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Epidemiology and Trend of HIV/AIDs in Yazd, A Province in the Center of Iran, 2011-2017

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ABSTRACT

Introduction: The first case of HIV-infection in Iran was a hemophilic child who was infected by imported blood products in 1989. Since then, the HIV epidemic in Iran has undergone significant changes. This study investigated the time variations of the epidemiology of reported HIV/AIDS -infections during 2011-2017 in Yazd, Iran.

Methods: This analytical cross-sectional study was carried out using the data recorded in health centers of Yazd province from 2011 to 2017. The data were collected from the records of 98 patients using a researcher-made checklist. The rate of newly reported HIV/AIDS by gender per 100,000 people was calculated.

Results: Out of 98 reported HIV/AIDS cases, 56.1% were men, and 43.9% were women; 55.1% of cases were infected through sexual contact, 30.6% through the infected needle while injecting for drug use, 1.6% through mother-to-fetus transmission, 1.3% through tattooing, and 5.1% through the unspecified mechanism. During these years the rate of newly reported HIV/AIDS in Yazd was declining, and the predominant mode of HIV transmission was through sexual contact.

Conclusion: Although the rate of newly reported HIV/AIDS -infection in Yazd province has decreased, we believe that the primary mode of HIV transmission has shifted from drug injection to unsafe sex.

Keywords: HIV, Acquired Immunodeficiency Syndrome, Epidemiology, Iran, Yazd

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Introduction

HIV is an RNA retrovirus transmitted through blood and secretions (especially genital secretions). The virus propagates in immune cells and gradually eliminates the body's defensive strength [1].

It is estimated that in 2016, the number of people infected with HIV passed 36.7 million [2]. Sub-Saharan Africa and especially southern Africa have the highest global HIV burden (70.8%) [3].

The HIV epidemic in the Middle East and North Africa (MENA) region is concentrated primarily in high-risk populations, including IDUs, sex workers, and homosexual men [4].

UNAIDS has estimated that between 2001 and 2012, the number of new HIV cases in the MENA region grew by 52%, which is the highest rate in the world. In the same period, the rate of AIDS-related deaths in this region has more than doubled, while the corresponding global rate has declined by 16% [5, 6].

In 2016, the number of HIV cases in Iran reached 32670, of which 84% were male, and 16% were female [7]. However, it is estimated that the real number of HIV-infected people in Iran can be five times higher [8], which means that 75% of HIV-infected Iranian are not aware of their infection [9]. A recent analysis of the AIDS epidemic in Iran has shown a growing trend of HIV infection among sex workers and homosexual men [10]. Another research has shown that the distribution of HIV cases in Iran is shifting from IDUs towards the general population, which may be attributed to the increasing rate of premarital and extramarital sexual contact especially with sex workers [11]. These relatively rapid developments in the epidemiological characteristics of AIDS among Iranians highlight the necessity of providing the healthcare officials and planners with the latest information about the epidemiological developments of this disease in different populations to facilitate the planning and management of prevention and control measures. This information can be obtained through periodic studies to reexamine the patterns of HIV transmission and to identify the high-risk groups in different populations. This information may also assist the healthcare planners to evaluate the performance of adopted measures during different periods of time and determine which programs are best suited for available human resources, finances, facilities and to what extent they facilitate the achieving of ultimate goals and the resolution of targeted healthcare problems [12]. Therefore, the authors of this paper investigated the epidemiology of AIDS and trends of HIV infection between 2011 and 2017.

Methods

This analytical cross-sectional study investigated the epidemiology and trends of HIV/AIDS infection in Yazd, Iran between 2011 and 2017. The statistical population consisted of all HIV/AIDS infected individuals who were identified in Yazd during the period of interest and whose personal and epidemiological information was available in the provincial health center. HIV/AIDS cases were diagnosed by testing certain groups of individuals, including suspected seropo-sitives, risk-related contacts of seropositive persons, blood donors, and prisoners, staff members in certain occupations, voluntary testers, and intravenous drug users. Tests for diagnosis included an initial test, using ELISA, and a confirmatory test, using Western Blot. The required information including the age, gender, marital status, occupation, mode of HIV transmission, addiction status, and nationality of the HIV/AIDS patients identified during this period was extracted from the infectious disease unit of Yazd Health Center using a researcher-made checklist. The collected information was imported into and analyzed by SPSS version 20. The rate of newly reported HIV/AIDS by year and gender per 100,000 people was calculated. The denominator of the rate of newly reported HIV/AIDS was obtained using the yearly reports (statistical information) published by the Yazd health department. Age and gender information of Yazd province for the year 2016 was extracted from available reports, and the population of Yazd in 2017 was calculated mathematically (using arithmetic progression).

The time trends of HIV/AIDS between 2011 and 2017 were analyzed using Minitab version 18.

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Results

Table 1shows the frequency of HIV/AIDS cases regarding studied variables. According to this table, between 2011 and 2017, 98 new cases of HIV/ AIDS -infection were identified in Yazd. Of these, 55 cases (56.1%) were male with an average age of 37.78 years, and 43 cases (43.9%) were female with an average age of 34.30 years. The age groups with the highest incidence of new HIV/AIDS infection were 25-34 years (34.7%), 35-44 years (30.6%) and 45-54 years (18.4%) in that order. In the six-year period between 2011 and 2017, 55.1% of HIV/AIDS cases identified in Yazd had been infected through sexual contact, 30.6% through the infected needle while injecting the drug, 1.6% through mother-to-fetus transmission, 1.3% through tattooing, and 5.1% through the unspecified mechanism. The most prevalent HIV/AIDS-related infection among the identified patients was hepatitis C (27.8%).

Table 1. Frequency of HIV cases in Yazd province regarding studied variables

Variables		N (%)
Sex	Men	55(56.1)
	Women	43(43.9)
Age(years)	1-14	6(6.1)
	15-24	4(4.1)
	25-34	34(34.7)
	35-44	30(30.6)
	45-54	18(18.4)
	≥55	6(6.1)
Marital status	Never married	17(17.3)
	Married	64(65.3)
	Divorced	11(11.2)
	Widowed	6(6.1)
Job status	Education	
	Illiterate	16(16.3)
	Junior Middle School or less	48(49)
	Associate degree or less	31(31.6)
	Bachelor degree or higher	3(3.1)
	Unemployed	53(54.1)
	Employed	45(45.9)
	Residence	
	City	91(92.9)
	Village	7(7.1)
Nationality	Iranian	95(69.9)
	Afghan	3(3.1)
Consuming substances	Yes	22(22.4)
	No	76(77.6)
History of traveling abroad	Yes	3(3.1)
	No	95(96.9)
Transmission mode	drug addiction	30(30.6)
	Sexual contact	54(55.1)
	Mother to child	6(6.1)
	Tattoo	3(3.1)
	Unknown	5(5.1)
AIDS-related infections	Hepatitis C	27(27.8)
	Hepatitis B and C	2(2.1)
	Tuberculosis	4(4.1)
	Hepatitis C and Tuberculosis	4(4.1)

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Table 2 shows the distribution and the rate of newly reported HIV/AIDS cases during the studied period. This table shows a steady decline in the rate of newly reported HIV/AIDS among men from 2011 to 2017. Among women, however, the rate of newly reported has had a decreasing trend between 2011 and 2015, an increasing trend between 2015 and 2016, and again a decreasing trend between 2016 and 2017. These trends in the rate of newly reported HIV/AIDS cases are also portrayed in Figure 1.

Table 2. Newly reported cases of HIV/AIDS by gender in Yazd province (per 100,000 people)

Years	Men	Women	Total(n)	Rate in men	Rate in Women	Total
2011	11	8	19	2.11	1.62	1.87
2012	8	4	12	1.51	0.79	1.16
2013	8	3	11	1.59	0.63	1.12
2014	9	4	13	1.77	0.83	1.31
2015	9	4	13	1.72	0.81	1.28
2016	5	14	19	0.93	2.76	1.82
2017	5	6	11	0.92	1.16	1.04

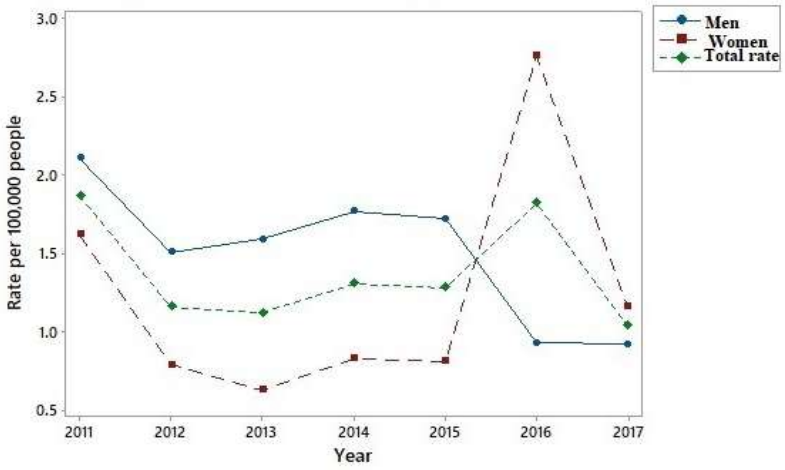

Figure 1. Time variation the rate of newly reported HIV/AIDS cases in Yazd province (2011-2017)

Figure 2 shows the trends of the mode of HIV transmission in Yazd province. According to this figure, between 2011 and 2017, HIV transmission through drug injection has decreased, and the cases of sexually transmitted HIV have increased.

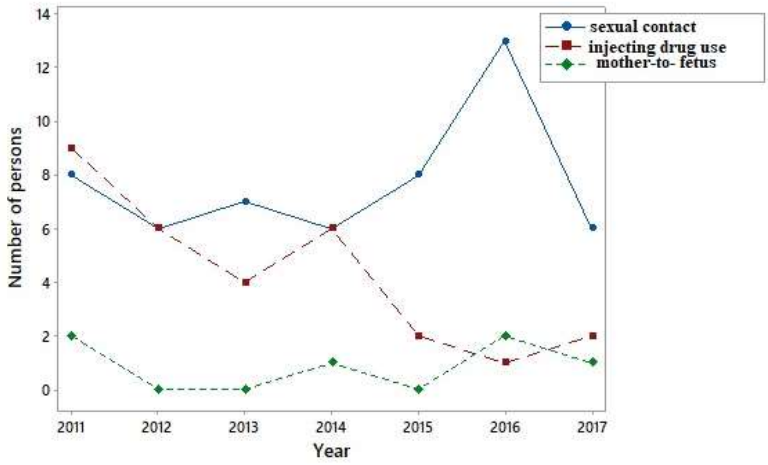

Figure 2. HIV transmission model in Yazd province (2011-2017)

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Table 3 shows the frequency of HIV/AIDS - infections through different transmission modes regarding studied variables. According to this table, between 2011 and 2017, 49.1% of HIV/AIDS cases in men were infected through a needle (drug injection), and 36.4% were infected through sex. Among women, the majority of HIV/AIDS cases (79.1%) were infected through sexual contact.

Table 3. Mode of HIV transmission in Yazd province regarding studied variables

Variables	Sexual contact	Drug Injection	Mother to child	Tattoo	Unknown
Sex					
Men	20(36.4)	27(49.1)	3(5.5)	3(5.5)	2(3.6)
Women	34(79.1)	3(7)	3(7)	_	3(7)
Age(years)					
1-14	_	_	6(100)	_	_
15-24	2(50)	1(25)	_	_	1(25)
25-34	25(73.5)	8(23.5)	_	_	1(2.9)
35-44	14(46.7)	13(43.3)	_	1(3.3)	2(6.7)
45-54	8(44.4)	7(38.9)	_	2(11.1)	1(5.6)
≥55	5(83.8)	1(16.7)	_	_	_
Marital status					
Never married	7(41.2)	4(23.5)	6(35.3)	_	_
Married	35(54.7)	21(32.8)	_	3(4.7)	5(7.8)
Divorced	8(72.7)	3(27.3)	_	_	_
Widowed	4(66.7)	2(33.3)	_	_	_
Education					
Illiterate	7(43.8)	4(25)	5(31.2)	_	_
Associate degree or less	44(55.7)	26(32.9)	1(1.3)	3(3.8)	5(6.3)
Bachelor degree or higher	3(100)	_	_	_	_
Consuming substances					
Yes	7(31.8)	13(59.1)	_	1(4.5)	1(4.5)
No	47(61.8)	17(22.4)*	6(7.9)	2(2.6)	4(5.3)
Job status					
Unemployed	28(52.8)	14(26.4)	6(11.3)	2(3.8)	3(5.7)
Employed	26(57.8)	16(35.6)	_	1(2.2)	2(4.4)

*This subjects were not addicted and sometimes amusingly injected the drug

Discussion

This study found a decreasing trend in the number of new male HIV/AIDS cases identified in Yazd between 2011 and 2017. Beside a short-term increase between 2015 and 2016, the number of new female HIV/AIDS cases in Yazd had a generally decreasing trend as well. This decreasing trend in the number of new HIV/AIDS cases can be due to several reasons. The first reason could be the increasing public awareness about HIV and its transmission modes and a healthier attitude toward AIDS.

Nevertheless, this awareness is still below global standards, and it is imperative to achieve further improvement with the help of more effective educational programs targeting broader groups of the population [13, 14]. Other important reasons behind the decreasing trend of new HIV incidence could be the increasing availability of addiction treatment clinics, improved training and treatment of IDUs, implementation of harm reduction programs (e.g., distribution of disposable needles), and improved availability of alternative therapies. Given the high rate of drug injection addiction in Iran, the continuation of the above programs and efforts seems essential for preserving the decreasing trend of HIV incidence among drug users [15, 16, 17].

Various studies have shown that drug injection (infected needle) is still the primary mode of HIV transmission in Iran. This can be due to Iran's position at the gateway of a major drug trafficking

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route from Afghanistan, and consequently high availability of drugs and relatively high number of drug addicts, which include more than 300,000 drug injection users [4, 18, 19]. However, with the increasing rate of IDUs covered by harm reduction programs, Iran experiences a sharp decreasing trend in the number of new AIDS cases. Recent evidence concerning the HIV epidemic in Iran shows a growing trend of HIV infection among sex workers and homosexual men, which is indicative of increased HIV transmission through sexual contact [10, 11]. Our investigation of the changes in the pattern of HIV transmission modes from 2011 to 2017 showed a gradual decrease in HIV transmission through the needle and a significantly higher rate of HIV infection through sex. This change in the pattern of HIV transmission in Yazd province is consistent with the results reported by Haghdoost et al. which showed a shift in the distribution of HIV cases from drug injection users towards the general population, probably because of the increasing rate of premarital and extramarital sexual contact especially with sex workers [11].

According to the latest HIV report, by the end of 2016, the predominant mode of HIV transmission among Iranian women was sexual contact (74%), but among Iranian men, it was drug injection (78%) [20]. In our study, too, 79.1% of female HIV cases were infected through sex. In men, however, although drug injection was still the most frequent mode of HIV transmission, there was a small difference between the number of infections through sex and infected needle (34.6% versus 49.1%). The gender ratio of HIV infection in Iran has also undergone some changes. In the first ten years since the first HIV incidence, only 2% of HIV cases were female, but between 2002 and 2012, this ratio has increased from 4% to 22%. In 2015, 70% of HIV cases were male, and 30% were female [21]. We also found that although the number of male HIV/AIDS cases identified In Yazd between 2011 and 2011 was still higher than the number of female cases, there was not as much difference between these numbers (56.1% versus 43.9%).

One of the factors that may have contributed to this increase in the number of HIV infections in women could be the sexual contact with addict males. It is estimated that every year, more than 1100 new cases of AIDS appear among IDUs' sexual partners, making them the second largest group of Iranians at risk of HIV infection [22]. The high prevalence of HIV among IDUs' sexual partners can be due to the dual risk of injection and unsafe sex. The suggested strategy for preventing this type of HIV transmission is a combination of training and counseling, periodic screening and tests, management of sexually transmitted infections, and providing condom for IDUs and their sexual partners.

The majority of the population in Yazd, and Iran as a whole consists of young people, whose marriage in older age makes them more susceptible to HIV infection through unsafe sex [11]. In our study, the highest frequency of HIV cases was observed in the age group of 25-45 years, among which sexual contact was the predominant mode of HIV transmission. The high rate of HIV/AIDS infections in this group is a warning sign indicating that further efforts should be made to raise public awareness about HIV infection, especially among young people, facilitate marriage and safe sex, and improve life skills concerning the aforementioned sociocultural issues. Regarding the marital status, the majority of reported HIV/AIDS cases were married, and the predominant mode of transmission among this group was sexual contact as well. The high incidence of HIV in married people could be due to two reasons: first, addict men infected through the needle can transmit the HIV to their sexual partners [23]. Second, men (especially married men) may become infected through sexual contact with sex workers and then transmit it to their future sexual partners. It is notable that research has also shown an increasing trend of sexual contact with sex workers before and after the marriage among Iranian youth [24]. Increasing incidence of HIV infection through sex and increasing prevalence of HIV infected women (especially pregnant women who ultimately give birth to an infected newborn) is a cause for concern

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and can be a sign of the third wave of HIV epidemic in Iran. Increasing rate of vertical and sexual transmission is expected to cause a shift of infection from high-risk groups to the general population and the innocent victims who do not exhibit high-risk behaviors, most notably the women who are infected by their husbands, or children who inherit the infection from their mothers [21].

Despite the observed decline in the rate of newly HIV/AIDS cases in recent years, one cannot completely rule out the possibility of an unexpected outbreak. Considering that HIV/AIDS cases identified in Yazd from 2011 to 2017 that were mostly sexually transmitted, to prevent HIV epidemic in the general population, healthcare authorities need to lay the legal, cultural, and social groundwork for the development of health services. The populations at risk of sexually transmitted HIV should be targeted in the same way that harm reduction programs target the drug injection users.

Conclusion

In conclusion, the findings suggest that in recent years, the rate of sexually transmitted HIV/AIDS infections has been steadily rising, and sexual contact is becoming the predominant mode of HIV transmission in Yazd in both men and women. Therefore, it is imperative to implement some interventions to reduce the incidence of high-risk sexual behaviors to control the HIV epidemic in this area.

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Conflict of interest

The author has no conflict of interest to declare.

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