

THE ACQUIRED IMMUNODEFICIENCY SYNDROME IN SINGAPORE – EPIDEMIOLOGICAL PERSPECTIVES

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SYNOPSIS

The Acquired Immunodeficiency Syndrome (AIDS) is caused by a retrovirus, the Human Immunodeficiency Virus (HIV). As at 30 April 1988, there were 22 infected individuals in Singapore, of which 4 had AIDS. A comprehensive retrospective study was carried out to establish the clinico-epidemiological features of the disease and its transmission in Singapore.

The infected patients have been related mainly to sexual transmission through sexual contact (homosexual, bisexual or heterosexual) with men and women from countries where HIV infection is more prevalent. The majority of the infected were homosexual males in the age range 20-39 years. There was one case of transfusion-associated AIDS and another was infected through heterosexual transmission. The local pattern is consistent with the Western pattern (Pattern 1), with the notable absence of intravenous drug abusers, paediatric cases or infected haemophiliacs.

Key words: AIDS, Singapore, Epidemiology

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INTRODUCTION

The Acquired Immunodeficiency Syndrome (AIDS) was first recognised in the United States in 1981 (1). Since surveillance began in 1981, the number of reported AIDS cases has grown exponentially. As at March 1988, 85273 cases were reported worldwide (2). Three patterns of AIDS worldwide could be recognised (3). In the Western pattern, AIDS predominantly occurred in homosexual men and intravenous drug abusers. In the African pattern, bi-directional transmission due to frequent heterosexual contact among both male and female patients was found. The incidence of AIDS in Asia is low compared to that of the Western countries and Africa. Asia reported only 231 cases from 37 countries (3). The pattern is not clear but these cases had either been related to imported blood and blood products or to sexual transmission through contact with men or women from countries where AIDS was more prevalent (4).

AIDS was made a notifiable disease under the Infectious Diseases Act 1976 on 17 April 1985 in Singapore (5). Reporting of newly diagnosed cases is mandatory. Surveillance data on infected cases have been collected since May 1985. The first case of Human Immunodeficiency Virus (HIV) Infection was detected on 16 May 1985. As at 30 April 1988, 22 Singaporeans with HIV infection have been detected locally. Of these, 4 had clinical AIDS.

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METHODS

A retrospective study was carried out using data obtained from case records and interviewing patients where appropriate at the Communicable Disease Centre. The period under study was from 16 May 1985 to 30 April 1988.

Basic demographic information including date of birth, sex, ethnic origin, education and occupation was obtained using a standardized questionnaire.

Information was obtained regarding their specific sexual activities and practices (e.g. receptive anal intercourse), recreational drug use and travel patterns. Histories of specific sexually transmitted diseases, smoking practices and alcohol usage were recorded. Questions were asked about any history of sexual contact with someone who previously or subsequently had AIDS.

A total of 22 HIV infected patients were studied. Surveillance data was incomplete in the sense that one patient who had AIDS received treatment and died abroad and another who was infected had left Singapore.

RESULTS

Of the 22 patients, 4 had clinical AIDS, 5 had AIDS-Related Complex, and 13 were asymptomatic at the time of diagnosis. All four AIDS patients had died.

The majority of the infected were males (95.5%). There was only one female patient. A large proportion of these fell within the age groups of 20-29 years (50.0%) and 30-39 years (32.0%). The median age was 28 years. 14 (64.0%) of the patients were Chinese, 4 (18.0%) were Malays, 1 (4.5%) was Indian and 3 (13.5%) belonged to other races. The percentage of Chinese, Malay, and Indian patients more or less resemble that of the mid-1987 population of Singapore.

19 (86.0%) of the patients were single and never married. Of the 3 (14.0%) who were married, one couple was infected, but the spouse of the remainder was seronegative.

The majority of the patients received a Secondary education (45.5%). Four (18.0%) patients received tertiary

education and had degrees varying from law to hotel management. 13.5% of patients had no formal education. 82.0% of the patients were conversant in English. Only three were conversant in Chinese and one in Malay only.

36.0% of patients received a monthly income of between \$1000 – \$1999, and 27.0% of between \$1 – \$999. Three (14.0%) patients had a monthly income of more than \$3000. 14.0% of patients had no income.

OCCUPATIONAL GROUPS

Table 1
OCCUPATIONAL GROUP DISTRIBUTION OF THE SEROPOSITIVES

Occupational Groups (6)	No. of seropositives
Professional/Technical	3
Administrative/Managerial	3
Sales Workers	1
Service Workers	12
Production Workers	1
Unemployed	2
TOTAL	22

The majority of the patients were service workers (54.5%). They worked mainly in the catering and lodging services e.g. as waiters, hotel room stewards and airline stewards. Some were hairstylists and tour guides. Those in the category "Professional/Technical" and "Administrative/Managerial" included a lawyer, an engineer and an accountant. None of the patients worked in any occupation related to patient care or in a medical laboratory (Table 1).

HOUSING/LIVING ARRANGEMENTS

16 (73.0%) patients resided in HDB flats and the remainder in private apartments and houses. 59.0% of patients lived together with their parents and siblings. The couple who were infected resided with their children. Two homosexual (9.0%) patients stayed alone and another two (9.0%) had lovers (male companions) with them. The remainder had living arrangements with their friends and relatives.

TRAVEL HISTORY

All 22 patients had a history of travel abroad. 68.0% of patients had travelled to Western countries (United States, Europe, Australia), 9.0% to Africa, and 77.0% to Asian countries. Of the Asian countries, 41.0% visited Thailand or Malaysia, 9.0% the Philippines, and 14.0% Japan.

32.0% of patients required overseas travel because of employment and had visited several countries since 1981. 14.0% received their education in the United States (San Francisco and New York) and Canada. 14.0% travelled on business, and 36.0% went on holiday overseas.

73.0% of patients had histories of sexual exposures overseas when they travelled. These included contacts with female prostitutes and homosexual men in the countries of destination.

SEXUAL ORIENTATION

Table 2
SEXUAL ORIENTATION OF THE SEROPOSITIVES

Sexual Orientation	No. of seropositives
Heterosexual	4
Homosexual	13
Bisexual	4
Refuse to Disclose	1
TOTAL	22

The majority of the infected were homosexuals (59.0%). 18.0% were bisexuals with both male and female partners. These two groups account for 77.0% of the infected. The patients in these categories were all male, single and never married.

Four (18.0%) of the patients were heterosexuals. These included a married couple and another married man whose spouse was tested seronegative. The remainder was single and had died of AIDS. He claimed to be heterosexual with sexual contacts with female partners only.

One patient who was single and educated in the United States had refused to disclose his sexual activities or orientation (Table 2).

64.0% of patients were sexually active between 10-19 years old, 32.0% between 20-29 years old. The median age was 17 years. In all three groups (heterosexual, homosexual and bisexual) sexual activities of the patients started between 10-29 years old.

SEX PARTNERS

The majority of patients had casual sex partners (32.0%) or both casual and regular sex partners (32.0%). In the homosexual group, 46.0% had casual partners and 46.0% had both casual and regular partners. Only one homosexual had regular partners who were foreign expatriates in Singapore. In the heterosexual group, 50.0% of the patients had sexual contact with female prostitutes. 50.0% of the bisexuals had sex with female prostitutes.

50.0% of the patients had sex with both local and foreign partners, 27.5% had contact with foreign partners and 18.0% with local partners. In the homosexual group, 54.0% had sex with both local and foreign partners, 31.0% with foreign partners and 15.0% with local partners. 25.0% of the heterosexuals had sex with foreigners, 25.0% with both local and foreign partners, and the remainder with local partners.

The patients were also studied with regard to the race of their sex partners. 64.0% of patients had Chinese partners, 45.5% had American partners, 32.0% had European partners and 23.0% had Asian partners. Four (18.0%) had Malay partners, while one had sexual exposure with an African female prostitute. Of the 13 homosexuals, 69.0% had Chinese partners, 61.5% had American partners, 32.0% had European or Malay partners and 23.0% had Asian partners. Asian partners refer to natives of Japan, Taiwan, Hong Kong, Thailand, the Philippines, and Malaysia.

Only one patient who was a homosexual was engaged in part-time prostitution. His clients were mainly

male foreigners. He received between 1-5 clients per day and practiced both ano- and oro-receptive sex.

SEX PRACTICE

In the homosexual group, 77.0% practiced both ano- and oro-receptive and insertive sex. The remainder 23.0% were passive partners, practising ano- and oro-receptive sex. In the bisexual group, 75.0% practiced both ano- and oro-receptive and insertive and vaginal insertive sex, 25.0% practised ano- and oro- and vaginal insertive sex. Of the heterosexuals, 50.0% practised vaginal insertive, 25.0% vaginal receptive and 25.0% both vaginal and oro-insertive sex.

82.0% of the infected had sexual relations with male partners (including the female case). 32.0% of the male patients had sexual relations with female partners. Three patients had sex as well as close non-sexual contact with persons who were later discovered to have HIV infection.

VENEREAL DISEASE

82.0% of patients had no history of venereal disease. Two patients had a history of gonorrhoea and another two had syphilis previously.

BLOOD TRANSFUSIONS

Two patients received blood and packed cell transfusions. One of these patients received packed cell transfusion during an operation in the United States in 1981. He developed clinical AIDS in 1986. The other patient (homosexual) who had G6PD deficiency and drug-induced hemolysis received blood in 1980.

DRUG USE

Only two patients had a history of drug abuse. Both were homosexuals who had smoked marijuana. There was no history of intravenous drug abuse in all the infected.

OTHER FACTORS

73.0% of the patients consumed alcohol, and 55.0% smoked. 32.0% gave a history of tranquillizer and sleeping pill usage. None of the patients had acupuncture previously. One patient who was exclusively heterosexual had tattoo done in Amsterdam in 1981. None had received hemodialysis.

CLINICAL DATA

Four patients had clinical AIDS, five had AIDS-Related Complex (ARC) and thirteen were asymptomatic at the time of diagnosis.

The associated diseases and opportunistic infections encountered in the four AIDS patients were:

(1) HOMOSEXUALS

- (a) Kaposi's sarcoma
- (b) Disseminated mycobacterium tuberculosis
- (c) Pneumococcal pneumonia

(2) HETEROSEXUALS

- (a) Isospora belli infection
- (b) Klebsiella pneumonia

- (c) Pneumocystis carinii pneumonia
- (d) Malignant high grade immunoblastic lymphoma
- (d) Chronic lymphatic leukemia

The mean survival of the four AIDS patients after first diagnosis was 35.5 weeks. The longest survival was 84 weeks in the patient who had pneumocystis carinii pneumonia. The shortest was 2 weeks in a homosexual who had disseminated mycobacterium tuberculosis infection. The other two patients died within 28 weeks; one had Kaposi's sarcoma, while the other contracted the disease probably from infected blood received overseas.

The five male ARC patients all presented with persistent generalized lymphadenopathy. 80.0% of them had pyrexia of unknown origin prior to diagnosis. 60.0% had malaise and lethargy, 40.0% had oral candidiasis and 20.0% had weight loss of more than 10% body weight.

All patients had a positive Elisa or Particle-agglutination test for HIV infection. Confirmatory test was carried out using the Western Blot procedure. In an analysis of the Western Blot banding pattern, all patients showed a positive band at GP 41 and 95.5% showed reaction at GP 120/160. 82.0% of patients showed a positive reaction at P 24, the core protein of the virus, as well as at P 31.

HIV viral antigen assay by the EIA method showed that at the time of diagnosis, eight (36.0%) patients were reactive. Of these, three had clinical AIDS.

IMMUNOLOGY

Of the 22 patients, 2 patients did not have record of their T-lymphocyte subsets. 50.0% of patients had a T-helper (T4) cell count of less than 300 cells/mm³, and 59.0% had a T-suppressor (T8) cell count of less than 600 cells/mm³. The mean number of T4 cells was 366 cells/mm³, and T8 cells was 681 cells/mm³. 54.5% of patients had a T4/T8 ratio of between 0.5 - 1.0. 32.0% had a ratio less than 0.5. The mean levels of serum immunoglobulins were within normal limits.

SEROLOGY

One patient had a positive VDRL serology and two had Hepatitis B surface antigen.

OUTCOME

Four patients with AIDS had died, three in Singapore and one in Paris. One patient had left Singapore, and the remaining are on out-patient follow-up.

CONCLUSION

The study presented an opportunity to review the pattern of HIV infection in Singapore. The infected cases have been related mainly to sexual transmission through sexual contact (homosexual, bisexual or heterosexual) with men and women from countries where AIDS is more prevalent. One patient had probable transfusion-associated AIDS, and his spouse was infected by heterosexual transmission.

The majority (59.0%) of the infected were homosexual males in the age range 20-39 years. They had multiple sex partners who were mainly foreigners, and 77.0% practised both ano- and oro-receptive and insertive sex. All were single, never married and travelled extensively. They were employed mainly in the service industry, such as in restaurants, hotels, airlines and tour agencies. A few were professionals or held managerial positions. This local pattern is consistent with the Western pattern with the notable absence of intravenous drug abusers,

paediatric cases or infected haemophiliacs (7).

82.0% of the infected were conversant in English, and this probably enabled them to interact and communicate with ease with their foreign sexual partners, and to travel extensively to multiple countries where AIDS is more prevalent. All patients had a history of travel and 73.0% had sexual exposures with partners in the countries of destination.

In 1986, visitor arrivals to Singapore reached a record of 3.19 million, of which Asia and ASEAN countries generated 64.0% of the total arrivals (8). 77.0% of the HIV infected in the study had a travel history to Asian countries. Although Asia had reported only 231 AIDS cases (3), low compared with the Western countries and Africa, the high flow of visitor traffic between Singapore and Asia and vice versa could have an impact on virus transmission. This is coupled by the fact that people from countries where AIDS is prevalent will continue to visit Singapore. In terms of arrival growth, Europe recorded the highest increase to 16.3%, the Americas registered 7.3% and Oceania 12.2% (8).

With the baseline information obtained in this study, further evaluation into risk factors would be carried out using a case-control model.

The AIDS era is upon us. In the absence of a vaccine or curative treatment, education and dissemination of information on how to avoid AIDS remain the key factors in controlling its spread. Such programme should be directed at the community and particularly at establishments in the service industry. Individuals who are sexually promiscuous, homosexuals and bisexuals have to change their way of life and their sexual norms to avoid infection. This "social vaccine" is perhaps the answer.

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