

Sexual Behavior, HIV Prevalence and Awareness Among Wives of Migrant Workers: Results from Cross-sectional Survey in Rural North India

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ABSTRACT

Background: Migration has been linked to the spread of HIV epidemic from the urban areas of western India to the rural areas of north India. **Objectives:** This is the first population-based study among the wives of migrant workers of Muzaffarpur district in Bihar with objectives to describe their sexual behavior within marriage, estimate the prevalence of HIV, and to know their awareness regarding HIV/AIDS. **Methods:** A two-stage cluster survey was conducted by randomly selecting 25 eligible wives from each of the 34 selected villages. A total of 850 wives were interviewed and the blood samples were collected for HIV testing. To determine the factors associated with HIV/AIDS-awareness, we calculated adjusted odds ratios and 95% confidence intervals (CI) using multiple logistic regression analysis. **Results:** 34 (3%) of 850 wives reported condom use with their husband. HIV prevalence was 0.59% (95% CI: 0.19-1.37%) among the wives of migrant workers. Out of 850 wives, 132 (15.5%) had heard about HIV. Condoms use (OR = 3.21, 95% CI: 1.22-7.90) and premarital sex (OR=7.44, 95% CI: 1.6-33.67) were found significantly positively associated with HIV knowledge of wives. HIV awareness of the wives was significantly associated with age-group 15-24 years, literacy status, and possession of television and husbands' literacy status. The knowledge about HIV among wives had significant positive impact on condoms use and premarital sex. HIV prevalence among the wives of migrant workers was higher than the prevalence among women in the general population. Education was found to be positively associated with awareness about HIV. **Conclusions:** Effective interventions are needed for increasing awareness of HIV among wives of migrant workers in Bihar.

Keywords: Bihar, HIV awareness, migrant, rural, sexual behavior

Introduction

Migration by single male workers is one of the important factors, which is responsible for high vulnerability to HIV infection. The migrant population acts as a "bridge population" between high-risk group such as female sex workers (FSW) and men who have sex with men

(MSM) to the low risk population such as wives or sex partners of migrant workers. The available evidence suggests that migration could be fuelling the increase in HIV prevalence in several high out migration states

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including Bihar. Further, the knowledge about HIV/AIDS was found to be very low among migrant workers of Uttar Pradesh (UP) and Bihar who are working in the textile factories in Surat.^[1] The state of Bihar in northern India is currently a low epidemic area of HIV/AIDS. The adult HIV prevalence, in the general population was 0.22% (men 0.26%, women 0.19%) compared to the national average of 0.31% (men 0.36%, women 0.25%). The total number of estimated new infections and deaths were 10056 and 6944 respectively during 2009 in Bihar.^[2]

Men's extramarital sexual behavior is the most important factor for introducing HIV/STI into the marital life.^[3,4] The husbands' extramarital sex has been seen as closely linked with the marital relationship and marital satisfaction for both husband and wife and male sexual satisfaction within the marriage.^[5,6] The perceived natural need for frequent sexual satisfaction also influences the migrant workers who live away from their home without their wives for a quite long period of time. The evidence from the different cities in India show that HIV is rapidly being transmitted to married monogamous women.^[7,8] A sero-prevalence among the wives of injecting drug users carried out in Manipur state of India revealed that 45% were sero-positive for HIV infection among the wives.^[9] The objective of this study was to estimate prevalence of HIV among wives using cross-sectional study. We have not used 80% power in sample size calculation because the objective was not to test any hypothesis. Considering the cost of the project, a trade-off was taken for cost and precision.

The married women in India generally have a low risk perception for HIV despite high-risk behavior of their husbands.^[10,11] The wives of migrant male workers may be no different and therefore may be unlikely to protect themselves from the infection from their husbands. Early marriages in rural areas also pose special risks to young women, because in India and especially in Bihar, almost 50% of girls are married by the time they are 18 years of age.^[12,13] Further, early marriage, violence and sexual abuse against women are the major socio-economic reasons of their vulnerability to HIV/AIDS infection. Poor awareness and knowledge about reproductive and sex health makes them more susceptible to HIV/AIDS infection in any given heterosexual encounter.^[12]

Few studies in India among migrant factory workers and homeless suggest HIV prevalence of around 3-5%.^[14] A recent study conducted among the workers of textile and diamond industries in Surat, Gujrat has revealed nearly 1% HIV prevalence.^[15] No study has been conducted so far that assesses the prevalence and awareness of HIV among wives of the migrant male workers. The present study aims to estimate the prevalence and awareness of HIV and associated risk behaviors among the wives

of male migrant workers in rural areas of Muzaffarpur district in Bihar.

Methods

We conducted a community-based cross-sectional survey among 15-49 year old wives of migrant workers living in the rural areas of Muzaffarpur district of Bihar in north India, and who lead a conjugal life for at least one month with sexual contact whenever their husbands were available. The sample size of 850 wives was estimated considering HIV prevalence of 3.41% among the wives and taking design effect of 1.5.^[16] Villages were selected by probability proportional to the population size and were mapped by the field investigators.^[17] We randomly selected 30 houses and recruited the first 25 wives who consented for both the interviews and blood draw.

We used a pre-tested structured questionnaire in Hindi to collect information about the socio-demographic characteristics of wives and their husbands, awareness about HIV/AIDS, and sexual behaviors with the husband. The data was collected using face-to-face paper-pencil based personal interviews by trained female investigators from local NGOs for the non-sensitive items and color-coded audio-assisted self-interviews for the sensitive questions.^[18,19] The interviews were held either in the participants' houses or a private place in the neighborhood as per the convenience of the participants. After completing the questionnaire and obtaining separate written consent, the participants were pre-counseled before drawing a 3-ml venous blood sample.

The serum samples were tested for HIV using three commercially available rapid antibody tests (SD BioLine HIV 1/2 3.0, Standard Diagnostic Inc., Gyeonggi-do, South Korea; CombAids RS-Advantage, Span Diagnostics, Gujrat, India; HIV Tridot, J. Mitra and Co. Pvt. Ltd., New Delhi, India) as per the guidelines of India's National AIDS Control Organization (NACO).^[20] The serum samples positive on all three tests were considered HIV positive. The participants were assigned unique study identification number, which they could also use to get their test results after post-test counseling at the nearest Integrated Counseling and Testing Centre (ICTC). We calculated a Living Standard Index (LSI), as a surrogate indicator for wealth, on the basis of house type, availability of electricity, fuel used for cooking, presence of a lavatory facility, and possession of household consumer items including car, scooter/motorcycle, television, radio, sewing machine, electric fan, and bicycle. A ranked score was assigned for each factor and the sum of scores for all factors for each household was taken as the LSI. On the basis of total score, the LSI was classified into three groups: low (total score ≤ 9), medium (total score = 10-19), and high (total score > 19).^[21]

First, univariate analysis was performed for each variable to find missing observations or non-responded items. Categorical variables were tabulated and continuous variables were summarized for descriptive statistics. Bivariate analysis using chi-square or Fisher's exact test was done to compare proportions. The significant variables from bivariate analysis were selected for step-wise multiple logistic regression analysis to determine the factors associated with HIV/AIDS-awareness using adjusted odds ratios (AOR) with 95% confidence intervals (CI). We used residual deviance test using chi-square statistic, Akaike Information criterion (AIC) and Bayesian Information Criterion (BIC) for the model selection. We tested the goodness-of-fit model by Hosmer-Lemeshow test. Epi-Info version 7 (CDC, USA) was used for data entry. The data were analyzed in Stata version 10 (Stata Corp, Texas, USA) using "svyset" command to account for the change in variance due to cluster sampling.

The study was approved by the UCLA Institutional Review Board and the Institutional Ethics Committee of the Rajendra Memorial Research Institute of Medical Sciences, Indian Council of Medical Research, Patna, India. All-important measures were taken to ensure and maintain the confidentiality of the response given by the wives during survey. No identification variables were used in survey except coded ID for each woman. Female investigators were used to interview woman in rural areas and colour-coded audio assisted method was used for collecting sensitive information. HIV test was done as per the NACO guidelines.

Results

Socio-demographic characteristics of wives and their husbands: The median age of 850 wives was 30 years (IQR: 23-35 years). More than half of them were married at 16 years of age (IQR: 15-18 years) and had three children (IQR: 2-4 children). In all, 666 (78%) were either illiterate or had informal education, 618 (73%) were homemakers and 815 (95%) belonged to households with low Living Standard Index. The median age of the husbands, reported by 644 wives, was 33 years (IQR: 27-40 years). Of the 850 husbands, 561 (64%) were illiterate. 401 (47%) had been working in other cities before their marriage and 668 (79%) were currently working as laborers in construction sites, factories or in the unorganized sector in the cities. The median duration of migration was 8 years (IQR: 3-12 years). Overall, 651 (77%) husbands had been working in cities with high or moderate HIV endemicity, as defined by NACO [Table 1].^[22]

Marital sexual behavior: The median age of sexual debut among the wives was 16 years (IQR: 15-18). Out of 850 wives, 806 (95%) reported 'good or very good' level of sexual satisfaction with their husband. 149 (18%)

wives reported having sex with their husbands in the last 1 month, with 55% reporting a frequency of more

Table 1: Socio-demographic characteristics of wives of migrant workers (N=850)

Characteristics	n (%)
Household	
<u>Religion</u>	
Hindu	759 (89)
Muslim	91 (11)
<u>Caste/Social Group</u>	
General	19 (2)
Other Backward Caste	478 (56)
Schedule Caste	353 (42)
<u>Living Standard index</u>	
Low	815 (94.6)
Medium	29(4.6)
High	6(0.8)
Wives	
<u>Age (years)</u>	
15-24	245 (29)
25-34	347 (41)
35-49	258 (30)
Currently pregnant	93 (11)
Education status	
Illiterate	485 (57)
Informal education	181 (21)
Primary(1-3 years)	37 (4)
Middle (4-7 years)	111 (13)
High (8-10 years)	32 (4)
Inter or above (12+)	4 (0.5)
<u>Occupation</u>	
Home maker	618 (73)
Agricultural Labour	164 (19)
Farmer	33 (4)
Unskilled Labour	30 (4)
Small business	4 (0.5)
Service	1 (0.1)
Median Monthly income (INR)	3500 (3000-4000)
Husband	
Illiterate	561 (66)
<u>Occupation</u>	
Unskilled worker	668 (78.6)
Skilled worker	85 (10)
Truck driver/helper	42 (5)
Service	23 (3)
Self Business	20 (2)
Agricultural worker	12 (1.4)
Migrant worker before marriage	401 (47)
<u>Duration of migration (years)</u>	
<3	180 (21)
3-6	224 (26)
>6	446 (53)
<u>HIV endemicity of migrated states district</u>	
High	116 (14)
Medium	535 (63)
Low	199 (23)

than 5 times. 16 (2%) wives reported engaging in anal (8) and/or oral (10) sex. In all, 816 (97%) of 850 wives reported occasional or nil usage of condoms during sexual intercourse with their husband. The most common reasons for not using condoms included dislike by husband (94%), feeling of reduced sexual pleasure (93%), unavailability of condom (92%) and not being able to get pregnant (90%). Out of 850, 127 (15%) wives reported usual consumption of alcohol before sex by husband with 78 (9%) reporting alcohol consumption by their husbands at the last sex act. 160 (18%) wives reported marijuana use before sex by their husbands [Table 2].

Table 2: Sexual behavior of wives of migrant workers (N=850)

Characteristics	n (%)
Age at sexual debut below 18 years	616 (72)
Sexual debut before marriage	7 (0.8)
<u>Level of sexual satisfaction with husband</u>	
Average	44 (5)
Good	542 (64)
Very Good	264 (31)
Last sex with husband more than 1 month before	701 (82)
Condom use at last sex with husband	25 (3)
<u>Usual frequency of condom use with husband</u>	
Most times	25 (3)
Some times	630 (74)
Never	196 (23)
<u>Reasons for not using condoms with husband*</u>	
Husband does not like using condom	796 (94)
Condom reduces sexual pleasure	791 (93)
Condom not available during sex	781 (92)
Not currently pregnant	763 (90)
Don't like using condom	690 (81)
Thought of using condom did not occur	646 (76)
Condom not necessary with husband	583 (69)
Want to become pregnant	443 (52)
Using other contraceptive measures/sterilized	291(34)
<u>Alcohol consumption by husband during sex</u>	
Always	34 (4)
Most times	93 (11)
Some times	619 (73)
Never	104 (12)

* responses not mutually exclusive

HIV prevalence and awareness: 5 (0.6%, 95% CI 0.2-0.4%) of 850 wives of migrant workers were HIV positive. Out of 850 wives, 132 (15.5%) had heard about HIV before the interview. Pre-marital sex was significantly higher ($p=0.013$) among those who heard about HIV (3.1%) compared to those who had not heard about HIV (0.41%) [Table 3]. On bivariate analysis the wives' age, that is 15-24 years, literacy status, husband's literacy status, low living standard, television ownership, condom use with husband and report of premarital sex were significantly positively associated with having heard about HIV. As per the final model wives who had heard about HIV were more likely to be 15-24 years old (adj. OR 1.3, 95% CI 1.02-1.8), literate (adj. OR 7.6, 95% CI 4.6-12.6), had literate husband (adj. OR 2.1; 95% CI 1.4-3.1) and owned television (adj. OR 1.5, 95% CI 1.2-1.8) [Table 4].

Discussion

This is the first population-based study among the wives of migrant workers of rural areas of Muzaffarpur district in Bihar, India. The HIV prevalence among them was 0.59 percent. The prevalence could be low due to infrequent exposure to sexual contacts with their husbands because the migrant workers visit their home for a very short period of time during a year. Hence, the probability of getting infected from their husband is quite low. None of the wives revealed having extra-marital relationships. Although low, the risk of HIV infection among the wives of migrant workers of rural areas was nearly 3 times as compared to women in the general population of Bihar.^[22] HIV prevalence among the general population is estimated on basis of the prevalence among ante-natal clinics (ANC) attendance and mothers tested at parents to child counseling and testing centre (PPTCT's).

A study conducted among the male migrant workers in four districts of Maharashtra state in India revealed that nearly 39% of the workers perceived themselves at high risk of HIV because of their sexual behavior.^[23] As per NACO estimate during 2008-09, the HIV prevalence among migrant workers was 2.36%.^[24] These reports indicate that the prevalence of HIV among the

Table 3: Distribution of selected characteristics of wives according to awareness about HIV among wives of migrant workers

Characteristics of wives	Heard about HIV		p-value*
	Yes (N=132)	No (N=718)	
	n (%)	n (%)	
Age 15-24 years	53 (40.2)	192 (26.7)	0.002
Literate	111 (84.1)	255 (35.5)	<0.001
Literate husband	76 (57.6)	213 (29.7)	<0.001
Low Living Standard Index	118 (89.4)	697 (97.1)	0.0001
Own television	20 (15.2)	26 (3.6)	<0.001
Condom use	9 (6.8)	16 (2.2)	0.004
Pre-marital sex	4 (3.3)	3 (0.41)	0.013

* p-value based on chi-square test

Table 4: Characteristics of wives associated with awareness about HIV among wives of migrant workers Muzaffarpur district, Bihar, India, 2011-12

Characteristics of wives	Crude Odds Ratio (95% CI)	p-value	Adjusted Odds Ratio (95% CI)*	p-value
Age 15-24 years	1.8 (1.2 - 2.7)	0.0018	1.3 (1.02-1.8)	0.001
Literate	9.6 (5.8 -16.5)	<0.001	7.6 (4.6-12.6)	<0.0001
Literate husband	3.2 (2.2-4.8)	<0.001	2.1 (1.4-3.1)	0.001
Low Living Standard Index	0.2 (0.1-0.5)	0.0001		
Own television	4.7 (2.5-9.2)	<0.001	1.5 (1.2-1.8)	0.001
Condom use	3.2 (1.2-7.9)	0.0041		
Pre-marital sex	7.4 (1.6 – 33.7)	0.091		

* Final model: Psuedo R-square=0.1870; LR Chi-square(2) = 25.26; p=0.0000; Hosmer-Lemeshow lack of fit test, Chi-square=10.55 at 8 d.f., p=0.4813

male migrant workers of Bihar has been gradually increasing over time. However, HIV prevalence among male migrant workers is much higher than the overall prevalence of HIV in the males of Bihar. The present study revealed the extent of problem among the wives of migrant workers. We found that out of 10 per 1000 male migrant workers probably infected with HIV infection, there could be 6 out of 1000 wives of migrant workers infected with HIV, which is nearly 0.6 % wives of these migrant workers in Bihar. Hence, these migrant workers are certainly playing a role of “bridge population” for the transmission of HIV infection to their wives.

The median age of first sexual experience of the wives was 16 years (IQR: 15-18 years), indicating that nearly 75% of the girls in rural areas are exposed to sex as soon as they turn 15 years of age. Early sexual debut is a risk factor of HIV.^[25,26] The first sexual experiences are part of the transition to adulthood, and they are influenced by the environment, context and culture in which young people tend to develop.^[27] In Indian social and cultural context, sex before marriage is considered a social taboo, but early marriage of girls less than 18 years of age in rural areas is a common social phenomenon. In this study, although the proportion of HIV positives among those women exposed to sex at an early age was higher compared to those women exposed to sex after 18 years of age, it was not statistically significant. The efforts should be taken to educate the masses about the social, behavioral and biological impact of early marriage of girl through various media.

Considering high vulnerability to HIV infection among the wives of migrant workers, low use of condoms during vaginal inter-course among these couples is a matter of grave concern. The common reason for not using condom is that it is disliked by the husbands as they think it will reduce the sexual pleasure. Condoms are a key component of combination prevention strategies, which individuals can choose at different times in their lives to reduce their risk of sexual exposure to HIV. Correct and consistent use of condoms can reduce the risk of sexual exposure to HIV.^[28] Extensive research among discordant couples have shown that correct and consistent condom use significantly reduces the risk of HIV transmission.^[29] We observed a significantly positive association between HIV knowledge and condom use in the study indicating high preference of condom use among those who had

knowledge of HIV, underscoring the importance of education as prevention.

Less than 1% wives reported premarital sex, which was probably low due to the social stigma attached to it. However, we observed a strong positive association between premarital sex and awareness of HIV. Premarital sexual experience is related directly to HIV/AIDS infection in term of duration of exposure to the disease.^[30] There are many factors related to this sexual behavior such as psychological factors including pleasure, cultural factors such as peers and the particular situation and opportunity factors such as use of condoms and availability of private space, as well as education and knowledge about HIV/AIDS. If the people have better knowledge, it could be hypothesized that behavior may be changed. People would engage in sexual experience mindful of protection, especially safer sex.^[31]

Being literate and owning a television set were significantly positively associated with awareness about HIV among the wives of migrant workers in this study. Hence, more emphasis should be given to create awareness for using electronic media in the rural areas. We observed that younger women were more knowledgeable about HIV as compared to older women. The reason could be due to greater use of phones, mobile and the internet by the younger population. Various studies have shown positive associations between socio-demographic and economic factors with the level of HIV knowledge and awareness.^[32]

Our study had certain limitations. The cross-sectional design limited the temporality of the associations between HIV awareness and various characteristics of the wives. We could not estimate the risk factors for HIV infection among the women due to small number of infections.

Conclusion

We report that the wives of migrant workers, who belonged to low socio-economic status with a poor living standard, were devoid of basic needs, were illiterate, were financially dependent on their husband, and had poor awareness and knowledge about HIV. There is an urgent need to evolve a strategy to create

greater knowledge and awareness about HIV/AIDS in this section of the community who are highly vulnerable to acquiring HIV infection from their migrant husbands.

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Conflicts of interest

There are no conflicts of interest.

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