

HIV TRANSMISSION IN SEXUAL PARTNERS OF PERSONS WITH HIV/AIDS ATTENDING THE INFECTIOUS DISEASES HOSPITAL, YANGON

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Abstract. A study was conducted in the Infectious Diseases Hospital, Yangon, for one year from August 1996 to 1997, to assess the extent and the factors related to HIV transmission among sexual partners of HIV/AIDS cases. It was a cross-sectional comparative study on 67 (61 males, 6 females) HIV positive individuals with or without AIDS, and their sexual partners. Separate interviews of index cases and partners were done, and clinical examination and laboratory tests for HIV and sexually transmitted diseases (STDs) were performed. HIV transmission was found in 41.8% of the partners. Male-to-female transmission was 39.3% (n=61) and female to male transmission was 66.7% (n=6). Seven and one half percent of the partners were suffering from AIDS. There were 4 (6.6%) pregnant mothers and 1 (25%) was HIV positive. Though 75% of the partners did not use condoms during their married life, HIV transmission was significantly reduced in the condom users (odds ratio (OR) = 0.18, 95% confidence interval (CI) 0.02- 0.98 p = < 0.05). The seropositive men who were less than 30 years of age had greater HIV transmission (OR = 5.67, 95% CI 1.13-36.46). However, socio-demographic factors, number of marital partners and age of first sex partners, duration of marriage, number of sexual relationships between these couples, duration of HIV positivity and AIDS infection, immunological status of the index group and STD positivity among partners had no significant association with the transmission of HIV. This study demonstrated that the transmission of HIV was high among the sexual partners of persons with HIV infection. It also highlighted the requirement of effective counseling and preventive measures against HIV infection among the couples.

INTRODUCTION

HIV/AIDS impose a major threat to both developed and developing countries of the world. In the world today, it is estimated that 26.8 million adults and over 2.5 million children have been infected by HIV. By the turn of the century, a total of 30 to 40 million will have been infected globally with HIV, of which nearly one-fourth will be in Asia (Anonymous, 1997).

Acquired immuno-deficiency syndrome (AIDS) was first identified as a disease that appeared to be transmitted by a sexual route. In the global context 70-80% of the HIV infection is transmitted via sexual contact (Berger, 1991). According to SEARO (Anonymous, 1997), three-fourths of all HIV infections today are due to heterosexual transmission. The heterosexual route is the major mode of transmission in the WHO South-East Asian Region. The presence of free infectious virus and/or virus infected cells have been shown in 10 to 30% of seminal and vaginal fluid specimens (Anderson *et al*, 1992; Wofsy *et al*, 1986).

The impact of HIV infection goes far beyond HIV positive individuals. It has implications for their

sexual partners and family members including future children (Carlos, 1994). HIV transmission to sexual partners of HIV positive hemophiliacs is between 10-20% (Jason *et al*, 1986; Lawrence *et al*, 1989). In Central Africa, male to female HIV-I transmission is 38% (Belec *et al*, 1989). In Brazil, HIV infection among female partners of seropositive men is 45% (Guimaraes *et al*, 1995). In Uganda, HIV infection through normal heterosexual contact is 71% (Sewankambo *et al*, 1987).

Though HIV transmission among sexual partners is high, there have not been many studies in Myanmar. This study was launched to scrutinize the role of sexual transmission in the spread of HIV infection in Myanmar, so as to help in future preventive measures of AIDS among couples having the HIV infection.

MATERIALS AND METHODS

It was a cross-sectional comparative study conducted for one year from August 1996, involving both sexes aged between 15 and 60 years, HIV positive with or without signs and symptoms of AIDS, consecutively attending the Infectious Disease Hos-

pital, Yangon. Those having sexual partners (spouses) for more than four months were included. HIV positive cases without sexual partners or those who refused to volunteer for the study were not included.

If one of a couple was HIV positive, he/she became the index case. However, if both of them were HIV positive, the one having signs and symptoms of AIDS (WHO, 1986) and/or having risk factors (intravenous drug users/ sexual promiscuity/ blood transfusion) and/or having lower CD4 count was selected as the index case.

Those giving consent were counseled and interviewed separately by using a pretested standardized proforma by a single interviewer. The clinical examination to diagnose sexually transmitted diseases (STDs) was done on both partners by a physician.

Swabs of discharge from penis (if present) or vagina were taken and smears tested for *Neisseria gonorrhoea*, *Trichomonas vaginalis*, *Gardnerella vaginalis* and *Candida albicans*. Venous blood was taken under aseptic conditions and sera were stored at -20° C until tested. The sera were screened for HIV positivity within two weeks of collection using HIV ELISA test according to manufacturer's instruction (Wellcozyme HIV 1 and 2, Murex Diagnostic Limited, England).

The positive sera were further confirmed by the Department of Medical Research Western blot method (Enzyme-linked immunoelectrotransfer blot technic for human T-lymphotropic virus type III / lymphadenopathy-associated virus antibodies) (Kay Thi Aye *et al*, 1997). Venereal Diseases Research Laboratory test using cardiolipin antigen (VD03 from Murex Diagnostics Limited) was applied to serum.

A *Treponema pallidum* hemagglutination test using erythrocytes sensitized with pathogenic *Treponema pallidum* extracts (Fujirebio Inc: Japan) were applied to sera of sexual partners of HIV positive persons.

The Coulter Manual CD4 Count Kit was used for CD4 counts. 210 fields were counted for each case.

A sample of discharge was obtained from the posterior fornix with a cotton-tipped swab in female partners and in male partners, a cotton wool swab was passed approximately 1-2 cm into the urethra.

Wet-mount microscopy (saline) was done for *Trichomonas vaginalis* and *Gardnerella vaginalis*, wet-mount microscopy (10% KOH) was done for

Candida albicans and Gram stained smear was done for the *Neisseria gonorrhoea* according to the Reference Manual for Laboratory Workers, Diagnosis of STDs (National AIDS Control Organization, New Delhi, 1994).

Data analysis and data management

Coded and open-ended data obtained from the study were cleaned and entered into Epi info version 6 software. After checking the range and consistency, prevalence of HIV infection among partners and odds ratios were calculated.

RESULTS

There were 67 index cases (61 males and 6 females) and their married partners in the study. There was only one partner for each index case. Out of the 67 HIV positive index cases, 62 cases were suffering from AIDS.

Characteristics of index cases

The mean age of index cases was 33.6 years ranging from 23 to 50 years and of partners was 30.8 years ranging from 18 to 48 years (Table 1). The literacy rate of the index cases and partners were 100% and 93.3% respectively.

Among index cases, 8.3% were dependants, 28.3% of the index cases were merchants, 23.4% were government servants, 20% were drivers/conductors, 11.7% worked abroad and 8.3% were manual laborers. Among the partners, 65% were dependants, 23.3% were merchants, 8.3% were government servants and 3.4% were manual laborers.

Median monthly family income was 7,500 kyats. Duration of marriage ranged from 4 months to 26 years with the median of 7 years. Two or more marriages were higher in the male group. Among the index cases 85% were married once, 13.3% were married twice and 7% had three marriages. Among the partners 93.3% had a single marriage and 6.7% were married twice.

Median age at first sex for both index and partner group was 20 years, the youngest age at first sex for both groups was 15 years, with a range from 15 to 37 years. Thirty-five percent of the partners and 25% of the index group practiced sex before 19 years.

Fifty-five percent of the male index cases had a history of intravenous drug use (IDU) but there was no history of intravenous drug use among female partners. Two out of 6 male partners were IDUs; they also gave a history of needle sharing

Table 1
 Characteristics of male index cases and their female sexual partners (n=60).

Characteristics	Index cases	Partners
Age in years		
Range	23 - 50	18 - 48
Mean	33.6	30.8
Literacy rate	100%	93.3%
Dependency rate	8.3%	65%
Occupation		
Merchants	28.3%	23.3%
Government employees	23.4%	8.3%
Drivers/conductors	20%	0
Worked abroad	11.7%	0
Manual laborers	8.3%	3.4%
Marital status		
Married once	85%	93.3%
twice	13.3%	6.7%
thrice	1.7%	0
Age at first sex		
Range	15 - 37	15 - 36
Before 19 years	35%	25%
Risk factors situation status (n=61)		
History of IDUs	55%	0
History of premarital and/or extramarital sex	61.6%	1.7%
History of blood transfusion	13.3%	18%
Condom knowledge		
Don't know	6.7%	25%
Know	93.3%	75%
Usage of condom		
(a) Never	66.7%	75%
(b) Sometimes/rarely	25%	21.7%
(c) Always	8.3%	3.3%

but they were HIV negative. (The wives of these two IDUs suffering from AIDS gave a history of sexual promiscuity and they were classified as index cases).

A history of premarital and extramarital sex was present in 61.6% (37/60) of male index cases, 16.7% (1/6) of the female index group, 1.7% (1/60) of female partners and 33.3% (2/6) of male partners. It showed that the proportion of premarital and extramarital sex in the male index cases and female partners (61.6% and 1.7% respectively) was higher than reported by Aung Htun *et al* (1991) who reported that 12% of currently married males and 1% of females had premarital and extramarital sex.

13.3% of male index cases and 18% of female partners had a history of blood transfusion.

Twenty-five percent of the partners of HIV posi-

tive cases had never heard about the condom. Among the partners who had knowledge about condoms, only 25% used condoms and only 3.3% were regular users. Among condom users, 13.3% of the partners were HIV positive whereas among non-users 46.7% were HIV infected (Table 3).

History of STDs (passing of pus discharge per urethra and/or soreness or chancre or warts or herpes/vesicles on the private parts and/or painful lymphadenitis in the groin and/or abnormal white discharge per vagina in females) was present in 27 out of 60 male index cases and 30 out of 60 female partners. Signs of STDs were found in 1 out of 60 male index cases. Among the 50 female partners, VDRL was reactive in 7%, TPHA was positive in 14%, *Trichomonas vaginalis* was detected in 4% and *Gardnerella vaginalis* was found in 3.3% of 30 female partners.

Table 2
Seroprevalence of HIV infection among female sexual partners.

Characteristics of sexual partners	Male to female		Female to male	
	(n)	%	(n)	%
1. No risk factors	49	40.8	0	0
2. History of premarital or extramarital sex	1	100	4	50
3. History of IDU	0	0	0	0
4. History of blood transfusion	11	27.3	2	100
Total	61 *	39.3	6	66.7

NB * = included 5 AIDS cases, 4 pregnant mothers (one pregnant mother was HIV positive).

HIV infection among sexual partners

Overall HIV transmission was found in 41.8% of the partners. Male to female transmission was 39.3% and female to male transmission was 66.7%. 7.5% of them were suffering from AIDS. Among the sexual partners who had no risk factors, male to female HIV transmission is 40.8%. There were 4 (6.6%) pregnant mothers and 1 was HIV positive (Table 2).

Factors influencing the HIV transmission from male index cases

The younger males with age less than 30 years had 5.67 times higher risk of HIV transmission to their sexual partners than the older age group ($p < 0.05$) (Table 3). HIV transmission was also found to be higher among the couples married for less than 10 years. HIV transmission was higher in those who had 3 or more sexual contacts per month. The transmission was also higher among the group who were away from home (frequently or sometimes) for less than 12 months than those who did not. HIV transmission was higher among couples who did not abstain from sexual relations since acquiring HIV positivity. HIV transmission was higher among female partners whose husbands had a history of STDs. There was no association between HIV transmission and the laboratory results of STDs among partners.

The odds ratio for condom usage during married life was < 1 , *ie* condom usage had a preventive effect on HIV transmission. Couples who used condoms had an 82% less risk of getting HIV infection than those who did not use condoms.

However, socio-demographic factors, number of marital partners, age of first sex of the partners, duration of marriage, number of sexual relationships between these couples, duration of HIV positivity

and AIDS infection and immunological status (CD4 counts) of the index group had no influence on transmission.

DISCUSSION

There was no difficulty among the 39 discordant pairs to determine whether the person was an index or a partner, *ie* who was the first infected person. In 27 concordant pairs, we selected the person with a history of risk factors (*eg* IDUs, promiscuity, blood transfusion, or who developed AIDS first) as an index case. In one concordant pair, both the husband and wife had AIDS signs and symptoms as well as a history of high-risk behavior. In that case CD4 counts were done on both as indicators and the person with the lower CD4 count was taken as the index case.

In this study, 62 out of 67 index cases were suffering from AIDS. The mean duration of AIDS signs and symptoms was 158.1 days and the mean duration of the date of HIV detection up to the time of study was 113.9 days. Among 82% of 61 AIDS cases HIV infection was detected only after they had been suffering from AIDS for a certain duration.

HIV was detected in only 4 cases (6.6%) prior to development of AIDS. The delay in detection of HIV infection was due to lack of knowledge among the cases and inaccessibility of laboratory diagnosis. Among 28 male index cases, the CD4 count ranged from 0 to 525 and the mean was 13.96. This may be the cause of higher transmission rate in this study group.

In a study by O'Brien *et al* (1994) male recipients with advanced immunodeficiency at enrolment were more likely to have infected their female

Table 3
Percentage distribution of HIV(+) and HIV(-) cases among female sexual partners.

Characteristics of the male index	HIV status of female partners		Odds ratio	95%CI
	HIV(+)	HIV(-)		
Age(years)				
< 30	33.3	8.1	5.67	1.13-36.46*
≥ 30	<u>66.7</u>	<u>91.9</u>		
	100%	100%		
Duration of marriage(years)				
≤ 10	82.6	67.6	0.44	0.09-1.78
> 10	<u>17.4</u>	<u>32.4</u>		
	100%(23)	100%(37)		
No of sexual contacts per month				
≥ 3	26.1	32.5	1.36	0.37-5.07
> 3	<u>73.9</u>	<u>67.5</u>		
	100%(23)	100%(37)		
Longest duration away from home (months)				
1-12	87.5	50	7	0.98-78.36*
≥ 13	<u>12.5</u>	<u>50</u>		
	100%(16)	100%(16)		
Abstinence from sexual relation since HIV positive				
Yes	78.3	82.9	1.34	0.28-6.15
No	<u>21.7</u>	<u>17.1</u>		
	100%(23)	100%(35)		
History of STD				
Yes	56.5	32.4	2.71	0.82-9.18
No	<u>43.5</u>	<u>67.6</u>		
	100%(23)	100%(37)		
Condom usage				
Yes	8.7	35.1	0.18	0.02-0.98*
No	<u>91.3</u>	<u>64.9</u>		
	100%(23)	100%(37)		

NB: *= p-value < 0.05

partners than men with neither condition. Kimura *et al* (1993) showed the rate of transmission of HIV in symptomatic men was significantly higher than that in asymptomatic men and the rate in men with CD4 counts fewer than 100 cells/ml was also significantly higher than that in men with higher CD4 counts.

In this study, among the 61 male index cases, 22 cases with a history of sexual promiscuity had 45.5% of their partners HIV positive, whereas 20 IDUs had 25% of their partners infected with HIV, while 11 male index cases with both a history of sexual promiscuity as well as IDUs had 54.5% of their partners infected.

All the male partners of the female index group who were suffering from signs and symptoms of AIDS had a history of risk factors. The female to male HIV transmission rate was 66.7% in this group. According to Nicolosi *et al* (1994), one of the highest risks for women to men HIV transmission is the

presence of acquired immune deficiency syndrome (AIDS) or a CD4+ lymphocyte count of $\leq 400 \text{ mm}^3$ in female index cases.

In this study, the male to female transmission rate of HIV was 39.3% (24/61) which was similar to that of a study by Guimaraes *et al* (1995) who showed a transmission rate 45%. There were only 6 female index cases in this study and the female to male transmission rate was 66.7%. Among two pairs of cases, the females had previous blood transfusions as well as their partners who were IDUs and HIV positive. According to our criteria for determining the index case, we could not definitely assume who was the index case in these pairs.

In this study, the age range of the index group was 23-50 years whereas the partners were 18-48 years. The youngest HIV positive partner was 18 years old.

The age at first sex was young in both groups, that is, 35% of the female partners and 31.7% of

the male index group practiced sex before 19 years. The youngest age at first sex was similar in both groups that is, 15 years.

Among these couples, 47 couples had abstained from sex with their partners after they knew that they were HIV infected whereas 12 couples were still practicing. Among these 12 couples, 8 never used condoms, 2 sometimes used condoms (25% to 75% of the sexual contacts), 1 rarely used (< 25% of the sexual contacts) and 1 always used condoms. Of those couples who never used condoms, 5 of the partners had HIV transmission. The reason for not using condoms in one pair was that both partners were already infected. Three index cases, although they knew that they had HIV infection and had been counseled, they did not inform their partners and they deliberately continued sexual relations with their partners without using condoms.

Among female partners, HIV transmission was higher in the younger age group (< 30 years), *ie*, 47% compared to 30% in the older age group (odds ratio 1.84). The rate of transmission was not significantly different among the lower education group (40%) and the higher education group (36%). It was also higher in the high risk occupation group than in the low risk one.

There were 43 children in 27 concordant paired group and 74 children in discordant paired group. Out of 4 pregnant mothers in the partner group, one had HIV infection.

This study showed that a substantial amount of HIV transmission occurred among sexual partners. Overall HIV transmission was 41.8%, male to female transmission being 40.8% and female to male transmission being 66.7%, showing sexual contact is one of the efficient modes of HIV transmission.

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