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Review Article

An overview on sexually transmitted infections in Iran

Roksana Janghorban^{1*}, Fatemeh Azarkish²

¹Assistant Professor in Reproductive Health, Community Based Psychiatric Care Research Center, Department of Midwifery, School of Nursing and Midwifery, Shiraz University of Medical Sciences, Shiraz, Iran

²Assistant Professor in Reproductive Health, Iranshahr University of Medical Sciences, Iranshahr, Iran

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***Correspondence:**

Dr. Fatemeh Azarkish,

E-mail: azarkish2005@yahoo.com

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ABSTRACT

Sexually transmitted infections (STIs) cause a large proportion of the global burden of ill-health, disability, and death. This paper reviews the status of STIs in Iran in the three groups of infections are caused by bacterial, viral, and parasitic pathogens and then focuses on human immunodeficiency virus (HIV) infection. This review was carried out in the period of 1977-2015 by searching in PubMed, Scopus, Embase, Web of sciences, Google scholar, the Iranian databases such as MagIran, IranMedex and SID using relevant English and Persian key words. Articles, reports, fact sheets, and official publications of World Health Organization (WHO), the United Nations Program on HIV and AIDS (UNAIDS), The United Nations Children's Fund (UNICEF), and the Ministry of Health and Medical Education (MOHME) of Iran were reviewed. Data on the prevalence of STIs in Iran is sparse with very limited generalizability to the general population. But studies show that these infections are concentrated in high risk sub-groups of the population. Iran has a low national HIV prevalence, but an increased prevalence among people who inject drugs, shifting the country from low prevalence to a concentrated prevalence. It seems that the more improvement of HIV/AIDS prevention, care and treatment programs in Iran need to more attention toward controlling HIV/AIDS through sexual health, proper linkage among HIV/AIDS, STIs, and SRH programs, reduction of stigma and discrimination toward people living with HIV/AIDS, and increase to access at risk populations.

Keywords: Sexually transmitted diseases, Acquired immunodeficiency syndrome, HIV

INTRODUCTION

Sexually transmitted infections (STIs) are infections that are passed on from one person to another through sexual contact. STIs cause a large proportion of the global burden of ill-health, disability, and death.¹ It is estimated that more than 1 million people acquire one of the infections every day in 2013.² In 2008, the total incidence of four curable STIs – *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Syphilis* and *Trichomonas vaginalis*- for the Eastern Mediaterranean region was estimated to be 26.4 million by the World Health Organization (WHO).¹ These infections are caused by over 30 bacterial, viral, and parasitic pathogens.² At first,

this paper presents the status of STIs in Iran in the three groups of infections and then focuses on human immunodeficiency virus (HIV) infection.

REVIEW OF LITERATURE

This review was carried out in the period of 1977-2015 by searching in PubMed, Scopus, Embase, Web of sciences, Google scholar using different combinations of following search terms including "STIs", "STDs", "*Chlamydia trachomatis*", "*Neisseria gonorrhoeae*", "*Syphilis*", "*Trichomonas vaginalis*", "HIV", "AIDS", "HPV", "HSV", "HBS", "Chancroid", "Iran",

"prevalence", "incidence", "surveillance system", and "care".

Articles, reports, fact sheets, and official publications of WHO, the United nations program on HIV and AIDS (UNAIDS), The United nations children's fund (UNICEF), and the Ministry of health and medical education (MOHME) of Iran were reviewed. The Iranian databases such as MagIran, IranMedex and SID were also searched with relevant English and Persian key words.

PART ONE

STIs status in Iran

According to WHO/UNAIDS report in 2003, incidence of urethral discharge and genital ulcer were 1.96 (10.000) and 8.4 (10.000), respectively.³ The executive board of the United Nations Development Program and the United Nations Population Fund showed that there were 700,000 reported cases of STIs in 2003 in Iran.⁴ Data on the

prevalence of STIs in Iran is sparse with very limited generalizability to the general population.

Bacterial infections

Gonorrhea

There is a limited data related to *gonorrhea* infection in Iran, but it seems that the overall prevalence of it in general population is low (Table 1). In most studies at low risk people without symptoms, the prevalence varies from 0 to 2.4%.⁵⁻¹² But the prevalence rises in studies which have done in prostitutes and people with urethritis.¹³⁻¹⁵ Results of Zirak-Zadah et al and Zargooshi's studies showed that rate of resistance to standard treatment in prostitutes and men who had sexual contact with sex workers rose from 1977 to 2002.¹³⁻¹⁴ It may be due to ban prostitution officially in those years and low health coverage for them. It could be an alarming characteristic of *gonorrhea* infection in Iran, but further studies are needed to confirm it.

Table 1: Gonorrhea prevalence in different populations in Iran.

Author/Ref	City	Studied population	Prevalence (%)
Zirak-Zadah T et al ¹⁴	Tehran	921 female sex workers	12.1
Zargooshi J ¹³	Kermanshah	162 men with urethritis	67.28
Dezfulimanesh M et al ⁵	Kermanshah	500 pregnant and non pregnant women, 15-49 y.o.	0.4
Bakhtiari A et al ⁶	Babol	550 non-pregnant women, 15-45 y.o.	0.2
Rashidi B et al ⁷	Tehran	209 infertile women and 170 pregnant women in the third trimester of pregnancy, 18-40 y.o.	Zero in both groups
Shahcheraghi F et al ¹⁶	Tehran	500 married female prisoners from Ewin, Rajaii shahr, Karaj and Varamin prisons, 16-45 y.o.	48.6 (by biochemical tests) Zero (by PCR)
Baghchesaraei H et al ⁸	Zanjan	328 pregnant and non pregnant women referred to gynecology and obstetrics clinics, 15-45 y.o.	0.9
Akya A et al ⁹	Kermanshah	255 married women referred to the gynecology clinics, 18-49 y.o.	2.4
Bahador A et al ¹⁰	Sabzevar	399 pregnant adolescents women	1.25
Ilami O et al ¹⁵	Yasuj	137 patients (28 male & 109 female) with symptomatic urethritis	7.14 (male) 4.65 (female)
Hassanzadeh P et al ¹¹	Shiraz	1100 pregnant women	1.18
Afrasiabi Sh et al ¹²	Kashan	294 married women referred to the obstetrics and gynecology clinics, 17-55 y.o.	2.38

Chlamydia

Chlamydia trachomatis is one of the most common STIs in the WHO Eastern Mediterranean region.¹ The infection in Iran may not be as high as in developed countries,¹⁷ but studies in Table 2 show that its prevalence with 6.4-10.3% at low risk people without symptoms is more than gonorrhea.^{8,18} The rate increases in people (men and women) with urethritis, and women with cervicitis.¹⁹⁻²⁴ *Chlamydia trachomatis* can lead to reproductive tract complications and pregnancy adverse outcome.²⁵ This could be a remarkable issue in reproductive health and

prenatal care in Iran because studies showed that the prevalence of *Chlamydia trachomatis* in pregnant women is higher than the low risk non-pregnant women.^{10,26} Additionally, the prevalence in infertile group and women with abortion is high.²⁶⁻²⁷

Syphilis

Syphilis prevalence in Iran is lower than 1% among pregnant women and other groups representative of the general population.³⁷⁻³⁹ In 2006, UNICEF reported that the prevalence in pregnant women was 85/100,000.⁴⁰ In

Table 3, studies show that the infection is concentrated in HIV-positive patients, sex workers, and prisoners.⁴¹⁻⁴⁴
 a few high risk sub-groups of the population such as

Table 2: Chlamydia prevalence in different populations in Iran.

Author/Ref	City	Studied population	Prevalence (%)
Darougar S et al ²⁸	Tehran & Bandar Abbas	177 female sex workers	6.9
Kajbaf M.J et al ²⁹	Ahwaz	101 infertile women	7.9
Fallah F et al ²²	Tehran	122 women with cervicitis	14.9
Naserpour Farivar T et al ²¹	Zahedan	1054 patients with UTI symptoms	9.02
Chamani-Tabriz L et al ¹⁸	Tehran	1052 women, 15-42 y.o.	6.4
Ghanaat J et al ¹⁷	Mashhad	150 men with urethritis	9.3
Rashidi B et al ²⁶	Tehran	233 infertile women and 225 pregnant women	13.8 (infertile group) 11.1 (pregnant group)
Khezerdoust S et al ³⁰	Tehran	1114 pregnant women in 11-32 week of gestation	2.9
Sotoodeh Jahromi A et al ²⁷	Bandar Abbas	200 women with full-term deliveries & 220 women with abortion	25.45 (abortion group) 5.20 (full-term group)
Taheri Beni B et al ²³	Ahwaz	620 women with cervicitis	18.1
Asgari S et al ²⁰¹¹ ³¹	Tehran	130 prisoner men, 16-49 y.o.	2.3
Baghchesaraei H et al ⁸	Zanjan	328 pregnant and non pregnant women referred to gynecology and obstetrics clinics, 15-45 y.o.	10.3
Hassanzadeh P et al ³²	Shiraz	210 pregnant women	Non-detection
Eslami G et al ³³	Tehran	121 women with spontaneous abortion	13.25
Ghazvini K et al ¹⁹	Mashhad	178 men with urithritis	10.6
Ilami O et al ¹⁵	Yasuj	137 patients (28 male & 109 female) with symptomatic urethritis	7.14 (male) 2.6 (female)
Afrakhteh M et al ²⁴	Tehran	301 women with STIs signs & symptomats	24.91
Akya A et al ⁹	Kermanshah	255 married women referred to the gynecology clinics, 18-49 y.o.	3.1
Bahador A et al ¹⁰	Sabzevar	399 pregnant adolescents women	12.28
Yeganeh O et al ²⁰	Tehran	200 men (100 symptomatic, 100 asymptomatic)	20 (symptomatic) 4 (asymptomatic)
Fathollahzadeh B et al ³⁴	Tehran	200 men (symptomatic & asymptomatic)	11 (symptomatic) 6 (asymptomatic)
Kazerooni PA et al ³⁵	Shiraz	278 female sex workers	9
Aslanimehr M et al ³⁶	Qazvin	240 married women	8.3

Table 3: Syphilis prevalence in different populations in Iran.

Author/Ref	City	Studied population	Prevalence (%)
Khamisipour GR et al ⁴⁴	Bushehr	635 high risk groups	2.4
Ayatelah J et al ³⁸	Yazd	1484 pregnant women	Zero
Ghorbani Gh et al ⁴⁵	Tehran	1041 soldiers	0.1
Nokhodian Z et al ⁴⁶	Isfahan	163 female prisoners	Zero
Navadeh S et al ⁴²	Kerman	177 female sex workers	7.2
Badie B et al ⁴¹	Tehran	450 HIV-positive patients	5.3
Motamedifar M et al ⁴⁷	Shiraz	1100 pregnant women, 15-42 y.o.	1.4
Mohammadali F et al ⁴⁸	Tehran	2,026, 628 blood donors	10.5/ 10 ⁵
Jedary Attary S et al ³⁹	Tehran	605 pregnant women	Zero
Beheshti Sh et al ⁴³	Shiraz	129 male prisoners, 14-60 y.o.	6

Viral infections

Human papillomavirus (HPV)

There is a lack of population-based studies to determine the prevalence of HPV in the general population in Iran (Table 4), but a systematic review on national data showed that the prevalence is 76% in cervical cancer patients and 7% in healthy women.⁴⁹ According to a meta-analysis of type-specific HPV prevalence in Iranian women, the six most common types were HPV 16, 18, 6, 11, 31, and 33; among them HPV 16 was the most frequent type.⁵⁰ This study showed that HPV vaccine could be a useful prevention strategy against cervical cancer in Iran.

Table 4: HPV prevalence in different populations in Iran.

Author/Ref	City	Studied population	Prevalence (%)
Alavian SM et al ⁵⁷	7 provinces	Systematic review	2.14
Zamani S et al ⁶⁴	Isfahan	118 IDUs	0.7
SeyedAlinaghi SA et al ⁵⁹	Tehran	499 male IDUs	5.8
Fathimoghaddam F et al ⁶⁵	Mashhad	1652 General population	1.39
Khosravani A et al ⁶⁶	Kohgiluyeh & Boyerahmad	209 High risk population	1.2
Babamahmood F et al ⁶²	Mazandaran	188 HIV positive persons	11.3
Nejad ME et al ⁶³	Tehran	213 HIV positive persons	11.3
Ziaee M et al ⁶⁷	Southern Khorasan	881 prisoners	6.9
Nokhodian Z et al ⁶¹	Isfahan	970 prisoners IDUs	3.3
Ramezani A et al ⁶⁰	Arak	100 male IDUs	6

Hepatitis B (HBV)

A systematic review in Iran revealed that prevalence of HBV infection is approximately 2.14% (1.3% to 6.3%) across provinces.⁵⁷ Therefore, according to regional classification of carrier rate of HBV infection throughout the world, Iran is likely located in the group with intermediate prevalence (2-7%).⁵⁸ The prevalence is higher among populations at high risk for infection, particularly injecting drug users (IDUs).⁵⁹⁻⁶¹ Studies

showed that the prevalence of HBV in HIV positive persons was frequent (Table 5).⁶²⁻⁶³

Table 5: HBV prevalence in different populations in Iran.

Author/Ref	City	Studied population	Prevalence (%)
Alavian SM et al ⁵⁷	7 provinces	Systematic review	2.14
Zamani S et al ⁶⁴	Isfahan	118 IDUs	0.7
SeyedAlinaghi SA et al ⁵⁹	Tehran	499 male IDUs	5.8
Fathimoghaddam F et al ⁶⁵	Mashhad	1652 General population	1.39
Khosravani A et al ⁶⁶	Kohgiluyeh & Boyerahmad	209 High risk population	1.2
Babamahmood F et al ⁶²	Mazandaran	188 HIV positive persons	11.3
Nejad ME et al ⁶³	Tehran	213 HIV positive persons	11.3
Ziaee M et al ⁶⁷	Southern Khorasan	881 prisoners	6.9
Nokhodian Z et al ⁶¹	Isfahan	970 prisoners IDUs	3.3
Ramezani A et al ⁶⁰	Arak	100 male IDUs	6

Herpes simplex virus (HSV)

The prevalence of the HSV type 2 infections in North Africa and the Middle East was estimated 9.6 and 8.6 among females and males, respectively.⁶⁸ In Iran, studies have shown that HSV-2 prevalence increases in high risk groups (Table 6).⁶⁹⁻⁷⁰ The typically asymptomatic nature of HSV-2, which facilitates its spread in the population, and its association with an increased risk of HIV acquisition highlight the increasing need to plan regular screening and safe sex programs in this group.⁶⁸ Additionally, the high prevalence of the infection in pregnant women could be an important concern in prenatal care.⁷¹⁻⁷²

Parasitic infection

Trichomoniasis

In a meta-analysis study in Iran, the overall prevalence rate of trichomoniasis was estimated 8% (95% confidence interval (CI) = 0.07 to 0.09) with the maximum 38.8% (95% CI= 0.036 to 0.042) and the

minimum 0.009% (95% CI=0.008 to 0.010), respectively (Table 7).⁷⁶ The prevalence of this infection increases in high risk behavior women such as prisoners.⁷⁷

Table 6: HSV-2 prevalence in different populations in Iran.

Author/Ref	City	Studied population	Prevalence (%)
Kasraeian M et al ⁷³	Shiraz	915 women, 20-55 y.o.	28.19
Ziyaeyan M et al ⁷²	Tehran	400 pregnant women	8.25
Shahraki DA et al ⁷¹	Isfahan	96 pregnant women	34.75
Asgari S et al ⁶⁹	Tehran	362 low risk women, 156 prisoners	2.5 (low risk group) 26.3 (High risk group)
Rezaei-Chaparpordi S et al ⁷⁴	Gilan	800 low risk people	3.5
Amirjannati N et al ⁷⁵	Tehran	217 infertile men	12
Aletaha SM et al ⁷⁰	Kermanshah	239 women with cervicitis	5.4

Table 7: Trichomoniasis prevalence in different populations in Iran.

Author/Ref	City	Studied population	Prevalence (%)
Rabiee S et al ⁷⁸	Hamadan	683 women	2.2
Valadkhani Z et al ⁷⁷	Tehran	450 female prisoners	10.2
Tehrani FR et al ⁷⁹	Tehran	1100 pregnant women	38.9
Nourian A et al ⁸⁰	Zanjan	1000 pregnant women	3.3
Hezarjaribi HZ et al ⁸¹	Sari	1832 women	7.3
Cheraghi M et al ⁸²	Khuzestan	1448 non-pregnant women	8
Sehhatie-Shafaie F et al ⁸³	Tabriz	1000 non-pregnant women	9.2
Hezarjaribi HZ et al ⁷⁶	30 cities	meta-analysis	8

STI/HIV strategies, prevention measures, care services in Iran with a review on challenges and barriers

In 2006, The WHO collaborating centre provided a technical assistant for the development of the second generation HIV surveillance in Iran. STIs surveillance system was a component of the strategic plan and "strengthening prevention of transmission of HIV through service providing centers" integrated to "care and treatment of STIs" and changed to "prevention, care and treatment of STIs" and "standard precaution".^{37,84} The STIs surveillance system had four main components including: syndromic reports, etiologic reports, monitoring drug resistance, and epidemiological studies and surveillance database. Syndromic and etiologic reports of STIs are done on monthly cumulative reports in Iran.⁸⁵

The Ministry of health and medical education (MoHME) implements various measures for STIs prevention and control including HBV vaccination for hepatitis B prevention; prophylaxis program for occupational exposures to HBV, HCV, and HIV; syphilis and HIV screening tests in pregnant women with high risk behaviors; provision of medical prophylaxis and free formula milk for infants and children with HIV-positive mothers.⁸⁶⁻⁸⁷

"Triangular Clinics" is an effective model for HIV prevention, care, and support in IDUs which provide harm reduction interventions (needle syringe programs and methadone maintenance treatment), sexually transmitted infection services, and care/support for people living with HIV/AIDS.⁸⁸ Additionally, establishment of behavioral disease counselling centers which provide services for HIV/AIDS prevention, STIs counselling and treatment, and harm reduction is another of care services in Iran.⁸⁷

Despite all efforts, lack of proper integration between HIV and sexual and reproductive health (SRH) policies and programs is the main challenge of improving quality and access to HIV services in Iran. The provision of SRH services is included in HIV/ AIDS programs while HIV/AIDS control strategies are not implemented in SRH programs.⁸⁷ Weakness in gender sensitive STIs/HIV/AIDS prevention policies forms the other challenge.⁸⁹

In terms of barriers, There is some difficulties to access people at risk for STIs and HIV (homosexuals, female sex workers, people who inject drugs, sexual minorities, homeless people, and youth) in health systems.^{87,89} In Iran, men who have sex with men (MSM) and sex workers are punished by law. Therefore, fear of revealing their sexual identity is a great obstacle for receiving education and care.⁸⁷ Despite young people form over one quarter of the Iranian population, they are excluded from STIs and HIV education and services due to stigma, shame or the fear of being judged, and lack of adolescent-

friendly services. Amongst this group, street children and young IDUs are further excluded and marginalized.^{87,90}

PART TWO

HIV status in Iran

Iran has a low national HIV prevalence of 0.14, but an increased prevalence among people who inject drugs, shifting the country from low prevalence to a concentrated prevalence. Besides, there is a rise in sexual transmission and new infections among women in recent years. The most important HIV transmission route in Iran is drug injection, followed by sexual contact. The transmission routes were reported from 20 March 2012 to 20 March 2013 include IDU, 45.5%, sexual transmission 36.8%, mother to child transmission 2.9%, unknown transmission mode 14.8%, and no new cases of transmission through blood transfusion.⁹¹

According to the UNAIDS report in 2014, the estimated number of people living with HIV in Iran was 74000 (51000 - 110000), although, based on the data of case registry system, 28663 people were infected with HIV until September 21st, 2014.^{91,92} Until this time, of total registered cases, 89.3% were men and 10.7% were women.⁹¹ The latest estimate showed that HIV prevalence rate in adults aged 15-49 years was 0.1-0.2%, and it remained constant from 2011 to 2014. The estimated number of women aged ≥ 15 , living with HIV, in Iran, was 93000 (6400-14000) in 2014.⁹² AIDS progress report of Iran showed that the estimated new high risk cases of HIV in 2014 were 4043 in IDUs, 2022 in sex workers, and 789 in MSM.⁹³ The United Nations General Assembly Special Session (UNGASS) country progress report in 2015 showed that 7.3% of the total people who needed antiretroviral therapy (ART) in Iran, received it. The people were comprised of 1516 females and 4069 males.⁹¹

HIV strategies in Iran

In 2001 for the first time, MoHME developed a five year strategic plan for the years 2002-2006. This plan with 11 strategies focused on partnership of governmental and non-governmental sectors to control HIV and AIDS in Iran. A monitoring and evaluation plan was not considered in this program. For the years 2007-2009, the 2nd strategic plan was arranged with 10 strategies and a program for monitoring and evaluation. From 2010 to 2014, the 3rd strategic plan was developed in 10 strategies with focus on prevention of sexual transmission of HIV.⁹³ The 4th strategic plan was developed for the years 2015-2019. Key populations in this plan are people who inject drugs, vulnerable women, and people living with HIV/AIDS, prisoners, working children with drug problems, HIV positive pregnant women, Amphetamine-type stimulants (ATS) users, and students with drug problems. Provision of services to working children and students with drug problems and HIV screening in the

general population with focus on most at risk population are important intervention areas which not covered in previous strategic plans in Iran.⁹⁴ Street children are one of the HIV high risk groups in Iran, without prevention program till now. A study in Tehran showed that HIV prevalence in the children was 4.6%.⁹⁵ It is estimated that 6400 students with drug problems will be new target population in the 4th strategic plan.⁹⁴ Additionally, this plan has identified pregnant women as a priority group for halting the vertical transmission of HIV.^{91,94}

During the implementation of aforementioned strategic plans, the establishment of voluntary counseling and testing (VCT) centers in most provinces and cities were very effective program in Iran. At this time, there are 160 VCT sites and 60 centers in prisons.⁹¹

Challenges in HIV surveillance system in Iran

One of the most important challenges in HIV surveillance system in Iran is the unequal access to services. The factors that contributed to it are including "stigma, discrimination, knowledge gaps on HIV and inadequate availability of free services". Besides, inconsistent adherence to care and treatment services in IDUs, finding appropriate locations for service delivery for vulnerable women, and "shortage of availability of adequate treatment services for psychoactive and Methamphetamine drugs" in Non-IDUs and lack of trained staff are additional challenges in this area.^{91,94}

Due to the most important route of HIV transmission in Iran, HIV positive men are more than women. Therefore, services were planned to respond to this group. Despite a shift in transmission route of the infection to sexual mode and increase of the number of HIV positive women, this plan and traditional barriers including economic and social dependency, maternal responsibilities, and financial constraints limit women's access to HIV facilities in Iran.⁹⁴

Difficulties in the access to most at risk populations are the other one of challenges in Iran. Although it has improved with establishment of drop in center (DIC) and services for vulnerable women, but there are some problems in access to the other at risk populations such as sex workers, MSM, working children with drug problem and ATS users.^{91,94}

Weak coordination in national programs among HIV/AIDS, drug abuse, and STIs and insufficient participation of private sector and non-governmental organizations in HIV/AIDS prevention and care are infrastructural challenges of HIV surveillance system in Iran.^{89,94,96}

Coverage of condom use is a concern in HIV prevention programs in Iran. Although the use of condom in sexual relationships represents one of the preventive strategies in the transmission of HIV, studies have shown that nearly

50% of women and men aged 15-49 years with multiple sexual partners did not use condoms during their last sexual intercourse. The indicator was reported 15% and 57% in IDUs and female sex workers, respectively.⁹⁷ Furthermore, the accessible evidence indicates protective behaviors based on condom use were low among at risk populations.⁹⁸ Additionally, “lack of perceived threat, absence of protective motivation, inadequate knowledge, perceived lack of control, negative attitudes towards condom, misperception, unsupportive environments, and cultural norms” have been identified as barriers to condom use among at risk women.⁹⁹ The situation could be a trigger for planning a better targeted education of high risk groups.

Finally, in terms of HIV treatment, despite the increased number of individuals who receive ART, there is a discordance between the growth coverage of treatment and need for ART. Several experts believe that this problem has occurred due to software overestimation in need of ART. This is because the AIDS-related mortality patterns from 2005 to 2011 showed no change or decrease of less than 25%, in the country.^{93,100}

CONCLUSION

It seems that the more improvement of HIV/AIDS prevention, care and treatment programs in Iran need to more attention toward controlling HIV/AIDS through sexual health, proper linkage among HIV/AIDS, STIs, and SRH programs, reduction of stigma and discrimination toward people living with HIV/AIDS, and increase to access at risk populations.

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