



HIV Infection in Rural South India: A Sexual Network Analysis

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BACKGROUND

The southern state of Andhra Pradesh (AP) has one of the highest rates of HIV-1 infection in India. Recent estimates of HIV infection in rural areas have begun to approximate the urban. Methods of HIV transmission in rural India are poorly understood.

PURPOSE

We examined risk factors for HIV transmission in a group of rural villages in AP through the use of a sexual network analysis survey - the Indian Health and Family Life Survey (IHFLS).

DESIGN, SETTING and PARTICIPANTS

Design: Case Control Study

Setting: 38 villages in rural Ranga Reddy District, Andhra Pradesh

Participants: 60 participants (20 HIV infected and 40 controls) matched by age, gender and village randomly selected from a Voluntary Counseling and Testing Program.

Table 1. Sociodemographic Characteristics (30 men and 30 women).

	Cases = 20	Controls = 40	OR	(95% CI)
Age (mean, SD)	34.6 (12.9)	38.6 (11.2)	0.97	0.92-1.02
Caste (%)			1.09	0.40 - 2.99
Other Caste (OC)	3 15.0%	5 12.5%		
Scheduled Caste (SC)	2 10.0%	8 20.0%		
Backwards Caste (BC)	10 50.0%	19 47.5%		
Scheduled Tribe (ST)	5 25.0%	8 20.0%		
Education (%)			0.74	0.11 - 4.90
>Primary	6 30.0%	11 27.5%		
≤Primary	14 70.0%	29 72.5%		
Birthplace (%)			2.27*	0.75 - 6.89
Outside this Village	7 35.0%	22 55.0%		
This Village	13 65.0%	18 45.0%		
Occupation Type (%)			1.00	0.34 - 2.93
Non-Agriculture	9 47.4%	19 47.5%		
Agriculture	10 52.6%	21 52.5%		
Personal Income			0.80	0.26 - 2.45
> 1000 rupees (\$23)	7 38.9%	11 32.4%		
≤ 1000 rupees	11 61.1%	23 67.6%		
Overnight travel past year			1.44	0.34 - 6.11
Never to less than a month	16 80.0%	34 85.0%		
More than a month	4 20.0%	6 15.0%		

*Unconditional Logistic Regression

MEASUREMENTS

Laboratory - HIV-1 status retested using WHO testing strategy III with additional Western Blot Confirmation. RPR and hepatitis B serology were also conducted. Survey - 336 item IHFLS survey (based upon the National Health and Life Survey which has been validated in the US and China) available in Telugu, English and Chinese. 17 domains included detailed items on sociodemographics, personal health, exposure to hypodermic needles, attitudes towards marriage and sex, sex life, sexual partners, STIs, childhood sexual experiences, homosexuality, sexual harassment and sexual consumption. Conditional logistic regression models were used for all analyses.

Table 2. Selected Male Characteristics in Rural AP.

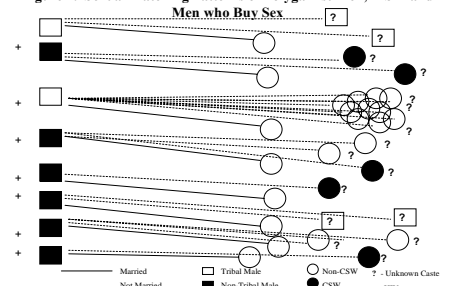
	HIV+ Cases N = 10	Matched Controls N = 20	OR	95% CI*
Personal Relationships				
Marital Status (%)			8.0	0.69-92.70
Remarried/Divorced/Widowed	3 33.3%	1 5.9%		
First marriage	6 66.7%	16 94.1%		
Condom use in past year			2.7	0.26-27.82
Yes	1 12.5%	5 27.8%		
No	7 87.5%	13 72.2%		
Life time sexual partners >1month				p=0.03*
0-1	4 57.1%	17 100.0%		
2 or more	3 42.9%	0 0.0%		
STDs				
Genital Lesion in the past year (%)			4.9	0.38-60.15
Yes	2 20.0%	1 5.0%		
No	8 80.0%	19 95.0%		
Sexual Consumption				
Used sexually explicit media (%)			0.6	0.13-3.25
Yes	3 30.0%	8 40.0%		
No	7 70.0%	12 60.0%		
Bought sex (%)				p=0.002*
Yes	5 50.0%	0 0.0%		
No	5 50.0%	20 100.0%		
Homosexuality				
Homosexual feelings (%)			4.8	0.38-60.15
Yes	2 20.0%	1 5.0%		
No	8 80.0%	19 95.0%		
Sex with other men (%)			2.1	0.12-37.72
Yes	1 10.0%	1 5.0%		
No	9 90.0%	19 95.0%		

*Fischer Exact test used to obtain a p-value when conditional and unconditional logistic regression models did not converge.

RESULTS

The sample mean age was 37 years, 22% were of a tribal caste and 78% of a non-tribal caste. Seventy percent of the sample earned ≤1000 rupees (\$23) per month. When compared to men, women were more likely to be born in another village (87% vs. 10%; p<0.01) and less likely to have greater than primary education (13% vs. 57%; p=0.014). Among female respondents, none were commercial sex workers (CSW), and there were no significant social or behavioral associations with HIV infection. Among male respondents, 50% (5/10) of the HIV(+) cases reported having sex with female CSW compared to none (0/20) of the HIV(-) controls. All men who had sex with female CSW were married, from a non-tribal caste and did not use condoms. Men who had sex with men (MSM) demonstrated a trend toward an increase in HIV infection (OR=4.0; p=0.26). MSM were more likely to be tribal (OR=16.0; p=0.042). All tribal MSM were married, had multiple male partners, and did not use condoms.

Figure 1. Sexual Matching Patterns of Polygamist Men, MSM and



CONCLUSIONS

In a rural south Indian sample, we did not identify specific HIV risk factors in women. For men, both CSW and potentially MSM play a role in dissemination of HIV infection in identifiable subpopulations. MSM amongst tribal individuals in rural areas may be a mechanism of HIV transmission and warrants further study. Public health interventions aimed at reducing HIV transmission in rural AP should consider targeting subpopulations of men that engage in covert MSM or CSW, as well as their at risk wives.