

Research Paper

Epidemiological Study of AIDS in Qom Province, Iran



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ABSTRACT

Background and Aim: Unfortunately, AIDS has high morbidity and mortality due to its easy transmission, secrecy, severe complications, and no definitive treatment. This study aimed to investigate the epidemiology of HIV in Qom Province, Iran.

Materials and Methods: This analytical cross-sectional study was performed on patients with AIDS referred to the Behavioral Diseases Counseling Clinic in Qom Province from its opening until the first half of 2019. Sampling was done by census and reviewing all registered files in this clinic. The inclusion criteria were completed files of all patients. However, records of patients who were incomplete or had other sexually transmitted diseases and neurological disorders were excluded from the study. After data collection, the files were entered in SPSS software, version 22.

Results: A total of 612 patients were studied in this study. The mean age of the patients was 36.63 ± 9.41 (\pm SD) years. Also, 523 patients were males (85.5%), and 89 were females (14.5%). The numbers (percentages) of single, divorced, and widows people were 217 (39.6%), 89 (16.2%), and 12 (2.2%), respectively. Most people (221 people, 42.5%) had primary education, and only 3 (0.6%) had a bachelor's degree. Most of them lived in urban areas (501, 97.9%) and were unemployed (323, 58.7%). Also, 403 (83.4%) had a history of addiction, 392 (95.7%) were injecting drug users, 345 (95%) had a history of injection among injecting drug users, 277 (66.1%) had extramarital sex, 245 (96.1%) had several sexual intercours, 26 (10.4%) used condom, and 18 patients (7.8%) had an infected child. The number of HIV-infected people in Qom until 2012 was about 477 people, which comprised 0.041% of the province's population (1151672 people the population of this province according to the 2011 census registered in the Statistics Center of Iran).

Conclusion: According to the study findings and the national statistics regarding the change of the primary method of transmission from injection to sex from 1997 to 2013 in Qom Province, we can conclude that Qom Province is also moving towards changing the main method of transmission from drug injection to sexual transmission.

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1. Introduction

AIDS is a global problem, and Iran is no exception. Unfortunately, AIDS is a disease with high morbidity and mortality due to easy transmission, the secrecy of the disease, severe complications, and lack of definitive treatment [1]. It is clear that prevention is the best way to reduce complications and mortality of such diseases. Therefore, the main strategy will be to know more about the ways of transmitting the disease and high-risk people. The prevalence of HIV among the general population in Iran is still low [2, 3] but has remained constant at 49.9% among injecting drug users [3].

Given that the prevalence of HIV in this group has exceeded 3%, Iran is classified as a concentrated epidemic region whose ignorance can result in widespread epidemics [4]. Unfortunately, it is difficult to investigate the disease because it is difficult to access the patient's information which is hidden from the patient or the community. Nevertheless, various studies have been conducted on this subject in different parts of Iran and the world. These studies have shown that the disease transmission routes to high-risk individuals differ in various areas. Thus, it is impossible to make a specific judgment or measure based on studies in other countries or regions. These issues highlight the need for detailed surveys in each region [5]. Measures taken over the past ten years have successfully reduced the progression of this epidemic among injecting drug users [6]. Because the shared injection equipment has not yet been eradicated, drug injections are still the most important factor in the HIV epidemic in Iran [7]. Therefore, maintaining and expanding prevention programs to reduce harm is important for this key group to reduce the transmission of new infections through drug injection.

In recent years, some evidence indicates the growing role of sexual transmission in spreading HIV in Iran [8]. The proportion of registered cases of sexually transmitted diseases is constantly growing, and the prevalence of HIV among female sex workers has reached 2.5%. Most female sex workers do not use condoms. Sexual activity is common among injecting drug users and is not normally protected [6]. In this regard, we can refer to the study of Dr Ismaili et al. conducted in Iran in 2012 [8]. This article reports that other modes of transmission, such as sexual transmission, play an essential role in this disease. This issue shows that we should not only focus on drug injection use, but we should consider and prevent other methods as well.

On the other hand, there is evidence of the prevalence of high-risk practices among young people, especially in relation to the use of amphetamine stimulants, which has increased alarmingly in recent years [9-11]. We must launch interventions to reduce the prevalence of high-risk sexual behaviors to control the HIV epidemic for all these reasons. The number of women living with HIV has increased in recent years. The increase in the number of pregnant women living with HIV has led to a corresponding increase in the number of births of HIV-infected babies [12]. Although the actual number of these babies is still small, the lack of effective PMTCT (prevention of mother-to-child transmission) programs could be problematic in the future and increase the prevalence. HIV transmission through contaminated blood or blood products has been eliminated [12], but the current control measures should be more potent than before with the latest equipment. Although this low rate has been ignored so far, the concentrated prevalence can be decreased in the general population with effective measures [13]. Unfortunately, no studies have been conducted and presented in this field in Qom, and this issue could lead to a higher prevalence of this disease in this city soon. In this study, we aimed to investigate the dangers of the HIV epidemic in Qom. We intend to use the results of special prevention methods in this city through the media, professors, and respected clerics who are the trustees of the people of Qom to educate and increase their awareness in this regard.

2. Materials and Methods

This analytical cross-sectional study was performed on patients with AIDS referred to the behavioral diseases counseling clinic in Qom Province from its opening until the first half of 2019 after obtaining the ethical code of permission and coordination with disease management in the university. Sampling was done by census and reviewing all registered files in this clinic. The inclusion criterion was the completed patient record. The exclusion criteria were incomplete patient records and having other sexually transmitted diseases or neurological disorders. After data collection, they were entered in SPSS software version 22. An independent t-test was performed to compare the quantitative variables and the Chi-square test for qualitative variables. Thus, absolute and relative frequencies were calculated for quantitative, central indices and dispersion, and qualitative variables.

3. Results

A total of 612 patients were studied in this study. The Mean±SD age of patients was 36.63±9.41 years. Also,

523 patients were males (85.5%), and 89 were females (14.5%). The numbers of single, divorced, and widows people were 217 (39.6%), 89 (16.2%), and 12 (2.2%), respectively. Most people had primary education (221, 42.5%), and only a few (3, 0.6%) had a bachelor's degree.

Most of them lived in urban areas (501, 97.9%) and were unemployed (323, 58.7%). Also, 403 (83.4%) had a history of addiction, 392 (95.7%) were injecting drug users, 345 (95%) had a history of injection among injecting drug users, 277 (66.1%) had extramarital sex, 245 (96.1%) had several sexual intercourses, 26 (10.4%) used condom, and 18 patients (7.8%) had an infected child.

The prevalence rates of hepatitis B and C among the studied patients were 6.4% (24 patients) and 70.1% (251 patients), respectively. Furthermore, other diseases were present in 30 patients (11.8%). The prevalence of AIDS was 64.2% (233 patients). The prevalence of gay men was 12.3% (75 patients). Influenza vaccination was performed in 323 patients (63.8%), and hepatitis vaccination in 325 patients (64.2%). Also, 414 people (80.9%) had a history of imprisonment. A history of TB was also present in 32 patients (6.2%). Further, 234 patients (46.2%) were receiving drug treatment. Finally, the mortality rate was 38% (161). The mean tests of the studied patients are given in [Table 1](#).

Regarding the patient's gender, the underlying factors of marital status, imprisonment status, addiction, injecting drug use, extramarital sex, multiple sexes, vaccination history, hepatitis vaccination history, TB infection, drug treatment, spouse infection, child infection, and death were found to be significantly different ([Table 2](#); $P < 0.001$).

4. Discussion

Until 2012, the number of HIV-infected people in Qom was 477, which comprised 0.041% of the province's population (1151672, according to the Iranian Center for Statistics). By comparison, 237 HIV-infected patients were registered in East Azerbaijan Province from 1987 to 2012 [14]. According to the population statistics of 2011 recorded in the Statistics Center of Iran, this rate was 0.006%. So, the number of patients in Qom Province is about 7 times that of East Azerbaijan Province—which seems to be a significant difference. In another study, the percentage of infected people in Kermanshah Province was 0.143% (2729 infected people out of 1935227 people in the province in that year), according to a conference speech on World AIDS Day in the 2009 seminar. This statistic is about 3.5 times that of Qom Province.

The overall rate in Iran is 0.033% according to the 2011 national statistics census related to HIV-infected patients until 2012, showing that the number of patients in Qom Province is about 1.5 times higher than national statistics. However, one cannot conclude that the prevalence of HIV infection in Qom is high or in East Azerbaijan is low because the difference may simply be due to better diagnosis and detection of HIV patients in Qom Province. However, this rate is high for the Qom Province.

In terms of gender comparison in this study, 85.5% of the patients were men, and 14.5% were women. This statistic was 91% males and 9% females in East Azerbaijan Province [14], 94.8% males and 5.2% females in Kermanshah Province, and 89.3% males and 10.7% females in national statistics [15]. In the United States, 79% of the patients were men, and 21% were women [16]. The higher rate of female infection in Qom Province compared to national statistics is worrying. In terms of age range, the most common infected age group in Qom Province is 35-44 years, followed by the age group of 25-34 years and the average age of patients is 36.6 years.

In the East Azerbaijan study, the average age of the patients was 31 years, and in the same study in Isfahan Province (mentioned above), the average age was 36.1 years. In the East Azerbaijan study, 71% of patients were 20-40 years old. Based on the national statistics, the highest prevalence is seen in the age group of 25-34 years and then in the 35-44 age group. A study in north-eastern Nigeria at Maiduguri Teaching Hospital, a referral center in several neighboring countries, found that the highest frequency of infection was in patients aged 30-39 years, followed by 20-29 years [18]. Our study shows that the infection in Qom Province has been less in adolescents and young people, while the statistics show the risk of this infection at a younger age group. Considering that the course of changes in Qom Province follows the course of changes at the national level with a few years' difference, if the proper measures are not taken for disease prevention, Qom Province will see a decrease in the age of infection in the next few years.

Regarding marital status, 35.6% of patients were single, 37.4% were married, 14.5% were divorced, and 2% were widows. In a similar study in East Azerbaijan, 54% of patients were single, 33% were married, and 13% had unknown relations [14]. In Kermanshah Province, more than 50% of patients are single. A significant number of patients in Azerbaijan and Kermanshah provinces were single, while in Qom, the number of single and married patients was equal. Of course, it is worth mentioning that

Table 1. Relationship between underlying factors of HIV patients based on patients' gender

Variables		No. (%)			P
		Male	Female	Total	
Marital status	Single	212(97.7)	5(2.3)	217(100)	<0.001
	Married	173(75.2)	57(24.8)	230(100)	
	Divorced	77(86.5)	12(13.5)	89(100)	
	Widow	2(16.7)	10(83.3)	12(100)	
Imprisonment status	Yes	404(97.6)	10(2.4)	414(100)	<0.001
	No	29(29.6)	69(70.4)	98(100)	
Addiction status	Yes	386(95.8)	17(4.2)	403(100)	<0.001
	No	21(26.3)	59(73.7)	80(100)	
Injecting drug status	Yes	374(97.9)	8(2.1)	382(100)	<0.001
	No	10(58.8)	7(41.2)	17(100)	
Extramarital sex	Yes	257(92.8)	20(7.2)	277(100)	<0.001
	No	88(62.0)	54(38.0)	142(100)	
Multiple sexual inter-courses	Yes	231(94.3)	14(5.7)	245(100)	<0.001
	No	5(50.0)	5(50.0)	10(100)	
Influenza vaccination	Yes	267(79.7)	68(20.3)	335(100)	=0.01
	No	166(90.7)	17(9.3)	183(100)	
Hepatitis vaccination	Yes	268(79.8)	67(20.2)	336(100)	=0.01
	No	165(91.2)	16(8.8)	181(100)	
	No	64(59.8)	43(40.2)	107(100)	
TB infection	Yes	31(96.9)	1(3.1)	32(100)	=0.035
	No	398(82.6)	84(17.4)	482(100)	
Pharmacological treatment	Yes	191(79.6)	49(20.4)	240(100)	=0.029
	No	236(86.8)	36(13.2)	272(100)	
Spouse infection	Yes	50(45.0)	61(55.0)	111(100)	<0.001
	No	38(95.0)	2(5.0)	40(100)	
Child infection	Yes	9(50.0)	9(50.0)	18(100)	=0.001
	No	46(59.7)	31(40.3)	77(100)	
Death	Yes	161(95.3)	8(4.7)	169(100)	<0.001
	No	195(74.7)	66(25.3)	261(100)	

Table 2. Laboratory test results of the studied patients

Variables	Frequency	Mean±SD	Min	Max
WBC	414	5911±3180	1500	55000
TLC	213	2077±963	14	8140
CD4	314	368±315	2	2060
PLT	400	190725±83009	8000	578000
Hb	403	13.5±2.24	4.4	19.7

WBC: white blood cell; TLC: total lymphocyte count; PLT: platelet; Hb: hemoglobin.

in Qom Province, most infected men were single (45%), and most infected women were married (67%).

Regarding education, 9.6% of the patients in Qom province were illiterate, 74.3% had primary and secondary education and high school, 1% had a university education, and 15% were unknown. In East Azerbaijan Province, 10% of patients were illiterate, 58% had primary, secondary, and high school education, 2% had a university education, and 30% had unknown education [14].

In terms of informing the partner in this center, only the patients' spouses were examined. In this study, out of 331 married, divorced, or widowed, 42% of them performed the partner awareness process, of which 67.7% of the patients were tested infected, and 32.4% of them were healthy. In comparison, 28.4% of the total spouses were positive, 13.6% were negative, and 58% were not tested (regardless of the test). In this regard, the spouse's awareness can be compared to the partner's awareness in a study conducted in Barcelona's two health care systems between January 2012 and June 2013. of 125 HIV-positive patients in the study, 108 (86.4%) agreed to provide information about their sexual partners. A total of 199 sexual partners were identified. HIV testing was performed on 58 partners (14.29%) (70.7%). Another 141 partners were tested, of which 26 were identified as infected with HIV. The pathogenesis effect of the program was 18.4% [19]. London reported 26% of partners who tested positive for HIV were infected after a partner information program in 2010 [19]. After conducting a sex information program for a partner in 2010, the HIV network in South Yorkshire [20] in England declared that 34% of the tested partners were infected [17]. This result was 34% in the northeast of England in 2011 [21]. At Trafford Manchester in 2011, the result was 25% [22].

In South Wales, the program was launched in 2008, with 25% of partners infected [23]. In this study, 12.3% of male patients reported having sex with a homosexual.

In a 2009 bio-behavioral survey of prisoners in Iran, 15.6% of men reported having sex with other men [24]. In another study conducted in October 2014 on 760 HIV-infected people across the United States, 49% were MSM (men who have sex with men) (66% of patients completed the partner awareness process, and 34% of participants did not complete the partner information report). Most of them were black men, MSM, had casual partners, and did not use condoms [25].

Comparing these studies, we can conclude that the amount of information in this study in Qom Province was 24% less than in the United States and about 44% less than in Barcelona. A study on sexual intercourse tracking and methods of informing the partner was conducted at the Infectious Diseases Clinic at Benfratelli Civic Hospital in Palermo in 2012 using an anonymous questionnaire filled out by 110 HIV-infected people. In this study, more than 90% of participants reported needing information. In the case of privacy protection during the information process and informing the partner that it is always more important than the risk of losing one's privacy, the answer was 81% [26]. This study shows that patients tend to report their status and risk of infection to their sexual partner, but the percentage of information in the Qom center is low and may need more guidance for patients because the method of informing may reduce the threat of relationship breakdown. Furthermore, this will cause more information. unfortunately, many patients tested in the center of Qom were infected. The reason is very important.

In pediatric testing, out of 231 patients with children in this study, 91 patients (40%) brought their children for testing, and among them, 10 patients with children (11%) were infected. Also, 60% of patients have not brought their children for testing. In a 2011 study of 39 infected parents in Guangzhou, China, 77% hid their illness from their children. They were afraid that their children might not understand the situation or create a

negative psychological burden on children. The others revealed the illness was due to emotional or financial, or other needs. They have done this with a sense of commitment to the child. A reliable study of the percentage of infected children of HIV-positive parents was not found, but perhaps in terms of informing the child, this article can be related to our study. In terms of informing the child, another study was conducted in the Infectious Diseases Department of Ibadan Teaching Hospital [25] in Nigeria from November 2008 to October 2009. The researchers examined 96 children aged 6-14 years infected with HIV, of whom only 13 (13.5%) were aware of their disease [27].

The study of patients with hepatitis B and C infection revealed that 6.4% were infected with hepatitis B virus and 70% with hepatitis C virus. In the East Azerbaijan study, the incidence of hepatitis B was 8%, and the incidence of hepatitis C was 45%. Co-infection with hepatitis B virus and HIV is common, with 70%-90% of HIV-infected people in the United States having evidence of past infection or active HBV infection [28, 29]. In contrast, in Asia and sub-Saharan Africa, vertical transmission and early childhood exposure are the most common modes of transmission, respectively, and the prevalence of HBV is higher among HIV-infected individuals (about 20%-30%) [30, 31]. Considering the presented percentage of concomitant hepatitis B infection in HIV patients in Qom Province, it seems lower than the global statistics. This low percentage may be due to the good vaccination coverage for these patients. Hepatitis C infection is common among people living with HIV. About 20% of people living with HIV worldwide have chronic co-infection with HCV [32]. The HCV prevalence varies from 50% to 90% in the United States and Europe [32].

The concurrence rate of HCV with HIV in patients in Qom Province is 70% and is seen only in patients who use drugs, equivalent to the average of this percentage in injecting drug users in Europe and the United States. Since the discovery of AIDS, tuberculosis (TB) and HIV have been closely linked. Globally, tuberculosis is the most common opportunistic infection in HIV-positive people [33] and the most common cause of death in AIDS patients [33]. HIV infection has contributed to a significant increase in the incidence of tuberculosis [34]. Globally, tuberculosis remains the most common cause of death in AIDS patients, killing 1 in 3 [33]. Approximately 33% of all people living with HIV are infected with tuberculosis, too (Between 12 and 15 million people). In parts of sub-Saharan Africa, up to 70% of patients have TB. It is estimated that up to 33% of all AIDS-related deaths

worldwide can be directly attributed to tuberculosis. This percentage increases to 50% in sub-Saharan Africa [35].

The World Health Organization reports that only 2.4% of all people living with HIV or AIDS are tested for TB. This low screening rate is shocking, given that tuberculosis is responsible for one-third of AIDS deaths [36]. At the Behavioral Diseases Counseling Center in Qom Province, 84% of patients were tested for tuberculosis infection, of whom 6.2% had a history of tuberculosis or active tuberculosis treatment. These percentages show that this clinic has done very well in the field of TB screening, and the rate of this infection in studied patients has been low compared to the global statistics. A study conducted at the Behavioral Diseases Counseling Center in Isfahan Province showed an 8% prevalence of tuberculosis among HIV patients in that center [37].

In terms of ways of transmission of infection, which was one of the most important goals of this study, the rates are as follows: injecting drug addiction alone, 23.3%; sex transmission, 5%; sex and injecting drug addiction together, 41.5%; mother-to-child, 1.8%; blood product injections, 6.2%; other methods, 5%; and unknown, 22.8%. In the East Azerbaijan Province study, the transmission methods were as follows: injecting drug use, 59%; injecting drug use and unprotected sex, 14%; unprotected sex, 11%; blood transfusion, 2.5%; mother-to-child, 0.8%; other methods, 0.9%; and unknown, 11%. In a study by Dr Jam [38] in Imam Khomeini Teaching Hospital in Tehran Province, Iran, in 2009, the following rates were reported: injected drugs use, 52.8%; unprotected sex, 6%; blood transfusion, 6.3%; mother-to-child, 1.1%; and other methods, 33.7%. The transmission methods based on the national statistics are as follows: injecting drug addiction, 67.2%; sexual transmission, 13.9%; blood products, 0.9%; mother-to-child, 1.3%; and unclear, 16.7%.

In our study, only 10.4% of people who had unprotected sex used condoms. Despite the increase in condom use over the past two decades, significant differences and gaps have remained. Reports of condom use during recent sexual intercourse with casual partners vary from 80% for men in Namibia [39] and Cambodia [27] to less than 40% for men and women in other countries. Similarly, among young people aged 15-24, condom use varies from more than 80% in some Latin American and European countries to less than 30% in some West African countries [40].

In our study, 95% of injecting drug users had a history of co-injection. Behavioral tracking data were taken in 2009

from 1712 injecting drug addicts in Manipur [28] and Nagaland [29] in northeastern India [41]. More than a quarter of injecting drug users shared needles or syringes. Furthermore, 40% had a casual sexual partner. Among those with casual sexual partners, 65% reported misusing condoms. Injecting drug users with shared syringes were more likely to have unprotected sex with their partners (spouse or girlfriend) (95% vs 87%). Also, 5498 mobile female sex workers were surveyed in a cross-sectional study in 22 districts of four southern Indian states [42]. Questionnaire questions assessed the ability of female sex workers to reject unprotected sexual clients, persuade clients who were reluctant to use condoms, and use condoms in a new location. Most female sex workers rated 60% of their ability to reject unprotected sex clients. However, less than one-fifth succeeded in convincing customers who did not want to use a condom or succeeded in using a condom in a new location. Younger and older female sex workers (compared to those in the middle age group) and those with more experience working with a source of income other than sex have a greater ability to reject unprotected sex, convincing clients who were reluctant to use condoms, and had to use condoms in new places.

Unfortunately, both the joint injection and the lack of condom use in our study are very high compared to other studies, and perhaps this issue affects the high rate of this disease in Qom Province. Regarding health care in the Behavioral Diseases Counseling Center in Qom Province, hepatitis B vaccination is given three times, and influenza vaccination is performed every October or November. Hepatitis B vaccination was performed in 67.4% of center seronegative patients, and influenza vaccination was performed in 63.8% of patients. A study conducted on the HIV-positive population of the Alsace HIV Center in France from 20 August 2000 to 15 September 2007 assessed the status of vaccinations against influenza, pneumococcus, tetanus, hepatitis A and B. Of 331 patients, 49% were asymptomatic, 29% symptomatic, 18% in the AIDS stage, and 4% were unknown. Also, 71 patients (21.4%) were vaccinated against influenza, 11 patients (3.3%) against pneumococcus, 34 patients against HAV, and 120 patients (36.2%) against HBV (only 16.3% had negative serological tests), and 186 patients against tetanus. The most common reasons for not being vaccinated were not consulting a doctor, expecting ineffectiveness, and fearing immunovirological complications. Finally, this article discusses the low level of vaccination coverage and the need to prescribe and explain its benefits to patients [43].

Comparing vaccination coverage shows both positive and negative points. Hepatitis B vaccination coverage in Qom Province is about 30% higher than in this study, and influenza vaccination is about 40% more,

which indicates a good coverage of hepatitis and influenza vaccination in this center. Unfortunately, pneumococcal and HAV vaccines, which are recommended for patients, are not prescribed. This issue is one of the shortcomings of health care in Qom Province. Besides, 64.2% of patients in Qom center have entered the clinical stage of AIDS, compared to 39.1% of patients in Imam Khomeini Hospital in Tehran. Regarding drug treatment, 46.2% of patients have received drug treatment. In comparison, in Dr Jam's study, 37.1% of patients at Imam Khomeini Hospital in Tehran have received antiretroviral drugs. According to the tests performed for patients, 38% of patients had anemia, 37.8% thrombocytopenia, and 11.8% leukopenia. In the Isfahan study, 71% of patients had anemia. In the Tehran study, 45% of patients were anemic [43].

5. Conclusion

History of imprisonment, unemployment, low level of education, and being single are important factors that lead people to addiction and sex outside the marriage. The use of common injecting tools and the non-use of condoms in sexual intercourse are the two leading causes of HIV infection. According to the mentioned studies and especially the national statistics regarding the change of the main method of HIV transfer from drug injection to sex, it can be concluded that the main method of HIV transmission has changed to sexual transmission in Qom Province from 1997 to 2013 too.

Ethical Considerations

Compliance with ethical guidelines

There were no ethical considerations to be considered in this research.

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Authors' contributions

All authors equally contributed to preparing this article

Conflict of interest

The authors declared no conflicts of interest.

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References

- [1] Guo W, Ming F, Dong Y, Zhang Q, Zhang X, Mo P, et al. A survey for COVID-19 among HIV/AIDS patients in two districts of Wuhan, China [Internet]. 2020. [Updated 2020 March 4]. Available from: <https://ssrn.com/abstract=3550029> [DOI:10.2139/ssrn.3550029]
- [2] Moradi G, Khoshravesh S, Hosseiny M. [Situation of linkage between sexual and reproductive health and HIV-related Policies in Islamic Republic of Iran - a rapid assessment in 2011-2 (Persian)]. *Int J Health Policy Manag.* 2015; 4(3):131-6. [DOI:10.15171/ijhpm.2015.30] [PMID] [PMCID]
- [3] Nasirian M, Doroudi F, Gooya MM, Sedaghat A, Haghdoost AA. [Modeling of human immunodeficiency virus modes of transmission in Iran (Persian)]. *J Res Health Sci.* 2012; 12(2):81-7. [PMID]
- [4] Shekholeslami NZ, Rezaeian M. [Rafsanjan AIDS clinic 1996-2005: Problems faced and solutions found (Persian)]. *East Mediterr Health J.* 2009; 15(4):1036-9. [PMID]
- [5] Emmanuel F, Salim M, Akhtar N, Arshad S, Reza TE. Second-generation surveillance for HIV/AIDS in Pakistan: Results from the 4th round of integrated behavior and biological survey 2011-2012. *Sex Transm Infect.* 2013; 89(Suppl 3):iii23-8. [DOI:10.1136/sextrans-2013-051161] [PMID] [PMCID]
- [6] Haghdoost AA, Mostafavi E, Mirzazadeh A, Navadeh S, Feiz-zadeh A, Fahimfar N, et al. [Modelling of HIV/AIDS in Iran up to 2014 (Persian)]. *J AIDS HIV Res.* 2011; 3(12):231-9. [Link]
- [7] Badakhshan A, Arab M, Rashidian A, Gholipour M, Mohebbi E, Zendehehdel K. [Systematic review of priority setting studies in health research in the Islamic Republic of Iran (Persian)]. *East Mediterr Health J.* 2018; 24(8):753-69. [DOI:10.26719/2018.24.8.753] [PMID]
- [8] Amin-Esmaili M, Rahimi-Movaghar A, Haghdoost AA, Mohraz M. [Evidence of HIV epidemics among non-injecting drug users in Iran: A systematic review (Persian)]. *Addiction.* 2012; 107(11):1929-38. [DOI:10.1111/j.1360-0443.2012.03926.x] [PMID]
- [9] Zarei E, Khabiri R, Tajvar M, Nosratnejad S. [Knowledge of and attitudes toward HIV/AIDS among Iranian women (Persian)]. *Epidemiol Health.* 2018; 40:e2018037. [DOI:10.4178/epih.e2018037] [PMID] [PMCID]
- [10] Aggarwal A, Panat SR. Knowledge, attitude, and behavior in managing patients with HIV/AIDS among a group of Indian dental students. *J Dent Educ.* 2013; 77(9):1209-17. [PMID]
- [11] Khalili M, Mirzazadeh A, Chegeni M, Abedi L, Rajaei L, Ardalan G, et al. Prevalence of high-risk sexual behavior among Iranian young people: A systematic review and meta-analysis. *Child Youth Serv Rev.* 2020; 119:105526. [DOI:10.1016/j.childyouth.2020.105526]
- [12] Biesma RG, Brugha R, Harmer A, Walsh A, Spicer N, Walt G. The effects of global health initiatives on country health systems: A review of the evidence from HIV/AIDS control. *Health Policy Plan.* 2009; 24(4):239-52. [DOI:10.1093/heapol/czp025] [PMID] [PMCID]
- [13] Wolfe D, Malinowska-Sempruch K. Illicit drug policies and the global HIV epidemic: Effects of UN and national government approaches. New York: IHRD; 2004. <https://www.opensocietyfoundations.org/uploads/1aaf4827e-44ec-pdff>
- [14] Haghgoo SM, Joula H, Mohammadzadeh R, Sabour S, Yousefi R, Ghahramani G, et al. Epidemiology of HIV/AIDS in the east Azerbaijan province, northwest of Iran. *Jundishapur J Microbiol.* 2015; 8(8):e19766. [DOI:10.5812/jjm.19766v2] [PMID] [PMCID]
- [15] Ainsworth M, Teokul W. Breaking the silence: Setting realistic priorities for AIDS control in less-developed countries. *Lancet.* 2000; 356(9223):55-60. [DOI:10.1016/S0140-6736(00)02440-5] [PMID]
- [16] Fauci A, Jameson JL, Kasper D, Hauser SL, Loscalzo J, Longo D. Harrison's principles of internal medicine. New York:McGraw Hill; 2018. [Link]
- [17] Bell R, Glinianaia SV, Tennant PWG, Bilous RW, Rankin J. Peri-conception hyperglycaemia and nephropathy are associated with risk of congenital anomaly in women with pre-existing diabetes: Apopulation-based cohort study. *Diabetologia.* 2012; 55(4):936-47. [DOI:10.1007/s00125-012-2455-y] [PMID]
- [18] Denué BA, Kida IM, Hammagabdo A, Dayar A, Sahabi MA. Prevalence of anemia and immunological markers in HIV-infected patients on highly active antiretroviral therapy in northeastern Nigeria. *Infect Dis (Auckl).* 2013; 6:25-33. [DOI:10.4137/IDRT.S10477] [PMID] [PMCID]
- [19] Garcia de Olalla P, Molas E, Barberà MJ, Martín S, Arelano E, Gosch M, et al. Effectiveness of a pilot partner notification program for new HIV cases in Barcelona, Spain. *PLoS One.* 2015; 10(4):e0121536. [DOI:10.1371/journal.pone.0121536] [PMID] [PMCID]
- [20] Tan PN, Chawla S, Ho CK, Bailey J, editors. Advances in knowledge discovery and data mining, part II. Paper presented at: 16th pacific-Asia conference, PAKDD. May 29-June 1 2012; Kuala Lumpur, Malaysia. [DOI:10.1007/978-3-642-30220-6]
- [21] Planning Commission Government of India. Twelfth five year plan (2012-2017): Economic sectors. Vol. II. New Delh: SAGE Publications India; 2013. [Link]
- [22] Rayment M, Curtis H, Carne C, McClean H, Bell G, Estcourt C, et al. Members of the British society for sexual health and HIV national audit group, and the British HIV association audit and standards subcommittee. An effective strategy to diagnose HIV infection: Findings from a national audit of HIV partner notification outcomes in sexual health and infectious disease clinics in the UK. *Sex Transm Infect.* 2017; 93(2):94-9. [DOI:10.1136/sextrans-2015-052532] [PMID]
- [23] Knapper CM, Roderick J, Smith J, Temple M, Birley HD. Investigation of an HIV transmission cluster centred in South Wales. *Sex Transm Infect.* 2008; 84(5):377-80. [DOI:10.1136/sti.2008.030536] [PMID]
- [24] Mehmandoost S, Khezri M, Mousavian G, Tavakoli F, Mehrabi F, Sharifi H, et al. Prevalence of HIV, hepatitis B virus, and hepatitis C virus among incarcerated people in Iran: A systematic review and meta-analysis. *Public Health.* 2022; 203:75-82. [DOI:10.1016/j.puhe.2021.11.020] [PMID]
- [25] Edelman EJ, Gordon KS, Hogben M, Crystal S, Bryant K, Justice AC, et al. VACS project team. Sexual partner notification of HIV infection among a National United States-based sample of HIV-infected men. *AIDS Behav.* 2014; 18(10):1898-903. [DOI:10.1007/s10461-014-0799-7] [PMID] [PMCID]
- [26] Dalle Nogare F, Di Lorenzo F, Sanfilippo A, Dalle Nogare ER, Arena N, Prestileo T. Contact tracing e partner notification in una coorte di pazienti con infezione da

- HIV. Uno studio prospettico condotto a Palermo nel 2012 [Contact tracing and partner notification among a cohort of HIV-1 infected patients. A prospective study carried out in Palermo in 2012]. *Recenti Prog Med.* 2014; 105(9):327-32. [DOI:10.1701/1606.17518] [PMID]
- [27] Brown BJ, Oladokun RE, Osinusi K, Ochigbo S, Ade-wole IF, Kanki P. Disclosure of HIV status to infected children in a Nigerian HIV care programme. *AIDS Care.* 2011; 23(9):1053-8. [DOI:10.1080/09540121.2011.554523] [PMID]
- [28] Rodríguez-Méndez ML, González-Quintela A, Aguilera A, Barrio E. Prevalence, patterns, and course of past hepatitis B virus infection in intravenous drug users with HIV-1 infection. *Am J Gastroenterol.* 2000; 95(5):1316-22. [DOI:10.1111/j.1572-0241.2000.01981.x] [PMID]
- [29] Scharschmidt BF, Held MJ, Hollander HH, Read AE, Lavine JE, Veerman G, et al. Hepatitis B in patients with HIV infection: Relationship to AIDS and patient survival. *Ann Intern Med.* 1992; 117(10):837-8. [DOI:10.7326/0003-4819-117-10-837] [PMID]
- [30] Hoffmann CJ, Thio CL. Clinical implications of HIV and hepatitis B co-infection in Asia and Africa. *Lancet Infect Dis.* 2007; 7(6):402-9. [DOI:10.1016/S1473-3099(07)70135-4] [PMID]
- [31] Uneke CJ, Ogbu O, Inyama PU, Anyanwu GI, Njoku MO, Idoko JH. Prevalence of hepatitis-B surface antigen among blood donors and human immunodeficiency virus-infected patients in Jos, Nigeria. *Mem Inst Oswaldo Cruz.* 2005; 100(1):13-6. [DOI:10.1590/s0074-02762005000100002] [PMID]
- [32] Soriano V, Vispo E, Labarga P, Medrano J, Barreiro P. Viral hepatitis and HIV co-infection. *Antiviral Res.* 2010; 85(1):303-15. [DOI:10.1016/j.antiviral.2009.10.021] [PMID]
- [33] Raviglione MC, Snider DE Jr, Kochi A. Global epidemiology of tuberculosis. Morbidity and mortality of a worldwide epidemic. *JAMA.* 1995; 273(3):220-6. [PMID]
- [34] Mann J, Tarantola DJM. AIDS in the world II: Global dimensions, social roots, and responses. New York: Oxford University Press; 1996. [DOI:10.7326/0003-4819-126-5-199703010-00026]
- [35] Tesfaye B, Alebel A, Gebrie A, Zegeye A, Tesema C, Kasie B. The twin epidemics: Prevalence of TB/HIV co-infection and its associated factors in Ethiopia; A systematic review and meta-analysis. *PLoS One.* 2018; 13(10):e0203986. [DOI:10.1371/journal.pone.0203986] [PMID] [PMCID]
- [36] World Health Organization. Guide to monitoring and evaluation for collaborative TB/HIV activities: 2015 revision. Geneva: World Health Organization; 2015. [Link]
- [37] Meidani M, Rezaei F, Maracy MR, Avijgan M, Tayeri K. Prevalence, severity, and related factors of anemia in HIV/AIDS patients. *J Res Med Sci.* 2012; 17(2):138-42. [PMID] [PMCID]
- [38] Jam S, Ramezani A, Sabzvari D, Moradmand-Badie B, Seyedalinaghi S, Jabbari H, et al. A cross-sectional study of anemia in human immunodeficiency virus-infected patients in Iran. *Arch Iran Med.* 2009; 12(2):145-50. [PMID]
- [39] Zhou Y, Zhang L, Li X, Kaljee L. Do Chinese parents with HIV tell their children the truth? A qualitative preliminary study of parental HIV disclosure in China. *Child Care Health Dev.* 2013; 39(6):816-24. [DOI:10.1111/j.1365-2214.2012.01394.x] [PMID]
- [40] Corsi DJ, Neuman M, Finlay JE, Subramanian SV. Demographic and health surveys: A profile. *Int J Epidemiol.* 2012; 41(6):1602-13. [DOI:10.1093/ije/dys184] [PMID]
- [41] Mishra RK, Ganju D, Ramesh S, Lalmuanpuui M, Biangtung L, Humtsoe C, et al. HIV risk behaviors of male injecting drug users and associated non-condom use with regular female sexual partners in north-east India. *Harm Reduct J.* 2014; 11:5. [DOI:10.1186/1477-7517-11-5] [PMID] [PMCID]
- [42] Bharat S, Mahapatra B, Roy S, Saggurti N. Are female sex workers able to negotiate condom use with male clients? The case of mobile FSWs in four high HIV prevalence states of India. *PLoS One.* 2013; 8(6):e68043. [DOI:10.1371/journal.pone.0068043] [PMID] [PMCID]
- [43] Mohseni-Zadeh M, Rey D, Batard ML, Beck Wirth G, Partisani ML, Lang JM, et al. [Insuffisance de couverture vaccinale d'une cohorte française de patients séropositifs VIH [Inadequate vaccination coverage in a French cohort of HIV positive patients] (French)]. *Med Mal Infect.* 2010; 40(12):683-90. [DOI:10.1016/j.medmal.2010.06.005] [PMID]

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