

Prevalence of sexually transmitted infections (STIs) and related factors among female prisoners in Tehran, Iran

Behnam Farhoudi, Elnaz Shahmohamadi, SeyedAhmad SeyedAlinaghi, Zohreh Rostam Afshar, Zohal Parmoon, Pegah Mirzapour, SeyedAlireza Nadji, Fatemeh Golsoorat Pahlaviani and Mehrzad Tashakorian

Abstract

Purpose – Sexually transmitted infections (STIs) can be transferred from one person to another through sexual contact. STIs lead to substantial morbidity and mortality and affect many different aspects of human life, including quality of life, sexual health, reproductive health and even the health of newborns and children. Despite of high rates of STIs in prisons, there are not sufficient screening, prevention and treatment programs to control STIs transmission among prisoners in Iran. This study aims to evaluate the prevalence of STIs among incarcerated women in Iran for the first time, using the active case finding strategy.

Design/methodology/approach – This is a cross-sectional study conducted on 438 incarcerated women in a prison in Tehran, Iran, from 2017 to 2018. A total of 438 prisoners were screened by active case findings for STI symptoms, then evaluated by complete genital and anal examination, followed by molecular testing.

Findings – A total of 189 (43.2%) prisoners announced vaginal discharge, while 194 (44.3%) individuals had vaginal discharge in the genital examination. In the cervical examination, 137 individuals (31.3%) had abnormal findings, of which 83 (18.9%) individuals had cervicitis, 40 (9.1%) individuals had cervical erosion, 38 (8.7%) individuals had cervical prolapse and 17 (3.9%) individuals had bleeding originated from the cervix.

Originality/value – This study showed that it is possible to set up a system in which the diagnosis, follow-up and treatment of prisoners with STIs can be actively performed. Educating prisoners about signs and symptoms, risk behaviors and prevention routes of STIs, as much as regular screening of prisoners, and adequate treatment can help control the STIs prevalence among prisoners and in the general population.

Keywords STIs, Prisoners, Chlamydia trichomoniasis, Mycoplasma genitalium, Prevalence

Paper type Research paper

(Information about the authors can be found at the end of this article.)

Introduction

World Health Organization estimates more than 1 million people acquire sexually transmitted infections (STIs) per day [World Health Organization (WHO), 2022]. STIs include more than 30 microorganisms; amongst them, only four are curable, including syphilis, gonorrhoea, chlamydia and trichomoniasis (Carvalho *et al.*, 2020a). STIs lead to substantial morbidity and mortality and affect many different aspects of human life, including quality of life, sexual health, reproductive health and even the health of newborns and children (Ciccarese *et al.*, 2020).

Prisoners are a community highly susceptible to STIs and blood-borne diseases due to their high-risk lifestyle and high-risk behaviors such as drug injection, multiple sex partners and tattooing (Butler *et al.*, 2007). The crowded cells and the lack of practical education to prevent STIs in prisons make them more vulnerable (Carvalho *et al.*, 2020b). The world

Received 7 September 2022
Revised 16 November 2022
Accepted 21 November 2022

The authors thank all staff in the prisons for their help. This study was supported by the Tehran University of Medical Sciences with code: 99-1-119-48219 and the ethics code: IR.TUMS.IKHC.REC.1399.126.
Conflict of interest: The authors declare no conflict of interest.

female imprisonment list of World Prison Brief (WPB) shows that the number of female prisoners has increased worldwide since 2000, and more than 714,000 women and girls are in prisons and houses of detention [World Prison brief (WPB), 2017]. Women are more susceptible to STIs because of their specific anatomy, as the mucosal layer of the vagina is thin, delicate and easily penetrated by pathogens [Centers for Disease Control and Prevention (CDC), 2020]. Studies also have demonstrated this gender disparity among female prisoners, as the frequency of human immunodeficiency virus (HIV) and syphilis was higher among female detainees compared to males (Belaunzaran-Zamudio *et al.*, 2017; Blogg *et al.*, 2014). Moreover, untreated STIs in women can cause infertility, ectopic pregnancy, severe psychological problems, premature delivery, stillbirth, low birth weight, neonatal infections and cervical cancer (Meheus, 1992).

Tehran, the capital city of Iran, has a population of about 12.8 million, and it is the most populous city in the country; which has caused various socioeconomic, cultural and health problems, increasing the prevalence of high-risk behaviors in society and, consequently, prisons (Ale-Ebrahim *et al.*, 2020). The diagnosis and treatment of STIs are exacerbated in communities with a social stigma around STIs (Taylor *et al.*, 2017). In Iran, discussing sex-related topics is taboo. Nevertheless, young adults are involved in high-risk sexual behavior such as inconsistent condom use. A study showed that only 40% of Iranian students, who had a history of sexual contact, reported using a condom in their last sexual intercourse (Rostami *et al.*, 2017).

Iran has about 6,880 female prisoners (Walmsley, 2006). The overall prevalence of STIs is low in Iran (Ghorashi, 2015). Still, the culture is changing and a dramatic change in the prevalence may occur. Although there are significant studies on sexual health in Iran (Karamouzian *et al.*, 2020; Nematollahi *et al.*, 2022; SeyedAlinaghi *et al.*, 2021), there is still a lack of information about STIs in female prisoners specifically. As far as we know, this is the first study that aimed to determine the prevalence of STIs among female prisoners in Tehran, Iran.

Materials and methods

Study participants

The present study is a cross-sectional study conducted in the Qarchak prison from 2017 to 2018. The subjects were all adult females (age above 18 years). A questionnaire was used to collect demographic information, history of sexual risk behaviors and drug use.

Process of case finding

All detainees are taken to the “receiving and identification unit (quarantine)” upon their arrival before being assigned to housing units based on their legal status. As a result, active case finding in this field began. When filling out the health ID in the quarantine unit, one of the physician members of the voluntary counseling and testing (VCT) center administered the questionnaire and looked for any complaints of sexually transmitted syndromes including any report of genital ulcers, vaginal discharge, lower abdominal pain and anal discharge.

The project’s researchers offered training courses on “Sexually Transmitted Infections in Prison guideline” for staff and peers in the quarantine and other wards of the prison after consulting with the penitentiary’s chief. This guideline is consisted of six executive instructions for diagnosis, treatment and active follow-up of STIs in prison settings and had been regulated by the Ministry of Health of Iran.

Prisoners were educated on the prevention of STIs and symptoms in the units by three trained staff members from the VCT center. A total of five training sessions for prison management and employees, as well as 10 sessions for prisoners were held. During these

sessions more than 20 members of prison staff and 220 prisoners acquired the proper education. In addition, 10 fellow prisoners (peers) and 10 caretakers received training.

During the study period, about 1,000 people were screened upon arrival, 438 of whom had at least one complaint compatible with STIs. As a result, 438 individuals were enrolled in the STI screening process. All of these people were referred to a doctor as directed, and after a clinical evaluation, they were educated, consulted and managed according to the clinical syndrome.

Ethical considerations

This study was approved by the Ethics Committee of Tehran University of Medical Sciences (IR.TUMS.IKHC.REC.1399.126). The study was conducted in accordance with the Declaration of Helsinki, and all participants received the information about the study protocol before enrollment. In this study, written informed consent was obtained from all participants and for the few illiterate individuals, verbal consent was acquired.

Measurements

Genital swabs were collected from cervical, vaginal or anal discharge to test for gonorrhea, chlamydia trichomoniasis, Mycoplasma genitalium and Trichomonas vaginalis. Blood specimens were collected for HIV rapid test, and genital ulcers were evaluated for Haemophilus ducrei, genital herpes, syphilis and Chlamydia trachomatis. All samples were confirmed by multiplex polymerase chain reaction.

Statistical analysis

All analysis was performed using SPSS software (version 27). Data are presented as mean \pm SD or as an absolute number and percentage when indicated. Fisher's exact and chi-square tests were used to compare the groups. The level of P-value for statistical significance was set as less than 0.05.

Results

During the project, 960 people were surveyed and among them, a total of 438 women aged 18–70 (mean age: 39.0 ± 9.9) were included in this study, of which 28 individuals (6.4%) reported having a history of STIs. Most of the population was educated (8.7% illiterate). Socio-demographic characteristics of individuals are presented in [Table 1](#).

Table 1 Sociodemographic characteristics of incarcerated individuals with self-reported syndromes of STIs ($n = 438$)

<i>Characteristics</i>	<i>Study population (%)</i>
Age (mean \pm SD)	39.0 \pm 9.9 (18–70)
<i>Years of schooling</i>	
>12 years	72 (16.4%)
7–12 years	277 (63.3%)
1–6 years	51 (11.6%)
Illiterate	38 (8.7%)
<i>Employment status</i>	
Unemployed	26 (5.9%)
Employee	29 (6.6%)
Self-employed	70 (16%)
Housewife	306 (69.9%)

According to [Table 2](#), HPV (2.7%) was the most common STI reported before incarceration, followed by HIV (1.1%) and HSV (1.1%). Approximately, 95% of the respondents claimed no history of diagnosed STIs in their sexual partners. However, 115 participants (26.3%) reported symptoms of STI in their latest sexual partner.

[Table 3](#) shows the distribution of STI syndromes based on complaints and examination. A total of 189 patients (43.1%) reported vaginal discharge, but on genital examination, vaginal discharge was observed in 194 patients (44.3%), and 140 of them were the same people who complained about it earlier. The second reported STI syndrome was genital ulcers (11.1%) followed by lower abdominal pain (4.8%).

A total of 137 patients (31.3%) had an abnormal examination of the cervix (exocervix and endocervix) and 83 of them had inflammation (swelling and redness). Besides, 40 patients (9.1%) had ulcers, 38 patients (8.7%) had cervical prolapse and 17 patients (3.9%) had bleeding ([Table 4](#)). Microbial evaluation of endocervical samples showed infection with trichomonas in 43 patients and Mycoplasma genitalium in 32 patients as summarized in [Table 5](#).

On examination of the genital area (internal and external), 49 patients (11.2%) had ulcers. 40 (9.1%) patients had cervical erosions, 8 (1.8%) had perineal ulcers, 6 (1.4%) had external genital ulcers (labia, vulva, perineum, perianal and pubis) and 2 (0.5%) had

Table 2 Behavioral characteristics of incarcerated individuals with self-reported syndromes of STIs (*n* = 438)

<i>Variables</i>	<i>No.</i>	<i>(%)</i>
<i>History of STIs before incarceration</i>	26	5.9
HIV	5	1.1
HPV	12	2.7
HPV + HIV	2	0.5
HSV	5	1.1
Gonorrhea	2	0.5
Gonorrhea + HIV	1	0.2
Trichomonas	1	0.2
Unknown	1	0.2
History of STI syndrome in partner	25	5.7
Symptom of STIs in the sexual partner	115	26.3
Presence of abnormal urethral discharge in the sexual partner	14	3.2
Presence of dysuria in the sexual partner	11	2.5
Presence of scrotal swelling in the sexual partner	10	2.3
Presence of genital ulcer in the sexual partner	14	3.2
Presence of anal discharge in the sexual partner	1	0.2
Drug use before incarceration	152	34.7
History of drug use in the sexual partner	225	51.4
New sexual partner in the last three months	94	22.4
Antibiotic use in the last month	119	27.2

Table 3 Distribution of sexually transmitted infection syndromes based on complaints and examination (438 people, some patients had two complaints at the same time)

<i>Characteristics</i>	<i>Compliant (n = 438)</i>	<i>Confirmed syndrome in examination</i>	<i>Confirmed syndrome in the examination without former complaint</i>
Abnormal vaginal discharge	189 (43.1)	194 (44.3)	54 (12.3)
Genital ulcer	14 (3.2)	49 (11.1)	40 (9.1)
Hypogastric pain	129 (29.4)	21 (4.8)	0 (0)
Anal discharge	20 (4.5)	1 (0.2)	0 (0)
Inguinal bubo	7 (1.6)	1 (0.2)	0 (0)

Note: All values expressed as number (%)

Table 4 Clinical characteristics in those with an abnormal cervical examination ($n = 137$)

Characteristics	Number	(%)
Inflammation	83	60.6
Ulcer	40	29.2
Protrusion	38	27.7
Bleeding	17	12.4

Table 5 Microbiological characteristics of cervical and vaginal samples ($n = 411$)

Characteristics	Exocervix	Endocervix	Vaginal
<i>Trichomonas vaginalis</i>	17 (4.13%)	43 (10.46%)	1 (0.24%)
<i>Chlamydia trachomatis</i>	4 (0.97%)	23 (5.59%)	1 (0.24%)
<i>Mycoplasma genitalium</i>	6 (1.46%)	32 (7.78%)	1 (0.24%)
<i>Nisseria gonorrhoea</i>	4 (0.97%)	6 (1.46%)	1 (0.24%)

perianal ulcers. Etiological examination for *Treponema pallidum*, *Haemophilus ducreyi*, *Chlamydia trachomatis* and genital herpes simplex was performed for all genital ulcer samples. Four patients (0.9%) with cervical erosions were found positive for herpes, three patients (0.7%) had vaginal ulcers due to herpes, five patients (1.1%) had cervical erosions due to chlamydia and one patient (0.2%) had vaginal ulcers due to chlamydia (Table 6).

In this study, there was a significant relationship between having a new sexual partner in the past three months and having vaginal discharge on the examination ($p = 0.004$). Of those who had a new sexual partner in the past three months, 57% had abnormal vaginal discharge on examination, whereas 41% of those who did not have a new sexual partner in the past three months had a vaginal discharge. All of the identified cases in this study received the required treatments accordingly.

There was no relationship between having a new sexual partner in the past three months and genital ulcers ($p = 0.27$). Moreover, there was no significant relationship between the vaginal discharge in women based on examination and abnormal urethral discharge in their sexual partners ($p = 0.21$).

Discussion

To the best of our knowledge, this is the first evaluation of the prevalence of STIs in a sample of female detainees in Iran. In this study, abnormal vaginal discharge (43.1%) was reported to be the most common sexually transmitted syndrome followed by lower abdominal pain (29.4%). In addition, we tried to improve the identification and treatment of STIs in prisoners by launching active case finding through symptomatic screening. In many other countries, studies have shown that the prevalence of STIs in prisoners is higher than in

Table 6 Clinical and microbiological characteristics in those who presented with a complaint of a genital ulcer ($n = 49$)

Characteristics	<i>Treponema pallidum</i>	<i>Haemophilus ducreyi</i>	<i>Chlamydia trachomatis</i>	Genital herpes simplex
External genitalia ($n = 6$)	0	0	0	0
Preanal ($n = 2$)	0	0	0	0
Perineum ($n = 8$)	0	0	0	0
Vagina ($n = 6$)	0	0	1	3
Cervix ($n = 40$)	0	0	5	4

the general population (Kouyoumdjian *et al.*, 2012). Risk factors for STIs in prisoners include high-risk sexual behaviors and drug addiction (Moradi *et al.*, 2019). Extending the screening and treatment of prisoners is recommended by the US Centers for Disease Control (Workowski *et al.*, 2021). In a screening of women prisoners in Los Angeles, which examined a total of 76,270 women, the prevalence of chlamydia was 11.4% and gonorrhoea was 3.1%. Also, primary syphilis was detected in 1.4% (141 of 9,733) and the overall prevalence of HIV was 1.1% (83 of 7,448) (Javanbakht *et al.*, 2014). In a review of large US prisons, the prevalence of chlamydia trachomatis in male and female inmates was reported to be 7% and 8.5%, respectively (Centers for Disease Control and Prevention, 2011). In these studies, asymptomatic prisoners were also screened with the help of laboratory tests. In a systematic review of studies for active disease detection in EU prisons, although the number of studies performed was limited, all of them used laboratory methods to do so. The positive rates in these studies for Chlamydia trachomatis, gonococcus and syphilis were 6%–11%, 0.2% and 3.6%–2.1%, respectively (Tavoschi *et al.*, 2018).

Expanded STI screening and treatment programs are becoming more prevalent in establishments such as prisons and jails. As a result, controlling these infections in prisons is vital to reduce the overall prevalence of the disease in general population (Seyedalinaghi *et al.*, 2017). All of the identified cases in this study received the required treatments accordingly. Retaining the benefits of treatment after release from prison can be accomplished through the use of motivators, rewards and connections to healthcare providers.

Complaint screening is an inexpensive way to identify people with STIs. Given that a health ID is prepared for all prisoners upon arrival at the prison using their history, it is easy to integrate questions into the health ID that lead to the identification of sexual syndromes. But the asymptomatic nature of a significant proportion of STIs leads to a lack of identification of some of the patients. The use of laboratory methods can improve the identification of patients. These laboratory procedures must be performed at the service site. On the other hand, laboratory tests are not possible on all prisoners and are very expensive. In a study in US prisons, given the prevalence of chlamydia and gonococcus, only screening of all prisoners at the onset of chlamydia and gonococcus was cost-effective in assessing syndromes and treating symptomatic cases (Kraut-Becher *et al.*, 2004).

Among those who had cervical discharge and were examined *in vitro* for etiology, 63 (15.33%) had trichomonas, 27 (6.57%) had chlamydia and 10 (2.43%) had gonococcus. Chlamydia trachomatis has been the most common cause in many studies in other countries (Arriola *et al.*, 2001; Joesoef *et al.*, 2009; Mertz *et al.*, 2002). As in other studies, the prevalence of syphilis was low (Kraut-Becher *et al.*, 2004) since no cases of syphilis were reported.

The needs of detained women have received little consideration and continue to be disregarded by health systems and penal authorities (Emerson *et al.*, 2022). The United Nations Basic Principles for the Treatment of Prisoners outline how prisoners' right to the greatest achievable standard of health care must be met as: "Prisoners shall have access to the health services available in the country without discrimination on the grounds of their legal situation" (Coyle, 2014). International and national policies emphasize the value of incarceration as an opportunity to address the health needs of a "hard to reach" segment of society and the prison as a setting where prisoners' health can be measured, maintained and enhanced (Condon *et al.*, 2007; Wolff and Shi, 2011).

In Iran, prisoner health care is provided through outpatient clinics that have not yet been integrated into the national health system (Moradi *et al.*, 2015). The Ministry of Health and the Iranian Judiciary have funded harm reduction programs to combat the HIV epidemic since 2004. Even after release, these programs offer VCT to prisoners. This is done at triangular clinics (TCS) in 128 Iranian prisons as part of a novel initiative by the Iranian penal system. TCS are behavioral disease counseling facilities that treat patients in three areas: STIs, HIV and acquired immune deficiency syndrome (AIDS) infections, as well as opium

injection (Moradi *et al.*, 2019). However, these settings were not established in all prisons of Iran, including the setting of this study.

Limitations

This study had several limitations, including the problems in completing the screening and the follow-up of prisoners due to the shortening of the average period of their imprisonment, which could lead to the release of the patients before the completion of their treatment, based on the diagnosed sexual syndrome. Due to the high cost of laboratory investigations in Iran, it was not possible to conduct tests on every prisoner to identify non-symptomatic cases. Therefore, the active case-finding strategy was used in this survey as a fast and affordable method to optimize the number of identified cases in a prison setting. On the other hand, screening for a sensitive issue, such as the symptoms of an STI, upon incarceration can lead to concerns about discrimination, stigma and lack of expression, which may have led to underestimation of STIs prevalence in this survey.

Conclusion

The high prevalence of risk factors for STIs exposes prisoners to these infections. Many detainees belong to groups that do not have adequate access to health care before arrest. Prison is a good opportunity to provide services to them. However, most of these services are not available in prisons. This study showed that it is possible to set up a system in which the diagnosis, follow-up and treatment of prisoners with STIs can be actively performed. Educating prisoners about signs and symptoms, risk behaviors and prevention routes of STIs, as well as regular screening, and adequate treatment can help control the STIs prevalence among prisoners and in the general population. Complaint screening is an inexpensive way to identify people with STIs. Given that a health card is prepared for all prisoners upon arrival at the prison using their history, it is easy to integrate questions into the health card that lead to the identification of sexual syndromes. But the asymptomatic nature of a significant proportion of STIs leads to a lack of identification of some of the patients. The use of laboratory methods can improve the identification of patients. These laboratory procedures must be performed at the service site. However, laboratory tests are not possible on all prisoners and are very expensive. Other studies that can determine in which subgroups of inmates such tests are cost-effective can be helpful. We hope the findings of this study could provide a stepping stone for future research with additional prisons, more thorough examinations of asymptomatic patients, and qualitative evidence.

References

- Ale-Ebrahim, J., Janani, L., SeyedAlinaghi, S.A., Farhoudi, B., Abbasi-Ghahramanloo, A., Sajadipour, M. and Motevalian, S.A. (2020), "Patterns of high-risk behaviors associated with HIV among male prisoners: a latent class analysis", *Medical Journal of the Islamic Republic of Iran*, Vol. 34, p. 109.
- Arriola, K.R., Braithwaite, R.L., Kennedy, S., Hammett, T., Tinsley, M., Wood, P. and Arboleda, C. (2001), "A collaborative effort to enhance HIV/STI screening in five county jails", *Public Health Reports*, Vol. 116 No. 6, p. 520.
- Belaunzaran-Zamudio, P.F., Mosqueda-Gomez, J.L., Macias-Hernandez, A., Rodríguez-Ramírez, S., Sierra-Madero, J. and Beyrer, C. (2017), "Burden of HIV, syphilis, and hepatitis B and C among inmates in a prison state system in Mexico", *AIDS Research and Human Retroviruses*, Vol. 33 No. 6, pp. 524-533.
- Blogg, S., Utomo, B., Silitonga, N., Ayu N. Hidayati, D. and Sattler, G. (2014), "Indonesian national inmate bio-behavioral survey for HIV and syphilis prevalence and risk behaviors in prisons and detention centers, 2010", *SAGE Open*, Vol. 4 No. 1, p. 2158244013518924.
- Butler, T., Boonwaat, L., Hailstone, S., Falconer, T., Lems, P., Ginley, T., Read, V., Smith, N., Levy, M., Dore, G. and Kaldor, J. (2007), "The 2004 Australian prison entrants' blood-borne virus and risk behaviour survey", *Australian and New Zealand Journal of Public Health*, Vol. 31 No. 1, pp. 44-50.

- Carvalho, F., Takeda, E., Chagas, E.F.B. and Pinheiro, O.L. (2020a), "Knowledge of the prison population about sexually transmitted infections", *Revista Gaúcha de Enfermagem*, Vol. 41.
- Carvalho, I., Guedes, T.G., Bezerra, S., Alves, F.A.P., Leal, L.P. and Linhares, F.M.P. (2020b), "Educational technologies on sexually transmitted infections for incarcerated women", *Revista Latino-Americana de Enfermagem*, Vol. 28.
- Centers for Disease Control and Prevention (2011), "Evaluation of large jail STD screening programs, 2008–2009", *Retrieved January*, Vol. 6, p. 2013.
- Centers for Disease Control and Prevention (CDC) (2020), "Sexually transmitted disease surveillance", available at: www.cdc.gov/std/statistics/2020/default.htm (accessed November 2022).
- Ciccarese, G., Drago, F., Oddenino, G., Crosetto, S., Rebora, A. and Parodi, A. (2020), "Sexually transmitted infections in male prison inmates. Prevalence, level of knowledge and risky behaviours", *Le Infezioni in Medicina*, Vol. 28 No. 3, pp. 384-391.
- Condon, L., Gill, H. and Harris, F. (2007), "A review of prison health and its implications for primary care nursing in England and Wales: the research evidence", *Journal of Clinical Nursing*, Vol. 16 No. 7, pp. 1201-1209.
- Coyle, A.J.P. (2014), "Health. 2. Standards in prison health: the prisoner as a patient", p. 6.
- Emerson, A., Lipnicky, A., Schuster, B. and Kelly, P.J. (2022), "Physical health programs and interventions with women during incarceration: a scoping review", *International Journal of Prisoner Health*, Vol. 18 No. 3, pp. 285-299.
- Ghorashi, Z. (2015), "Sexually transmitted infections in Iran: a literature review", *Journal of Occupational Health and Epidemiology*, Vol. 4 No. 4, pp. 260-265.
- Javanbakht, M., Boudov, M., Anderson, L.J., Malek, M., Smith, L.V., Chien, M. and Guerry, S. (2014), "Sexually transmitted infections among incarcerated women: findings from a decade of screening in a Los Angeles county jail, 2002–2012", *American Journal of Public Health*, Vol. 104 No. 11, pp. e103-e109.
- Joesoef, M.R., Weinstock, H.S., Kent, C.K., Chow, J.M., Boudov, M.R., Parvez, F.M., Cox, T., Lincoln, T., Miller, J.L. and Sternberg, M. (2009), "Sex and age correlates of chlamydia prevalence in adolescents and adults entering correctional facilities, 2005: implications for screening policy", *Sexually Transmitted Diseases*, Vol. 36 No. 2, pp. S67-S71.
- Karamouzian, M., Nasirian, M., Ghaffari Hoseini, S. and Mirzazadeh, A. (2020), "HIV and other sexually transmitted infections among female sex workers in Iran: a systematic review and meta-analysis", *Archives of Sexual Behavior*, Vol. 49 No. 6, pp. 1923-1937.
- Kouyoumdjian, F., Leto, D., John, S., Henein, H. and Bondy, S. (2012), "A systematic review and meta-analysis of the prevalence of chlamydia, gonorrhoea and syphilis in incarcerated persons", *International Journal of STD & AIDS*, Vol. 23 No. 4, pp. 248-254.
- Kraut-Becher, J.R., Gift, T.L., Haddix, A.C., Irwin, K.L. and Greifinger, R.B. (2004), "Cost-effectiveness of universal screening for chlamydia and gonorrhea in US jails", *Journal of Urban Health: Bulletin of the New York Academy of Medicine*, Vol. 81 No. 3, pp. 453-471.
- Meheus, A. (1992), "Women's health: Importance of reproductive tract infections, pelvic inflammatory disease and cervical cancer", in Germain, A., Holmes, K.K., Piot, P., Wasserheit, J.N., (Eds), *Reproductive Tract Infections: Global Impact and Priorities for Women's Reproductive Health*, Springer US, Boston, MA, pp. 61-91.
- Mertz, K.J., Schwebke, J.R., Gaydos, C.A., Beidinger, H.A., Tulloch, S.D. and Levine, W.C. (2002), "Screening women in jails for chlamydial and gonococcal infection using urine tests: feasibility, acceptability, prevalence, and treatment rates", *Sexually Transmitted Diseases*, Vol. 29 No. 5, pp. 271-276.
- Moradi, G., Farnia, M., Shokoohi, M., Shahbazi, M., Moazen, B. and Rahmani, K. (2015), "Methadone maintenance treatment program in prisons from the perspective of medical and non-medical prison staff: a qualitative study in Iran", *International Journal of Health Policy and Management*, Vol. 4 No. 9, pp. 583-589.
- Moradi, G., Mohamadi-Bolbanabad, A., Darvishi, S., Zavareh, F.A., Piroozi, B., Zareie, B., Gouya, M.M. and Tashakorian, M. (2019), "Patterns of sexual behaviors and related factors among prisoners in Iran: results from a national survey in 2015", *International Journal of Prisoner Health*, Vol. 16 No. 1.
- Nematollahi, A., Gharibzadeh, S., Damghanian, M., Gholamzadeh, S. and FJBWsh, F. (2022), "Sexual behaviors and vulnerability to sexually transmitted infections among transgender women in Iran", Vol. 22 No. 1, pp. 1-8.
- Rostami, F., Shokoohi, M., Aderayo Bamimore, M., Nasirian, M., Asadi-Aliabadi, M. and Haghdoost, A. (2017), "Prevalence of sexually transmitted infections based on syndromic approach and associated factors among Iranian women", *Iranian Journal of Health Sciences*, Vol. 5 No. 1, pp. 1-12.

Seyedalinaghi, S.A., Farhodi, B., Mohraz, M., Mohammadi Firouzeh, M., Hosseini, M. and Kamali, K. (2017), "Prevalence of HIV in a prison of Tehran by active case finding", *Iranian Journal of Public Health*, Vol. 46 No. 3, pp. 431-432.

SeyedAlinaghi, S., Leila, T.A.J., Mazaheri-Tehrani, E., Ahsani-Nasab, S., Abedinzadeh, N., McFarland, W., Mohraz, M. and Mirzazadeh, A. (2021), "HIV in Iran: onset, responses and future directions", *AIDS*, Vol. 35 No. 4, p. 529.

Tavoschi, L., Vroling, H., Madeddu, G., Babudieri, S., Monarca, R., Vonk Noordegraaf-Schouten, M., Beer, N., Gomes Dias, J., O'Moore, É., Hedrich, D. and Oordt-Speets, A. (2018), "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", *Epidemiologic Reviews*, Vol. 40 No. 1, pp. 105-120.

Taylor, M., Alonso-González, M., Gómez, B., Korenromp, E. and Broutet, N. (2017), "world health organization global health sector strategy on sexually transmitted infections: an evidence-to-action summary for Colombia", *Revista Colombiana de Obstetricia y Ginecología*, Vol. 68 No. 3, pp. 193-201.

Walmsley, R. (2006), *World Female Imprisonment List*, International centre for prison Studies, London.

Wolff, N. and Shi, J.J.C. (2011), "Patterns of victimization and feelings of safety inside prison: the experience of male and female inmates", *Crime & Delinquency*, Vol. 57 No. 1, pp. 29-55.

Workowski, K.A., Bachmann, L.H., Chan, P.A., Johnston, C.M., Muzny, C.A., Park, I., Reno, H., Zenilman, J.M. and Bolan, G.A. (2021), "Sexually transmitted infections treatment guidelines, 2021", *MMWR. Recommendations and Reports*, Vol. 70 No. 4, p. 1.

World Health Organization (WHO) (2022), "Sexually transmitted infections (STIs) of 2015", available at: [www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-\(stis\)](http://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-(stis))

World Prison brief (WPB) (2017), "World female imprisonment list: fourth edition, women and girls in penal institutions, including pre-trial detainees/remand prisoners", available at: www.prisonstudies.org/sites/default/files/resources/downloads/world_female_prison_4th_edn_v4_web.pdf (accessed 3 November 2022).

Author affiliations

Behnam Farhodi is based at the Social Determinants of Health Research Center, Amir-al-Momenin Hospital, Tehran Medical Sciences Branch, Islamic Azad University, Sari, Iran

Elnaz Shahmohamadi, SeyedAhmad SeyedAlinaghi, Zohreh Rostam Afshar, Zohal Parmoon and Pegah Mirzapour are all based at the Iranian Research Center for HIV/AIDS, Iranian Institute for Reduction of High-Risk Behaviors, Tehran University of Medical Sciences, Tehran, Iran

SeyedAlireza Nadji is based at the Virology Research Center, National Institutes of Tuberculosis and Lung Diseases, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Fatemeh Golsoorat Pahlaviani is based at the Iranian Research Center for HIV/AIDS, Iranian Institute for Reduction of High-Risk Behaviors, Tehran University of Medical Sciences, Tehran, Iran

Mehrzaad Tashakorian is based at the Health and Treatment Directorate of Prisons and Security and Corrective Measures Organization, Tehran University, Tehran, Iran

Corresponding authors

Elnaz Shahmohamadi can be contacted at: elnaz.sh1996@gmail.com and SeyedAhmad SeyedAlinaghi can be contacted at: s_a_alinaghi@yahoo.com

For instructions on how to order reprints of this article, please visit our website: www.emeraldgroupublishing.com/licensing/reprints.htm
Or contact us for further details: permissions@emeraldinsight.com