

Original Research Article

A clinico-epidemiological study of HIV seroconcordant and serodiscordant couples

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ABSTRACT

Background: The aim of the present study was to assess the epidemiological and risk factors that are likely to influence HIV transmission among married couples and to study the pattern of sexually transmitted infections among both concordant and discordant HIV infected couples..

Methods: This cross-sectional study was done on 100 HIV patients and their married partners attending to Institute of Venereology, Madras Medical College, Tamil Nadu. Detailed history of their high risk sexual behaviour, previous venereal diseases (PVDs) was noted and physical and genital examination was done. All the partners of HIV cases were examined for HIV to know the serostatus (seroconcordant and serodiscordant).

Results: Among the 100 married couples, 65 couples were seroconcordant for HIV and 35 couples were serodiscordant. Of them, 94 males and 71 females were positive for HIV. History of PVDs was found in 34 patients (28 were seroconcordants and 6 were serodiscordants). The most common STD in the males noticed was ano-genital warts (n=11) and genital ulceration (n=11) is associated with maximum seroconcordance rates. Whereas in the females it was bacterial vaginosis (n=11).

Conclusions: The findings suggest that risk factors such as STDs, PVDs in males, anal intercourse, sexual contact during menstruation, avoidance of condom during sexual act and lack of circumcision was significantly associated with presence of HIV concordance in the study population. Duration and frequency of sexual contact with partner, previous venereal diseases in females and ART were found not to influence the transmission of HIV.

Keywords: HIV, Seroconcordant, Serodiscordant, Risk factors

INTRODUCTION

The HIV epidemic of India kindles a keen interest in the epidemiological aspect of the disease. India accounts for about half of Asia's HIV prevalence and houses the 3rd largest number of people living with HIV/AIDS.¹ Although HIV prevalence is high among sex workers and drug users, clients of sex workers play a major role in India's HIV epidemics and form the largest infected population group in our country. As per the 2010 report of the Joint United Nations Program on HIV/AIDS

(UNAIDS), more than 90 percent of infected women have acquired the virus from their husbands or intimate partners.¹ In most cases, the increased risk for the women arises not only due to their own sexual behaviour but because their partners being an intravenous drug users (IDU) or them having sexual contact with sexual workers.² The factors that are likely to influence HIV transmission among married couples are poorly studied and need to be clearly established and the present study tries to focus on this area.

Based on the serostatus, the couples can be classified to seroconcordant (both partner are on same HIV status either they are HIV positive or negative) and serodiscordant (couple in which one partner is HIV positive other is HIV negative, having different serostatus).³ HIV negative individuals in discordant partnerships are more prone to acquire HIV and preventive interventions for such individuals are highly needed.⁴

The present study was carried out to assess the prevalence, epidemiology and risk factors associated with HIV transmission among couples participated in the study and relating the findings with their serostatus and to study the pattern of sexually transmitted infections among both concordant and discordant HIV infected couples.

METHODS

This cross sectional study was conducted during the period from June 2010 to December 2011 on 100 HIV patients and their married partners attending Institute of Venereology, Madras Medical College, Tamil Nadu were randomly selected for the study. HIV infected individual who is not willing to disclose their personal history or not willing to bring their partner and high risk group such as commercial sex workers, transgenders were excluded from the study.

All the selected HIV seropositive index case and their partners were interviewed at outpatient department in privacy and in confidential manner. A structural questionnaire was administered to the patient after getting signed consent. The questionnaire included questions related to demographic characters, sexual behaviours and history of previous sexually transmitted infections. In sexual history, the patients were asked about homosexual, bisexual behaviour, sexual practice, premarital, extramarital contact and condom usage. The history of presenting complaints, past STIs' and their treatment were recorded.

The clinical staging of HIV seropositive index cases were done after medical examination, based on World Health Organization (WHO) clinical staging of HIV. Physical and genital examination was done to find out any genital or extra genital evidence of STI's. The STIs' in these patients were diagnosed with clinical findings and relevant lab investigations. Investigations for endocervical swab for gonococcal culture were done on all female patients. Blood samples were collected for performance of the serological tests, which includes HIV Rapid Method (strategies 3) and VDRL if positive confirmed by Treponema Pallidum Hemagglutination (TPHA). The results of HIV were given only after post-test counselling.

Statistical analysis

Data collected were analysed using Chi-square, the statistical significance was considered if $p < 0.05$.

RESULTS

A total of 100 HIV seropositive individuals and their married partners were examined in this study. Among the 100 married couples 65 couples were seroconcordant for HIV (both husband and wife were HIV positive) whereas 35 couples were serodiscordant for HIV (either husband or wife is HIV positive) (Figure 1). Among 100 couples, 94 males and 71 females were positive for HIV (Figure 2).

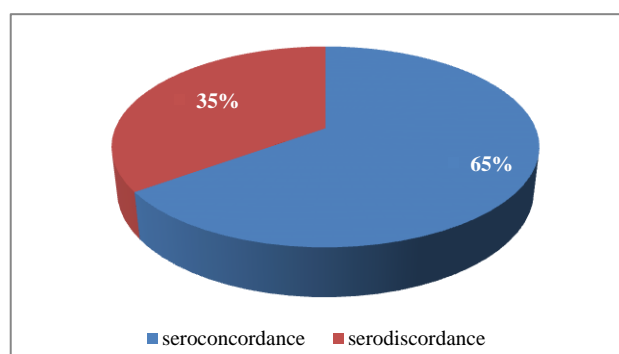


Figure 1: Serostatus of the couples.

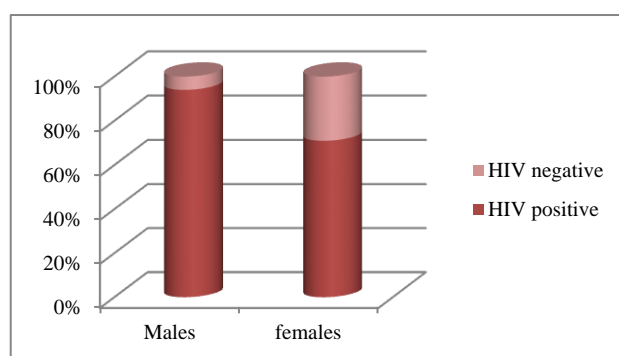


Figure 2: HIV positivity in males and females.

Table 1 presents the socio-demographic characteristics of the couple. Patients of the age group 36-45 years were more affected in both sexes. Most of the couples were from urban areas (68%). Majority of the males had an educational status which lies between 6th to 12th standard whereas majority of the females were illiterate. Majority of the couples (67%) had a monthly income in the range of Rs. 2000 to 5000. About 33% of the couples had a low income of about Rs 2000 or below. A larger proportion of the males (84%) had high risk sexual behaviours both before and after marriage with the commercial sex workers. 9% of them had history of contact with homosexuals. Only 6% of the females had history of sexual contact with person other than their married partner. In this study 90% of the couples had a heterosexual orientation while 8% were bisexual. Two of the couples denied high risk behaviour and had history of blood transfusion. The reasons for HIV screening were tabulated in Table 2. Among the index cases 92 were males and 8 were females (Table 2).

Table 1: Socio-demographic characteristics of the study participants.

Variables	Total number of males	Total number of females	Percentage (%)
Age group (in years)			
18-25	1	14	7.5
26-35	29	37	33
36-45	45	39	42
46-55	19	10	14.5
56-65	6	0	3
Area of residence			
Urban	68	68	68
Rural	32	32	32
Educational status			
Illiterate	16	41	28.5
<5 th std	24	18	21
5 th -12 th std	56	38	47
Graduate	4	3	3.5
Monthly income (in Rs.)^a			
<2000			33
2000-5000			67
High risk sexual behaviours*(sexual contact other than married partner)			
Commercial sex workers (CSW)	84	0	42
Homosexuals	9	0	4.5
Known person	7	6	6.5
Denies history	8	94	51
Possible routes of HIV acquisition in index cases			
H/O blood transfusion	2	-	2
Bi sexual	8	-	8
Heterosexual	82	8	90

*Multiple responses, ^ajoint monthly income of couple.

Table 2: Reason for HIV testing in index cases.

Reason for HIV testing in index cases	Males	Females
High risk behaviour	10	Nil
Presence of STI	18	2
Antenatal screening	Nil	2
Referred from other departments	64	4
Total	92	8

Table 3 presents the risk factors in relation to the HIV seroconcordance and serodiscordance of the couples. The proportion of couples who were seroconcordant increased with the increase in their years together they spent after marriage but the proportion was statistically insignificant. Number of sexual contacts of study couples with their partners per week was not significant statistically in relation to the prevalence of HIV. The HIV staging was done according to the WHO classification. Stages 1 and 2

were considered together as early and stage 3 and 4 as late. And their comparison with serostatus data was statistically significant ($p < 0.05$).

Table 3: Risk factors in relation to the HIV seroconcordance and serodiscordance of the couples.

	Frequency (n=100)	Outcome	
		Discordance (n=35)	Concordance (n=65)
		N (%)	N (%)
Duration of marital contact (years)			
<5	19	9 (47.4)	10 (52.6)
5 to 10	31	11 (35.5)	20 (64.5)
11 to 15	22	8 (36.4)	14 (63.6)
>15	28	7 (25.0)	21 (75.0)
Sexual contacts per week			
≤1	12	9 (75.0)	3 (25.0)
2 to 3	75	24 (32.0)	51 (68.0)
≥4	13	2 (15.4)	11 (84.6)
HIV stage grouping			
Early (1+2)	71	32 (54.9)	39 (45.1)
Late (3+4)	29	3 (10.3)	26 (89.7)
Patients under ART			
No	88	29 (33.7)	57 (66.3)
Yes	12	6 (50)	6 (50)
Condom usage			
No	77	17 (22.1)	60 (77.9)
Yes	23	18 (78.3)	5 (21.7)
Role of circumcision			
No	93	29 (31.2)	64 (68.8)
Yes	7	6 (85.7)	1 (14.3)
Practise of anal sex			
No	65	34 (56.7)	26 (43.3)
Yes	35	1 (2.5)	39 (97.5)
Sex during menstruation			
Yes	38	1 (2.6)	37 (97.4)
No	62	34 (54.8)	28 (45.2)

As shown in Table 3, among all the 100 couples only 12 were under ART, while two of the couples were defaulters. Of the 12 couples who were under the treatment 6 were seroconcordant and 6 were serodiscordant. Most of the study population (77%) have never used condom during their sexual acts. 23% of the couples used condom occasionally whereas 3% were unaware about the usefulness of condom and their difference with serostatus was significant statistically ($p < 0.05$). In this study, 7 males had undergone circumcision whereas the rest of the population (93) had not been circumcised. Of the 7 males with circumcision 1 was seroconcordant and 6 were serodiscordant ($p < 0.05$). All the patients in the study denied having oral sex with their partners. Anal sex was practiced by about 35 couples of the study population whereas 65 of the couples denied the anal sexual practise. Out of those who practiced anal sex 5 were serodiscordant and the

remaining 30 were seroconcordant ($p < 0.05$). Out of 100 couples, 38 couples had a history of having sex during the menstrual phase of their female partner among which

37 of them were seroconcordant and 1 was serodiscordant ($p < 0.05$).

Table 4: Prevalence of PVDs among study population.

PVDs	HIV seroconcordance	HIV serodiscordance	Males	Females	Total
Genital ulceration	17	2	16	3	19
Urethritis	5	1	6	0	6
Balanoposthitis	3	2	5	0	5
Vaginal discharge	3	1	0	4	8
Total	28	6	27	7	34

Table 5: STIs distribution among study couples.

STIs	HIV seroconcordance	HIV serodiscordance	Males	Females	Total
VDRL reactivity	12	4	9	7	16
Herpes genitalis	7	0	5	2	7
Ano-genital wart	9	3	11	1	12
Non-specific genital ulceration	11	1	8	4	11
Non-specific urethritis	7	2	9	0	8
Candidal balanoposthitis	5	2	7	0	6
Vulvovaginal candidiasis	7	2	0	9	9
Bacterial vaginosis	11	3	0	14	14
Trichomonas vaginalis	6	1	0	7	7
Cervicitis	8	1	0	9	9
Bartholin's abscess	0	1	0	1	1
Total*	82	21	49	54	100

*Multiple responses.

Analysis of the presence of previous history of venereal disease (PVDs) and their relation to the HIV serostatus of the couples were presented in Table 4. Among the study population, previous history of venereal disease (PVDs) was found in 34 patients. Of them, 28 were seroconcordants and 6 were serodiscordants. Among 34 cases, 27 were males and 7 were females.

Relation of sexually transmitted disease and HIV serostatus of the couples were given in Table 5. In the study population, the most common STD in the males was ano-genital warts ($n=11$) and genital ulceration ($n=11$) is associated with maximum seroconcordance rates. Whereas in the females it was bacterial vaginosis ($n=11$).

DISCUSSION

A hundred HIV patients and their married partners attending Institute of Venereology, Madras Medical College were randomly recruited for the present study.

In this study, 65% of the couples were HIV positive seroconcordance and 35% of the couples were HIV serodiscordant which was similar to study conducted in Baroda (72.4% were seroconcordance while 27.6% were serodiscordant).⁴ This shows the increase in transmission of HIV infection through intimate sexual relationships. Majority of the index cases are males, therefore females

are vulnerable to new infections. So, prevention measures should be targeted towards these population groups.

The mean age of males and females in this study was 40.5 and 34 years respectively. The total mean age was 37 years. The findings are similar to those observed in the studies conducted in Kashmir.⁵

Most of the couples were from urban areas which constituted 68% and the rural inhabitants constituted about 32%. This can be attributed to the low awareness about HIV disease among the rural population. In a study conducted in rural areas of the Saurashtra region of Gujarat, India it was found that the basic knowledge of HIV/AIDS is still lacking in about two fifths of the rural population. Literacy and media exposure are definitive factors that determine awareness of HIV among them.⁶ In our study, majority of the males had a basic educational status 6th to 12th standard whereas majority of the females were illiterates.

In this study majority of the couples had a monthly income in the range of Rs. 2000 to 5000. None of our patients had a monthly income greater than Rs.5000. People with low literacy and poor family have higher risk of HIV. Majority of these populations are in their productive age group and therefore it affects the economic status of the family and also the country.⁷

In this study 84% of the males give history of exposure to commercial sex workers. Several studies conducted in India show a similar finding.^{8,9} About 92% of the index cases acquired HIV through heterosexual contacts whereas 8% were bisexuals and the remaining 2% had history of blood transfusion. These findings correlate with many studies in the South Indian region which confirm that heterosexuality to be the primary mode of transmission.¹⁰

In relation to this study findings of more than 90% of the index cases having history of high risk behaviour only 10% of them came for HIV screening on the first hand. The same scenario was observed in those with STIs (observed 40% in males and 39% in the females). This suggests the lack of awareness and initiative among the population at risk towards HIV.¹¹

Though statistically insignificant, the proportion of concordance significantly increased across the category of number of years of marital relationship and frequency of sexual contact per week. A cross sectional studies conducted in Europe have corroborated similar finding.¹² Advanced HIV disease (stage 3 and stage 4) were significantly associated with seroconcordance of the couples. Similar findings have been seen in various other cross sectional studies conducted in Zambia and South Africa.¹³

Various studies depicted initiation of ART therapy can prevent HIV transmission from index case to partner.^{14,15} In this study role of ART in HIV transmission were not statistically significant. This can be due to only few patient were under ART in our study so the data can be too low to calculate statistical significance. Since it was a cross sectional study we were not able place the events properly i.e. HIV transmission between partners have occurred before initiation of ART.

The practise of anal sex and sex during menstruation were statistically significant in the seroconcordant group for HIV transmission which was similar to the findings observed in other studies.^{16,17} The proportion of condom usage was significantly high in serodiscordant groups as compared to the seroconcordant group. The protective effect of condom usage among serodiscordant couples have been demonstrated in various studies.¹² Similar findings have also been confirmed in the studies conducted by CDC, USA.¹

Though the prevalence of circumcision was low (7%) this study population, it was significantly associated with serodiscordancy. Circumcision decreases the risk of achieving HIV infection in the heterosexual group up to 8 times compared to the uncircumcised population. This can be explained by a large number of Langerhans cells in the prepuce skin which act as the target for HIV virus.¹⁸ Further it also reduces the likelihood of contracting STD, hence decreasing the chance of HIV transmission. Inclusion of male circumcision into the

current HIV prevention measure guidelines is warranted by the UNAIDS and the WHO in 2007.¹⁹

In this study 34 patients had a positive history of PVDs. Of them 27 were males and 7 were females. The association of PVDs and the seroconcordant rates in males was statistical significant whereas it was not statistically significant in the females. However, there was a significant increase in the proportion of seroconcordance across the category of PVDs in the female population. A study conducted in Europe also shows association of PVDs with sexual transmission of HIV.²⁰ The statistical insignificance in the female population could be attributed to the following reasons; very less number of females had a positive history, PVDs in the females are relatively asymptomatic, predominant social stigma among the female population and low educational status leading to unawareness among them.

In the present study, 49 males and 54 females had sexually transmitted infections at the time of clinical examination. Among the sexually transmitted infections, genital ulceration is associated with maximum seroconcordance rates in males and bacterial vaginosis in females. This was evidenced in previous study done by Ward et al.²⁰

CONCLUSION

The findings of the present study emphasize that the partners of HIV infected persons are identified, counselled and offered HIV testing since they are at the highest risk of acquiring HIV infection. Further high rates of co-occurring STI in people living with HIV/AIDS will impede the efforts taken to prevent HIV transmission. Therefore aggressive behavioral interventions that include STI screening and treatment of all sexually active HIV-infected persons becomes imperative.

Limitations of the study

- Since it was a cross sectional study there was difficulty in determining the sequence of events. For example, some of the potential risk factors for concordance may not have occurred before the partner was infected with HIV.
- Bias is another problem in this study. Data referring to previous years may be affected by recall bias, and information on sexual practices and drug use may additionally be affected by reporting bias.
- The study had a small sample size and hence statistical analysis may not be conclusive in some of the risk factors in relation to HIV concordance.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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