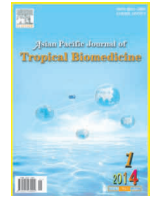




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## Prevalence of HIV infection and the correlates among homeless in Tehran, Iran

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## PEER REVIEW

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## Comments

Introduction is quite concise and well–addresses the paucity of data regarding the frequency of HIV among Iranian homeless. Discussion also thoroughly compares the results of different studies which were conducted among other high–risk groups like MSM and IDUs. This article adds quite novel data regarding the frequency of HIV infection among Iranian homeless.

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## ABSTRACT

**Objective:** To determine the prevalence of HIV infection among homeless men and women and the related risk behaviors in Tehran, Iran.

**Methods:** In 2007–2008, Tehran municipality stacked up 10657 homeless men and women for assessment of HIV and began collaboration with Iranian Research Center for HIV/AIDS (IRCHA) departments to conduct HIV infection prevalence surveys in homeless populations. The results were analyzed for associations with demographic information, family support, status of drug abuse and relation with family and friends.

**Results:** Overall HIV prevalence was 1.7% (95% confidence interval 1.4–1.9). Factors independently associated with HIV infection included history of using drugs [AOR 8.15 (4.86–13.67)], older age [AOR 1.80 (1.08–2.99) for 40– 55 yr], occupation [AOR 1.64 (1.19–2.24) for unemployed], and no relation with family [AOR 1.82 (1.30–2.54)].

**Conclusions:** This study supports the idea that injection drug use is contributing to the increased spread of HIV among Iranian homeless. Harm reduction programs should be expanded, particularly among homeless injection drug users.

## KEYWORDS

Homeless, HIV infection, Prevalence

## 1. Introduction

While more than 24 000 HIV–infected cases have been identified in Iran, current estimates from UNAIDS argue that more than 90 000 HIV–positive people are living in the nation. Although injection drug use (IDU) has been primarily introduced as the main route of transmission, heterosexual route has also been speculated as the second most prevalent way of HIV

acquisition. In fact, except for a prevalence rate of more than 5% among IDUs, it is estimated that prevalence rate remains less than 1% in general public, ranking Iran among countries with concentrated epidemic<sup>[1,2]</sup>.

Among at risk populations, homeless people have been of immense interest worldwide. Globally, a wide range of 8.5% to 42% of homeless people is HIV–infected, and the figure seems to be rising especially in the developing world<sup>[3]</sup>.

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It seems that IDU is the primary route of HIV transmission among Iranian homeless population<sup>3,4</sup>. In United States, HIV infection among homeless adults ranges between 10.5% and 21%; which is believed to be strongly associated with practice of risky behaviors particularly with means of unprotected sexual contacts.

It has been shown that certain demographic and behavioral features are associated with HIV infection among the homeless: illiteracy or low education, being widowed or separated for homeless women, heavy alcoholism, being gay, lesbian or bisexual in homeless youth, casual sexual contacts and survival sex among runaway youth and substance use have been previously mentioned by some authors<sup>5</sup>. In general, impoverished and disfranchised homeless may decidedly engage in behaviors that put oneself at risk for HIV acquisition. For example, condoms are less likely to be used, in part due to less availability and less access to health care centers or having sex under the effect or context of drugs. Additionally, more significant life stressors such as unemployment could be observed among those coping with housing stressors. This cluster of risks occurring among these minorities further highlights the need for immediate interventions, especially in developing nations<sup>6,7</sup>. To our knowledge, no previous study has addressed the prevalence rate of HIV infection in Iranian homeless. We conducted this study to identify the prevalence of HIV infection and determine its demographic correlates among the homeless in Tehran, Iran.

## 2. Materials and methods

Methods of the survey have been described previously<sup>1</sup>. Briefly, we conducted a cross-sectional survey among the homeless men and women, who were approached consecutively upon detention in Tehran, Iran, to estimate the prevalence of HIV infection and associated risk factors during 2007 and 2008. Participants included homeless men and women who were arrested by municipality and kept in special camps in Tehran. Participants were approached to be assessed for HIV infection and associated risk factors. Records were kept separate from other homeless, gathering system and referrals for treatment and care were given through Tehran University Medical Center. The Institutional Review Board of municipality reviewed and approved the study protocol.

We offered serologic screening for HIV antibody. Samples were first screened using an enzyme-linked immune sorbent assay (Biotest AG, Dreieich, Germany). HIV positive samples were confirmed by Western blot (Diagnostic, Berlin, Germany). A questionnaire was used to record demographic information and injecting drug risk behaviors. A total of 10657 people participated and provided a specimen. HIV point prevalence was calculated as the number of confirmed HIV positive individuals and the test results were stratified by demographic characteristics and injection drug use. After description of the variables by proportions and 95% confidence intervals (CI), we conducted logistic regression analyses to determine associations with HIV infection. Variables associated with HIV infection in bivariate analysis at the  $P \leq 0.10$  level were included as potential independent predictors. The final model retained

those variables associated with HIV infection at  $P < 0.05$  level.

## 3. Results

Demographic characteristics and risk behaviors of the homeless are described in Table 1. Of the 10657 participants, 178 (1.7%) were HIV positive (95% CI: 1.4–1.9; Table 1).

**Table 1**

Characteristics, behaviors, and HIV infection prevalence among the homeless, Tehran, Iran, 2007–2008.

Variables	N <sup>1</sup> (%)	HIV infection (N)	HIV infection prevalence % (95% CI)
Total	10657 (100)	178	1.7 (1.4–1.9)
Gender <sup>2</sup>			
Male	9622 (90.3)	175	1.8 (1.6–2.1)
Female	1035 (9.7)	3	0.3 (0.06–0.8)
Age groups <sup>2</sup>			
<25 yrs	950 (9.0)	8	0.8 (0.4–1.6)
25–40 yrs	4328 (41.2)	89	2.0 (1.6–2.5)
40–55 yrs	3292 (31.4)	66	2.0 (1.5–2.5)
55–70 yrs	1255 (12.0)	12	0.9 (0.5–1.7)
≥70 yrs	668 (6.4)	0	0.0 (0.0–0.5) <sup>3</sup>
Birthplace			
Tehran	6231 (58.5)	107	1.7 (1.4–2.1)
Other	4426 (41.5)	71	1.6 (1.2–2.0)
Education level <sup>2</sup>			
Illiterate	4342 (40.7)	48	1.1 (0.8–1.5)
Primary	2197 (20.6)	43	1.9 (1.4–2.6)
Junior high school	2099 (19.7)	44	2.1 (1.5–2.8)
Senior high school and college	1888 (17.7)	42	2.2 (1.6–3.0)
Bachelor and higher	131 (1.3)	1	0.8 (0.02–4.2)
Marital status <sup>4</sup>			
Single	5195 (48.7)	81	1.5 (1.2–1.9)
Married	2974 (27.9)	44	1.5 (1.1–2.0)
Separated	951 (8.9)	28	2.9 (2.0–4.2)
Divorce	913 (8.6)	18	2.0 (1.2–3.1)
Widow	624 (5.9)	7	1.1 (0.4–2.3)
Occupation <sup>2</sup>			
Unemployed	5403 (50.7)	112	2.1 (1.7–2.5)
Employed	5254 (49.3)	66	1.2 (1.0–1.6)
Nationality			
Iran	10464 (98.2)	177	1.7 (1.4–1.9)
Other	193 (1.8)	1	0.5 (0.01–2.8)
Parents			
Alive	4413 (41.4)	67	1.5 (1.2–1.9)
Dead	6243 (58.6)	111	1.8 (1.5–2.1)
Life condition <sup>2</sup>			
Alone	6780 (63.6)	134	2.0 (1.6–2.3)
Along with family or friend	3877 (36.4)	44	1.1 (0.8–1.5)
Relation with family <sup>2</sup>			
No	6272 (58.8)	127	2.0 (1.7–2.4)
Yes	4385 (41.2)	51	1.2 (0.9–1.5)
Family support <sup>4</sup>			
No	10115 (94.9)	175	1.7 (1.5–2.0)
Yes	542 (5.1)	3	0.5 (0.1–1.6)
Relation with friends <sup>5</sup>			
No	6996 (65.6)	128	1.8 (1.5–2.2)
Yes	3661 (34.4)	50	1.4 (1.0–1.8)
Status of drug abuse <sup>2</sup>			
No	4381 (41.1)	18	0.4 (0.2–0.6)
Injection	3044 (28.6)	113	3.7 (3.1–4.4)
Non-injection	3232 (30.3)	47	1.4 (1.1–1.9)
History of hospitalization <sup>5</sup>			
No	10471 (98.2)	178	1.7 (1.5–2.0)
Yes	186 (1.8)	0	0.0 (0.0–2.0) <sup>3</sup>

<sup>1</sup>: Subgroups do not always add up to total due to missing data.

<sup>2</sup>:  $P < 0.002$ , <sup>3</sup>: One-sided 97.5% CI, <sup>4</sup>:  $P < 0.05$ , <sup>5</sup>:  $P = 0.08$ .

At the  $P < 0.10$  level, HIV infection was associated with male gender, older age, low educational level, marital status, unemployment, no relation with family and friends, no family support, history of hospitalization and injection drug use (Table 1).

In Table 2, we showed independent associations of prevalent HIV infection among the homeless, including all variables associated with HIV infection at  $P < 0.05$ . Older age [adjusted odds ratio (AOR) 1.80 (1.08–2.99) for 40–55 years], unemployment [AOR 1.64 (1.19–2.24)], no relation with family [AOR 1.82 (1.30–

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