ORIGINAL PAPER

Prevalence of sexually transmitted infections and associated factors among male prisoners in Great Tehran Prison by active case finding

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Abstract

Introduction: Sexually transmitted infections (STIs) are transferred from one person to another through sexual contact. Despite high rates of STIs in prisons, there is no sufficient screening, prevention, and treatment programs to prevent STIs transmission among prisoners. Due to the contact between prisoners and general population during visiting or after release, controlling STIs transmission among prisoners helps significantly decrease the rate of STIs in society. Therefore, recognizing and reducing risky behaviors among prisoners may have remarkable effects in this regard. This study was performed to evaluate the prevalence and risk factors of STIs among incarcerated men through clinical examination and molecular tests, and to recommend possible and proper solutions for controlling STIs in prisons.

Material and methods: This was a cross-sectional study conducted among 139 incarcerated men in the Great Tehran Prison, Iran from January to September 2018. We aimed to evaluate the risk factors and prevalence of STIs among imprisoned men based on clinical and molecular findings initiated by active (screening prisoners with STIs' symptoms complaints) case findings.

Results: Among those screened, a total of 139 prisoners were found by active and passive case findings for STIs symptoms. They were examined by complete genital and anal examination, followed by molecular testing for a definite diagnosis. The mean age of participants was 33.4 years. During active and passive case findings, 27 (19.4%) prisoners reported abnormal urethral discharge, and 89 (59.5%) individuals claimed that they have had STIs, most of them gonorrhea. Furthermore, most of the prisoners were not aware of the possibility that their sexual partners could have an STI. Also, 104 (74.8%) prisoners had a history of drug use. In clinical examination, 15 (10.8%) individuals had abnormal urethral discharges. In molecular survey, 7 (5%) persons had gonorrhea, 3 (2.2%) had *Chlamydia trachomatis*, and 3 (2.2%) had *Mycoplasma*.

Conclusions: Prisons are high-risk settings for transmission of STIs, while the prevention, screening, and treatment programs are not adequately developed. Educating prisoners about signs and symptoms, risk behaviors, STI preventive measures, regular screening of prisoners, and sufficient treatment can help control the STIs prevalence among the prisoners and, therefore, in the general population

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Introduction

Sexually transmitted infections (STIs) are transmitted from person to person through sexual relationship. The daily incidence of these infections is one million people worldwide [1]. STIs, including gonorrhea, chlamydiosis, syphilis, trichomoniasis, genital herpes, genital warts, human immunodeficiency virus (HIV), some viral hepatitis, and other less common causes, may also be related to each other; for instance, studies have showed that infection with type 2 herpes simplex (HSV-2) increases the risk of acquiring and transmitting HIV [2, 3].

Numerous studies have identified risk factors associated with STIs, including imprisonment. Higher prevalence rates of HIV and STIs have been found in studies conducted among prisoners in various regions of the world compared with general population due to high-risk of unprotected sexual contacts and intravenous drug use [4, 5]. Regarding gonorrhea and *Chlamydia*, a large number of inmates are unaware that they are infected [6]. On the other hand, due to a shortage of sterile needles, they are more inclined to needle-sharing. Occasionally, 15 or 20 inmates share a single needle. Some inmates make their own needles out of hardened plastic, which results in vain damage [7]. Therefore, controlling these infections in prisons is vital in order to reduce their overall prevalence. UNAIDS has reported that despite the high-risk of HIV transmission in local prisons, prevention, diagnosis, and treatment of people living with HIV remain insufficient. Moreover, patients with pre-existing HIV who are being incarcerated must provide a completely personal and medical history as well as undergo medical examination [8]. The same is about other sexually transmitted infections. According to studies, syphilis is becoming more common among inmates, and can lead to an increase in syphilis prevalence in the general population [9]. Thus, the focus has shifted to control the disease in jails.

The WHO strategy has proposed new goals for controlling STIs by 2030 [10]. Prisoners should be addressed as a part of high-risk population, with early diagnosis and treatment. Expanded STIs screening and treatment programs in institutions, such as prisons and jails are becoming more evident [11].

To estimate the prevalence of HIV infection in Iranian prisons, several studies have been conducted [9, 12-14], but little information on other STIs have been presented. Therefore, the aim of the current study was to evaluate the prevalence, clinical features, and associated factors of STIs among incarcerated men in the Great Tehran Prison, Iran.

Material and methods

Study participants

This cross-sectional study was conducted in the Great Tehran Prison from January to September 2018, and included adult male subjects (age above 18 years). Demographic information, imprisonment history, history of sexual risk behaviors, and drug use were recorded using a questionnaire. The questionnaire is provided in Supplementary File 1.

Process of case finding

The Great Tehran Prison is divided into three sections. All inmates are taken to the receiving and identification unit (quarantine) before being assigned to one of two housing wards, depending on their legal status. Therefore, due to the importance of quarantine, active case finding started in this area. In the quarantine unit, one of the staff members, when filling out a health certificate, screened every prisoner who entered the prison for symptoms of sexually transmitted diseases, including any report of genital ulcers, urethral discharge, inguinal bubo, scrotal swelling, and anal discharge.

After coordination with the head of penitentiary, training sessions on STIs in the prison were held by researchers of the study for the staff and prisoner peers in the quarantine as well as various wards of the prison. Three staff members from voluntary counseling and testing (VCT) center trained inmates on the most common STIs transmission routes and STIs symptoms in the units. A total of five training sessions were conducted for the prison managers and staff, and 80 sessions for the prisoners. Additionally, 10 fellow prisoners (peers) and 26 caregivers were trained.

During the study period, an average of 70 people per day (range, 50-80) and a total of about 20,000 people were screened upon arrival, 139 of whom had at least one complaint of STIs. Thus, 139 people were enrolled in the examination process for STIs. All of these individuals were referred to a physician according to the instructions and after clinical evaluation, they were educated, consulted, and treated based on clinical conditions.

Ethical considerations

This study was approved by the Ethics Committee of Tehran University of Medical Sciences. To meet the ethical obligations, written informed consent was obtained from all participants. To protect participants' privacy and information confidentiality, no identifiers were documented at any stage.

Measurements

Blood specimens were collected for HIV rapid test, and genital swabs from urethral and anal discharge to test for gonorrhea, *Chlamydia trachomatis*, *Mycoplasma genitalium*, and *Trichomonas vaginalis*. Genital ulcers were evaluated for *Treponema pallidum*, *Haemophilus ducreyi*, genital herpes, and *Chlamydia trachomatis*. All samples were confirmed with multiplex polymerase chain reaction (PCR). Positive HIV rapid test results were confirmed using Western blot test.

Statistical analysis

Data analysis was performed using SPSS software, version 26, and presented as mean ± SD or, when indicated, as an absolute number and percentage.

Results

During the study, about 20,000 people were surveyed and among them, a total of 139 men (0.7%) aged 19-63 years (mean age, 33.4 ± 7.9 years) were included, of which 60 individuals (43.2%) reported having history of STIs. Most of the population was educated (1.4% illiterate). Socio-demographic characteristics of the individuals are presented in Table 1.

According to Table 2, urethral discharge (12.5%) was the most common symptom reported before incarceration, followed by scabies (7.2%) and genital warts (5.8%). Approximately, 59.7% of the respondents claimed no history of STIs in their sexual partners. HIV rapid test was performed for the participants, among whom two prisoners with a history of HIV before incarceration had a positive test. The results were supported by confirmatory tests.

Table 3 shows the distribution of sexually transmitted infections based on complaints and examination. Abnormal anal discharge was observed in four patients, and their anal specimens were evaluated for gonorrhea, *Chlamydia trachomatis*, syphilis, *Haemophilus ducreyi*, and genital herpes. The results were negative in all the patients.

Among those with inguinal bubo, three samples were sent for urethral swabs and two for genital ulcers. No simultaneous swollen lymph nodes were observed. None of the urethral specimens was positive for *Chlamydia trachomatis*, *Mycoplasma genitalium*, *Trichomonas vaginalis*, and *Neisseria gonorrhea*. Clinical characteristics in those who presented with a complaint of inguinal bubo are highlighted in Table 4.

Etiological examination for *Treponema pallidum*, *Haemophilus ducreyi*, *Chlamydia trachomatis,* and genital herpes simplex was performed from genital ulcer samples, as shown in Table 5. Among 38 people with genital ulcers, thirty-one

Table 1. Socio-demographic characteristic of incarcerated individuals with self-reported symptoms of STIs, Great Tehran Prison, Iran (*n* = 139)

Characteristics	Study population
Age in years (mean ± SD)	33.4 ± 7.9 (19-63)
Education, *n* (%)	
Bachelor's degree and higher	17 (12.2)
Did not complete high school	54 (38.8)
High school diploma	45 (32.4)
Elementary	21 (15.1)
Illiterate	2 (1.4)
Employment status, *n* (%)	
Unemployed	5 (3.6)
Employee	9 (6.5)
Self-employed	123 (88.5)

Table 2. Behavioral characteristics of incarcerated individuals with self-reported symptoms of STIs, Great Tehran Prison, Iran (*n* = 139)

Variables	*n* (%)
History of STIs before incarceration	89 (59.5)
Urethral discharge	17 (12.5)
HIV	2 (1.4)
Genital warts	8 (5.8)
Genital warts/urethral discharge	2 (1.4)
Genital warts/HIV	1 (7.0)
Genital herpes	2 (1.4)
Unknown	4 (2.9)
Scabies	10 (7.2)
Scrotal swelling	2 (1.4)
Ulcer	7 (5.0)
History of STIs symptoms in partner	18 (12.9)
Symptoms of STIs in sexual partner	50 (36.0)
Presence of abnormal vaginal discharge in sexual partner	17 (12.2)
Presence of dysuria in sexual partner	16 (11.5)
Presence of genital ulcer in sexual partner	4 (2.9)
Presence of dyspareunia in sexual partner	18 (12.9)
Drug use before incarceration	104 (74.8)
History of drug use in sexual partner	60 (43.2)
New sexual partner in the last 3 months	47 (33.8)
Antibiotic use in the last month	67 (48.2)

Table 3. Distribution of sexually transmitted infections' symptoms based on complaints and examination (139 people, some patients had two complaints at the same time), Great Tehran Prison, Iran

Characteristics	Symptom (*n* = 139)	Examination	Confirmed symptom in examination	Confirmed symptom in examination without former complaint
Urethral discharge, *n* (%)	27 (19.4)	13 (48.1)	15 (10.1)	2 (13.3)
Genital ulcer, *n* (%)	85 (61.1)	31 (36.5)	38 (27.3)	7 (18.4)
Inguinal bubo, *n* (%)	8 (5.8)	4 (50.0)	6 (4.3)	2 (33.3)
Anal discharge, *n* (%)	3 (2.2)	1 (33.3)	4 (2.9)	3 (50.0)
Scrotal swelling, *n* (%)	7 (5.0)	1 (14.3)	4 (2.9)	3 (75.0)

Table 4. Clinical characteristics of persons who presented with a complaint of inguinal bubo (*n* = 8), Great Tehran Prison, Iran

Characteristics	*n* (%)
Confirmed inguinal bubo on examination	4 (50.0)
Swollen lymph node	0 (0.0)
Urethral discharge	1 (25.0)
Genital ulcer	3 (75.0)

Table 5. Clinical and microbiological characteristics of persons with genital ulcer on examination (*n* = 38), Great Tehran Prison, Iran

Characteristics	*n* (%)
Trichomonas vaginalis	0 (0.0)
Chlamydia trachomatis	1 (2.6)
Mycoplasma genitalium	0 (0.0)
Neisseria gonorrhea	3 (7.9)
Treponema pallidum	0 (0.0)

Table 6. Clinical and microbiological characteristics of persons who presented with a complaint of urethral discharge or those with urethral discharge on examination (*n* = 22), Great Tehran Prison, Iran

Characteristics	*n* (%)
Urethral discharge	13 (48.1)
Dysuria	18 (66.7)
Frequency	17 (63.0)
Trichomonas vaginalis	0 (0.0)
Chlamydia trachomatis	3 (13.6)
Mycoplasma genitalium	1 (4.6)
Neisseria gonorrhea	5 (22.7)

were confirmed and 7 cases were found during examination. Only 7 samples were confirmed by laboratory (18.4%), and two of them were positive for genital herpes. No cases were observed positive for *Haemophilus ducreyi* and *Treponema pallidum*.

Table 6 demonstrate the clinical and microbiological characteristics of individuals who presented with a complaint of urethral discharge or had urethral discharge on examination. For all these patients (*n* = 29), a sample of urethral swab was sent while finally, the results of 22 patients (75.9%) were reported by laboratory. The total number of positive cases of *Chlamydia trachomatis* from 22 urethra samples was 3 (13.6%), one of which was observed in the examination of urethral discharge, but the patient had no complaints.

Discussion

In the current study, a total of 139 (0.7%) prisoners were screened by active and passive case findings for STIs symptoms, evaluated with complete genital examination, followed by molecular testing for accurate diagnosis. Based on the evaluation, urethral discharge (12.5%) was the most common symptom reported before incarceration, followed by scabies (7.2%) and genital warts (5.8%). People who had recently been arrested or released from prison had a significant risk of STIs and incidental positive HIV tests; therefore, many studies reported a higher prevalence of STIs in prisoners than in the general population [15]. In this study, we attempted to improve the identification and treatment of STIs in prisoners by launching active case finding through symptomatic screening. The US Center for Disease Control and Prevention (CDC) recommends expanding prisoner screening and treatment [16]. However, in this study, the number of sexually transmitted infections through screening is lower than reported statistics in some other countries. In a study in Malawi, the prevalence of STIs over two years among 4,229 male prisoners was estimated to be 4.8% [17]. In another study, based on active diagnosis of all newly arrived prisoners in a French prison over three years using counseling and physical examination and a urethral swab for gonococcus and *Chlamydia trachomatis*, 16% had at least one STI. In the same study, the prevalence of *Chlamydia* was 4%; however, no case of genital herpes or gonorrhea was observed [18].

In a systematic review of active case finding in European prisons (although in a limited number of studies), the prevalence of *Chlamydia trachomatis*, gonococcus, and syphilis were 6-11%, 0.2%, and 1.3-2.6%, respectively [19]. Complaint-based screening is a low-cost method of identifying people with STIs. Hence, all inmates receive a health ID card based on their history when they enter prison, and it is simple to include questions in this ID card that lead to diagnosis of an STI. However, because a considerable number of STIs are asymptomatic, some individuals may remain undiagnosed. Although the use of laboratory procedures can lead to improved patient identification, these laboratory procedures are quite costly, and could not be provided inside of a prison.

Although all individuals identified through self-reported screening in the study reached the phase of clinical examination and risk assessment, and also acquired medical services, when it came to treatment, this system was not effective. A significant proportion of identified individuals have not been treated and those who have been treated have not received adequate care. It seems that staff training is essential in this regard. It indicates that even though the project started with several training sessions on STIs held by physicians, these sessions needed to be improved. In transferring samples to the laboratory, a significant number of them were lost, which can be attributed to the difficult conditions in which the samples had to be sent out of the prison and the lack of cooperation between the sending center and lab-

oratory. As a result, attempting to use point-of-care (POC) testing appears to be beneficial in this area. Furthermore, the use of POC to identify *Chlamydia* and gonorrhea has been recommended in some populations of prisoners in the United States [16].

Of the five STI symptoms studied, 61% were genital ulcers and 19% were urethral discharge. Although only 36% of genital ulcers were confirmed on examination, they still accounted for the largest share of complaints. Etiologically, the most common pathogen among those with urethral discharge was Neisseria gonorrhea with 23% (5 out of 22 cases) in laboratory examination, although *Chlamydia trachomatis* has been the most common pathogen in many studies in other countries [20]. In most of the genital ulcer samples, no etiological factor was identified (70%, 5 out of 7 cases). In two cases (28%), genital herpes was isolated. Genital herpes was previously mentioned as the most prevalent type of genital ulcer in Iran. No cases of syphilis were reported in this analysis, which is in line with previous research demonstrating low frequency of syphilis [21].

Our study did not include information on the type of sexual contacts, but another study conducted in the Great Tehran prison found the prevalence of homosexual contact among male prisoners to be approximately 9.8% [5]. One of the limitations in completing prisoners' screening and follow-up was the short average time of imprisonment, which can lead to patients being released before completing treatment. With proper planning, treatment can be continued after release to some extent. In the present study, entry-related stress, fear of information confidentiality, and concern about the consequences of infections could be barriers to expressing symptoms, especially since the majority of screenings were performed during arriving at the prison.

Conclusions

The high prevalence of STIs risk factors exposes inmates to these infections. Many detainees belong to groups that do not have adequate access to healthcare before arresting. Therefore, prison is a good opportunity to provide medical services to these persons. However, most of the services are not available in jails. This study showed that it is possible to set up a system, in which the diagnosis, follow-up, and treatment of inmates with STIs can be actively performed. Active case finding is an inexpensive way to identify people with STIs. Given that a health certificate is prepared for all prisoners upon arrival at the prison, it is easily possible to integrate some questions into the health certificate that lead to the identification of sexual diseases. Even though the asymptomatic nature of a significant proportion of sexually transmitted infections leads to limitations in the identification of some patients, the use of laboratory methods can improve patient screening. These laboratory procedures must be performed at the service point (POC). On the other hand, laboratory tests are not possible in all prisoners, and are very expensive. Future studies assessing in which subgroups of inmates such tests are cost-effective can be helpful.

Disclosures

1. Institutional Review Board statement: Ethical approval of the study was granted by the Ethics Committee of the Research Deputy of Tehran University of Medical Sciences, with approval Number: IR.TUMS.IKHC.REC.1399.125.
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4. Conflict of interests: None.

References

1. World Health Organization. Global health sector strategy on sexually transmitted infections 2016-2021: toward ending STIs. Contract No.: WHO/RHR/16.09. Geneva: WHO; 2016.
2. Wasserheit JN. Epidemiological synergy. Interrelationships between human immunodeficiency virus infection and other sexually transmitted diseases. Sex Transm Dis 1992; 19: 61-77.
3. Looker KJ, Elmes JA, Gottlieb SL, Schiffer JT, Vickerman P, Turner KM, et al. Effect of HSV-2 infection on subsequent HIV acquisition: an updated systematic review and meta-analysis. Lancet Infect Dis 2017; 17: 1303-1316.
4. Harding TW. AIDS in prison. Lancet 1987; 2: 1260-1263.
5. SeyedAlinaghi S, Farhoudi B, Mohraz M, Golsoorat Pahlaviani F, Hosseini M, Farnia M, et al. Prevalence and associated factors of HIV infection among male prisoners in Tehran, Iran. Arch Iran Med 2017; 20: 356-360.
6. Javanbakht M, Boudov M, Anderson LJ, Malek M, Smith LV, Chien M, et al. Sexually transmitted infections among incarcerated women: findings from a decade of screening in a Los Angeles County Jail, 2002-2012. Am J Public Health 2014; 104: e103-e109. DOI: 10.2105/AJPH.2014.302186.
7. Kamarulzaman A, Reid SE, Schwitters A, Wiessing L, El-Bassel N, Dolan K, et al. Prevention of transmission of HIV, hepatitis B virus, hepatitis C virus, and tuberculosis in prisoners. Lancet 2016; 388: 1115-1126.
8. Farhoudi B, SeyedAlinaghi S, Dadras O, Tashakoriyan M, Pouya MN, Gouya MM, et al. Health service provision for disease control among prisoners: a conceptual note. J Health Res 2020; 34: 353-358.
9. Seyedalinaghi SA, Farhoudi B, Mohraz M, Mohammadi Firouzeh M, Hosseini M, Kamali K. Prevalence of HIV in a prison of Tehran by active case finding. Iran J Public Health 2017; 46: 431-432.
10. United Nations. Transforming our world: the 2030 agenda for sustainable development. Department of Economic and Social Affairs 2015/2016. Available at: https://sdgs.un.org/2030agenda.
11. Centers for Disease Control and Prevention. IDU/HIV Prevention, HIV/AIDS counseling and testing in the criminal justice system. Available at: http://www.cdc.gov/IDU/facts/cj-ct.pdf.
12. Navadeh S, Mirzazadeh A, Gouya MM, Farnia M, Alasvand R, Haghdoost AA. HIV prevalence and related risk behaviours among prisoners in Iran: results of the national biobehavioural survey, 2009. Sex Transm Infect 2013; 89 (Suppl. 3): iii33.

13. Kheirandish P, Seyedalinaghi SA, Hosseini M, Jahani MR, Shirzad H, Foroughi M, et al. Prevalence and correlates of HIV infection among male injection drug users in detention in Tehran, Iran. J Acquir Immune Defic Syndr 2010; 53: 273-275.
14. Ziaee M, Sharifzadeh G, Namaee MH, Fereidouni M. Prevalence of HIV and hepatitis B, C, D infections and their associated risk factors among prisoners in Southern Khorasan Province, Iran. Iran J Public Health 2014; 43: 229-234.
15. Dolan K, Wirtz AL, Moazen B, Ndeffo-Mbah M, Galvani A, Kinner SA, et al. Global burden of HIV, viral hepatitis, and tuberculosis in prisoners and detainees. Lancet 2016; 388: 1089-1102.
16. Workowski KA, Bachmann LH, Chan PA, Johnston CM, Muzny CA, Park I, et al. Sexually transmitted infections treatment guidelines, 2021. MMWR Recomm Rep 2021; 70: 1-187.
17. Zachariah R, Harries AD, Chantulo AS, Yadidi AE, Nkhoma W, Maganga O. Sexually transmitted infections among prison inmates in a rural district of Malawi. Trans R Soc Trop Med Hyg 2002; 96: 617-619.
18. Verneuil L, Vidal JS, Ze Bekolo R, Vabret A, Petitjean J, Leclercq R, et al. Prevalence and risk factors of the whole spectrum of sexually transmitted diseases in male incoming prisoners in France. Eur J Clin Microbiol Infect Dis 2009; 28: 409-413.
19. Tavoschi L, Vroling H, Madeddu G, Babudieri S, Monarca R, Vonk Noordegraaf-Schouten M, et al. Active case finding for communicable diseases in prison settings: increasing testing coverage and uptake among the prison population in the European Union/European Economic Area. Epidemiol Rev 2018; 40: 105-120.
20. Brown CK, Earley M, Shaikh R, Fickenscher J, Ott J, Person A, et al. Voluntary STD testing and treatment program at a metropolitan correctional facility: evaluation of test acceptability and associated risk factors. J Correct Health Care 2014; 20: 70-80.
21. Nasirian M, Baneshi MR, Kamali K, Haghdoost AA. Estimation of prevalence and incidence of sexually transmitted infections in Iran; a model-based approach. J Res Health Sci 2015; 15: 168-174.