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HIV prevalence in suspects attending Sir Sunder Lal Hospital

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ABSTRACT

Objective: To assess the sero-positivity rate of HIV infection among clinically suspected subjects of reproductive age group (15-49 years), biological and behavioral characteristics of the subjects gender specific variation of sero-positivity rate, and the differentials of the sero-positivity rate for the history of blood transfusion or blood products or other organs, history of needle exposure and symptoms of morbidity. **Methods:** Study is based on the retrospective data of the calendar year 2005 obtained from Voluntary Counseling and Testing Centre (VCTC) (now renamed as ICTC), Department of Microbiology, I.M.S., B.H.U., Varanasi. These cases were either referred by the consultants of different OPD'S of Sir Sunderlal Hospital or came voluntarily for knowing their HIV status. About 2-3 mL of blood samples were collected in a plain vial and tested for HIV status by strategy II/III as per WHO/NACO guidelines. **Results:** Overall sero-positivity of HIV was 15.3% (18.1% in males and 12.2% in females) which increased 6-7 folds in the age group 35-49 years as compared to 15-24 years in both the sexes. Sero-positivity rate in male migrants was 43.1%, while in female migrants it was 18.7%. The history of multiple sexual contacts was about 3 times higher in males as compared to females; predominantly it was very high in male migrants (67.7%) as compared to male non-migrants (15.8%). History of multiple sexual contacts was not uncommon in females and it was 25.0% in female migrants and 9.7% in non-migrant females. The sero-positivity rate with the history of multiple sexual contacts was 45.4% in males and 60.3% in females, while without history of multiple sexual contacts these were only 2.8% and 5.3% respectively. Sero-positive cases had on an average 3.6±1.7 various morbidity symptoms as compared to 0.7±1.1 in sero-negatives. It is to be noted that sero-positivity rate was more in those females who seemed apparently healthy compared to those presenting with some of the symptoms; vice versa, in males presenting with some symptoms HIV infection was 7 times higher than those without symptoms. **Conclusions:** The findings indicate a high sero-positivity among both the genders. Multiple heterosexual contacts, especially, in migrants are the main root of transmission of HIV. These are causing spread of HIV to their spouses. The multiple sexual contacts in the society, especially, among non migrant females of this region are indicating the distortion of traditions and cultures which are a serious concern and may lead to HIV infection on the rise. Awareness program to the susceptible group is the need to reduce further spread of HIV.

1. Introduction

HIV/AIDS has exceeded all expectations since its identification. Globally, nearly 33 million people are currently living with HIV and about 25 million people have already died with the worst of the epidemic centered on Sub-Saharan Africa[1,2]. The spread of HIV has been observed greater than predicted, thus, it has put its impact on social capital, population structure and economic growth. Responding to AIDS nothing less than a sustained social mobilization is necessary to combat one of the most serious crises facing human development[3].

In India with population over one billion, around half are in the sexually active age group (15-49 years). The first HIV/AIDS case in Asia was detected in 1985 in Thailand and subsequently in 1986 in Chennai, India in a commercial sex worker[4]. Since then HIV infection has been reported in all states and Union Territories of India. As on 6 July 2007, UNAIDS/ NACO/ WHO estimates in National Household Survey data, around 2.5 million people were living with HIV at the end of 2006. Country India is still facing a wide spread of poverty, illiteracy, social inequalities, poor nutritional and health status, high prevalence of sexually transmitted diseases (STD) and reproductive tract infections

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(RTI), and virtual lack of public hygiene. Furthermore, the epidemiology of HIV is complicated in India because of high labor migration and mobility in search of employment from economically backward to advanced region. Information drawn form different studies showed that during heterosexual sex, women compared to men are at two fold risks to get HIV infection. Poor perception of safe sex and still a persistent denial about AIDS in many states makes India vulnerable to the overwhelming AIDS epidemic.

Study conducted in Ludhiana in a specific population group had shown 0.3% prevalence of HIV in general population, 0.12% in blood donors, and nil in pregnant women. The subjects were deficient in knowledge about the modes of spread of HIV/AIDS. Sexually active unmarried young (15-24 years), those including in extra-poppy-husk were at higher risk of HIV infection[5]. In 1999-2000, the overall sero-positivity among patients attending SS Hospital of BHU (from eastern UP, Western Bihar and MP) was 3.17% (6.42% in high risk group and 0.37% in low risk group[6]. Pune study in 1996 reported overall prevalence of HIV-1 infections as 21.2% and being higher in females (32.3%) than in males (19.3%). Higher HIV-1 sero-prevalence was associated with behavioral and biological characteristics *e.g.* sex work, life time number of sexual partners, receptive anal sex, lack of circumcision, genital diseases, and lack of formal education[7]. In south India 81% housewives among 135 detected HIV positives indicates the husbands probably are the main source of infection[8,9]. Thus, transmission via sex workers, long distance truck drivers and the HRG groups has now extended the epidemic into general population who might have been considered to be at low risk of HIV infection, apart from being in a marital sexual relationship[10-13]. The present study was undertaken with the following objectives:

To assess the sero-positivity rate of HIV infection in clinically suspected subjects of reproductive age group (15-49 yrs);

To assess gender specific variation of sero-positivity rate as per biological and behavioral characteristics of the subjects;

To assess the differentials of symptoms of morbidity among confirmed HIV and non HIV cases.

2. Materials and methods

This study is based on 6007 subjects of reproductive age group (3201 males and 2806 females) of the year 2005 taken out from total 7050 screened subjects for sero-positivity at VCTC (renamed as ICTC (Integrated Counseling and Testing Centre)), Department of Microbiology, IMS, BHU, Varanasi (UP). The subjects screened were either the suspects referred by various OPD' s of Sir Sunderlal Hospital, a teaching hospital of BHU or who came voluntarily to know their HIV status. Mostly screened subjects were from eastern Uttar Pradesh, Western Bihar, Madhya Pradesh and Jharkhand. About 2-3 mL of blood samples were collected in a plain vial. All the samples of symptomatic and asymptomatic subjects were tested for HIV positivity using strategy II/III as per WHO/NACO guidelines.

In aspect of statistical analysis, initially the data were cross-tabulated and male versus female prevalence ratio (PR) along with 95% confidence interval for different biological and behavioral characteristic was calculated. As per need of the data *t*-test and *Chi*-square test were applied to test the significance. Software SPSS version 12.0 was used for the analysis.

3. Results

Table-1 illustrates that prevalence of HIV in male compared to female suspects was about 1.5 times higher (PR=1.48; 95% *CI*, 1.47-1.49). In both the sexes HIV prevalence had increased with the increase in age. In the age group 35-49 years, significantly more males (30.4%) as compared to females (18.5%) were sero-positive (PR=1.64; 95% *CI*, 1.60-1.68), while in age groups 15-24 and 25-34 years, the positivity rate in males and females was statistically same. Positivity rate was higher in suspects of rural than urban in both the gender. The prevalence ratio of male to female was 1.34 (95% *CI*, 1.33-1.36) and 1.74 (95% *CI*, 1.66-1.83) in rural and urban suspects respectively. The positivity rate in male migrants (43.1%) compared to non-migrants (2.2%) was very high, while it was 18.7% and 10.8% in female migrants and non migrants respectively. Prevalence ratio of male to female was 2.31 (95% *CI*, 2.25-2.37) in migrants and 0.20 (95% *CI*, 0.19-0.22) in non-migrants. Though history of multiple sexual contacts is much less in females than males, in both the sexes the sero-positivity rates with history of multiple sexual contacts was tremendously high and higher in females than males (45.4% in males and 60.3% in females with multiple sexual contacts and 2.8% in males and 5.3% in females without history of multiple sexual contacts). The prevalence ratio of male versus female was 0.75 (95% *CI*, 0.74-0.76) in those with history of multiple sexual contacts and 0.53 (95% *CI*, 0.50-0.56) in those without history of multiple sexual contacts. The history of either blood transfusion or needle exposure had shown almost same positivity rate in both the genders.

Table-2 illustrates gender-wise HIV prevalence in those with and without some morbidity symptoms. According to their socio-demographic status, prevalence of HIV among those who presented with some morbidity conditions was significantly higher in males (27.1%) than females (8.9%), while in those suspects presented without any morbidity symptoms the prevalence was significantly higher in females (37.3%) than males (3.81%). In both the genders, HIV prevalence had been increasing with age, either the suspects were presented with some morbidity symptoms or not. In the respective age groups 15-24, 25-34 and 35-49 years of the suspects were presented with some morbidity symptoms; the prevalence in males was 5.8%, 30.0% and 38.0% as against 2.7%, 10.1% and 15.6% in females, while in those suspects

Table 1

Gender specific HIV prevalence in suspects according to their age*, place of residence, history of migration, history of multiple sexual contacts and history of BT/NE**.

Characteristics		Male			Female			PR/95 % *CI*	χ^2/ *P*-value
		No. of suspects	HIV +ve	Positivity %	No. of suspects	HIV +ve	Positivity %		
Age group (years)	15–24	749	31	4.10	872	31	3.60	1.140 (1.01 – 1.29)	0.230/*P*>0.05
	25–34	1516	264	17.40	1276	188	14.70	1.180 (1.16 – 1.20)	3.480/*P*>0.05
	35–49	936	285	30.40	658	122	18.50	1.640 (1.60 – 1.68)	28.190/*P*<0.001
Residential status	Rural	2020	469	23.20	1593	276	17.30	1.340 (1.33 – 1.36)	18.530/*P*<0.001
	Urban	1181	111	9.40	1213	65	5.40	1.740 (1.66 – 1.83)	13.750/*P*<0.001
History of migration	Yes	1244	536	43.10	492	92	18.70	2.310 (2.25 – 2.37)	89.760/*P*<0.001
	No	1957	44	2.20	2314	249	10.80	0.204 (0.19 – 0.22)	118.910/*P*<0.001
History of multiple sexual contact	Yes	1151	523	45.40	348	210	60.30	0.753 (0.74 – 0.76)	23.170/*P*<0.001
	No	2050	57	2.80	2458	131	5.30	0.530 (0.50 – 0.56)	17.541/*P*<0.001
History of BT/NE	Yes	125	28	22.40	76	12	15.79	1.420 (1.12 – 1.79)	0.914/*P*>0.05
	No	3076	552	17.95	2730	329	12.05	1.490 (1.48 – 1.51)	38.580/*P*<0.001
Total		3201	580	18.10	2806	341	12.20	1.480 (1.47 – 1.49)	40.550/*P*<0.001

* Suspects are of age-group 15–49 years; **BT/NE: Blood transfusion / Needle exposure; PR: prevalence ratio (male/female).

Table 2

Gender specific HIV prevalence in suspects presenting with or without some morbidity symptoms according to their age, place of residence, history of migration, history of multiple sexual contact and history of BT/NE in the reproductive age group (15–49 years).

Characteristics		With some morbidity symptoms				PR	χ^2/*P*-value	Without morbidity symptoms				PR	χ^2/*P*-value
		Male		Female				Male		Female			
		No.	%	No.	%			No.	%	No.	%		
Age group (years)	15–24	467	5.8	825	2.7	2.15	7.10, *P*<0.001	282	1.42	47	19.15	0.074	28.86, *P*<0.001
	25–34	791	30.0	1094	10.1	2.97	119.81, *P*<0.001	725	3.72	182	42.86	0.087	217.64, *P*<0.001
	35–49	708	38.0	563	15.6	2.44	76.55, *P*<0.001	228	7.02	95	35.79	0.196	42.43, *P*<0.001
Residential status	Rural	1530	29.0	1359	12.6	2.30	115.07, *P*<0.001	490	5.10	234	44.87	0.114	170.03, *P*<0.001
	Urban	436	20.4	1123	4.4	4.64	98.30, *P*<0.001	745	2.95	90	17.78	0.166	40.63, *P*<0.001
History of migration	Yes	1085	46.2	464	15.9	2.90	125.93, *P*<0.001	159	22.01	28	64.29	0.343	20.95, *P*<0.001
	No	881	3.6	2018	7.2	0.50	3.20, *P*<0.001	1076	1.12	296	34.80	0.032	342.94, *P*<0.001
History of multiple sexual contact	Yes	985	49.1	238	62.2	0.80	12.55, *P*<0.001	166	23.49	110	56.36	0.417	30.81, *P*<0.001
	No	981	5.0	2244	3.2	1.60	5.55, *P*<0.05	1069	0.75	214	27.57	0.027	259.17, *P*<0.001
History of BT/NE	Yes	88	28.4	72	13.9	2.04	4.073, *P*<0.05	37	8.11	04	50.00	0.162	2.65, *P*>0.05
	No	1878	27.1	2410	8.7	3.115	253.25, *P*<0.001	1198	3.67	320	37.20	0.099	295.95, *P*<0.001
Total		1966	27.1	2482	8.9	3.045	258.44, *P*<0.001	1235	3.81	324	37.30	0.102	296.82, *P*<0.001

Table 3

Gender wise morbidity present in HIV positives and HIV negative subjects.

Morbidity symptoms	Symptoms present in HIV positives and negatives				PR	χ^2/ *P* value	Symptoms present in HIV positives and negatives				PR	χ^2/ *P* value
	Male (533)		Male (1 433)				Female (220)		Female (2 262)			
	No.	%	No.	%			No.	%	No.	%		
Fever	341	63.98	263	18.35	1.297	377.82, *P*<0.001	115	52.47	104	4.60	1.106	560.55, *P*<0.001
Weightless	315	59.10	171	11.93	1.842	461.90, *P*<0.001	88	40.00	54	2.38	1.630	518.93, *P*<0.001
Weakness	417	78.24	393	27.24	1.061	411.94, *P*<0.001	165	75.00	162	7.16	1.019	800.70, *P*<0.001
Loose motion	291	54.60	128	8.93	2.274	480.35, *P*<0.001	103	46.82	35	1.55	2.943	773.96, *P*<0.001
Cough	74	13.88	65	4.54	1.138	50.25, *P*<0.001	10	4.55	15	0.66	0.667	26.54, *P*<0.001
Anorexia	219	41.09	131	9.14	1.672	268.78, *P*<0.001	59	26.82	44	1.95	1.341	305.63, *P*<0.001
Tuberculosis	251	47.09	85	5.93	2.953	461.60, *P*<0.001	78	35.46	62	2.74	1.258	397.02, *P*<0.001
STD	75	14.07	204	14.24	0.368	0.00, *P*>0.05	34	15.45	68	3.01	0.50	75.72, *P*<0.001
Others	24	4.50	336	23.45	0.072	91.95, *P*<0.001	16	7.27	82	3.63	0.195	6.105, *P*<0.05
Average No. of symptoms	4.31 ± 1.62		1.83 ± 1.20		T=36.749, *P*<0.001		3.76 ± 1.67		1.26± 0.77		T=40.05, *P*<0.001	
Median	5.00		1.00		2.00		4.00		1.00		1.00	
Range	5 (1, 6)		5 (1, 6)		5 (1, 6)		5 (1, 6)		5 (1, 6)		5 (1, 6)	
χ^2– value/ *P*-value	535.36, *P* < 0.001								662.57, *P* < 0.001			

presented without any morbidity symptoms; the prevalence in males was 1.42%, 3.72% and 7.02% as compared to 19.2%, 42.9% and 35.8% in females. The prevalence ratios of male versus female in both presented with or without symptoms were statistically significant (p<0.001). The positivity rate in males of rural area presenting with some morbidity symptoms was 2.3 times higher than females (29.0% in males and 12.6% in females) while for suspects of urban area it was 4.64 times higher (20.4% in males and 4.4% in females). But positivity rate in male suspects of rural area presenting without any symptom compared to female suspects was very low (5.1% in males and 44.9% in females); similar result in suspects without any morbidity symptoms was seen in urban area too (3.0% in males and 17.8% in females). Among

suspects presenting with some morbidity symptoms and had history of migration the positivity rate was 46.2% in males compared to about one third in females (15.9%) while in those without symptoms it was 64.3% in females as against about one third in males (22.0%). Though, the positivity rates in male and female suspects presenting with some morbidity symptoms and had no history of migration was very low (3.6% in males and 7.2% in females), it was about 2 times higher in females than males. But, in female suspects presenting without any morbidity symptoms and had no history of migration, the positivity rate was tremendously high (34.8%) than males (1.1%). History of multiple sexual contacts had been found in most of the positive cases. From among them presenting with some morbidity symptoms and had history of multiple sexual contacts alarmingly about half (49.1%) males and three fifth (62.2%) females were sero-positive, whereas in those of no history of multiple sexual contacts it was only 5.0% in males and 3.2% in females. In the suspects though had no morbidity symptoms the positivity rate, if had the multiple sexual contact, was 23.5% in males and 56.4% in females respectively, while only 0.75% males against 27.6% females were positive even without history of multiple sexual contacts.

Table-3 reveals gender specific distributions of various symptoms presented by sero-positive and sero-negative suspects referred by the consultants during their visit to SS Hospital or directly visit to ICTC center. Though the number of presenting symptoms in each sex with sero-positive or sero-negative varied between 1 to 6, the average number of symptoms present in sero-positive was 4.31±1.62 in males and 3.76±1.67 in females showing statistically significant difference (P<0.001). In those who were sero-negatives the average symptoms presented were 1.83±1.20 and 1.26±0.77 in males and females respectively with no statistical difference. Fifty percent male sero-positive reported 5 or more symptoms, while in female sero-positives it was 4 or more. Weakness was reported by both male and female sero-positives (78.24% in male and 75.0% in female). Fever, weight loss and loose motion symptoms were present in 63.98%, 59.10% and 54.60% male positives, while these were in 52.47%, 40.00% and 46.82% in sero-positive females respectively. Tuberculosis and anorexia was also present in 47.09% and 41.09% in male sero-positives and 35.46% and 26.82% in female sero-positives respectively. Rest of the symptoms cough, STDs and others (like skin infections, gynee problem and lymph node) though present but in less than 15% of sero-positives in both the genders. Among sero-negatives, all the symptoms presented were less than 15% in both the sexes except weakness and fever in males which were 27.24% and 18.35%, respectively.

Table-4 indicates the exposure of gender specific multiple sexual contacts in migrants and non-migrants. Out of 3201 male and 2806 female suspects, migrants constituted about 40% and 18% respectively. About two third (67.7%) male migrants and one sixth (17.5%) female migrants had multiple sexual contacts. Even among non-migrants, history of multiple sexual contacts was found in 15.8% male and 9.7% female suspects.

The exposure of multiple sexual contacts among the suspects presenting with some symptoms as per their sex, place of residence and history of migration is shown in Table-5. Suspects presenting with some symptoms, the exposure to multiple sexual contacts was in more than 50% of migrants (varying "between" 50.00% to 64.49%) irrespective of their place of residence and sex. In male non-migrants multiple sexual contact was only "between" 3.66% to 5.88% and contrary to this in female non-migrants it was very high ranging 61.68% in rural to 75.86% in urban.

Table 4

Gender specific exposure of multiple sexual contacts in migrants and non-migrants suspects of age-group 15-49 years (%).

Status of suspects	Male		Female	
	No. of suspects	Percentage	No. of suspects	Percentage
Migrants	1244	67.70	492	25.00
Non-migrants	1957	15.80	2314	9.70
Total	3201	35.96	2806	12.40

Table 5

Place of residence and gender specific exposure to multiple sexual contacts of suspects of age group 15-49 years presenting with some symptoms as per their history of migration.

	Male			Female		
	Rural	Urban	Total	Rural	Urban	Total
No. of migrants	611	142	753	82	20	102
No. migrants exposed to multiple sexual contact	394	80	474	50	10	60
Percent of migrants exposed to multiple sexual contact (%)	64.49	56.34	62.95	60.98	50.00	58.83
No. of non-migrants	164	68	232	107	29	136
No. non-migrants exposed to multiple sexual contact	6	4	10	66	22	88
Percent of non-migrants exposed to multiple sexual contact (%)	3.66	5.88	4.31	61.68	75.86	64.71

4. Discussion

Migration is a usual phenomenon that takes place mostly from rural to urban areas. Those well educated migrate to places wherever get the opportunities, but illiterates and less educated always favor to migrate to industrialized cities. From this region of Uttar Pradesh migrations to industrialized cities are mostly to Mumbai and Pune in Maharashtra; Surat and Ahmadabad in Gujarat; Ludhiana in Punjab and to some extent to Delhi. These illiterates and less educated people who are facing the problem of poverty and having no employment opportunity in rural areas usually migrate single even if married. These migrants due to longer outside stay are indulging in risky sexual behavior usually with commercial sex workers[9]. Owing to ignorance of their HIV status and lack of awareness of mode of transmission these migrants expose their spouses during their intermittent

return to their families and in turn to new born to the risk of HIV[8]. This act is going on without break and disease load is continuously increasing geometrically[14]. Though both Uttar Pradesh and Bihar falls in the low prevalence states, HIV/AIDS epidemic is progressively increasing both in its magnitude and geographical spread as indicated through records of ICTC, Department of Microbiology, IMS, BHU[6].

Social conditions in rural areas characterized by poverty, gender inequality, and illiteracy magnify the harmful impact of infection. Any strategy to deal with HIV infections in rural areas in India must, therefore, include interventions to mitigate their inequalities[15].The present study provides the insight of the HIV/AIDS suspects attending to SS Hospital or ICTC, Department of Microbiology, IMS, BHU. These detailed findings cannot be generalized, but are very much useful to illustrate the scenario for further intervention strategy.

The most common mode of HIV transmission in the study is heterosexual intercourse, which confirms the findings of earlier studies from India[16-18].

The overall sero-positivity rate was about 1.5 times higher in males than females. In male and female suspects positivity rates are statistically same in the age groups 15-24 and 25-34 years respectively, while it was 1.64 times higher in male compared to female suspects of the age group 35-49 years. Positivity rate was higher in rural suspects than urban in both the genders. The positivity rates in both the genders having the exposure of multiple sexual contacts were 45.4% in males and 60.3% in females. Very high positivity rate of 43.1% was observed in male migrants compared to only 2.2% in male non-migrants that indicates the high risk exposure among them. This is also supplemented by the facts that about two third of male migrants had the exposure of multiple sexual contacts which seems the major root of transmission of HIV infection. About three fifth migrants irrespective of their sex and residential status had the exposure of multiple sexual contacts. Surprisingly, more than 60% female non migrants (61.7% in rural and 75.0% in urban) had the exposure of multiple sexual contacts. This indicates that society of this region intact with strong social customs and taboos is now breaking down and leading to a serious problem of HIV spread.

Multiple sexual contacts are the main culprit for the spread of HIV which is more common in migrants. In a society of this region bound by traditions and culture the multiple sexual contacts even among non-migrant females pose a serious concern. This indicates that the culture is breaking down and because of this HIV transmission may pose a serious threat in future if no suitable measures to prevent this infection are adopted well in time.

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