst IDUs being averted or delayed. Such cases have been reported from Dhaka in Bangladesh, Pskov in Russia, Hong Kong (Burrows, 2006) and the United Kingdom (Stimson, 1995).

Subgroup analysis showed that the HIV prevalence amongst IDUs is higher when the studies have been conducted in the community and DIC settings, in Tehran, and when current injectors are recruited.

The information was more reliable for Tehran, and in recent years the pooled prevalence was 18.5%. Tehran, the capital city of Iran, is home to more than 11% of the country's population. Tehran has faced the greatest growth in population size, economy, industrialization as well as a growth in social problems in the last decades. It also seems that the highest number of drug users live in Tehran, mainly in the marginalized areas.

Most studies carried out in prison settings were conducted before 2005 and show a relatively low prevalence. The only recent study in prison was conducted in Tehran and showed a higher prevalence rate (24.4%). More investigations are needed to assess the trend of HIV prevalence amongst IDUs in prison settings.

The review showed that very few female cases were included in the HIV prevalence studies on IDUs. However, current information suggests that female IDUs constitute 3% to 4.7% of the country's IDU population (Narenjiha et al., 2009; Rahimi-Movaghar, 2004; Rahimi-Movaghar et al., 2010), which is close to the proportion of female IDUs in the total sample of this review. The study also showed that female IDUs are also at high risk of HIV infection.

Main shortcomings in the quality of studies were missing data on refusal rate, and gender-specific data, followed by lack of consistency in definitions of injecting drug use. Most of the studies used the definition of lifetime injecting use of drugs, which might not provide precise data on the current situation amongst IDUs. Most other studies, which were conducted on current IDUs, had used different definitions of current and some had provided no definition. WHO, UNODC, UNAIDS technical guide recommends that IDUs

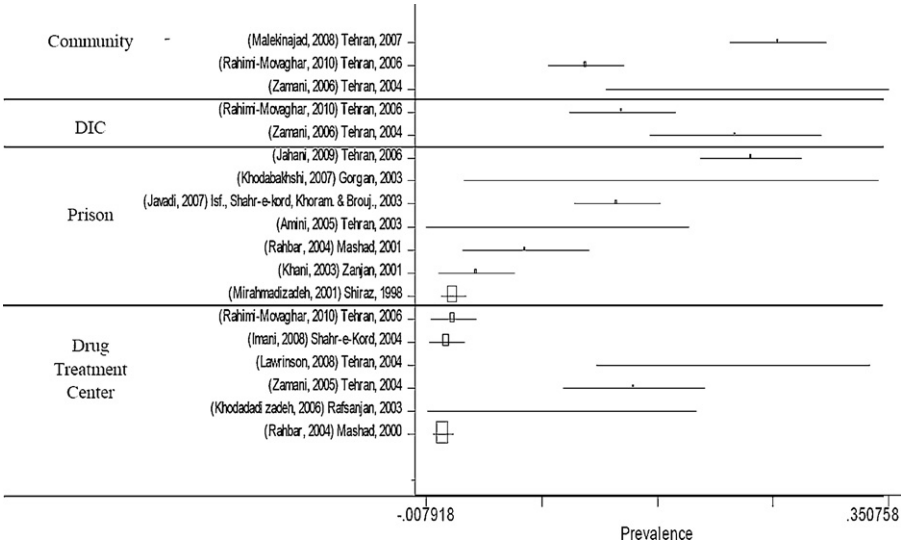

Fig. 1. Forest plot of HIV prevalence and CIs for included studies.

be defined as those who have injected any time within the past 12 months (World Health Organisation, 2009). Generally, setting constant definitions is important for comparability of data across communities and over time.

All studies utilized convenient or peer referral sampling, except one (Malekinejad et al., 2008) in which the recruitment method was respondent-driven sampling (RDS). For drawing conclusions about the national HIV prevalence in hard-to-reach populations, designing methods to improve country-level representative sampling, such as RDS, is recommended. However, obtaining a truly representative national sample may never be feasible (Joint United Nations Programme on HIV/AIDS, 2010).

Generalizing the result of this review to the whole country has several limitations. First, the information is lacking from many parts of the country and is scant about female IDUs and in the prisons in more recent years. Second, sample size is low in many studies. It is because the main samples were prisoners or drug users in treatment centres, and IDUs constituted only a part of the whole sample. In many excluded studies on similar target groups, the number of IDUs in the sample and the HIV prevalence amongst the IDU subsample were not reported.

Another limitation is that most studies have been carried out in high-risk areas and settings. A qualitative study in six districts of Tehran in 2001 (Razzaghi, Rahimi-Movaghar, Green, & Khoshnood, 2006) showed that IDUs can be divided into two major groups: a majority who live with their families with good self-care and a low rate of risk behaviour and a homeless minority with high deprivation. Therefore, it is possible that the IDU group with good social support and healthcare can be under-presented in the samples of the conducted studies.

Finally, there is an important shortcoming of using systematic review for prevalence studies without weighting and adjusting the results according to the size of each subpopulation. However, the available information did not permit us to perform such calculation. Despite these limitations, it is more accurate to use the results of such a review for estimating the national HIV prevalence of IDUs, than relying on one two studies conducted in specific settings and locations of a country as done for assessing the global situation (Mathers et al., 2008). Another strength of this study is the inclusion of literature in Persian language.

In Iran, the investment in HIV prevention amongst IDUs has been considerable in recent years. However, the investment in research has been inadequate, making it difficult to properly monitor the HIV epidemics and the impact of policies and interventions. It is possible that the high rate of HIV infection amongst IDUs in some areas can occur and not be recognized. Overall, these figures show a serious need for high quality repeated studies that cover various parts of the country, as well.

In conclusion, HIV prevalence amongst IDUs has increased over time and has the potential to increase exponentially. Other countries of the Middle East might face similar conditions. Scaling up harm reduction measures, increasing the availability and coverage, and improving the quality of services is highly recommended in order to prevent a future catastrophic epidemic.

Acknowledgments

This study was financially supported by the Ministry of Health through the contract number 132/8545 of Tehran University of Medical Sciences. We would like to appreciate the kind cooperation of Behnam Farhoudi, Abbas Sedaghat, Azarakhsh Mokri, Ali R. Rahbar, Saman Zamani, Ali Khodadadizadeh and Parastoo Kheirandish for providing us the necessary information.

Conflict of interest

None.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.drugpo.2011.09.002.

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