HIV/AIDS epidemic features and trends in Saudi Arabia

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BACKGROUND: More than 60 million persons have been infected since AIDS was described in 1981. By the end of 2003, an estimated 40 million individuals were living with HIV globally. The surveillance of HIV/AIDS still faces challenges in Saudi Arabia. This study describes the pattern and characteristics of HIV/AIDS cases in Saudi Arabia.

METHODS: This descriptive analytic study describes the reported HIV/AIDS data for all notifiable cases during the period 1984 to 2003 in the Kingdom of Saudi Arabia. Case definitions based on ELISA and Western Blot tests were used. Age, sex and regional distribution were studied in addition to survival rates.

RESULTS: As of 2003, 1743 Saudi nationals and 6064 non-Saudi HIV cases were reported. Among Saudis, 872 were AIDS cases. Males accounted for 1329 HIV infections, comprising 77%, with a male-to-female ratio of about 3:1. Adults 15-49 years constituted 78% of cases, including 46% of cases infected through sexual activity, while 33% of reported HIV seropositive cases had already died. Most cases (67%) were registered in Jeddah, Riyadh and Dammam. Infection through blood transfusion declined with no reported cases since 2001.

CONCLUSION: The number of reported HIV infections in KSA has increased in the last few years. Using the coverage rate estimating method, the number of Saudi HIV infections since the emergence of the epidemic was estimated to be 2640 cases as of the beginning of the year 2004. The estimated number of HIV infections is almost one and one-half times the reported number, indicating that a problem of underreporting of HIV/AIDS cases still exists.

AIDS was described in June 1981 among homosexuals in the USA, and the virus HIV was isolated in 1983-1984.[1] Since the beginning of the epidemic, more than 60 million people have been infected with the virus.[2] At the end of 2003, an estimated 34 to 46 million individuals were living with HIV globally, about one third of them aged 15 to 24 years.[3]

In countries of the Middle East and North Africa, the visible trend is also towards an increasing number of cases. By the end of year 2003, the estimated total number of people living with HIV/AIDS was 600 000. The prevalence among adults aged 15 to 49 years was 0.2 to 0.4%.[3] Significant outbreaks of HIV infection have been noticed in groups of injecting drug users in some countries in the region in recent years.[3] The main modes of transmission among adults in the region are heterosexuality and intravenous drug use.

In Saudi Arabia, the first case of HIV was diagnosed in 1984. During the same year the National AIDS Control Program was established, which has adopted multisectoral and comprehensive strategies to combat the disease. Since then, information about HIV cases from different regions in the Kingdom began arriving at the Ministry of Health. However, the surveillance of HIV/AIDS still faces many challenges, including under-reporting and difficulty reaching high-risk groups. In addition, there is a lack of information about these high-risk groups, although the size of some of these groups, like intravenous drug users, seems to be non-negligible. Njoh and Zimmos described more than two thousand IV drug users admitted to one hospital in Jeddah between January 1995 and May 1996.[4] The

available data on reported cases gathered by routine surveillance does not reflect the actual situation. Moreover, no studies have explored the features of the epidemic in Saudi Arabia and those few excellent published papers are either restricted to subjects such as mode of transmission of HIV-1,[5] the epidmiology of *Pnemocystis carnii*,[6] or they describe the epidemiology of the disease in the early years of the epidemic.[7] This study is intended to define the pattern and characteristics of HIV/AIDS cases in Saudi Arabia, and the visible trend of the HIV epidemic in the Kingdom. Moreover, the study aimed to assess the actual extent of the epidemic through estimation of the total HIV infection.

Methods

This report is a descriptive overview of the data on HIV/AIDS cases collected by the AIDS control program at the Saudi Ministry of Health. Notification of HIV/AIDS cases has been mandatory since 1984. Cases are detected by testing certain groups of individuals, including suspected patients, risk-related contacts of seropositive persons, blood donors, prisoners, staff in certain occupations, newcomers to the country, voluntary testers and intravenous drug users. Tests for diagnosis include an initial test using ELISA and a confirmatory test using Western Blot. Confirmed positive cases are reported to regional health authorities and through regional AIDS coordinators to the National AIDS Program.

The variables studied included geographical distribution, age group, sex and reported mode of transmission. The same classification appearing in WHO UN AIDS annual reports utilized as global and regional data reference are used in this study. Survival following AIDS was calculated as the interval from the date of confirmed diagnosis using the Western Blot test to the date of death for patients who presented with symptoms and signs fulfilling the AIDS case definition. Since most untreated AIDS patients in developing countries die in 3 to 5 years,[8] survival rates at 1, 2, and 3 years following AIDS diagnosis were estimated using the Kaplan-Meier method. The HIV coverage rate technique was applied for estimating overall HIV infection. This HIV coverage rate is defined as the ratio of reported AIDS cases with prior report as HIV positive to the total number of reported AIDS cases. To obtain an estimate of all HIV infections, the reciprocal of this ratio was multiplied with the number of all reported infections.[9] Data were processed and analyzed using the Excel 2000, and SPSS 10 programs.

Results

The cumulative reported numbers of HIV among Saudi and non-Saudi residents of Saudi Arabia to the end of 2003 were 1743 and 6064, respectively. Figure 1 shows the annual reported HIV infections among Saudi citizens. Of 1743 HIV-infected Saudis, 872 were defined as AIDS cases according to the expanded WHO AIDS case definition for surveillance. Males accounted for 1329 HIV infections, comprising 77% of all reported cases, with a male-to-female ratio of about 3:1. Children under 15 years of age constituted about 9%, adults 15 to 49 years 78%, and adults over 49 years accounted for 13% of all HIV-infected Saudis. Young patients aged 15 to 24 years accounted to 237 individuals (14% of all cases). The trend of HIV infection among this young age group has been static for the last few years (Figure 1). Jeddah, Riyadh and Dammam were the main regions reporting cases, collectively reporting 67% of all cases, reaching 40%, 15% and 12% of cases, respectively (Figure 2).

Twenty-nine percent of HIV-infected Saudis denied any risky behavior and thus the source of infection is unknown. In the remaining cases, infection probably resulted from sexual activity in 46% of cases, blood transfusion in 17%, maternal-to-child transmission in 5%, intravenous drug use in 2% and organ transplant in 1%. Figure 3 shows that HIV transmission due to infected transfused blood has been declining since 1995, with no reported cases since 2001. The reverse is true for both sexual transmission and cases linked with intravenous drug use where the trend is much increased in the last few years. While suspected patients and contacts

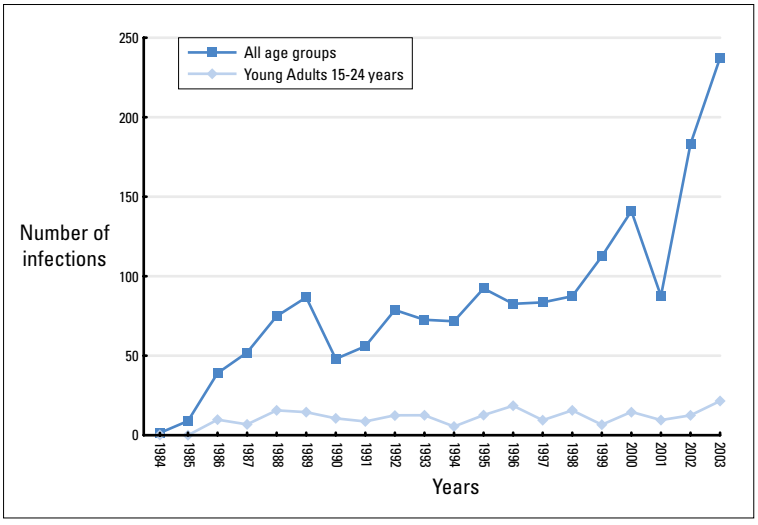

Figure 1. Reported cases of HIV/AIDS in Saudi Arabia (1984-2003).

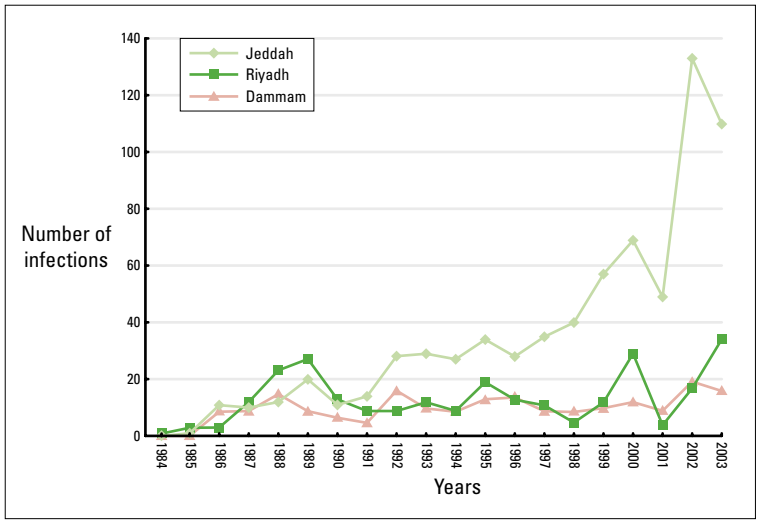

Figure 2. Reported cases of HIV/AIDS in major population centers (1984-2003).

Table 1. HIV cases by groups tested and reported to the national AIDS program.

Groups	Number of HIV cases	Percent of total HIV cases
Suspected patients	623	36
Contacts of patients	256	15
Blood donors	197	11
Hemophiliacs and patients with blood disorders	106	6
Post surgery	137	7
Prisoners	112	6
Drug users	69	5
Patients on dialysis	55	3
Job applicants	72	4
Tuberculosis patients	46	3
Routine medical check up	22	1
Voluntary testers	34	2
Pregnant women	11	0.5
Others	14	0.5
Total	**1743**	**100**

constituted 51% of reported HIV seropositive Saudi cases, screening of blood donors, hemophiliacs (and others with blood diseases), patients for surgery and pregnant women comprised 11%, 6%, 7% and 0.5%, respectively (Table 1).

About 33% of reported HIV seropositive Saudis were already dead, so the people living with HIV/AIDS at the beginning of 2004 were only 1165. Using the Kaplan-Meier method, the 3-year survival rate for those who were reported as AIDS patients from 1984 to 1995 was found to be 27%, while the 3-year survival rate for those reported as AIDS from 1997-2000 was 72%. The overall coverage rate of HIV reporting was 66%, so the estimated cumulative number of HIV-infected Saudis, including hidden cases until the end of the year 2003 could be about 2615 infections.

Discussion

Our study, the curve of the HIV epidemic showed an overall rise, but in a zigzag pattern with many peaks reflecting rises and falls during different periods. This can be explained, in part, by variation in detection and reporting through the years, and lack of regular surveillance among high-risk groups. The rising trend is clear in year 2002 and 2003, which is most probably due to better reporting in these years. This trend in the reported number of HIV infections over the years does not reflect the change in incidence, since it includes newly reported cases that include older adults. It also does not distinguish between people who acquired the virus recently and those who were infected many years ago. For that reason, HIV infections reported among adolescents and young adults in the age group 15 to 24 years are considered a more accurate monitor for new and recent HIV infections due to the expected short period of risky behavior for this age group. In our study, this age group constituted only 14% of all HIV infections, compared to 30% in sub-Saharan Africa. The trend of infection for this young group did not show any significant increase during the last decade (Figure 1).

Gender distribution and distribution by mode of transmission among HIV-infected Saudis revealed a unique pattern with a predominance of males over females , with a ratio of 3:1. This is different from other countries in the Middle East, which experience an equal gender distribution of infection, and is also contrary to sub-Saharan Africa, where women are more affected.[10] Male predominance is a characteristic of the "Pattern 2" epidemic, which is seen

in industrialized countries and Europe. Women accounted for only 18% of HIV infections in the United States in 1999[11] and 25% of HIV infections in Europe.[10] This was explained by homosexuality and drug use being the main mode of transmission in these countries.[12] In the USA, 60% of men were infected through homosexual relations and 25% through injecting drug use.[13] In Saudi Arabia, homosexuals and drug users were not of significant proportions among HIV cases.[5] Thus, a higher female prevalence of HIV infection might be expected in KSA since heterosexuality is the prevailing mode of sexual transmission. Our data might be explained by the large number of males who travel to other countries, especially to areas with a high prevalence of HIV infection. Travel and tourism enhance the probability of having casual sex, a fact that increases the risk of exposure to sexually transmitted infections.[14]

Adults 15- to 49-years old were found to constitute 78% of all cases, a fact that points to the serious social and economical impact of the disease. The study revealed disparities between regions in the number of reported HIV infections. Jeddah was found to be the main focus for infection (37% of cases), which could be due to life style factors such as high risk behaviors and the presence of illegal sex workers, in addition to the heavy population of that area.

Blood transfusion was incriminated as a risk factor for 17% of all HIV infections among Saudis, which differs from the 26% reported by Alrajhi and colleagues.[5] The difference could be due to the variation in location and numbers of patients in the two studies. The trend of mode of transmission by blood transfusion (Figure 3) shows that most of the cases infected through contaminated blood were registered before 1995. These patients most probably received blood unscreened for HIV in the 1980s before blood safety measures were undertaken. However, the incidence of this type of transmission significantly declined after implementation of blood safety policies.

Thirty-three percent of infected Saudis had died by 2003 compared with 30% worldwide.[3] This high percentage can be explained by the fact that most infections are detected among suspected patients and contacts (51%), who already have a bad prognosis, rather than asymptomatic HIV infection. However, the study showed that the 3-year survival rate of AIDS patients improved by more than 100%, from 27% in 1984-1995 to 72% in 1997-2000, which can be attributed to the introduction of highly active

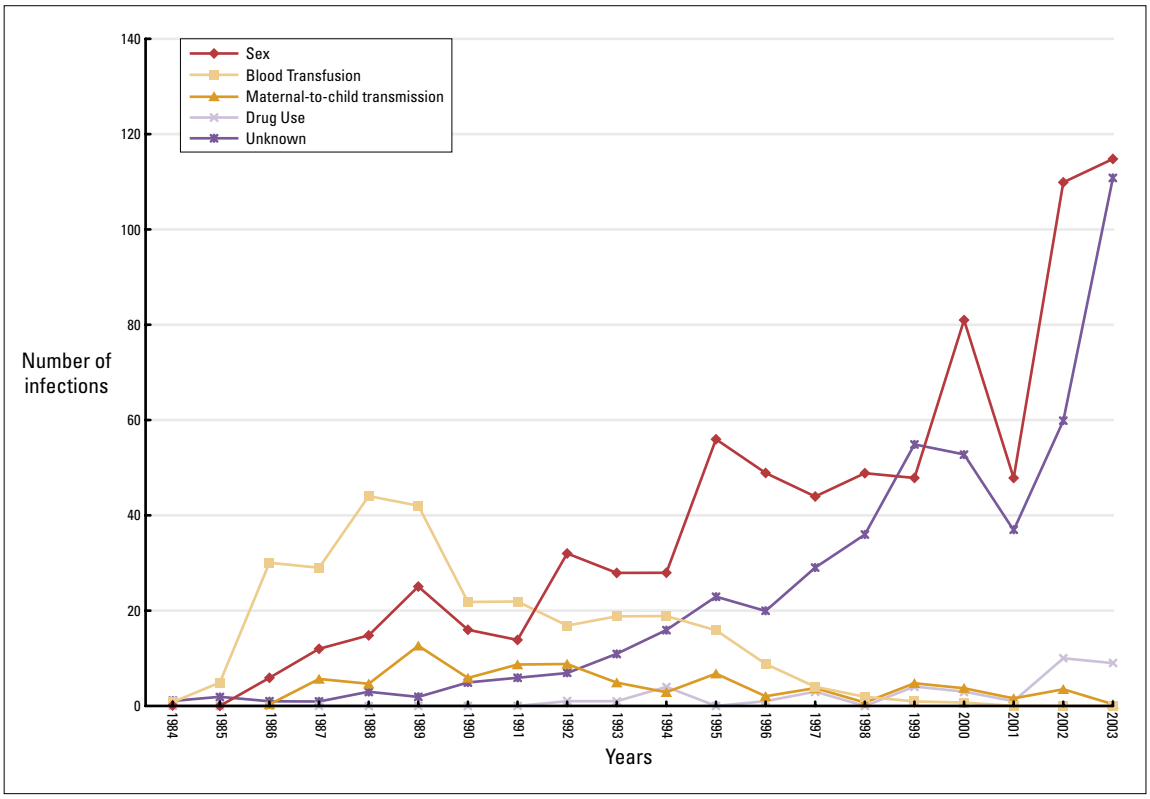

Figure 3. Mode of transmission of HIV infections in Saudi Arabia (1984-2003).

multiple antiretroviral therapy. A high survival rate with therapy has been demonstrated in many studies in other countries. A study conducted in the USA showed that the survival time improved from 11 months for cases diagnosed in 1984 to 46 months for those diagnosed in 1995.[15] By applying the coverage rate estimating method for cases reported to the end of the year 2003 it was found that the total Saudi HIV infections is about 2640 cases since the emergence of the epidemic (1984 through 2003). This estimated number of HIV infections is almost one and one-half the reported infections during this period, denoting that despite recent improvement, a problem of underreporting of HIV/AIDS cases still exists.

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