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HIV prevalence and awareness among
wives of rural migrant workers of Muzaffarpur district in
Bihar, India

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy
in Epidemiology

by

Alok Ranjan

2013

ABSTRACT OF THE DISSERTATION

HIV prevalence and awareness among
wives of rural migrant workers of Muzaffarpur district in
Bihar, India

by

Alok Ranjan

Doctor of Philosophy in Epidemiology
University of California, Los Angeles, 2013
Professor Roger Detels, Chair

Background: There is paucity of study about HIV prevalence among the wives of migrant workers from rural areas of Bihar, India. This is the first population-based study conducted among the wives of migrant workers of Muzaffarpur district with objectives to estimate the prevalence of HIV, and describe the sexual and other risk behaviors; and delineate the knowledge, attitudes and risk perception related to HIV/AIDS.

Methods: We used a combination of both qualitative and quantitative research methods. First we conducted in-depth interviews among 24 wives of migrant workers. Based on the information collected, structured questionnaire was developed and tested. A cluster survey was conducted selecting 34 villages as primary selection units (PSUs), and then selecting 25 eligible wives randomly from sampling frames. A total of 850 wives were interviewed and blood samples were collected for HIV testing.

Results: HIV prevalence was 0.59% (95% CI : 0.19 – 1.37%) among the wives of migrant workers. The odds of risk of HIV infection among wives of migrant workers was more than 3-folds as compared to women in the general population (0.19%). In course of in-depth

interviews, 15 out of 24 wives (62.5%) wives were found to be aware of HIV/AIDS, whereas in main interview the proportion of wives who were aware of HIV/AIDS was nearly 15.52% (95% CI : 14.5 – 16.5). Knowledge was found significantly associated with age group 15-24 years, education level of women, TV set in house and husbands' education in a multivariate regression analysis. 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 associated with HIV knowledge of wives. Out of 132 wives having knowledge about HIV, 72% of them had good level of knowledge about transmission and protection, and high positive attitude towards HIV/AIDS. Wives had very low level of perception about their own risk, but perceived their husband at higher risk. Condoms use was very low among them.

Conclusions: HIV prevalence among the wives of migrant workers was higher than the prevalence among women in the general population. Education was found to be associated with good level of awareness about HIV. Our findings can support the designing and implementation of effective interventions for prevention of HIV among wives of migrant workers.

Keywords: HIV, sexual behavior, wife, Migrant workers, Bihar, India

The dissertation of Alok Ranjan is approved.

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ANC	Antenatal Clinic
AOR	Adjusted Odds Ratio
ASHA	Accredited State Health Activists
AIC	Akaike Information Criterion
BIC	Bayesian Information Criterion
CI	Confidence Interval
CSW	Commercial Sex Workers
DLHS	District Level Health Survey
FFPI	Face to Face Personal Interview
FSW	Female Sex Workers
HIV	Human Immunodeficiency Virus
HRG	High Risk Group
ICTC	Integrated Counseling and Testing Centre
ICMR	Indian Council of Medical Research
IDU	Injecting Drug Use/users
IEC	Information Education and Communication
INR	Indian Rupee
IQR	Inter-quartile Range
IRB	Institutional Review Board
LSI	Living Standard Index
MSM	Men who have sex with men

NACO	National AIDS Control Organization
NFHS	National Family Health Survey
NGO	Non-government Organization
NH	National Highway
OR	Odds Ratio
PLWAH	People Living With AIDS and HIV
PPTCT	Prevention of Parent-to-Child Transmission
STD	Sexually Transmitted Disease
STI	Sexually Transmitted Infection
UCLA	University of California, Los Angeles
UP	Uttar Pradesh
USD	United States Dollar

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CHAPTER – 1

INTRODUCTION

Acquired immune deficiency syndrome (AIDS) is a collection of symptoms and infections resulting from the specific damage to the immune system caused by the human immunodeficiency virus (HIV). The late stage of the condition leaves individuals prone to opportunistic infections and tumors. Although treatments for AIDS and HIV exist to slow the virus's progression, there is no known cure.

In India, the first case of HIV/AIDS was detected in Chennai, in the southern state of Tamil Nadu in 1986, and since then HIV infection has gradually spread to almost all the states and Union Territories ¹. The HIV prevalence has declined from 0.41% in 2000 to an estimated 0.31% in 2009 in India. In comparison to 270,000 new infections estimated in 2000, only approximately 120,000 new HIV infections were estimated in 2009, showing a 50% decline in the number of new annual HIV infections at the national level. The estimated HIV prevalence among people 15 to 49 years old was 0.31% (0.25-0.39%) in 2009. The total estimated number of people living with HIV/AIDS in 2009 was nearly 2.4 million (1.9–3 million) of whom 83% were adults aged 15–49 years. The proportion of women living with HIV was 39% of the total, nearly 0.93 million women. The adult prevalence among men was 0.36% and among women was 0.25%.²

As per the annual report of the National AIDS Control Organization (NACO) in India, the most common route of transmission of HIV infection is still heterosexual (87.4%) followed by perinatal transmission (5.4%), injecting drug use (1.6%) and homosexual transmission (1.5%).³

Currently there are three HIV epidemic zone in India based on the prevalence of HIV among high risk groups (HRG) and ante-natal as proxy for the general or low risk population. A total of six states of India are identified as high endemic zone, Andhra Pradesh (0.90%), Karnataka (0.63%) and Maharashtra (0.55%)- in south-west, and three states Manipur (1.4%), Mizoram (0.81%), Nagaland (0.78%) in the far north-east. Besides these, the states/union territories of Goa, Gujrat, Punjab and Tamil Nadu, with an estimated adult HIV prevalence greater than the national prevalence (0.31%), are in the middle endemic zone. The remaining states and union territories are in low endemic zone. Delhi, Odisha, West Bengal, Chhattisgarh and Pondicherry have an estimated adult HIV prevalence of 0.28% to 0.30% whilst HIV prevalence in other states, including Bihar, is less than 0.28%. Of India's 35 states and territories, four southern states (Andhra Pradesh, Maharashtra, Karnataka, and TamilNadu) account for 55% of all HIV infections.² Among the high risk groups, injecting drug users (IDUs) (9.2%), men who have sex with men (MSM) (7.4%) , female sex workers (FSWs) (4.9%) and single male migrants (2.36%) have the highest prevalence of HIV.³

Bihar is currently a low epidemic area of HIV/AIDS with less than 5% prevalence among high risk groups and less than 1% prevalence among ante-natal clinics (ANC) attendees. The adult HIV prevalence was 0.22% as compared to the national average of 0.31% in the general population. The HIV prevalence among males and females were 0.26% and 0.19% respectively.²

In India, the majority of HIV transmission is due to heterosexual route (87.4%) mainly due to interactions of sex workers and their clients who are considered most-at-risk population, and to others through them. These clients of sex workers are acting as a "bridge population" between high and low risk groups. The clients of sex workers are mainly married men, and

among these married men some of them are having sex with men, drug users, long distance truckers and seasonal male migrants.^{4,5} Two decades back the HIV epidemic was mainly concentrated among high-risk population (HRG) in urban areas like metropolitan and big cities, but gradually over the passage of time the disease have spread to rural areas. There are few studies that have documented the spread of the HIV epidemic in rural areas of India because of increased mobility of individuals to and fro from rural to urban areas.^{6,7}

Migration plays a very important role in transmission of various types of infection from high endemic zone to low endemic zone through the migrant populations. Associations among migration, mobility and infection have played an important role in the spread of the HIV epidemic since the beginning.^{8,9,10,11,12} These states further played a significant role in transmission of HIV infection into low endemic zones of the country through migration process.^{7,8}

There are many factors which promote the rapid spread of HIV infection and these factors vary in different parts of world. Demographic, socio-cultural and economic factors play important role in allowing rapid spread of the virus among people triggering an epidemic. Internal migration of people may be much faster and migrants may move to several places within a short span of time thus extending the territorial spread of these diseases. The increasing movement of people, with associated age and sex selectivity in terms of dominance of single male migration, has great potential in spreading through sexually transmitted health risks. In addition to age and sex selectivity, in the case of developing countries the majority of the migrants are poor, illiterate and from rural areas. The impact of migration on spread of HIV infection have been reported from many other developed and developing countries.^{8,13,14,15,16,17,18}

Knowledge about HIV/AIDS and STDs was found to be very low among migrants as demonstrated by a study , conducted among migrant workers of Uttar Pradesh (UP) and Bihar working in textile factories situated in Surat, Gujrat, India. The fact that only 5 percent of migrants had heard about HIV but a large majority had heard about AIDS implies that only partial knowledge is being transmitted, which in turn has implications for the effectiveness of information, education and communication (IEC) activities.^{19,55}

There have been two extensive reviews of the HIV epidemic in India. Both suggest that the pattern of HIV infection is remarkably similar to that seen early on in the epidemics in Thailand, Kenya, and Zimbabwe. In the beginning of the epidemic in India, most HIV infection remained confined within the high-risk groups (CSWs, their clients, IDUs, STD patients) in major urban areas.²⁰

An indication of this spread to the general population in India is a report of seroprevalence among married monogamous women attending a STD clinic in Pune, India showing that 13.6% of the women tested positive for HIV.²¹ Twenty five to thirty percent of AIDS cases in India occur in women – predominantly infected by heterosexual transmission. Recent reports indicated that many of them (70 –80%) do not belong to a high-risk group. HIV prevalence among women attending ante-natal clinics is on the rise in the major urban cities like Chennai, Mumbai, Nagpur, and Ahmedabad. Several studies conducted in different towns showed that HIV is rapidly being transmitted to married monogamous women.^{21,22} 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.²³ Many press reports published during the year 2008 showed an increasing trend of HIV prevalence among pregnant women in two districts,

Lakhisarai and Saharsa in Bihar and other rural areas.^{24,25,26} Over the past decade there has been a dramatic shift in the gender ratio so that currently almost half of the 33.2 million persons worldwide with AIDS are women.^{27,28} This global epidemiological picture is being replicated in India. Women currently represent an estimated 40% of people aged 15–49 living with HIV/AIDS in India.^{29,30}

Men's extramarital sexual behavior is the most important factor for introducing HIV/STI into marital life.^{21,31,32,33} 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 marriage.³⁴⁻³⁹ 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.

According to analysis using the National Family Health Survey (NFHS-III) data, 1.18 million married couples are affected by HIV in India, where one or both partners are infected. Among a large pool of sero-discordant married couples the women were positive in 20% of the cases, and husbands were negative. Further, condom use among these couples is only 6%. HIV prevalence among currently married women (0.19%) is only slightly lower than that for all the 15-49 year old women (0.22%) in the country and higher in urban (0.29%) than rural (0.14%) areas.⁴⁰ There are also indications of female to male transmission of HIV considering that female sero-discordance is reported in 0.16 million couples in India and that 39% of all HIV infected women have uninfected husbands.⁴¹

Globally a major proportion of HIV prevalence is mainly attributed to the sexual behavior. Understanding the sexual behavior in context to socio-cultural practices is vital to the development of successful prevention strategies.⁴² It is very important to locate and estimate the size of various risk groups, their risk behaviors and assessment of their HIV status for identifying various factors related to the epidemic, and for program planning and measurement of program effectiveness.⁴³⁻⁴⁶ Available epidemiological data are a good source for planning and developing programs and policies related to HIV/AIDS prevention and control. However, the HIV prevalence statistics in India are mainly estimated on basis of the data available through sentinel surveillance from antenatal (ANC) and sexually transmitted disease (STD) clinics. This method is simple and economic for monitoring trends in high-risk groups over time, but lacks validity due to facility-based sampling, and hence does not provide real insight into the extent of the epidemic or transmission to guide program strategy at the local level.^{45,47,48} Behavior Surveillance is carried out periodically to assess the risk behavior in India, but has certain inherent limitations.⁴⁹ Further, sentinel and behavioral surveillance activities have no linkage that limits the usefulness of the information.

Epidemiology of HIV/AIDS in Bihar

Bihār – The name *bihār* is derived from the Sanskrit *vihāra* meaning "abode". The region roughly encompassing the present state was dotted with Buddhist *vihara*, which were the abodes of Buddhist monks in the ancient and medieval periods. (Figure-1:Map of Bihar).



Currently, Bihar is one of the states of the Indian union situated in the eastern part of India between latitude 21-58-10 N ~ 27-31-15 N and longitude 82-19-50 E ~ 88-17-40 E (Figure-1). Patna is the capital of Bihar. To Bihar's north is the Kingdom of Nepal. On its other three sides Bihar is surrounded by the Indian states of Uttar Pradesh to the west, Jharkhand to the south and West Bengal to the east. Bihar lies in the very fertile Gangetic plain. It's average elevation above sea level is 173 feet. The total area of Bihar is 94,163 sq km. The total population of Bihar per the 2011 census is 103.8 million (approx.) making it the third largest state in terms of population.⁵⁰ The density of population is 880/square km. Now there are 38 districts as main administrative units.

Bihar is among the least developed states of India and has a per capita income of Rs.24,681 (\$537) a year against India's average of Rs.60,972(\$1410) by the end of 2011.⁵¹ A total of 40% live below the poverty line as compared to India's average of 26.1%. The blame for this stems from many factors: grossly discriminatory central government policies, viz. Freight

equalization scheme, lack of vision of the political classes, and inadequate investments in agriculture, infrastructure and education. Some people believe that misrule, caste-dominated politics and rampant corruption by politicians and bureaucrats have been the cause of the lack of development of the state. The economy is mainly based on agricultural and trading activities. The vast swath of extremely fertile land makes it ideal for agriculture. Despite a number of rivers and good fertile soil, investment in irrigation and other agriculture facilities has been grossly inadequate. Agriculture is mainly dependent upon the vagaries of nature. The growing population has an adverse impact on agriculture. High population load has rendered many families into landless laborers within and outside the state.

Due to lack of infrastructure and industries, there is very low level of employment opportunities for young adult males and females of the state compelling them to migrate to places like Delhi, Mumbai, Kolkata, Surat, Ahmedabad, Punjab and Hariyana for livelihood and occupation. Based on the 1999-2000 National Sample Survey, Bihar has the highest rate of out-migration about 3.1% of the total population in India.²⁵ As per the census 2001, Bihar is the second state in India with a net migration of about 1.7 million from rural to urban areas.⁵² On this rate of out-migration, approximately 2.5 million of the total population of the state lives outside for various reasons. The rate of migration varies from one area to other area of the state ranging between 2-25% depending upon various socio-cultural and economic practices. A large proportion around 20-30% of adult males in the age group 20-45 migrates to these places. The majority of them work as laborers on construction sites, factory workers or in other informal activities in cities and earn too little to have formal housing in the cities. Most of these migrants live in slums in sub-human living conditions. It is well known that vulnerability to STDs and

HIV is often greatest when people find themselves living and working in conditions of poverty, powerlessness and social instability, conditions which apply to most of the migrants.¹⁹

Separation from family and socio-cultural norms, isolation/loneliness, a sense of anonymity that offers more sexual freedom, and availability of some disposable income in hand, makes migrants more vulnerable to adopting high-risk behavior. These behaviors include alcohol, drug use, and unprotected sex with persons with unknown sexual history which make them vulnerable to HIV infection. They move alone leaving their families in the villages, thus they have nobody to fall upon in case of need. They often feel insecure and isolated at the place of destination. The resulting isolation may increase vulnerability to HIV.⁵³ However, migrants being social human beings create their own social networks and relationship, which are often non familial and of short duration particularly among single migrants. This kind of social networking and relationships may also make them more vulnerable to peer group pressures and acts. In addition to individual risk-factors of HIV/AIDS infections, migrant labour is also exposed to various environmental risk-factors, such as availability of recreational outlets like beer bar, discotheque, easy availability of commercial sex workers, exposure to pornographic materials, etc. that may increase their vulnerability to HIV infection.⁵⁴ The cultural heterogeneity of people from different areas may keep the anonymity of the relationships with realistic possibility of unsafe sex due to drunkenness and drug-use that are known to increase impulsivity. The problems get multiplied if these migrants have poor or no access to health care as well poor information about the health care facilities at the place of destination.^{19,55}

Contrary to traditional belief, studies show that sexually transmitted diseases and sex with multiple partners are common in the country, both in urban and rural areas. It is felt that

HIV is spreading fast to rural areas through migrant workers and truck drivers. Surveys show that 2 to 10 percent of some truck drivers in the country are infected with HIV.^{56,57} These studies on certain highly mobile groups such as truck drivers, commercial sex workers and itinerant traders have helped in drawing inferences about linkages between migration and HIV Spread. There is a paucity of credible information on the actual role of migration in the spread of HIV. These migrant workers are at increased risk of contracting sexually transmitted diseases (STDs) and HIV/AIDS by means of their unsafe behavioral practices. In fact, migrants are thought to act as an important “bridge population” to transmit HIV from high-risk commercial sex workers (CSWs) to the general population especially to their wives or with other partners or local commercial sex workers who further transmit infection to their other local clients.^{22,58-60} Few studies have been done in India among migrant factory workers and homeless.⁶¹⁻⁶² These studies have shown a prevalence of around 3-5% among these groups. The majority of them were from the neighboring state like Bihar. The HIV prevalence among migrant workers was 2.4%.³ A recent study conducted among the workers of textile and diamond industries in Surat, Gujrat has revealed nearly 1% HIV prevalence.⁶³

Study Goals and Specific Objectives

One decade back HIV/AIDS infection was mainly concentrated in the urban and industrial areas of India. The studies on HIV transmission and risk behavior related characteristics among these migrant male population from semi-urban and rural areas of Bihar in India describes only one part of the scenario. No study has been conducted so far to estimate the prevalence of HIV/STD among wives of the migrant male workers in Bihar. The present study aims to estimate the prevalence of HIV and associated risk behaviors among the wives of migrant workers in rural

areas of Bihar and to understand the role of migration itself and other risk factors for acquiring HIV in this population with the potential to spread the infection to the general population. This will increase our understanding of the epidemiology of HIV in Bihar.

Data collected through sentinel surveillance and at Integrated Counselling and testing centres (ICTC) have certain limitations as these do not represent the target population. Population-based community surveys are required to collect a representative sample and for better coverage. This is particularly imperative for rural women who are not only underrepresented at government-based ANCs but may also perceive themselves to be at no/low risk for contracting HIV infection, probably not recognizing the threat from their husbands who may be engaging in high-risk behavior. Such a scenario can be visualized in areas with large mobile populations, such as single male migrant workers, that are known to act as the “bridge population” for transmission of HIV.

A community-based survey of wives of single male migrant workers in Muzaffarpur district of Bihar was conducted in order to understand the dynamics of various behavioral, social and cultural factors for HIV transmission among them.

The specific objectives of this study were as follows:

Qualitative Research:

1. To learn the socio-cultural and behavioural practices related to marriage and sex in rural area, and the factors that may be associated with potential transmission of HIV to them from their partners.

Specific Aims:

1. To conduct formative in-depth interviews among 24 wives of single male migrant workers in the study area
2. To obtain formative data to develop the survey instrument to be used as a part of the quantitative study.

Quantitative Research:

Objectives:

1. To understand
 - a) Socio-demographic characteristics including education level, income, migration history of husbands
 - b) Knowledge and attitude towards HIV
 - c) Knowledge, attitude and practice towards condom use among the wives of migrant workers
2. To determine the prevalence of HIV among them.
3. To explore their behavioral and demographic factors associated with HIV infection.
4. To evaluate the role of migrant workers in HIV transmission to the general population.

Specific Aims:

1. To construct mapping of a convenient study site for the purpose of establishing a sampling frame and recruiting study subjects.
2. To identify the residences of migrant workers for the study and recruit their wives as participants in the most representative manner
3. To conduct interviews among the participants to measure characteristics of the participants.
4. To collect blood specimens for screening of HIV among wives using a rapid HIV test and for confirming HIV positive-status using ELISA testing.

The findings of the study will enable informed design and implementation of policies, programs and strategies that address the HIV/AIDS related issues of migrant workers and their spouses in Bihar. In specific terms, the findings will guide health planners to design specific interventions for the HIV/AIDS program in the districts.

Scope of the study

In light of the above mentioned objectives , the study focused on the following themes and indicators:

A. Demographic and socio-economic

- i. Age, marital status, educational attainment, social and religious affiliation, source of livelihood
- ii. Asset base of household

B. Sexual Behaviour

i. Age at first sexual debut

ii. Age of first sexual partner

iii. Knowledge, ever use, current use, future use of condoms and circumstances surrounding condom use

C. HIV/AIDS

i. Knowledge of HIV/AIDS

ii. HIV testing

iii. HIV/AIDS risk perception

iv. Sources of HIV/AIDS information

D. Contraception

i. Knowledge about contraception

ii. Ever use and current use of contraception

iii. Non-use of contraception

iv. Future use of contraception

Outline of the dissertation

The report contains six chapters, of which chapter one is introductory. Chapter two presents the methodological issues for the study including problems encountered. Chapter three presents in-depth interviews conducted among the wives of migrant workers related to socio-cultural pattern of marriage and sex in relation to HIV transmission and awareness. Chapter four presents the prevalence and knowledge of HIV, and relationship control in terms of sexual power, decision making and gender attitude. Chapter five presents the findings of level of knowledge, attitude and risk perception among those women who had ever heard HIV/AIDS before participating in this study. Chapter six, the last chapter, presents a summary of the major findings and emerging issues for policy and program action.

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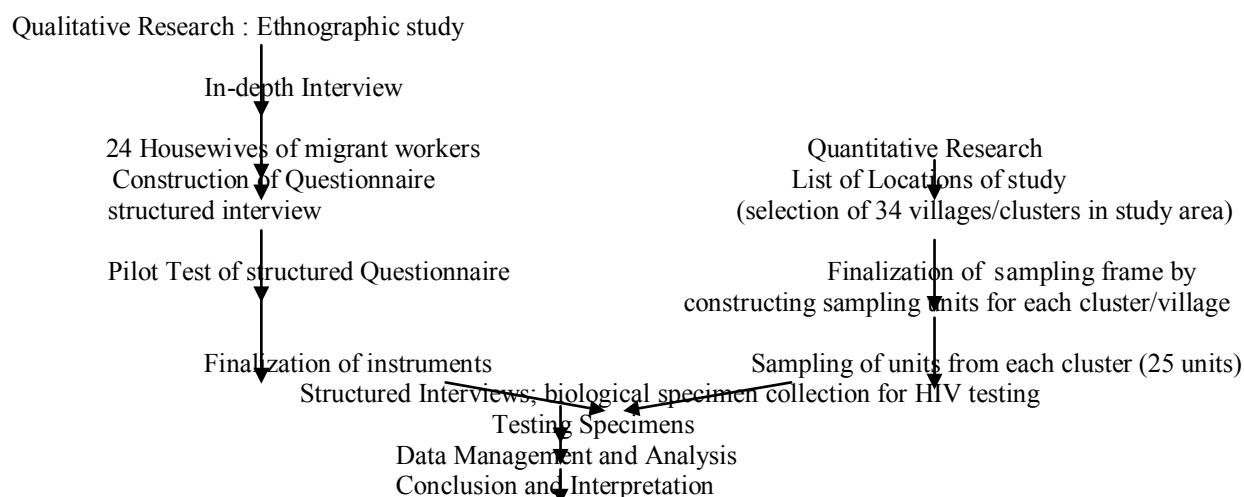
CHAPTER – 2

METHODS OVERVIEW

Study Design

This study combined both qualitative and quantitative methodologies in order to better understand the HIV epidemiology among the wives of migrant workers in the study area. A flow-chart of method is presented in Figure-2.1.

Figure 2.1 : Flowchart of Study Design



The qualitative study included in-depth interviews in a small subset of the study subjects. A community-based cross sectional study was carried out for conducting structured interviews of wives of migrant workers.

Study Area

Based on the reports of various national and international agencies working on HIV/AIDS epidemiology, Muzaffarpur district was considered as a high HIV prevalence area in Bihar. It was one of the highest prevalence districts among seven district of the state. The HIV prevalence

was 1.07% among the high risk population.¹ This district had the highest prevalence (0.33%) among the ante-natal clinic (ANC) attendees as per the HIV sentinel surveillance (HSS) report.^{2,4} According to a Mobile AIDS Testing (MAT) conducted by the Regional AIDS Testing and Networking in India (RATNEI) in 2007, the HIV prevalence was 3.41% among 100,000 adult males and females population of the state.³ Also, a high rate of out-migration of workers was observed in 10-11 villages of the Kurhani block in the course of a survey conducted in ten thousand persons for an epidemiological study of visceral leishmaniasis in this district during 1992-95 (unpublished data). Therefore, we selected Muzaffarpur district as our study area.

Muzaffarpur district of Bihar is spread over an area of 3172 sq. kms. The district is bounded on the north by East Champaran and Sitamarhi districts, on the south by the district of Vaishali, on the east by the districts of Darbhanga and Samastipur (part) and on the west by Saran and part of Gopalganj districts. The district headquarters is located at Muzaffarpur. In 2011, Muzaffarpur had population of 4.778 million of whom males and females were 2.517 and 2.261 million respectively, and constituted 4.60 percent of total Bihar population.⁵ Overall, there were 898 females per 1000 males. Literacy rate in rural areas of Muzaffarpur district was 63.75 % as per census data 2011. Gender wise, male and female literacy stood at 72.09 and 54.44 percent respectively. In total, 2,264,092 people were literate of whom males and females were 1,350,850 and 913,242 respectively. The rural population in the district is 90.17% and urban population is 9.83%. The scheduled castes and scheduled tribes contributed about 15.7% and 0.04% of the population respectively. The decennial growth rate between 2001 and 2012 was 27.54%. The density of the population was 1506 per sq. kms. Hindi is the main language spoken in the district.

Muzaffarpur district consists of 2 sub-divisions and 16 Community Development Blocks. It has 3 towns and 1,811 villages.⁵

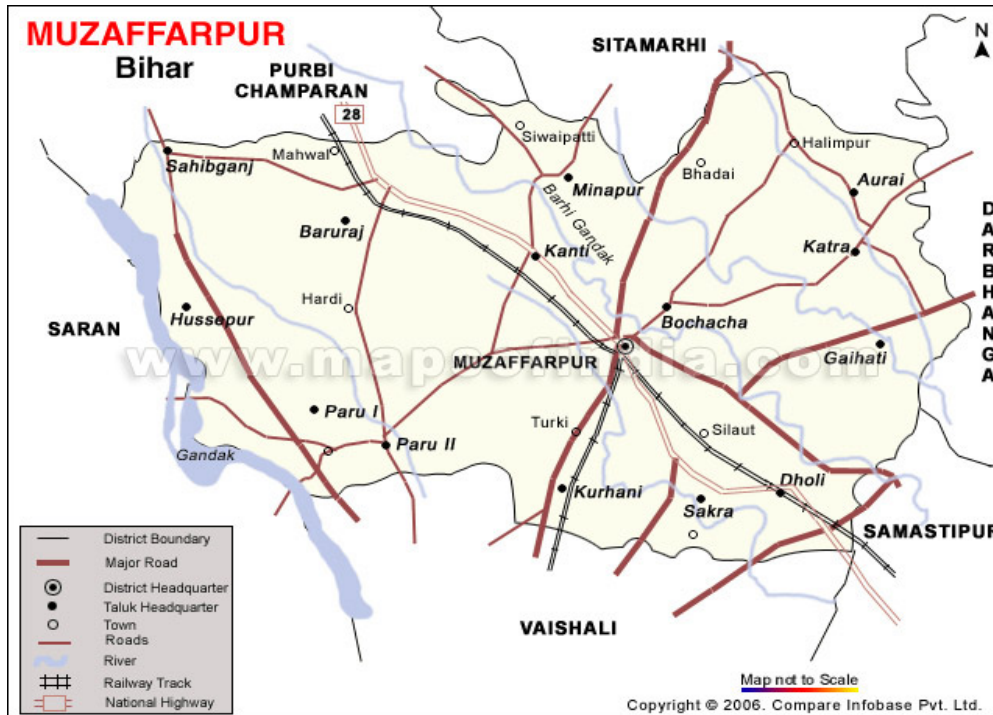


Figure-2.2 : Physical Map of Muzaffarpur District, Bihar

Muzaffarpur district is the center of several industries, big and small. The Prabhat Zarda Factory, Bharat Wagon and Engineering Ltd., units of Leather Development Corporation, Muzaffarpur Dairy under the Bihar State Dairy Corporation are the major industries located in Muzaffarpur town and its periphery. The above industries have generated considerable employment and have also been helpful in establishing a number of small industries including a few cottage industries. The most important item that is manufactured in Muzaffarpur town is railway wagons. It is also a very important centre for the cloth trade.

The district is well connected from all important areas through a good network of state and national highways. NH-28 passes mid-way through district. All blocks and villages are well connected by motorable roads.

Selection of Subjects

1) Defining the source population

The source population refers to all married women aged 15-49 years whose husbands are working outside their village for at least one month a year and have a permanent house in the selected study villages. We have not included those who lived in the village for a short duration or temporarily immigrated from a nearby village.

2) Defining migrant workers' wives

A migrant was defined as a person, who was born and grew up in the village, currently working outside the state for the livelihood and who visit their native place once or twice for at least seven days in a year. Study population consists of married woman who lead a conjugal life for at least one month and have sexual contacts whenever their husbands were available.

3) Eligibility Criteria

a) Inclusion criteria:

- I. Age: 15-49 years, Married/Widow (recently 1-2 years)
- II. Gender: Female
- III. Residing more than six months in village

b) Exclusion criteria:

- I. Unmarried 15-49 years old women
- II. Married but Husbands not working outside village.
- III. Women with mental impairment

Sample Size:

For conducting in-depth interviews, 24 wives of migrant workers from 4 villages were selected. The sample size for the quantitative study was 850 wives of migrant workers.

Sampling strategies and recruitment of participants:

In-depth Interview

A sampling frame of potential participants living in four villages of study area was created. From this list, 24 participants, wives of migrant workers, were selected after taking their verbal consent. Prior to their selection, all of them were briefed thoroughly about the aims and purpose of conducting in-depth interviews. Participants were volunteers identified with the assistance of local women's groups and NGOs working in the study areas. The interview was semi-structured, and conducted by the married female investigators using an interview guide in the local language, which is mainly a version of the Hindi language. The interview guide was duly approved by the Institutional Review Board (IRB) of UCLA and Institutional Ethical Committee at Rajendra Memorial Research Institute of Medical Sciences, Patna.

All the interviews were conducted in an isolated private room in a location convenient to the participants. The participants were paid an honorarium of INR 150 (US \$ 3) for compensating for their time.

Structured interview

We constructed a complete list of all inhabited clusters/villages based on the Census of India, 2001 for the study district. A one-stage cluster sampling at two levels technique was used with the help of C-survey software (University of Indonesia, Jarkarta, Indonesia and UCLA, Los Angeles, California, USA). All the selected villages were mapped with important legends and Census information was used for estimating the population of adult males and females in each village. At the second stage, houses of migrant workers in each village was identified with the help of local field workers, and a sampling frame of the houses of migrant workers for each village was constructed. Twenty five subjects per cluster/villages were randomly selected from the sampling frame of each village.

A short screening questionnaire was administered to all consenting subjects to check for their eligibility for the main interview. We used face-to face personal interviews (FFPI) technique for the first two sections for establishing rapport with the interviewee. Another advantage of face to face personal interview (FFPI) at this stage was to assure that interviewers would explain the rationale and format of the survey directly. All the interviews were conducted in a separate room close to their locality. Only interviewer and interviewee were present in the room. For interviewing last part, which requests sensitive information about sexual behaviors, audio-recorded with color-coded questionnaire [Cassette player with earphones] was used.^{6,7,8} Each participant heard the question using earphones and recorded their response on a coded answer sheet listing the possible responses, but not the questions. The answer sheet included only the identification number, the number of questions, and the number of the alternative responses to each question. The interviewer was available for clarification of questions and for other help.

A pre-coded structured questionnaire was used for collecting information on demographic and socio-economic characteristics, sexual and other HIV-related risk behaviors, knowledge and attitudes associated with HIV/AIDS, HIV testing, and perception of HIV infection risk. Basic demographic and socioeconomic information and responses to questions about HIV knowledge were obtained via face-to-face personal interviews (FFPI). All sensitive questions about personal behaviors, marital relationships etc., were asked through pre-recorded audio device. The questionnaire was translated and recorded in local Hindi language. Each subject was asked to provide a blood sample after completing the questionnaire for HIV testing. A unique study identification number was given to each subject to use for obtaining test results. Before sample collection, participants were given pre-test counseling. After specimen collection, participants were given HIV prevention information and post-counseling, and an appointment date for receiving their test results. Recruitment of subjects was entirely voluntary and anonymous.

Eligible participants who were willing to join this study were given an information sheet to read (or read to them if they could not read it). Procedures of informed consent were followed. The study was approved by the UCLA Institutional Review Board (IRB) and Institutional Ethics Committee of ICMR, Patna, India.

Details of the methods and data analyses are part of the dissertation results as separate subject-specific manuscripts.

Dissertation results

The next four chapters constitute the results as four separate but interrelated manuscripts, each formatted into the introduction, methods, results and discussion sections as relevant to the subject matter of the chapter. These are:

1. Sexual behaviors and HIV-related issues in rural areas: A qualitative assessment of wives of migrant workers.
2. Prevalence of HIV and associated risk factors among wives of migrant workers in rural areas of Muzaffarpur district in Bihar, India.
3. HIV knowledge, attitude and risk perceptions among the wives of migrant workers in Muzaffarpur district, Bihar, India.
4. Discussions and Conclusions

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CHAPTER – 3

Sexual behaviors and HIV-related issues among wives in rural areas: A qualitative assessment of wives of migrant workers

Introduction

During the initial phase of the HIV epidemic in India, the disease was confined to limited areas, and more prevalent among the adult males compared to females. But gradually over time and space, the disease spread to a large area and the rate of growth of HIV infection among women has increased to many folds, almost comparable to males in India. As per the NACO statistics during 2009-10, there were 2.4 million people living with HIV out of whom 39% were women amounting to 0.9 million of the total.¹ The heterosexual route is the main cause of HIV transmission in 87.4% of the total HIV infected cases.² A decline of disease prevalence is observed in 2009 as compared to 2000, however the prevalence among women continues to remain high.^{3,4,5,6,7}

The HIV epidemic in India is moving into low endemic areas, low risk populations and to the rural areas as evidenced through many reports.^{8,9,10,11,12} The expanding sexual networks and increasing mobility of the “bridge population” across the country are some of the important factors for transmission dynamics of HIV in India. Single male migrants are one of the most vulnerable groups who get exposed to HIV infection due to various social and behavioural reasons. The predominant mode of migration in Bihar is “circular” or “oscillating” migration, in which young men leave their rural partners to work in urban areas like Delhi, Mumbai, Kolkata, Surat, Ahmedabad, Chennai, Bangalore Punjab and Hariyana. It has been argued that it is not so much the movement itself but rather the “conditions and structure of the migration process” that put people at risk for HIV and other STDs.¹³ The role of migration in the spread of HIV or STDs

has been attributed to sexual contacts during seasonal migration. Migrant workers then infect their wives or regular partners when they return.^{14,15,16}

Married women are highly vulnerable to sexually transmitted diseases (STDs) including HIV due to high risk behavior of their husbands.^{17,18,19} Some of the married males have multiple sex partners which also put their wives at risk of getting HIV infection.^{20,21,22} Other factors for spread of HIV infection among married women may be attributed to male resistance to condoms use and women's inability to negotiate safer sex, domestic violence, and overall lack of knowledge about STI/HIV infection among women.^{23,24,25}

The National Family Health Survey, Phase-3 (NFHS-3) conducted by the Ministry of Health and Family Planning, Government of India, has reported level of correct knowledge about HIV/AIDS among both urban and rural women in India.²⁶ As per the estimates during 2007-08, 25% of the women living in the rural areas of Muzaffarpur district in Bihar had heard about HIV/AIDS and 89% of these women had high level of knowledge about HIV / AIDS, and 26% had heard about RTI/STI.²⁷

The existing information about the sexual networks and risk profile of wives and their migrant husbands are very important in order to understand the HIV epidemic in the district. Globally a large proportion of the HIV prevalence is attributed to individual socio-psychological and personal behavior, and mode of interactions or sexual mixing pattern within and outside the community. Qualitative methods attempt to grasp these phenomena in more holistic way or to understand a phenomenon within its own context or to emphasize the immersion in and comprehension of human meaning ascribed to some set of circumstances or phenomena, or all three.²⁸ We used in-depth interviews^{29,30,31,32,33} of wives of migrant workers to describe the

interpersonal, social and cultural context of the reported behaviors and information related to marriage and sexual practices commonly prevalent in the rural areas.

Methods

Study Area

Out of 16 sub-districts or developmental blocks in Muzaffarpur district, Kurhani block was selected, considering the approachability and logistics. Four villages were selected from two Panchayats, the lowest administrative unit as per the three tier administrative structure of the state government.

Study Population and sample size

The study participants were wives of migrant workers of 15-49 years age, living in rural areas of Muzaffarpur district for at least six months, and without any mental health problems. There was no actual calculation of the sample size for this phase of study. It is suggested that 50-100 is a reasonable size for a qualitative study.³⁴ A sampling frame of these participants was created by the two female interviewers with the help of a non-Government Organization (NGO) and ASHA (Accredited Social Health Activists) of 4 villages in the selected panchayat of Kurhani block in the district. All 24 participants, after going through the project information or having it explained to them by the ASHA workers, gave their formal consent to participate. The place and time of interview was told to them one day in advance. All 24 participants who gave their formal consent attended the interview at schedule time and place. They were paid an honorarium of INR 150 (US \$3) for compensating their time.

Data Collection

In-depth interviews were conducted by two female field interviewers recruited for the study. These female investigators were selected from Muzaffarpur district only because to make conversation in local Hindi dialect with the participants. They received one-week training about the techniques for conducting in-depth interviews. The P.I and interviewers discussed together

how to reach the migrant workers' wives, what information they need to collect and how they would collect it.

An in-depth interview guide was prepared which was approved by the Institutional Review Board of UCLA and institutional ethical committee of ICMR, Patna. The guide was mainly focused on basic demographic information, sexual behavior, including premarital, marital, and extramarital; quality of marital relationship; HIV/AIDS related knowledge, including risk factors; condom use; personal risk perception; social and economic status; gender roles; decision making within family; peer networks; substance abuse; work-related activities etc. The questions were of a general nature and not directed to their personal behaviors.

In-depth interviews were conducted in the local language, mainly a version of the Hindi language. All the interviews were tape-recorded and were later translated into English by a professional Hindi-to-English translator. Both female interviewers conducted all the 24 interviews together dividing their job responsibilities between them; one of them was asking questions from the guide and recording the entire process using a tape recorder, another was taking down written notes simultaneously. Both of them were prompting participants during the interviews. All the participants were interviewed in a closed room provided by the head of the local Panchayat. The purpose of selecting this place was to make a neutral place where the extent of distractions during the interviews could be minimized.

Data Analysis

All the hand written field notes and tape-recorded materials taken at the time of each interview were collected from the female field interviewers by the PI. A separate cassette tape for each respondent was used. The hand written field notes and tape-recorded material was verified by the PI to ensure completeness of the interview. The tape-recorded version and written-notes of each

participant were combined together for each section on plain sheets of paper in the local Hindi language by PI. Using the sheets, the contents of 24 in-depth interviews were first translated into English with help of a trained Hindi Translator, and then transcribed on MS Excel sheet for each question. A master chart was developed for transcribing responses of all the participants.

We performed the most common formal content analysis.^{35,36} We used the interview guideline to do a content analysis of the interview transcripts and organized the statements into major themes to describe the pattern of responses. The themes were presented as quotes to describe social norms about sex and marriage, marital and extra-marital sexual behaviors, impact of migration and HIV/AIDS-related knowledge and risk perception for self and husbands.

Results

The interview guide was divided into four sub-sections. The results for each section and sub-sections are presented.

A. Socio-demographic profile

Table 3.1 presents socio-demographic and economic characteristics of wives and their husbands. The median age of the wives of migrant workers at the time of interview was 30 years (range; 22-45 years). The median age at the time of marriage of these respondents was 16 years (range; 14-22 years). The median age of their husbands at the time of marriage was 21 years (range; 17-25 years). The average age difference between husband and wife was 3-8 years. Out of 24 respondents, 14 had formal education at school level, ranging between 4th to 10th standard. The median number of children the respondents had was 3 (range;1-6 children). Almost 75% of the respondents (18 out of 24) had no agricultural land for farming, no cattle or other means of livelihood. They were totally dependent on the income earned by their husbands. Out of 24

wives, 14 had knowledge about various contraceptive devices such as condoms (n=14), permanent sterilization (n=7), and intra-uterine devices (n=1).

Husbands' Profile: The husbands of the participants were working in other states or big cities like Kolkata, Delhi, Mumbai, Surat, Punjab, Hariyana, Assam, Sikkim and Bangalore. Out of 24 participants, husbands of 10 participants were working as skilled workers like plumber(1), carpenter(1), mason(3), Barber(1), Mechanic(2), truck driver(1) and office staff(1). Husbands of 12 participants were working as unskilled labor such as factory laborers in textile and steel factory, laborers at construction sites, agricultural laborer and rickshaw puller. Husbands of 2 participants were fruit/vegetable vendors. Except for 4 husbands, 20 of them had an addiction to one or other forms of tobacco products (Cigarette, bidi, chewing raw tobacco, betel leaf) and 7 had addiction to alcohol. Except for 4 wives, none had any knowledge about extra-marital affair of their husband or visiting to commercial sex workers at their place of job. Four of them had some sort of suspicion about their husbands' sexual behavior. The median duration of migration (in years) as told by the respondents was 10 years (range; 4-25 years). Out of 24 husbands, 9 of them visit their village at least 2 times a year, and 15 used to visit only once a year during the festival time.

B. Socio-cultural and behavioral practices related to marriage and sex

Table 3.2 presents socio-cultural and behavioral practices related to marriage and sex as reported or perceived by the wives of migrant workers. The median age of marriage of boys as reported was about 20.5 years (range;18-21 years), whereas for the girls the median age was 18 years (range;15-20 years) in the study villages. The median age of first sexual contacts of girls was 16.5 years (range; 15-18 years) as reported by 22 participants.

Premarital Sex of girls and boys : Out of 24 wives, 9 of them told that almost all the girls in the village had sex only after marriage, but 14 had opinion that some of the girls (5-20%) had sex before marriage also. The reported median age of first sexual contact of the boys was 19 years (range; 16-23 years). Out of 24 wives, 14 of them told that some of the boys (15-20% of total) had sexual contacts before marriage, whereas 9 told that only after marriage. Out of 24, 15 had opinion that 10-15% young unmarried boys and girls of their village in age group 15-17 years had sex with their friends living in village or their close relatives not blood related.

“..nearly 90 to 95% girls in our village had sex only after marriage, but nearly 5-10% girls enjoy sex before marriage also” (4th Participant, 30 years)

“ yes...many boys nearly 25% in village enjoy sex with the girls of same village...who are going to school with them....(5th participant, 25 years).

“Nearly 20-30% boys and 10-15% girls in village have sex before marriage..mostly in the age group 15-18 years...it was very rare 10-15 years back...even some married women (I know who, but won't disclose their name) are enjoying sex with some younger boys..who are living in cities for study..they bring lot of gifts for them ..(9th participant,40 years)

Reasons for premarital sex : Various reasons were explained in relation to premarital sex in rural areas. Co-education of boys and girls, love affair, delayed marriage, watching bad movies, bad company, allurements for gifts money were some of the important reasons for premarital sex among boys and girls. Some of the boys visit to commercial sex workers (CSW), especially those who are studying outside in big city outside village. These boys also offer good gifts to their girl friends in village and enjoy sex with them. Some women had opinion that use of mobile and electronic gadgets among young boys and girls were the sole reason for premarital sex as they could access to pornographic materials through these.

“These days young boys and girls are enjoying sex before marriage....mostly within the same age group or studying in the same school/college...they meet outside village and enjoy sex...(3rd participant, 30 years)

“unmarried boys or girls enjoy sex because they don’t get married early..or they feel they won’t get early married because of their family and social reasons..(1st Participant, 28 years).

“some boys who are living away from their family might be having sex with women available there....(6th participant, 30 years).

“young boys who are using toxic products like drinking alcohol, smoking, chewing tobacco..get hyperactive...they also watch bad movies (pornography) on their mobile set...these thing in early age tempt them for sex...some of them visit CSW also (2nd participant, 26 years)

Multiple partners of males : Nearly 5-10% of the males in villages had many sex partners, as told by 14 out of 24 of the participants. Their partners were mostly women of the same village who had doubtful character, with close relatives like sister-in-laws, friends’ wife, agricultural laborers working in the farm, women living without husband, and commercial sex workers.

“About 5% adult males have multiple partners...they enjoy sex with other women outside village not within village (1st Participant, 28 years).

“ Nearly 5-10% of adult males enjoy sex with other women and with commercial sex workers also ...(2nd Participant, 26 years).

“Males, nearly 5-10% not more than that, have sex with unmarried girls....they think that unmarried girls give them more pleasure...(3rd Participant, 30 years).

Reasons for Multiple Partners among Males: Some women had opinion that males belonging to affluent and powerful families had tendency to enjoy sex with other women within and outside village. Sometimes these males exploit the situation of some poor women, especially those who

work as agricultural laborer or domestic help. Beautiful and physically attractive women or unmarried girls are usual target of these males as told by some of the respondents. Some of these males enjoy sex with their close relatives or friends.

“Women working as agricultural labourer in the field of land lords become soft target for sex...males usually allure them for money or some kind of gifts..(13th participant, 30 years).

“Affluent Males usually get attracted towards good looking girls or women...these women get trapped for sex for some kind of favour..(16th Participant,22 years).

“Males enjoy sex with those women who are physically very attractive and active..and their husbands are living outside..(19th Participant,28 years)

Multiple Partners of women: As regard to sexual behavior of women in villages, 10 out of 24 told that women had multiple partners but in very low proportion 5-10%, especially those who were not happy with their husbands or living alone. They usually got involved with their close relatives like brother-in-laws, husband's friends, some distant relatives or sometime with rich landlords.

“Some women have sex with their close relatives like brother-in-laws, or husband's friend..(3rd Participant, 28 years).

“ Few women enjoy sex with other males of same village....most of the time unmarried boys...”(12th Participant, 25 years).

Reasons for extra-marital relationship: Various reasons were told by the women in relation to extra-marital relationship. Some rural women living without their husbands for a long duration got tempted to satisfy their natural sexual urge and hence develop some kind of close relationship with other males in village. Unsatisfied marital relationship with husbands and poverty were some of the important factors for extra-marital relationship in village.

“Some women who are living alone without their husband develop close relationship with other males of same village...usually neighbours...” (13th Participant,30 years).

“Sometime woman develops sex or close relationship with other male, usually within their family or neighbourhood,.... if she is not happy or satisfied with her husband...” (22nd Participant, 35 years)

Common form of sexual relationship in rural areas: Out of 24, 14 of them told that the most common sexual relationship in their community was between husband and wife, whereas eight of them told that besides spousal relationship, some had sexual relationship with other also (10-20%).

“In our village, the most common sexual relationship is between husband and wife, nearly 95%...but some married and unmarried persons have sex relationship with other partner within or outside village...”(3rd participant,30 years).

“Besides married couple, some unmarried girls/boys or married males/females have other partner with whom they enjoy sex...but very small number...4 or 5 out of 100 (9th participant,40 years).

Commercial sex activity in rural areas: All the women were explained about the meaning of commercial sex workers very categorically. Most of the women (21) told that no commercial sex activity was prevalent in and around their villages, however, two told that some women working at the brick chimneys were found offering paid sex in the villages. These women come from the neighbor state, and belong to tribe populations who are considered very strong. Males of villages are their usual clients.

C. Cause of Migration

Almost all the respondents had information about adult male migration to the extent of 10-40% from their villages. These males were working in other states like Maharashtra, Karnataka, Gujarat, Delhi, Punjab, Haryana, West Bengal, Assam and Sikkim. Almost all the respondents had similar view related to the main reason for migration such as lack of job opportunity, adequate remuneration, and respect.

“Lack of job opportunity in rural areas compel the adult married or unmarried males to migrate to other cities”

“the kind and level of remuneration was not adequate to support the family in village..at least in big cities our husband get enough money to support our family ..and that too with honour and respect.”

“My husband is a factory worker in Delhi...factory work is not available in our village or near by districts..so he has no option but to work outside...the kind of jobs he looks for is not available here...(6th participant).

In order to provide financial support to family, these migrants males work in factory, construction sites as mason, plumber, carpenter, painter or as laborers, agricultural laborers mainly in Punjab and Haryana, vegetables/fruit vendors, auto/taxi drivers, rickshaw/thella puller and other menial jobs available. On average these migrants were working for last 6 years ranging between 2 to 15 years.

Visit to home: Most of these migrants visit their homes at least once in a year during the festivals, but some of them come twice or whenever required due to some unavoidable circumstances in family like illness, death or marriage.

“ My husband comes to home one or twice..especially during festivals like holi or chatha..but sometimes if somebody in the family gets sick or something very urgent..they he also comes...(9th participant).

“My husband usually comes once or sometime twice in a year depending on availability of money...”(23rd Participant).

Impact of migration at family level: Nearly 75% of these migrant workers were married. In absence of husband, their wives had to face a lot of difficulties in managing household activities and responsibilities especially taking care of sick and old parents.

“It is very difficult to manage households work without husband support...my in-laws give me support..otherwise I won't be able to take care of everything...(4th participant).

“We face a lot of hardship in his absence...but there is no other option...at least his financial support is adequate for all of us to meet a square-meal...rest we manage ourselves with support of each other like in-laws, children, all do some work...(9th participant).

Risky behaviors of migrant workers: Out of 24, 18 told that some males 10-15%, not all, might have some risky sexual behavior outside because they live away from their wives for a long duration, and in order to satisfy their natural urge to sex, some of them visit sex workers available there. These women were not sure about this behavior of their husbands. Due to this behavior, these migrant males could get exposed to HIV infection and consequently put their wives at risk of getting HIV infection during sex with them.

“some males who are living away from their family but not all have some risky behaviours...some of them do visit sex workers in city..(1st Participant).

“I don't know whether my husband does risky thing or not....may be..I'm not sure..but since they are living away from their wives for long time..some of them might be visiting sex workers for

their own sexual need...I would say 10-15% of migrant workers only do this..not all..(3rd participant).

“Not all but some do visit CSWbut not my husband...I’m sure about this..(17th participant).

Transmission of HIV infection to wives: Out of 24, 18 had almost similar opinion about getting HIV infection from their husband.

“If husband gets infected with HIV, wife can get infection from him ..(2nd Participant).

“If husband gets infected from other women...wife too can get infected from her husband during sex..and no wife can refuse sex to her husband if he comes after a long time...(3rd and 5th participant).

“Wife can get HIV infection from her husband if husband had sex with other women who were infected...(6th, 10th, 13th, 15th participant).

D. Knowledge about HIV/AIDS

HIV knowledge among women: Out of 24 women, 15 (62.5%) had knowledge about HIV/AIDS through various sources like advertisement on TV or through HIV awareness programme by some NGOs in their villages. Almost all those responded had opinion that HIV is a fatal disease, and there is no medicine available for its cure.

“It is a fatal disease...if someone get infected with HIV..he or she is going to die...there is no cure”, (1st Participant)

“It is a deadly disease.....no one survives after getting this HIV infection... (2nd Participant)

“HIV kills infected person as there is no medicine available for treatment to cure...(3rd Participant)

“..people die ultimately due to lack or unavailability of medicine...(5th Participant).

Knowledge about transmission of HIV: All the 15 women had opinion that people can get HIV infection due to sex with infected person and multiple partners. Commercial sex workers were considered as the main source of infection because they sleep with many clients. One of them told that besides sex HIV can be transmitted through blood transfusion and using infected needles and syringes.

“People get HIV infection due to sex with infected person...they die once they get HIV infection..(9th participant)

“HIV infection spreads from infected to non-infected partners...or due to multiple partners...(14th Participant)

“Sex with many person especially with CSW cause HIV infection”..(16th participant).

“ Person can get infected through blood transfusion, used syringe and needle, besides sex with infected partner”...(22nd participant)

Identification of HIV cases by look : Out of 15, 6(40%) told that it was difficult to identify HIV infected persons from their appearance, whereas 9(60%) described some symptoms of HIV infected persons like weak and pale look, vomiting, upset stomach, fever, and loss of appetite.

“It is very difficult to identify HIV infected person from the appearance itself....” (1st Participant)

“HIV infected persons look very pale, thin, with vomiting tendency, diarrheal symptoms, ...(12th , 13th and 14th Participants).

Risk of HIV infection: Out of 24, 10 had no knowledge about risk involved with type of sexual behavior, whereas 14 told that sex with unknown partners(9), multiple partners(1), infected partners(1) and commercial sex workers(3) could be very risky for getting HIV infection. Out of 14, 9 had opinion that males, having multiple partners and visiting to commercial sex workers,

could be at high risk of getting HIV infection. When asked how do people get HIV infection or who are at the high risk of getting HIV infection, 15 out of 24 had one or other explanations like migrant workers, truck drivers, CSWs, women having sex with infected husbands or other partners, could be at high risk of getting HIV. Out of 15, 10 told that wives of migrant workers could be at high risk of getting HIV infection because they were not aware of HIV status of their husbands.

“Those males who are frequently visiting commercial sex workers are at high risk of getting HIV infection...(2nd Participant,26 years; 15th participant 38 years).

“ Some migrant males are living away without their family for a long period of time..they start visiting commercial sex workers or look for sex with other available women at place of their work..they can get infected with HIV (7th participant, 45 years).

“Males who are frequent visitor to brothels and sex workers are usually at high risk of getting HIV infection..also having multiple partner and needle sharing can cause HIV infection...(16th Participant,25 years)

Women at high risk of HIV: These women unknowingly got exposed to HIV infection from their partners who were ignorant of their HIV status. Commercial sex workers were considered at the highest risk of getting HIV infection because they came in contact with many males coming from various areas and professions. Wives of migrant workers could also be at risk if their husbands had high risk behaviors. Women with multiple sex partners without knowing their infection status could be at high risk.

“women having sex with many male partners can get HIV/AIDS disease....because most of the males do not want to use condom during sex because it hampers their sexual pleasure...most rural women are ignorant about protection methods..(3rd participant,30 years).

“commercial sex workers are at the highest risk of getting HIV infection because they come in contact with many customers with whom they perform sex without knowing their HIV status...(7th participant,45 years) (15th participant,30 years)

“ woman in village can get HIV infection only if she is enjoying sex with many males apart from her husband.....males are mainly responsible for the plights of women for everything..(9th participant,40 years)

“Unsafe sex with infected persons or multiple partners, with commercial sex workers, using used syringe and needle can cause HIV infection...Commercial sex workers are at high risk of getting HIV infection because they come in contact with many clients whom HIV status are not known to them...and clients don't like using condom..(2nd and 3rd Participants).

“Migrant males and their wives are at high risk of getting HIV infection if husbands are visiting sex workers at their place of occupation...wives can get infection from their husband due to regular sex when they visit home after a long gap...(7th Participant).

When asked who are not at risk, 10 out of 15 responded explaining sex with husband-wife only(4), no sex with unknown persons(3), abstaining from sex(2) and use of condoms during sex with unknown person(1).

Impact of HIV in community: When they were asked this question “In your opinion, how might HIV affect people in your community, now and in the future”, only 5 out of 15 responded to this.

“I'm sure that our village will be severely affected due to HIV in future because many young adults are working in big cities like Mumbai, Surat, Delhi etc... there are lot of HIV cases...especially CSW....I'm sure many of them, migrant workers do visit CSW....they may also get infected....(12th participant).

“A large number of males of this village are working in big cities...we don’t know their sexual behavior particularly their visit to CSW...also in nearby cities commercial sex activities are increasing...many young unmarried or married males are visiting those sex workers also....moreover educational level in rural areas is very low..they don’t know much about HIV spread...so taking all these factors I am scared about my village in future...Government should do something to stop migration...(14th participant)

They had speculation that HIV would spread in the community in future due to migrant workers, not all but some, because of their risky behaviors while living away from their family. Wives of these migrant workers could get infection in future because most of them were not aware of this disease and how to protect themselves from getting HIV infection. Migrant males were mainly held responsible for spread of this disease in community in years to come.

Protection from HIV: Out of 15, 4 had no idea as how to protect themselves from getting this infection from their husband, whereas 11 had various opinions such as wives would request husbands to use condoms during sex (6), get tested for HIV (2) if they had ever visited to sex workers at place of their job, and would avoid sex with husband (3).

“ wife should try to know if their husband had ever visited to CSW or sex with other women....probably very difficult for rural women..high chance of physical abuse..so insist husband to use condom...”(3rd participant)

“..will ask husband to use condom if he had some risky behavior....but difficult...(5th and 14th participants)

Marital relationship and sexual power: Considering women’s status in rural areas, these females had very little control in matters of sexual relationship with husbands. It was told that husbands had all authority in matter of sexual practices.

“I can’t ask my husband to use or not to use condoms...it’s all depends on him..(2nd participant)

“I know condom can be used for keeping birth space..but my husband does not like it...so I don’t insist.. otherwise he will get angry..” (5th participant)

Almost all the respondents who answered had opinion that it could severely affect their family or married life. They considered that it would be very difficult and challenging tasks for wives rather impossible to ask their husbands to get tested for HIV or to avoid sex with them. If they did so, they could be physically abused or subjected to very harsh treatment by their husbands.

Extra-marital relationship of wives of migrant workers: When they were asked about the extra-marital relationship of wives of migrant workers while their husbands are away, 5 out of 15 told non-existent of this kind of relationship in their community, however, 10 had opinion that not all but some women around 5-10% might have this kind of relationship but difficult to say exactly what proportion of wives of migrant workers and with whom they had relationship. Due to fear of social stigmatization no wives would dare having this kind of relationship. In rural society, people would not accept this kind of behavior. Further, nine (60%) of these respondents had opinion that this behavior could put them at high risk of getting HIV infection from other males because of unawareness about HIV status of their partners.

Mother-to-child transmission of HIV: All the 15 respondents had opinion that a baby born to HIV infected mother could be at high risk of getting HIV infection from mother because blood and breast milk after birth (2).

Use of condoms: When asked about the protection from HIV, they had opinion such as use of condoms during sex with unknown partners (7), avoid sex with unknown partners (5), HIV test of suspected partners (1) and use of medicines (1). Surprisingly, 14 had opinion that condoms can provide protection from getting HIV infection. In their opinion not all women in rural areas

but 25-50% were aware of condoms. Nearly 10-20% women might be insisting their husband to use condoms for birth control. Almost all the respondents had similar opinion about procurement of condoms. None of them ever bought condoms from market shops as they felt uncomfortable buying condoms because of shyness. The most important reason for using condoms was keeping space between child birth (4), for protection from diseases (3), and both (7). Only 4 respondents answered the reasons for not using condoms such as disliking of husbands using condoms during sex because of reduced sexual pleasure, non-availability of condoms all the time, and lack of knowledge and awareness among married couple about use of condoms. When asked “what can be done to use condoms regularly”, only one respondent told that those women who had knowledge about use of condoms should educate their female friends about its usefulness. Males, who know about usefulness of condoms, should take initiative to educate their friends. These steps could help in promoting awareness about use of condoms in the community.

Awareness about HIV Testing: Out of 15 respondents who had knowledge about HIV, only 3 had information about HIV testing facility at nearby primary health centers (PHCs). None of them and their husbands had ever tested for HIV. After the interview, 10 out of 15 respondents told that they would suggest their husbands to get tested for HIV if they had ever indulged into some risky behavior while living away from home for the sake of family and children.

Discussion

The qualitative results from the in-depth interviews helped in framing a general picture or view of migrant workers’ wives about socio-cultural practices related to marriage and sex in rural communities, and their knowledge, attitude and perception about HIV/AIDS. This information further helped in providing formative information for developing the questionnaire for the structured interviews. Though the participants for in-depth interviews were selected from

the study population wives of migrant workers, the sample cannot be considered as representative of wives of migrant workers in the selected study district because of non-random selection. Nonetheless, it helped in generating some idea about the real scenario regarding the HIV and sexual activity in rural community, especially among women.

The study revealed that 62.5% of the women had correct knowledge about HIV/AIDS, 92% had knowledge about one or other method of contraceptive devices. Also, 60% of the women felt that condom could provide protection from HIV/AIDS infection. National Family Health Survey-III (NFHS-3) was conducted during 2007-09 at the district level in all states of India. The District Level Health Survey (DLHS) conducted in Muzaffarpur district reported that 89.7% women in age group 15-49 living in rural areas had correct knowledge about HIV/AIDS, and 31.9% had heard of sexually transmitted infections (STIs) and 28.7% knew that consistent use of condom protect from HIV/AIDS.²⁷ These estimates were based on representative sample drawn using standard sampling technique, whereas the participants in the in-depth interview was not a representative sample of the women living in the district, that could be one of the reasons for getting deviation in estimates of these factors.

Most of the north Indian states having a patriarchal family system where females have very little or almost non-existent role to play in the decision making process. The power to make decisions is completely vested into the bread earner or head of the family, mainly husband. Sex is considered a very sensitive issue and even wives feel very shy in discussing sex issue with their husband. Women don't feel comfortable in expressing their sexual desire or asking their husband to use condom. Some of them had apprehensions of being physically abused by their husbands. Bihar is one of the leading states in India in terms of physical or sexual violence

against women. A total of 56% of women, aged 15 to 49, are subjected to physical or sexual violence in Bihar against the national average of 35%.³⁷

The ability of women to discuss sexual issues within marriage would be a great step forward in exerting women's making decisions ability.³⁸ Good communication between married couple has significant influence on safer sex behaviors.³⁹⁻⁴¹ However, these women indicated that little communication about sexual and reproductive health occurred between married couples in India as well as evidence in various published reports.⁴²⁻⁴⁴ In this study we found that most of the women did not express their sexual likes and dislikes to husbands as per the socially acceptable traditional image of the wife in Indian society and family.⁴⁵ Thus there is likely a profound impact of husband's attitude and behaviors related to sexual communication on the women's sexual behaviors.⁴⁶ Interpersonal communication in married life plays a very important role in enhancing the ability of female partners to convey their expectations.⁴⁷ Hence, there is an urgent need to develop strategies to improve better communication within marriage for reducing the risk of women for HIV/STI infections as well as unwanted pregnancies.^{45,48,49} In India, sexuality is considered a taboo, and sexual matters are generally not discussed in the family especially with female members of the family.⁵⁰

It was observed that in rural communities the most common sexual relationship was between husband and wife i.e. a strictly monogamous relationship, a common social phenomenon in the Indian society. The extent of other forms of sexual relationships like sex with other males or females reported to be very low (5-10%), but the early sexual debut among the boys (15-25%) and girls (5-10%) revealed the changing sexual activity in rural society. The reason for this changing sexual activity among unmarried boys and girls could be due to synergistic effects of watching movies and availability of electronic gadgets such as mobile

phones, TV, DVD etc. which provide opportunity of watching pornography, a common leisurely activity among young boys in rural areas. In many parts of India, a large number of young girls with low literacy levels were married by the age of 16-18 years. Indian girls were found to lack the independent authority for the control of their sexuality or reproduction.⁵¹ Post marriage, the control of female sexuality shifts from the father to the husband. The lack of adequate knowledge of the young women about sexual matters and contraception results in early and successive pregnancies and sexual disharmony.⁵²⁻⁵⁴ Lack of adequate sexual knowledge and early sexual debut in this group of rural young population could make them vulnerable to HIV and other sex-related diseases. Early initiation of sexual activity and higher numbers of non-marital sex partners are linked in turn to a wide variety of negative life outcomes, including increased rates of infection with sexually transmitted diseases.⁵⁶

In this study, we observed that 15 out of 24 women participant i.e. nearly 62.5% women had correct knowledge about the spread and transmission of HIV infection like sex with infected and unknown persons, having multiple partners, visiting commercial sex workers, infected needles and syringes, and blood transfusion. The women knew that migrant males (not all, 10-20%), truck drivers and commercial sex workers could be at the high risk of getting HIV infection. Almost all the women who had knowledge about HIV/AIDS told that babies born to HIV infected mother could acquire infection from mother. As per the report of National Family Health Survey (NFHS-3) for Muzaffarpur district in Bihar, 89.7% women had correct knowledge about HIV/AIDS whereas in our study it was 62.5%.²⁷ This difference could be because of two different approaches, qualitative vs quantitative or the sample in our study was not representative of entire district or both.

Nearly 45% of the respondents had knowledge about the various modes of protections from HIV infection such as use of condoms, abstinence from sex with other unknown persons, and HIV testing of suspected persons. They viewed condom as the most preferable mode of protection from HIV and other sexually transmitted infections. They had opinion that most couples used condom as contraceptive to delay birth, not as protection from HIV infection from husbands. Surprisingly the extent of condom use by couple in rural area of Muzaffarpur district was very low, around 0.6% only. Female sterilization was the most preferred mode of contraception that is used after the completion of the family.²⁷ The scenario is almost similar to the national level in India.²⁶ The most important reason for low use of condom among married couples in the study population could be due to the fact that most women expressed a mutual trust with their husbands. Insisting condom use within marriage could be construed as a sign of infidelity.^{56,57} Indian society is, in general, male dominated, hence, it is very difficult for married women to negotiate condom use even as a contraceptive.^{56,58,59}

Migrant males, drivers, commercial sex workers and women having sex with infected husbands or partners were considered as the most vulnerable group for acquiring HIV infection by 10 out of 15 who had knowledge about HIV. But these women perceived themselves at low risk of getting HIV infection from their husbands because of the facts that they considered their husband as faithful, and they believed that not all migrant males visit to CSW. Some of them, however, had apprehensions that their husbands might have been visiting CSW at their place of work. Low perception of risk among married women from the spouses has been reported as one of the major determinants of HIV/STI infection.^{22,25,60} Married women may believe that they cannot get the infection from their husbands owing to a strong social and cultural belief in

marriage as an institution.⁶¹ Interventions for this group have to be designed taking into account these socio-cultural factors that influence perception of marital life.⁶²

Nearly two-third of women, who had knowledge about HIV, had a perception that wife of migrant worker got engaged in extra-marital relationship with other males, preferably close relatives like brother-in-laws or husband's friend, in absence of her husband in rural areas. Based on information collected from other sources, it was observed that when they husbands were away from their native places for a long duration the wives got involved with sexual relationship with other men, including relatives of the husbands.⁶³ An analysis of National Family Health Survey data suggests that female partners of migrant men are also at increased risk of HIV infection.⁶⁴

One of the most important socio-economic reasons for large volume of migration is lack of adequate livelihood which further led to poverty. Poverty is one of the reasons that compel married women to indulge in paid sex in absence of their husband. It is reported that having extramarital sex provided the married women greater authority in their families and economic independence.⁶⁵ However, sexual behavior of these women highly expose them to acquire infection from their partners. They can also transmit the virus to their extra-marital partners if the women are already infected themselves, either from their infected husbands or other partners.

The knowledge and awareness about vertical transmission of HIV among the wives of migrant workers can be viewed as an impact of information, education and communication (IEC) activities under HIV/AIDS awareness program implemented by the National AIDS Control Society (NACO) in collaboration with State AIDS Control Society in the rural areas. The IEC activities need to be strengthened further so that a large number of women can be made aware of HIV/AIDS.

In summary, the wives of migrant workers reported on average a good knowledge about transmission of HIV and its possible risk factors, social and cultural aspects of marriage and sex, infrequent condom use, and vulnerability of HIV infection among migrant male workers of the rural areas. They also reflected changing sexual activities among young unmarried boys and girls. Married women in the area also appear to be having extra-marital relationships, thus rejecting monogamous sexual behavior among the married couples especially in rural areas. The wives expressed concern for their husbands but had low self risk perception for acquiring HIV infection.

As this study was conducted in a small and purposive sample of wives of migrant workers, its findings cannot be generalized across the district because of the study design and non-representative sample. This qualitative research helped to reveal some of the more nuanced cultural, social and interpersonal shifting contexts of sexual behaviors and HIV-related concerns of the wives of migrant workers or married women. Findings from this exploratory qualitative study proved helpful in identifying the key issues and that require programmatic respond to the specific prevention needs of the women in the study area. Further, the findings of the study gave us insights to design and conduct a larger and more representative quantitative study among the wives of migrant workers to understand the dynamic combination of biomedical, behavioral and socio-cultural factors that influence transmission of HIV within marriage.

Table 3.1: Socio-economic and demographic profile of wives and their husbands

Characteristics	
Median Age of wives (Years)	30 (22 – 45) years
Median age at time of marriage (years)	16 (14 – 22) years
Median age of husband at time of marriage	21 (17 – 25) years
Formal Education at school level	58%
Median number of children	3 (1-6)
Possession of agricultural lands	25%
Knowledge about HIV/AIDS	62.5%
Knowledge about Contraceptive Devices	58%
Alcohol addiction of husband	29%
Addiction of Tobacco Products	83%
Knowledge about sexual relation of husbands with other of commercial sex workers	17%

Table 3.2: Reported Socio-cultural behavior related to marriage and sex in rural areas

Characteristics	N=24
Premarital sex among girls	58%
Proportion of premarital sex among girls	5-20%
Premarital sex among boys	58%
Proportion of premarital sex among boys	15-20%
Average age of sexual debut of girls	16 (15-18) years
Average age of sexual debut of boys	19 (16 – 23) years
Multiple partners of male in village	58%
Proportion of males having multiple partners	5-10%
Multiple partners of female in village	42%
Proportion of females having multiple partners	5-10%
Commercial sex activity around village	12.5%

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CHAPTER – 4

Prevalence of HIV, Knowledge and associated factors among the wives of migrant workers of Muzaffarpur district in Bihar

Introduction

One indicator of the impact of unprotected extramarital sex on the HIV epidemic is the growing rate of infection among women. Over the past decade there has been a dramatic shift in the gender ratio so that currently almost half of the 33.2 million persons worldwide with AIDS are women.^{1,2} This shifting global epidemiological picture is being replicated in India; as the epidemic accelerated in the early 1990s, gender distribution estimates for 1994 indicated a male to female ratio of 5:1, with female cases mostly among sex workers.³ By the end of the decade, the epidemic had crossed over to the general population, and gender ratios had reduced to a 3:1 ratio with current estimates at 1.7:1.⁴⁻⁶ As per the National AIDS Control Organization (NACO) statistics during 2009-10, there are 2.4 million people living with HIV out of which 39% are women amounting to 0.9 million of the total.⁷ The estimated adult HIV prevalence in India was 0.32 percent (0.26% – 0.41%) in 2008 and 0.31 percent (0.25% – 0.39%) in 2009. The adult prevalence is 0.26 percent among women and 0.38 percent among men in 2008, and 0.25 percent among women and 0.36 percent among men in 2009. Heterosexual route is the main cause of HIV transmission in 87.4% of the total HIV infected cases.⁸ Decline of disease prevalence is observed in 2009 as compared to 2000, however the prevalence among women continues to remain high.⁹⁻¹³

At the national level, the total number of estimated HIV infections was 120,470 (100,493-147,676) i.e. nearly 0.12 million. Out of these HIV cases, nearly 96% of HIV infection

occurred in those above 15 years of age, having maximum in age group 15-49 years. The total estimated population at risk of HIV infection in age group 15+ years was nearly 61 million.¹⁴

Bihar is a low HIV endemic zone in India. The estimated adult (15-49 years) HIV prevalence in Bihar during 2009 was 0.22 % between 0.18 to 0.27%, and lower than the national average. The total number of estimated new infections and deaths were 10056 (6458 – 14761) and 6944 (5448 – 8856) respectively during 2009 in Bihar.

Available evidence suggests that migration could be fuelling the spread of HIV epidemic in high out migration states such as Uttar Pradesh, Bihar, Rajasthan, Orissa, Madhya Pradesh and Gujarat. The recent sentinel surveillance data (2008-09) has shown an increase in HIV prevalence in these states. Of the 120,470 estimated new infections in 2009, the six high prevalence states accounted for only 39% of the cases, while the states of Orissa, Bihar, West Bengal, Uttar Pradesh, Rajasthan, Madhya Pradesh and Gujarat accounted for 41% of new infections.⁸ In addition, data from integrated counseling and testing centers (ICTCs) in destination areas such as Thane District of Maharashtra State and Surat of Gujarat State have shown high prevalence of HIV among migrants. The HIV-positivity rate among male migrants from Uttar Pradesh (UP) tested in Thane ICTCs was 9.1% and female migrants was 7.9%. Similarly, the male migrants from Andhra Pradesh tested in Thane ICTC had a prevalence of 23.8% and female migrants were 16.4%. Likewise, the Ganjam migrants tested in Surat ICTC also showed high HIV prevalence with 2.3% among male and 3.5% among female migrants. The high prevalence among migrants reported in ICTCs in the destination states is worrisome as it could spiral an epidemic in their places of origin which are currently low prevalence.¹⁴

The state of Bihar is considered a low endemic area per the above estimate, but is considered highly vulnerable to HIV infection because of various socio-economic factors such as lower literacy, low per capita income, lack of employment etc. Single male migration is one of the factors responsible for high vulnerability to HIV infection. The migrant population acts as a “bridge population” between high risk group such as FSW and MSM to the low risk population such as wives or sex partners of migrant workers.

Men’s extramarital sexual behavior and lack of awareness are the most important factors for introducing HIV/STI into marital life.^{6,15-17} Husbands’ extramarital sex has been seen as closely linked with the marital relationship and male sexual satisfaction within marriage.¹⁸⁻²³ Married men who report marital sexual dissatisfaction refer to their need for sexual excitement, sexual curiosity, novelty or variety, and sexual enjoyment as justifications for extramarital sex.²⁴ Such justifications are exacerbated by husbands’ sense of hyper-masculinity or real manhood that argues for their perceived natural ability to have continued access to multiple sexual partners and their perceived natural need for frequent sexual satisfaction.²⁵⁻²⁷ These factors presumably also influence the migrant workers who live away from their home without their wives for a quite long period of time.

Increasing rate of prevalence of HIV among wives, in general and particular of the migrant male workers, is suggesting that increased attention is warranted for the women partners of migrant male workers. Sex within marriage is generally considered “low risk”. A high proportion of HIV discordant couples can greatly influence the transmission dynamics of HIV epidemic due to inter- or intra-marital transmission of infections.^{28,29,65} Information about both partners can greatly enhance the epidemiological value of sexual behavior data.

Married women in India generally have a low risk perception for HIV despite high risk behavior of their husbands.³⁰⁻³⁷ Wives of migrant male workers may be no different and therefore may be unlikely to protect themselves from infection from their husbands. Also young women are biologically more vulnerable to HIV/AIDS infection than young men and this situation is further aggravated by their lack of knowledge and awareness on HIV/AIDS. 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.³⁸⁻³⁹ Further, early marriage, violence and sexual abuse against women are the major socio-economic reasons of their vulnerability to HIV/AIDS infection. Their biological factor like poor awareness and knowledge about reproductive and sex health makes them more susceptible to HIV/AIDS infection in any given heterosexual encounter. 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.

No such study has been conducted so far that assesses the prevalence of HIV among wives of the migrant male workers. The present study aims to estimate the prevalence of HIV and associated risk behaviors among the wives of male migrant workers in rural areas of Muzaffarpur district in Bihar, and to understand the role of migration itself and other risk factors for acquiring HIV in this population with the potential to spread the infection to the general population. We also assessed the marital relationship power between wives of migrant workers and their husbands.

Methods

Study design

A community based cross-sectional survey was conducted among the wives of migrant male workers of age 15-49 years without any known cognitive disability living in Muzaffarpur district for at least six months. The study was conducted between October 2011 to May 2012.

Study Population

Study population consisted of married woman who lead a conjugal life for at least one month and have sexual contact whenever their husbands were available. As per the 2011 C ensus, Muzaffarpur had population of 4.778 million of whom male and female were 2.517 and 2.261 million respectively, and constituted 4.60 percent of total Bihar population. Overall, there were 898 females per 1000 males. The literacy rate in rural areas of Muzaffarpur district was 63.75% . Gender wise, male and female literacy stood at 72.09 and 54.44 percent respectively. In total, 2,264,092 people were literate of whom males and females were 1,350,850 and 913,242 respectively. The rural population in the district is 90.17% and urban population is 9.83%. The Scheduled castes and scheduled tribes constitute about 15.7% and 0.04% of the population respectively. The decennial growth rate between 2001 and 2011 was 27.54%. The density of the population was 1506 per sq. kms. Hindi is the main language spoken in the district. Muzaffarpur district consists of 2 sub-divisions and 16 Community Development Blocks. It has 3 towns and 1,811 villages.⁴⁰

Sampling and sample Size

We collected the sample by the two- stage cluster sampling using probability proportional to size(PPS) method.⁴¹⁻⁴³ We used Iwan Ariawan's and Ralph Frerichs' algorithm for estimating sample size for cluster surveys.⁴⁴ We assumed that the prevalence of HIV infection among the wives of migrant workers in Muzaffarpur district was the same as that of the general population which was nearly 3.41% reported in course of mobile AIDS testing among 100,000 adult

populations of the district during 2007.⁴⁵ Further, we assumed that a) half length of the 95% CI (δ) is 1.5, b) significance level of $\alpha=0.05$. The formula for estimating sample size is given by

$$N = (1.96/\delta)^2 P(1-P)*DE$$

Where P = Reported Proportion of HIV infection among the general population

and, DE = design effect.

We kept a low design effect of 1.5 to minimize the total variance. Based on sample size calculation shown above and actual resources for this research project, we planned to recruit about 850 eligible women in the study area for the quantitative study. We selected 25 subjects per cluster/village using random sampling in each of 34 clusters/villages selected for the study.

In the first phase, all selected villages i.e. clusters were mapped by the field investigators for identifying the important landmarks such as school, temple, common meeting places etc. for locating migrant's houses. Houses of migrant workers in each village were identified and located on map with the help of local community leaders or community health workers. A sampling frame of houses of migrant workers was created for each of village by making house-to-house visits by the field team. In each village, 30 houses were selected randomly. We visited all the houses along with the members of a Non-Governmental Organization (NGO) group, especially working on HIV issues, who helped the field team in recruiting wives of migrant workers. The first 25 women, who gave their consent for the interviews and blood sample collection, were selected in each village.

Data Collection

We designed a structured questionnaire in English that was translated into Hindi and back-translated into English to check for accuracy and validity. We pilot tested the Hindi version of the questionnaire and revised the language and structure. We collected information about the

socio-demographic characteristics of wives and their husbands, social-cultural practices about marriage and sex, HIV/AIDS-related knowledge, attitude and risk perceptions, sexual behaviors mainly with spouse, and marital-relationship attitude.

Statements of the women with regard to family income might not be reliable because actual family income was difficult to estimate based on their response. Some women might not know the monthly income of their family also. Thus, besides asking monthly income of husband/family, a surrogate indicator for wealth, i.e., living standard index (LSI), was calculated 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).⁴⁶

Sexual relationship power was measured by a combination of a 11-items relationship control subscale and a six-item decision-making making dominance sub-scale.⁴⁷ The women were asked their degree of agreement (strongly agree, agree, disagree and strongly disagree) to statement about relationships between husband and wife. A high-score represent high sexual relationship power. Marital relationship-attitude was measured by a seven-item scale that was adapted from the WHO Multi-country Study on Women's Health and Life Experiences questionnaire.⁴⁸ The wives of migrant workers were asked to agree or disagree to a list of statements about acceptable behavior of husband and wife. The sum of all items for used as final measurement for gender attitude.

The data was collected between October 2011 to May 2012, using face-to-face paper-pencil based personal interviews (FFPI) by female investigators for the non-sensitive items and color-coded audio assisted self interviews for the sensitive questions.^{49,50,51} We trained the field investigators from a local NGO with a data collection protocol to obtain verbal consent from the participants and administered the questionnaire either in the participant's house or a private place in the neighborhood. The investigators were available to clarify any questions if needed.

Blood Sampling

After completing the questionnaire and obtaining separate written consent the participants were pre-counseled before drawing a 3 -ml venous blood sample. The participants were assigned unique study identification number that they could also use to get their test result. Each participant was compensated approximately USD 2 (100 INR) for the interviews and additionally USD 2 (100 INR) if they donated blood.

HIV Laboratory Test

The serum samples were coded by the study identification numbers generated by the PI and labeled under the strict supervision of Field supervisor. Trained Laboratory Technicians determined the HIV sero-status using three commercially available rapid antibody tests (SD BioLine HIV ½ 3.0, Standard Diagnostic Inc., Gyeonggi-do, South Korea; CombAids RS-Advantage, Span Diagnostics, Gujrat, India; HIV Tridot, J.Mitra & Co. Pvt. Ltd., New Delhi, India) as per the guidelines of India's National AIDS Control Organization (NACO)⁵². The flow-diagram of HIV-testing is shown in Figure 4.1. Serum samples positive on all three tests were considered positive. HIV-Positive women were referred to the nearest Integrated counseling and testing centre (ICTC) in district headquarter for further management.

The study was approved by the UCLA Institutional Review Board and the Institutional Ethics Committee of the Rajendra Memorial Research Institute of Medical Sciences, ICMR, Patna, India.

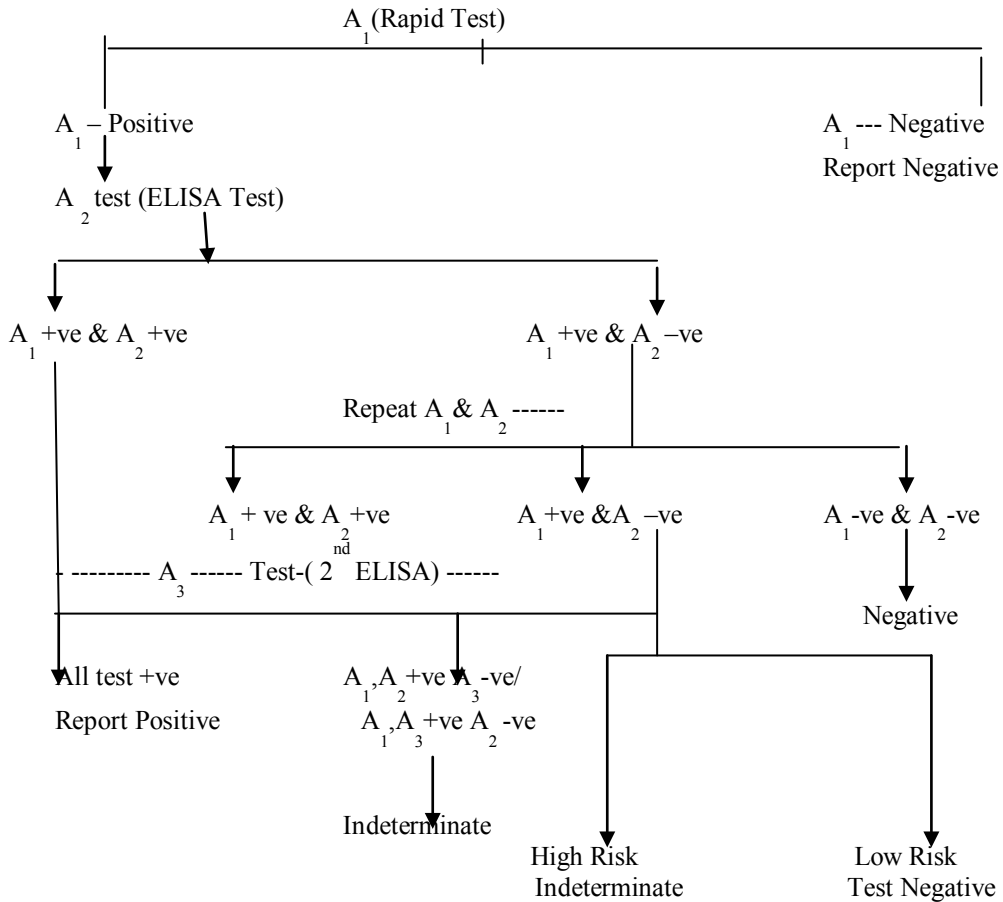


Figure-4.1 : Flowchart for HIV Diagnosis by WHO/UNAIDS

Statistical Analysis

Each questionnaire was checked manually by the field supervisor and later by the PI to verify completeness and accuracy of information recorded. In case of any mistakes, the respective field investigators were asked to rectify the mistakes. After manual verification, the data was entered into computer using Epi-Info version 7 (CDC, USA). The data was transformed to MS Excel Sheet (MS Office 7) for further analysis.

The data was analyzed using Stata version 10 (Stata Corp, Houston, Texas, USA). Considering the study design, which was basically two-stage cluster sampling at two levels, we used “svyset” command of Stata to declare the data set as cluster survey in order to minimize the variance for estimated parameters of the study.

Firstly, univariate analysis was conducted for each variable to find missing observations or non-responded items in the given data set. Categorical variables were tabulated and continuous variables were summarized for descriptive statistics. Bivariate analysis using chi-square distribution was performed for statistical association, and Fisher’s exact test was used wherever applicable in case of expected cell frequency less than 5. Multivariate analysis was performed using logistic regression analysis for modeling HIV knowledge using socio-economic factors. We created dummy variables for multinomial variables for converting into binary variables. Odds ratios with 95% confidence interval were calculated and Mantel-Hanszel z-statistic was used for checking significance. We used residual deviance test using chi-square statistic for the model selection and also used minimum value of Akaike Information criterion (AIC) and Bayesian Information Criterion (BIC) for the model selection. We performed Hosmer-Lemeshow test for lack of fit model using chi-square statistic.

Results

We interviewed 850 subjects out of 1020 who were eligible for the study. A total of 12 (1.4%) refused to participate in the study for various reasons such as non-willingness for blood sampling, due to small children and due to some pre-occupied work. Socio-demographic and economic characteristics of wives and their husbands are summarized in Table 4.1 and 4.2.

Socio-demographic Characteristics of wives and their husband

The median age of women was 30 years (IQR: 23-35 years). The maximum number of respondents (41%) were in the age group of 25-34 years. The median age of respondents at the time of their marriage was 16 years (IQR:15-18 years). The median number of children was 3 (IQR: 2-4 children). Eleven per cent of respondents were pregnant at the time of interview. More than half, nearly 57% of respondents were illiterate without having any informal or formal education. Among the literate, nearly 21% had informal education enabling them to just read and write. Nearly 89% of the respondents were of Hindu religion, and 56% of the total belonged to backward community (OBC) castes followed by schedule caste (SC) community (41%). Most of the respondents were housewives (73%) without any occupation, and among the employed, nearly 19% were working as agricultural laborers in their respective village itself. The median monthly income of respondents was Rs. 900 (IQR: Rs. 600 -1000). Twenty percent of women had some kind of minor health problems such as cold, cough, fever, GI problems.

The median age of husband, as told by the respondents, was 33 years (IQR: 27-40 years). Illiteracy was higher among the husbands (64%) as compared to wives (57%). The median monthly income of the husband was Rs. 3500 (IQR: Rs. 3000 – 4000). The median number of dependents was 5 (IQR: 4-6). Nearly 95% of the respondents belonged to the low income level, based on estimated living standard index. Nearly 47% of husbands had been working in other cities before the time of their marriage.

The median duration of migration was 8 years (IQR: 3-12 years). The place of migration was distributed as per the defined endemic zone of HIV/AIDS in India by NACO. Nearly 77% of the husbands had been working either in high or moderate endemic zone of HIV/AIDS in India. Out of the total, nearly 53% of husbands were working as migrant workers outside the state for more than 6 years. Most of the husbands (79%) were working as unskilled workers as laborers in

construction sites, factories or in the unorganized sector. Nearly 5% of the husbands were working as truck drivers/helpers, considered a high risk group for transmission of HIV.

Opinion about Socio-cultural behavior related to marriage and sex

Women were asked about their opinion on current social and cultural practices related to marriage and sex in their community (Table-4.3). As reported by the women, nearly 58% of the boys in rural area usually get married between 21-25 years, while 42% marry between 18-20 years, whereas 95% of the girls in rural areas get married between 16-18 years. Pre-marital sex among girls was reported by nearly 16% of the respondents, although 67% of them had opinion that less than 5% of girls had sex before marriage, whereas 30% told high proportion ranging between 5-15% of total girls had sex before marriage. The average age of sex before marriage was between 15 – 20 years as told by 91% of those who responded the question about pre-marital sex. The most common sex partners of these girls were either boy friends of the same age group or very close relatives as indicated by 89%. Only 5% women reported on the availability of sex workers in and around village, and of them nearly 35% respondents told that the most common place for availability of sex workers was motels situated near highway, commonly known as “Dhaba”, whereas , very surprisingly, 63% had opinion that women working in brick kilns operating in and around village were also acting as sex worker during their leisure time. Most of these sex workers, nearly 85%, were either from other nearby villages or other cities. Forty six percent of the women had no idea about the type of customer of these sex workers, but 24% reported about unmarried males of village, and 30% had opinion that married and widower/separated males could be the customers of these sex workers.

So far as village males having multiple partners were concerned, 12% of women told that some males in their village had multiple partners, whereas nearly 66% of women had no idea about males having multiple partners in their respective villages. The median proportion of males reported having multiple partners living in the village was 5% (IQR: 2 – 10%). Close relatives were considered as the most common sex partners (46%) of these males, followed by married women of the village (42%). Seven percent of respondents had the opinion that some males of their village might also visit CSW. Only 6% respondent felt that women in their villages had multiple partners. The median proportion of females reported having multiple partners was 3% (IQR: 2-5%). Most of their partners were reported to be either married males or unmarried boys of the same village.

Sexual and Risk Behaviour

Table-4.4 presents the sexual and other risk behaviors' of wives and their husbands as reported by the wives. The median age of sexual debut among the wives was 16 years (IQR: 15-18). Nearly 72% of the women had sex experience below 18 years of age. Less than 1% had reported sex before marriage. Nearly 95% of the wives had reported good or better level of sexual satisfaction with their husband. Eighteen percent of women had sex with their husbands in the last 1 month, and 55% of them had sex for more than 5 times. Only 16(2%) wives revealed sexual intercourse other than vaginal, of whom 8 (50%), 6(38%) and 2(12%) had oral, anal and both respectively.

Husbands' alcohol and substance misuse

Wives were asked about the frequency of consumption of alcohol and other intoxicants by their husbands during the last sex. Seventy eight (9%) reported that their husbands had drunk alcohol during the last sex. Nearly 15%, 73% and 12% were habitual drinkers, social or occasional

drinkers and non-drinkers respectively. Addiction of husbands to other intoxicant substances was reported by 85 (10%) who had used other intoxicants before the last sex. Nearly 81% husband were frequent consumer of local drinks, 18% marijuana and less than 1% brown sugar. None of them were intravenous drug users (IDU).

Condom Use

The level of condom use among the couples was very low; only 25(3%) were frequent user, but 97% of them used condoms either rarely or never during their course of marriage. We asked 10-questions related to reasons for not using condoms to all wives. The majority of them did not like using condoms, nearly 85%, because of reduced sexual pleasure, and 69% of them reported that condom was not necessary while sex with husband. Further, 95% had opinion that their husbands did not like using condom. Another major reason for not using condom was non-availability of condom during sex, reported by 92% of the wives. The overall coefficient of reliability using Cronbach's alpha was 0.52, indicating fair consistency among the items. The overall score for low use of condom was very high showing that condom use was very low among the wives or their husbands in the study area.

HIV Prevalence

Table-4.5 presents HIV prevalence and its association with socio-economic and risk factors. Out of 850 subjects screened for HIV status, nearly 21 women were found initially positive by rapid HIV test, but later using two confirmatory tests, only 5 women were confirmed and found to be HIV positive. The overall prevalence of HIV positive among the wives of migrant workers was 0.59% (95% CI: 0.19 – 1.37%).

Prevalence was not found significantly associated with any of the socio-economic and risk factors. This could be due to very low prevalence, or probably due to sparse data.

HIV Knowledge among screened

Table 4.6 presents the association of HIV knowledge among wives with other relevant socio-economic factors. Out of 850 screened and interviewed, 132 (15.54%) had heard about HIV before the interview and had some level of knowledge about its transmission and prevention. We observed a high proportion of educated women had knowledge about HIV, hence found to be significantly associated (chi-square = 107.3, $p < 0.001$). The unadjusted odds ratio was 9.6 (95%CI: 5.8 – 16.5) and was significant ($p < 0.001$). The women living in households having a television set had more knowledge about HIV, and hence found to be significantly associated (chi-square=28.96; $p < 0.001$). The unadjusted odds ratio was 4.75 (95% CI: 2.52 – 9.17), and was statistically significant ($p < 0.001$). The husband's education level was found to be significantly associated with wives knowledge about HIV (chi-square=38.4; $p < 0.001$). The unadjusted odds ratio was 3.22 (95% CI: 2.16 – 4.81), and was found to be highly significant ($p < 0.001$). Age was found to be significantly associated with knowledge of HIV (chi-square=16.88; $p < 0.001$). Younger women (15-24 years) were more knowledgeable compared to the other age category (chi-square=9.77; $p = 0.002$). The unadjusted odds ratio was 1.84 (95% CI: 1.22 – 2.74), and was significant ($p = 0.0018$). Low living standard index was found significantly associated with low level of knowledge about HIV (chi-square = 32.42; $p = 0.0001$). The unadjusted odds ratio was 0.22 (95% CI; 0.11 – 0.49; $p = 0.0001$). These factors might have played a causal association with the level of HIV knowledge among the wives of migrant workers.

We performed a step-wise multivariate regression analysis using logistic regression to model the association of significant factors on knowledge of HIV. Four variables, namely education status, age, presence of television set and husband's education level were found to be independently associated with level of knowledge of HIV, after adjusting for other factors taken

into model. The adjusted odds ratios with 95% CI and p-value on the basis of z-score are presented in Table -4.7.

Residual deviance test using chi-square statistic was used for the model selection. We tested the goodness-of-fit of model using chi-square statistic at given degree of freedom using Hosmer-Lemeshow test. The result is presented in Table 4.8. Minimum value of AIC and BIC was taken for the best model selection.

We assessed the association between knowledge of HIV and condom use, and it was found to be highly significant (chi-square=8.23; p=0.0004). The odds ratio was 3.21 (95% CI:1.22 – 7.90), and was statistically significant (p=0.0041). The odds of using condoms was more than 3-times higher among the women who had knowledge of HIV as compared to those who did not know about HIV.

We assessed the association between HIV knowledge and pre-marital sex, and it was found to be highly significant (chi-square = 9.317 ; p=0.013). The odds ratio was 7.44 (95% CI : 1.61 – 33.67), and was statistically significant (p=0.0091). The odds of having pre-marital sex was more than 7-times higher among the women who had knowledge of HIV as compared to those who did not know about HIV.

Marital Relationship Power

Marital relationship power was measured on the basis of three domains: Sexual relationship dominance, decision making dominance and gender attitude. Table-4.9 presents sexual relationship power of wife/husband measured on 11-items on 4-scales. The median score for sexual relationship power was 32 (IQR: 31 -34) indicating disagreement about dominance of male power related to sexual behavior between married couple. The Cronbach's Alph was also 0.76 indicating a good consistency towards disagreement. Table-4.10 presents decision making

dominance or power of wife/husband measured on 6-items questions on 3-scales. The overall median score was 11 (IQR:10-12) indicating that an even level of agreement towards decision making dominance . The Cronbach's alpha was 0.53 indicating fair consistency towards women decision making power. Table-4.11 presents the gender attitude of wife/husband measured on 7-items questions on 2-scales. The median score was 2 suggesting no supremacy of husband in conjugal life related to sex and other marital affairs. The Cronbach's Alpha was 0.65 showing a good consistency towards non-approval of male dominance.

None of the wives reported anything about extra-marital affairs with other man.

Discussion

This is the first population-based study ever carried out among the wives of migrant workers of rural areas of Muzaffarpur district in Bihar, India. The estimated HIV prevalence among the wives of migrant workers in the study area was 0.59 percent. The overall prevalence of HIV among women in general population during 2009 was 0.19 percent among women in Bihar.¹⁴ Hence, 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 although still low. HIV prevalence among the general population is usually estimated on basis of the prevalence among ante-natal clinics (ANC) attendant and mothers tested at parents to child counseling and testing centre (PPTCT's).

The main objective of this study was to estimate the prevalence of HIV among wives of migrant workers of the state because there have been some reports on HIV prevalence among the male migrant workers but not about wives in Bihar. 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.⁵³ A few studies have

been done in India among migrant factory workers and homeless. These studies estimated HIV prevalence, nearly 3-5%, among these migrant workers and homeless in Kolkata, West Bengal, and majority of them were from the neighbor state of Bihar.⁵⁴⁻⁵⁵ As per NACO estimate during 2008-09, the HIV prevalence among migrant workers was 2.36%.⁸ A recent study carried out among the male migrant workers of Bihar working in diamond and textile industries in Surat, Gujrat during 2012 reported a 1% HIV prevalence among them.⁵⁶ These reports indicate that the prevalence of HIV among the male migrant workers of Bihar has been gradually decreasing over time. This is very similar to the overall scenario of HIV epidemiology in India in general. However, 1% HIV prevalence among male migrant workers is much higher than the overall prevalence of HIV in males of Bihar. The present study reveals the extent of problem among the wives of migrant workers. Combing the results of these two studies, we assert that out of 10 per 1000 male migrant workers are probably infected with HIV infection, there could be 6 out of 1000 wives of migrant workers infected with HIV i.e. nearly 0.6 % wives of these migrant workers in Bihar might be infected with HIV. Hence, these migrant workers are certainly playing a role of “Bridge Population” for transmission of HIV infection from high endemic zone to low endemic zone.

The reason for low prevalence among the wives of migrant workers could be due to less exposure to sexual contacts with their husbands because the migrant workers do visit their home for a very short period of time during a year. Hence the probability of getting infected from their husband is little low due to lack of constant exposure to sex.

We did not observe any impact of socio-economic and demographic factors on the prevalence of HIV infection among wives of migrant workers. Probably this could be due to sparse data bias, because only 5 women were found positive for HIV infection. In bivariate

analysis, we experienced cell values less than 5, and hence most of the association was away from the null value due to sparse data. The amount of data was not sufficient to indicate significant associations with some of the possible risk factors, a limitation of our study.

The median age of first sexual experience of this study population was 16 years (IQR: 15-18 years), indicating that nearly 75% of the girls in rural areas are exposed to sex as early as the age of 15 years. Early sexual debut is a risk factor of HIV reported by many studies in Africa and other places.⁵⁷⁻⁶³ Early sexual debut increases the risk of having multiple partners and less use of condoms.⁵⁷ First sexual experiences are part of the transition to adulthood, and they are influenced by the environment, context and culture in which young people develop.⁶⁴⁻⁶⁵ 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. 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 (OR = 1.53 (95%CI:0.49 – 70.3)), but was not statistically significant. The official marriage age of girl in India is 18 years and above, but in rural areas of India, especially in states like Bihar, girls are getting married earlier. Efforts have been taken to educate the masses about the social, behavioral and biological impact of early marriage of girl through various media. Further intervention efforts are required in order to encourage youth to delay coital debut and to promote strategies to make young people's first sexual experience safer.

None of the women revealed having extra-marital relationships also probably due to social stigma. However in the course of the interviews, these women opined that nearly 6% of the village women had multiple partners, but did not want to reveal their own extra-marital behavior because of social fear and stigma.

Sexual intercourse (oral and anal) other than vaginal was reported by only 2% of the respondents. The proportion of women having anal intercourse with their husbands only was 1%. Low reporting of anal sex may be due to the fact that anal sex is considered non-normative and heavily stigmatized in the social and cultural context in rural areas of India. However, a study conducted among the wives of truck drivers in Tamil Nadu in India reported that nearly 13% of wives of truck drivers had ever practiced anal sex.⁶⁶ Under-reporting of all these non-normative and highly stigmatized behaviors of rural women was subject to social desirability bias.

Considering high vulnerability to HIV infection among the wives of migrant workers, low use of condoms during vaginal intercourse among these couples is a matter of grave concern. Only 3% of these couples were using condoms frequently, 97% were either using rarely or not at all. The most important reasons for not using condom were dislike by husbands (94%) and reduced sexual pleasure (93%). Wives of these male migrant workers, who had a negative attitude towards condom use during sex, might be highly vulnerable to HIV infection if their husbands had risky behavior such as visiting commercial sex workers (CSW) at place of their work. 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.⁵ Extensive research among discordant couples have shown that correct and consistent condom use significantly reduces the risk of HIV transmission.⁶⁷ We observed a significant positive association between HIV knowledge and condom use in the study ($p=0.0041$) indicating high preference of condom use among those who had knowledge of HIV underscoring the importance of education as prevention.

The proportion of knowledge about HIV among the wives of migrant worker was nearly 16 per cent, indicating a very low level of knowledge. A study conducted among the Indian women in 13 states revealed that about 17 per cent of women had heard about HIV/AIDS in states like Maharashtra, Gujarat, West Bengal, Delhi and Assam where the general literacy level among women was considerably higher compared to the women of Bihar.⁶⁸ The National Family Health Survey, Phase-3, conducted by the Ministry of Health and Family Planning, Government of India, has reported the level of correct knowledge about HIV/AIDS among both urban and rural women in India.⁶⁴ As per the estimates during 2007-08, 25% of the women living in the rural areas of Muzaffarpur district in Bihar had heard about HIV/AIDS and 89% of them had high level of knowledge about HIV / AIDS, and 26% heard about RTI/STI.⁶⁸ In comparison to this estimate, the level of knowledge about HIV/AIDS among the wives of migrant workers was low. Low level and lack of knowledge about STI/HIV infection among women could one of the factors for spread of HIV infection.³⁷ Hence a proper strategy is urgently required to create more awareness especially targeting the migrant workers and their wives who are considered highly vulnerable to HIV infection.

The proportion of women who reported pre-marital sex was less than 1%, probably low due to social stigma. However, we observed a strong association between pre-marital sex and knowledge of HIV i.e. the odds of having pre-marital sex was more than 7-times higher among the women who had knowledge of HIV as compared to those who did not know about HIV. Premarital sexual experience is related directly to HIV/AIDS infection in term of duration of exposure to the disease.^{70,71} 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.^{72,73}

The importance of knowledge of HIV/AIDS related to sexual experience is in terms of influencing premarital sexual experience. Especially, it could be hypothesized that knowledge would lead to more practice of safe sex.^{71,74} However, the results of a 1997 survey, in Mumbai, India, do not support this hypothesis.⁷⁴ The study found that the likelihood of having sex before marriage is highest among young men with a moderate level of knowledge. For young women, premarital sexual experience increases as the level of knowledge rise, that is, those with a high level of knowledge have considerably elevated incidence of premarital sexual experience.

In a multivariate analysis, we observed that HIV knowledge was found to be significantly associated with various socio-economic factors such as lower age group (15-24 years), education status (literate), husband's education status, and availability of television set in the household after removing the confounding effect of other relevant factors. The adjusted odds of HIV knowledge among educated women was more than seven folds higher as compared to that of uneducated women. We observed that availability of TV set in household significantly helped women in knowing or creating awareness about HIV/AIDS in rural areas. Hence, more emphasis should be given on creating awareness using electronic media in rural areas. We observed that younger women were more knowledgeable about HIV as compared to old women age. The reason could be due to greater use of phones, mobile and the internet by the younger population. Various studies have shown positive associations as we observed between socio-demographic and economic factors with the level of HIV knowledge and awareness.^{75,76}

Gender power inequities play a key role in the HIV epidemic through their effects on sexual relationships.⁷⁷⁻⁸³ Further, some studies have reported that women's decision power has little effect on general contraceptive use.⁸⁴⁻⁸⁸ We hypothesized that this would certainly decrease the likelihood of consistent condom use and increase the risk for HIV infection among the wives of migrant workers in study area, because husband had the authority to make decisions to use condom during sex. A few studies have documented important effects, findings that women with greater sexual relationship power were more likely to use condoms and to use condom consistently.^{89,90} Another study carried out in South Africa found that women with low relationship control were 2 times more likely to use condom inconsistently.⁹¹

The inherent limitation of this cross-sectional study design was that HIV prevalence was measured not incidence, and that's why it was difficult to establish a causal association between sexual power and HIV infection. The measure of sexual power or relationship described in the study refers to recent events in a current relationship while infection may have acquired in a prior partnership or under different circumstances. More research is needed to assess the determinants of sexual relationship power and its association with HIV in this study population.

Conclusion

This study found that the wives of migrant workers belonged to low socio-economic status with a poor living standard, were devoid of basic needs, were illiterate, 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 at high risk or highly vulnerable to HIV infection because of their husband promiscuous behavior.

Table-4.1: Socio-demographic characteristics of wives of migrant workers, Muzaffarpur District, Bihar, India, 2011-12.

Characteristics		N(%)	Median (IQR)
1. Age Group	15 – 24	245 (29)	30 years (23-35) years
	25 – 34	347 (41)	
	35 – 49	258 (30)	
2. Age at Marriage		850	16 years (15 – 18) years
3. Number of Children		850	3 (2 – 4)
4. Pregnancy status	Yes	93 (11)	
	No	757 (89)	
5. Educational Status	Literate	366 (43)	
	Illiterate	484 (57)	
6. Level of Education	No Education	485 (57)	
	Formal Education	181 (21)	
	Primary(1-3)	37 (4)	
	Middle (4-7)	111 (13)	
	High (8-10)	32 (4)	
	Inter or above (12+)	4 (0.47)	
7. Religion	Hindu	759 (89)	
	Muslim	91 (11)	
8. Caste	Forward	19 (2)	
	OBC*	478 (56)	
	Schedule Caste	353 (42)	
9. Occupation of Women	None	618 (73)	
	Unskilled Labour	30 (4)	
	Agricultural Labourer	164 (19)	
	Self Agriculture	33 (4)	
	Small Shop	4 (0.5)	
	Service	1 (0.1)	
10. Number of dependents			5 (4 – 6)
11. Any Health Problem	Yes	170 (20)	
	No	680 (80)	

*OBC- other backward caste

Table-4.2: Socio-demographic and economic characteristics of migrant workers of Muzaffarpur District, Bihar, 2012.

Characteristics	N (%)	Median (IQR)
1. Husband age known	644 (76)	
1.a Husband age		33 years (27 – 40) years
2. Husband Education Level		
Illiterate	561 (66)	
Literate	289 (34)	
3. Migrated at time of Marriage		
Yes	401 (47)	
No	449 (53)	
4. Husband's Monthly Income	850	Rs. 3500 Rs. (3000 – 4000)
5. Wife's Monthly Income	227 (27)	Rs. 900 Rs. (600 – 1000)
6. Living Facilities in House		
a. Concrete House	7 (0.8)	
b. Own Drinking Water Facility	305 (36)	
c. Electricity Connection	151 (18)	
d. LPG availability	3 (0.35)	
e. Self Lavatory in House	54 (6.4)	
7. Consumer Items in House		
i. Four Wheeler	2 (0.2)	
ii. Two Wheeler	12 (1.4)	
iii. TV Set	47 (5.5)	
iv. Radio/Transistor	23 (2.7)	
v. Fan	22 (2.6)	
vi. Sewing Machine	15 (1.8)	
vii. Cycle	295 (34.7)	
viii. No Consumer Items	558 (65.6)	
8. Living Standard index		
Low ≤ 9	815 (94.6)	
Medium (10-19)	29 (4.6)	
High (>19)	6 (0.8)	
9. Area of Migration Related to HIV		
High Endemic Zone	116 (14)	
Medium Endemic Zone	535 (63)	
Low Endemic Zone	199 (23)	
10. Duration of Migration		8 (3 – 12) years
< 3 years	180 (21)	
3 – 6 years	224 (26)	
>6 years	446 (53)	

Table-4.2 : Socio-demographic and economic characteristics of migrant workers of Muzaffarpur District, Bihar, 2012.

Characteristics	N (%)	Median (IQR)
11. Type of Occupation		
Agricultural Workers	12 (1.41)	
Unskilled Workers	668 (78.59)	
Skilled Workers	85 (10)	
Truck drivers/helpers	42 (5)	
Self Business	20 (2)	
Services in Job	23 (3)	

Table-4.3 : Distribution of Opinion about socio-cultural behavior related to marriage and sex among the wives of migrant workers of Muzaffarpur district, Bihar, 2012.

Characteristics	N (%)
1. Age of marriage of Boys in rural areas	
a. 18- 20 years	353 (41.6)
b. 21-25 years	492 (58)
c. > 25 years	3 (0.4)
2. Age of Marriage of girls in rural areas	
a. 16- 18 years	806 (95)
b. 19-21years	34 (4.6)
c. > 21 years	3 (0.4)
3. Sex before marriage in girls	
Yes	134 (15.8)
No	296 (34.8)
Can't say	420 (50.0)
3a. Proportion of girls having sex before marriage	
a. < 5%	90 (67.16)
b. 5-15%	40 (29.85)
c. 16-25%	3 (2.24)
d. > 25 %	1 (0.74)
3b. Average age of sex before marriage	
a. 14 years	8 (5.97)
b. 15 – 20 years	122 (91.04)
c. > 20 years	4 (2.98)
3c. First sex partner	
a. Boy Friend	78 (58.21)
b. Close relatives (not blood related)	41 (30.59)
c. Unknown person	9 (6.72)
d. Can't say	6 (4.47)
4. Availability of Commercial Sex workers	
a. Yes	41 (4.82)
b. No	116 (13.64)
c. Can't Say	693 (81.52)
4a. Type of sex Workers	
a. Female Sex workers available in village	1 (2.43)
b. In Motels near highways	14 (34.64)
c. Women working in Brick kiln	26 (63.41)
4b. Locality of Sex Workers	
a. From same village	4 (10.0)
b. From other village	7 (17.5)
c. From other cities	28 (67.5)
d. Can't say	2 (5.0)

Table-4.3 : Distribution of Opinion about socio-cultural behavior related to marriage and sex among the wives of migrant workers of Muzaffarpur district, Bihar, 2012. (contd.)

4c. Type of Customer	10 (24)
a. Unmarried Males	6 (15)
b. Married Males	6 (15)
c. Widower/Separated	19 (46)
d. Can't say	
5. Village Males having multiple partner	
a. Yes	104 (12)
b. No	184 (22)
c. Can't say	562 (66)
5a. Proportion of Males having multiple partner	Median = 5% IQR = (2 – 10%)
5b. Sex Partners of Males	
a. Close Relatives	46 (46)
b. Other Married women	43 (42)
c. Unmarried Girls	6 (5)
d. FSW	9 (7)
6. Village Females having Multiple Partners	
a. Yes	54 (6)
b. No	59 (7)
c. Can't say	737 (87)
6a. Proportion of Females having multiple partners	Median = 3% IQR = (2 – 5%)
6b. Sex Partners of Females	
a. Close Relatives	1 (2)
b. Other Married Males	29 (54)
c. Unmarried Boys	24 (44)

Table-4.4 : Sexual and other risk behaviors of wives of migrant workers of Muzaffarpur district during 2011-12.

Characteristics		N(%)
1. Average age of sexual debut	< 18 years	616 (72)
	≥ 18 years	234 (28)
2. Sex before Marriage	Yes	7 (0.82)
3. Level of sexual satisfaction with husband	Average	44 (5)
	Good	542 (64)
	Very Good	264 (31)
4. Last sex with husband	within 1 Month	149 (18)
	> 1 month	701 (82)
4a. Frequency of sex within 1 Month	> 5 times	82 (55)
5. Sexual intercourse other than vaginal	Yes	16 (2)
5a. Type of sexual intercourse other than vaginal	Oral	8 (50)
	Anal	6 (37.5)
	Both	2 (12.5)
6. Condom use whilst last sex with husband	Yes	25 (3)
6a. Usual Frequency of Condom Use With husband	Most Times	25 (3)
	Some Times	630 (74)
	Never	196 (23)
7. Heard of HIV/AIDS prior to this interview	Yes	132 (15.5)
8. Consumption of Alcohol during last sex by Husband	Yes	78 (9)
8a. Usual Consumption of Alcohol during sex By Husband	Always	34 (4)
	Most Times	93 (11)
	Some Times	619 (73)
	Never	104 (12)
9. Addiction of other toxic substance before sex	Yes	85 (10)
9a. Type of toxic substance	Local Drink	688 (81)
	Marijuana	160 (18)
	Brown Sugar	1 (0.82)
10. Reasons for not using condoms with Husband		
a. Condom not necessary whilst sex with husband	Yes	583 (69)
b. You don't like using condom	Yes	690 (81)
c. Condom reduces sexual pleasure	Yes	791 (93)
d. You want to have a child	Yes	443 (52)
e. You are pregnant	No	763 (90)
f. Husband does not like condom	Yes	796 (94)
g. Non-availability of condom during sex	Yes	781 (92)
h. Condom costs too much	No	14 (2)
i. Thought of using condom did not occur	Yes	646 (76)
j. Using other contraceptive measures/Permanent sterilization	Yes	291(34)
Cronbach's Alpha = 0.52		

Table-4.5: Distribution of association of HIV prevalence with other socio-economic factors

Factors		HIV Status			Chi-square ; p-value(Fisher Exact Test)	OR (95%CI); p-value (Fisher's Exact)
		+ve	-ve	Total		
HIV Prevalence		5 (0.59)	845	850		
		95% CI = 0.19 – 1.37				
Education	No	3	481	484	0.0192, p=0.63	1.13 (0.13 – 13.65); p=0.62
	Yes	2	364	366		
TV Set	No	4	800	804	2.09; p=0.24	0.23 (0.02 – 11.32); P=0.24
	Yes	1	45	46		
Husband Education	No	4	557	561	2.59; p=0.12	2.07(0.21 – 102.3); P=0.44
	Yes	1	288	289		
Age	15 – 24	2	243	245	0.31; p=0.63	1.65 (0.14 – 14.49); P= 0.45
	>24	3	602	605		
Age of Sexual Debut	<18 year	4	612	616	0.429; p=0.58	1.53 (0.49 – 70.3); P=0.58
	≥ 18	1	233	234		
Condom Use	No	4	821	825	5.12; p=0.139	0.12 (0.01 – 5.99); P=0.139
	Yes	1	24	25		
HIV Knowledge	Yes	2	130	132	2.30; p=0.1742	3.66 (0.31 – 32); p=0.1742
	No	3	715	718		

Table-4.6: Distribution of association of HIV knowledge with other socio-economic factors

Factors		HIV Knowledge			Chi-square ; p-value	OR (95%CI); p-value
		Yes	No	Total		
Education	Yes	111	255	366	107.3; p=0.000	9.6 (5.8 – 16.5); p=0.000
	No	21	463	484		
TV Set	Yes	20	26	46	28.96; p=0.000	4.75 (2.52 – 9.17); p=0.000
	No	112	692	804		
Husband Education	Yes	76	213	289	38.4; p=0.000	3.22 (2.16 – 4.8); p=0.000
	No	56	505	561		
Age	15 - 24	53	192	245	16.88; p=0.000	
	25 – 34	57	290	347		
	35 - 49	22	236	258		
Age	15 – 24	53	192	245	9.77; p=0.002	1.84 (1.22 – 2.74); p= 0.0018
	>24	79	526	605		
Living Standard Index	Low	118	697	815	32.64; p=0.0001	0.22 (0.11 – 0.49); p=0.0001
	Above	15	20	35		
Condom Use	Yes	9	16	25	8.23; p=0.004	3.21 (1.22 – 7.90); p=0.0041
	No	123	702	825		
Pre-marital Sex	Yes	4	128	132	9.41;p=0.013	7.44 (1.61 – 33.67); p=0.091
	No	3	715	718		

Table-4.7: Logistic Regression analysis to model HIV Knowledge among wives

Factors	AOR (95% CI)	p-value (Z-score)
Age group 15-24 years	1.28 (1.02 – 1.82)	0.001
Women Education Level	7.63 (4.61 – 12.63)	0.0000
Availability of TV set	1.46 (1.16 – 1.83)	0.001
Husband Education	2.05 (1.36 – 3.11)	0.001

Table-4.8 : Model Selection and fitted model for knowledge of HIV among wives

Model	Observations	Log-likelihood (null)	Log-likelihood (Model)	d.f.	AIC	BIC
Initial	850	-367.015	-311.0102	2	626.02	635.51
Final	850	-367.015	-298.3783	5	606.75	630.48

LR Chi-square(2) = 25.26; p=0.0000; Hosmer-Lemeshow lack of fit test, Chi-square=10.55 at 8d.f., p=0.4813

Table-4.9: Sexual Relationship Power or Dominance between wife and husband (migrant workers)

Factors	Strongly agree	Agree	Disagree	Strongly Disagree
1. Husband gets violent if asked to use condoms	0	16(2)	610(72)	223(26)
2. Husband gets angry if asked to use condoms	1	22(3)	694(82)	133(16)
3. Most of the time you do whatever your husband wants to do	82(10)	468 (55)	244(29)	56(6)
4. Husband has more power to take important decision	76 (9)	456 (54)	198(23)	120(14)
5. Husband instructs you about spending time with other	0	8(1)	677 (80)	165 (19)
6. If you ask your husband to use condom, he may think you are having sex with other male	0	6 (0.72)	621 (73)	223 (26)
7. Your husband does whatever he wants even if you don't want so	150 (18)	285 (34)	332 (39)	83 (9)
8. You are more committed to your relationship than your husband	54 (6)	137 (16)	570(67)	89 (10)
9. When your husband and you disagree, he gets his way most of the time	47 (6)	152 (18)	527 (62)	124 (14)
10. Your husband always wants to know where about of you	0	9 (1)	636 (75)	205(24)
11. Your husband might be having sex with other women	3(0.75)	6(0.71)	492 (58)	349 (41)
Cronbach's Alpha = 0.76				

Table-4.10: Decision making Power or Dominance between wives and migrant workers

Factors	Husband's Decision	Both	Wives' Decision
1. Authority about relatives visit to house	238 (28)	607 (71)	5 (1)
2. Decision about Sex	154 (18)	694 (81)	2(1)
3. Authority about discussing important things	130 (15)	719 (85)	1 (1)
4. More power in your relationship	580(68)	270(32)	
5. Decision to use condoms	50 (6)	800 (94)	5 (0.6)
6. Decision about type of sexual act	55 (6)	790 (93)	
Cronbach's Alpha = 0.53			

Table-4.11: Attitude of wives of migrant workers towards Gender Norms

Factors	Agree	Disagree
1. A good wife must obey her husband even if she doesn't agree with him on issues	79 (9)	771 (91)
2. It is important for a man to show his wife who is important	67 (8)	783 (92)
3. It's wife obligations to have sex with her husband even if she does not want it	0	850 (100)
4. A man has good reason to physically assault his wife if she does not agree with him	0	850 (100)
5. A man has good reason to hit his wife if she refuses sex	0	850 (100)
6. A man has good reason to hit his wife if she asks his relationship with other woman	0	850 (100)
7. A man has good reason to hit his wife if she is unfaithful to him	0	850 (100)
Cronbach's Alpha = 0.63		

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CHAPTER-5

Knowledge, attitude and perception about HIV/AIDS among the wives of migrant workers of Muzaffarpur district in Bihar.

Introduction

Acquired Immunodeficiency Syndrome (AIDS) has become one of the most serious health problems in the world as well as in India. The first human immunodeficiency virus (HIV) infection was detected in India in 1986 and in 1992 in Bihar. The official estimate of HIV cases in the country had reached 2.39 million by 2009-10 of whom 39% were women amounting to 0.93 million of the total.¹ Although a decline of disease prevalence was observed in 2009 as compared to 2000, the prevalence among women continued to remain high.²⁻⁶ There are many socio-economic factors such as early marriage, high level of illiteracy, financial dependence, violence and sexual abuse against women which make them vulnerable to HIV/AIDS infection. Further, a large proportion of the women have poor access to information and education. Behavior change as a result of knowledge is a key to controlling the transmission. This is further accentuated among poverty-stricken communities.¹

A few studies have examined awareness of HIV/AIDS either among special groups or in specific regions in different parts of India. A study conducted in Bareilly district in Uttar Pradesh showed only 27.4% women in rural areas were aware of HIV/AIDS.⁷ A study conducted among women in urban areas of Pondicherry showed that 96% of women were aware of HIV/AIDS.⁸ In urban areas of Vadodara city in Gujrat showed 47% awareness among young women.⁹ The awareness of HIV/AIDS among the prostitutes in Kolkata in 1992 was only 30 per cent; however, almost 70 per cent knew of other sexually transmitted diseases.¹⁰ A clinical study in

Vellore, Tamil Nadu reported that 29% of the women attending a medical outpatient department for any illness were aware of AIDS.¹¹ The information about the extent of awareness about HIV among women living in rural areas of Muzaffarpur district was 25%.¹² Knowledge of HIV is greater among those who are better educated and from higher socio-economic classes than among the general population.¹³

The National Family Health Survey, Phase-3, conducted by the Ministry of Health and Family Planning, Government of India, has reported the levels of correct knowledge about HIV/AIDS among both urban and rural women in India.¹⁴ Per the estimates during 2007-08, 25% of the women living in the rural areas of Muzaffarpur district in Bihar had heard about HIV/AIDS and among them 89% had high level of knowledge about HIV / AIDS.¹² Low level and lack of knowledge about HIV infection among women is one of the factors promoting spread of HIV infection.¹⁵

The state of Bihar is one of the most backward regions having a low socio-economic and human development index in India. The level of literacy among women was 33.3% in 2001, but dramatically improved to 53.3% in 2011. However, this is still low compared to other developed states of India.¹⁶ The low level of awareness about HIV per NFHS-III could be due to in part because of the low literacy rate among women, especially in rural areas.

The HIV epidemic in the district needs to be better understood in the context of what is known about the sexual behavior and risk profile among these married women and their migrant husbands. In order to contribute to the discussions of risk reduction for HIV infections within marriage we explored knowledge, attitude and risk perception related to HIV/AIDS among the wives of migrant workers, and did more in-depth investigations among those who had prior

information about HIV/AIDS, using structured interviews that helped describe the interpersonal, social and cultural context of the reported behaviors and information.

Methods

Study design and population

A community based cross-sectional survey was conducted among 15-45 years old wives of migrant male workers living in Muzaffarpur district for at least six months, and without any known cognitive disability. The study population consisted of married woman who led a conjugal life for at least one month and had sexual contacts whenever their husbands were available.

In 2011, Muzaffarpur had a population of 4.778 million of whom males and females were 2.517 and 2.261 million respectively, and constituted 4.60 percent of the total Bihar population. Overall, there were 898 females per 1000 males. The literacy rate in rural areas of Muzaffarpur district was 63.75 % . Male and female literacy stood at 72.09 and 54.44 percent respectively. In total, 2,264,092 people were literate of whom males and females were 1,350,850 and 913,242 respectively. The rural population in the district is 90.17% and urban population 9.83% of the total. The Scheduled castes and scheduled Tribes constituted about 15.7% and 0.04% of the population respectively. The decennial growth rate between 2001 and 2011 was 27.54%. The density of the population was 1506 per sq. kms. Hindi is the main language spoken in the district. Muzaffarpur district consists of 2 sub-divisions and 16 Community Development Blocks. It has 3 towns and 1,811 villages.¹⁶

Sampling and sample Size

Based on sample size calculation shown in the previous chapter and actual resources for this research project, we interviewed 850 eligible women in the study area for this quantitative study,

selecting 25 subjects per cluster/village using random sampling in each 34 clusters/villages in the study. We visited all the houses along with the members of a Non-Governmental Organization (NGO) group, especially working on HIV issues, who helped the field team in recruiting wives of migrant workers. The first 25 women, who gave their consent for the interviews and blood sample collection, were selected in each village.

Data Collection

The data collection method has already been described in the previous chapter. In course of the interview, all the subjects were asked whether they have heard about HIV/AIDS before this interview or not. Out of 850 women interviewed, only 132 women had prior knowledge of HIV/AIDS. We collected very exhaustive information about the HIV/AIDS-related knowledge, attitude and risk perceptions of the 132 wives of migrant workers who reported prior awareness about HIV/AIDS before this survey.

Questionnaire

Knowledge was assessed using an 18-item question which included knowledge on ways of getting infection, myths, treatment and prevention of HIV/AIDS. The responses were binary variable (Yes or No). Attitude was assessed using a 16-item question towards HIV/AIDS and with HIV/AIDS patients. It was a 3-scale question (Agree, partially agree and disagree). Risk perception was assessed on the basis of a 4-item question about women and their husband. Risk behaviors were also assessed.

Statistical Analysis

Each questionnaire was checked manually by the field supervisor and later by the PI for the verification of completeness and accuracy of information recorded. In case of any mistakes, the

respective field investigators were asked to rectify the mistakes. After manual verification, the data was entered into a computer using Epi-Info version 7.

The data was analyzed using Stata version 10 (Stata Corp, Houston, Texas, USA). Firstly univariate analysis was conducted for each variable to find missing observations or non-responded items in the given data set. Earlier in the course of the survey, we took all efforts to minimize missing values and repeating the interviews in all villages again for those individual records showing missing values.

Variables for correct response of items related to Knowledge about HIV transmission and prevention, and attitude were created by adding up raw score as responded during the interview for measuring the correct knowledge and attitude. Cronbach's alpha was computed for knowledge items related to transmission and prevention, and for attitude in order to measure the reliability and consistency of the items.

We performed factor analysis using the extraction by principal component method and varimax rotation for measuring knowledge of and attitude towards HIV of the wives who had reported knowledge about HIV/AIDS.¹⁷ First we checked whether the data is suitable for factor analysis or not using Kaiser-Meyer-Olkin Measure of sampling adequacy, and Bartlett's test of sphericity, which is a chi-square test. These two conditions were adequate for applying factor analysis for all three constructs.

Results

A total of 132 wives, who had heard about HIV/AIDS before this interview, were interviewed further for assessing the level of correct knowledge, attitude and risk perceptions about HIV/AIDS among these women. None of the women refused the follow up interviews.

Knowledge about HIV/AIDS

In order to assess knowledge about HIV, we focused mainly on transmission, risk factors and prevention aspects. Knowledge was assessed using 18-item questions which included knowledge on ways of infection, myths, testing services, transmission, and prevention of HIV/AIDS. For knowledge, each right response was given a score of 1 while a wrong or unsure response was scored 0, so that the total scores could vary between 0-18. Knowledge scores from 0 to 10 were considered poor knowledge while knowledge scores more than 10 were considered good knowledge regarding HIV/AIDS.

Correct responses for each item are presented in Table-5.1. Overall, 110 (80%) of the women felt that HIV-infection could be avoided or one could protect oneself from getting HIV-infection. Seventy per cent had correct knowledge about vertical transmission, but only 32% had correct information about exclusive breast feeding. Most of the women, nearly 78%, believed that only immoral behavior could lead to HIV-infection. But on the contrary, nearly 82% of women felt that not only sex workers but other women in the society could be at risk of getting HIV-infection, and 64% women thought that only those males with high risk-behaviours could get HIV-infection. A high proportion, nearly 80%, knew that condoms provide protection from HIV. Women had correct information about sharing needle/syringe (91%), single sex-partner (75%) and blood test before transfusion (70%). Overall the proportion of women with a total score more than 10, indicating good knowledge, was 72%. Surprisingly, only 17% of the respondents reported that HIV cannot be transmitted through mosquito bites. Nearly 88% of women felt that tattooing in village fair should be avoided by the village women because the needle used for tattooing might be dangerous or might carry HIV-infection i.e. it could be a risk factor for HIV transmission.

We performed bivariate analysis using knowledge level with other socio-demographic and economic factors like age, educational status, religion, caste and living standard index of the women who responded about HIV. Table 5.2 presents the result of bivariate analysis. Overall, 72% of the respondents had good knowledge of HIV having total score more than 10. Except caste category, none of the demographic factors were found significantly associated with knowledge level about HIV/AIDS (chi square tests; $p > 0.05$).

We performed factor analysis separately for making assessment about “Knowledge related to transmission” based on 10-items and “knowledge related to prevention” based on 8-items in order to assess the unknown variables or factors.

The result of factor analysis for 10-items related to knowledge regarding transmission is presented in Table-5.3. Factor analysis results showed that unmeasured variable, knowledge related to transmission, was explained by only one factor because it contained the maximum “Eigenvalue” i.e. 2.28 having proportion of 84% variance, and after that all other factors had value less than 1, hence, not meet the criteria for retaining the factor. The load of each item on unknown factor is presented in Table-5.4. The results showed that out of 10-items, six items had acceptable loading factor between 0.3 to 1. However, the uniqueness value of each item was very low with an overall average of 30% predictability, indicating that apart from knowledge of respondents there could be some other factors related to these items. The reliability coefficient of 10-items variables in terms of Cronbach’s Alpha, was nearly 0.72, indicating a good level of consistency among the response of each items.

The result of factor analysis for 8-items related to knowledge about prevention is presented in Table 5.5. Knowledge related to prevention, was explained by two factors, i.e. Factor-1 indicated response in favor of pertinent preventions whereas factor-2 indicated response

in favor of not very pertinent prevention. Both these two factors had “eigenvalues” more than 1, and with 97% cumulative proportion of variance, thus satisfying the retention criteria of factors. The load of each item is presented in Table-5.6. The results showed that the first five items had reasonable loads on first factor, where as last three items had reasonable load on factor-2. The reliability coefficient of 8-items variables in terms of Cronbach’s Alpha, was nearly 0.60, indicating a fair good level of consistency among the response of each items. However, high uniqueness values of each items are indication of low predictability of around 40%.

The overall reliability coefficient of 18-items taken together was about 0.78, showing a high level of consistency of response related to knowledge regarding transmission and prevention of HIV.

Attitude of women towards HIV/AIDS

In order to assess the attitude of women towards HIV/AIDS, a set of 16-questions were asked on a 3 point-scale (agree, partial agree and disagree). Table-5.7 presents the distribution of responses of 132 women for each question pertaining to their attitude. The majority of the women (78%) believed that only immoral behavior of the persons put them at high risk of getting HIV infection.

In order to get overall impression about the attitude of women based on 16-questions, responses were converted into raw score for assessing positive response, with having minimum score of 16 and maximum score of 48. The median score was 31 (Range : 22 – 37). We assumed that any values above median score of the total possible score can be considered as a positive attitude of the respondents. Attitude scores from 16-30 were considered as negative attitude and score above 30 were considered as positive attitude. Table-5.8 presents attitude level in relation to various socio-demographic and economic characteristics. Overall 58% of the respondents had

positive attitude towards HIV/AIDS and patients with HIV/AIDS. Nearly 55% women felt that those suffering from HIV/AIDS should have all the rights to reveal their infection status to others, which showed a high positive attitude towards HIV/AIDS patients. Women had positive attitude towards sending their children to schools having HIV-infected children (83%), HIV infected teacher should continue their teaching (80%), and sharing meal with infected person was safe (75%). More than 50% women felt that HIV infected persons should be allowed to continue their work and to participate in social functions, indicating a positive attitude towards HIV infected persons. The majority of the women (75%) had the opinion that HIV-infected couples should not plan a pregnancy. Many women had the opinion that HIV-infected mother should avoid breast feeding because of risk of transmission of infection from mother to child through milk. Only 7% thought that HIV-infected mother should continue breast feeding their babies. Mean attitude scores were not significantly different ($p>0.05$) by age, education level, religion, and living standard index but were for caste ($p=0.02$).

We performed factor analysis for identifying the unknown variable related to measurement of attitude. The result of factor analysis for 16-items question related to attitude towards HIV/AIDS is presented in Table 5.9. Attitude was completely explained by factor-1 and factor-2. These two factors had “eigenvalues” more than 1 with 81% cumulative proportion of variance, thus, satisfying the retention criteria of factors. The load of each item is presented in Table-5.10. The factor loading of each item ranged between 0.3 to 1 indicating a reasonable factor load. Also, the overall lower uniqueness showed reasonable predictability, nearly 65%, of the factor model. The reliability coefficient of 16-items variables in terms of Cronbach’s Alpha, was nearly 0.875, indicating an excellent level of consistency among the response of each item.

Risk Perceptions and behaviors

Table-5.11 presents the risk perceptions of the women about self and their husbands. Of 132 women who had knowledge about HIV, 33(25%) had had on HIV-test on the recommendation of their gynecologists during pregnancy. None of them were found positive for HIV. Only 8(6%) perceived themselves at risk of getting HIV infection. Of 132, 112 (85%) perceived themselves at very low level of risk of HIV infection. Seventeen women (13%) had perception about HIV risk among their husbands, and 106(80%) felt that their husbands were at very low risk of getting HIV infection. Only 4(3%) had sex before marriage at an average age of 16-17 years. The median age of sexual debut of women having knowledge about HIV was 17 years (range: 14-22 years). Two (1.5%) had sex other than vaginal sex. Nearly 25% of 132 women had never used condom during sex with their husbands. However 92 (70%) had used condom sometimes but not always, whereas 8(6%) told that they had used condoms most times during sex with their husbands. Of 132, 93 (71%) felt no need of use condoms while having sex with husband, while 39 (30%) did not like condom during sex because of reduced sexual pleasure (89%). Of 132 women, 122 (92%) reported that their husbands did not like using a condom during sex. Twenty eight (21%) of women were using either other forms of contraceptives or were permanently sterilized. Out of 132 women, 98 (74%) reported that their husband used alcohol before sex only sometimes not regularly. None of the women reported a physical relationship with any man after marriage.

Discussion

There is a complete lack of information on HIV awareness and knowledge among women in Bihar, the most backward state of India in terms of socio-economic and health indices. This study is the first properly planned epidemiological study conducted in the most vulnerable group of women i.e. wives of rural single male migrant workers.

The district family health survey conducted during 2007-08 through NFHS-III in Muzaffarpur district indicated that 25% of women in rural areas of the district had ever heard of HIV/AIDS, and around 89% of those had a good level of knowledge.¹² In the present study we observed that nearly 16% of the subjects had ever heard of HIV of whom 72% of them had correct knowledge. The difference in these two estimates could be due to different sampling frames. The NFHS-III conducted the study in a very large population with proper representation of all socio-economic categories. In the present study, there was no representation of women belonging to high income levels. In this sub-analysis of 132 women, 111 (84%) were literate, and that could be a reason why 72% of the women had correct knowledge about disease transmission and prevention. A study conducted in thirteen states of India showed that nearly 17% of women had ever heard of HIV/AIDS.¹³ A study conducted in Bareilly district in Uttar Pradesh showed that only 27.4% women in rural areas were aware of HIV/AIDS.⁷ Low level and lack of knowledge about HIV infection among women is one of the factors promoting spread of HIV infection.¹⁵

We observed that younger respondents (15-24 years) had better knowledge levels as compared to older (>24 years), but the difference was not statistically significant ($p=0.09$). Various studies conducted in India and Africa in women have reported the similar findings.^{13,18} Further, it is reported that higher general awareness and knowledge about HIV are associated with better treatment adherence.¹⁹

In this study, we observed that a high proportion of women had correct information about transmission such as mother-to-child transmission, high risk among sex workers, high risk among men having risky behaviors, and especially tattooing. The majority of women felt that tattooing was not safe for females in rural areas because the needles or equipments used by the

artists for making tattoos were not safe. Tattoos have been used as cultural symbols among many tribal populations, as well as the caste-based Hindu population of northern India. Tattooing is reported to be associated with HIV. A study conducted among male inmates in a state prison system from 1992-2005 showed tattooing in jail was significantly associated with HIV infection.²⁰ However, the USA Center for Disease Control (CDC) reported no instances of HIV transmission through tattooing or body piercing, although hepatitis B virus were transmitted during some of these practices. In the USA, there are very strict regulations for tattoos studios. But in India, the situation is entirely different. There are no regulations for performing safe tattooing especially in rural areas where it is very common among women of all ages. This could be one of the factors of HIV transmission among women considering 39% discordant couples where wives were positive and husbands were negative.^{14,21} There is a need to investigate the association of HIV with tattooing process in rural areas of India, especially northern India.

These women had correct knowledge about prevention such as avoid sharing needle/syringe, restrict to single sex-partner, condom use, and blood test before transfusion. The reason for having correct information among these women could be due to high literacy level as 84% of these women were literate suggesting that education among women can play a very important role in creating health awareness. It has been reported that a good basic education itself ranks among the most effective—and cost-effective—means of HIV prevention.²²

Surprisingly, most of the women advocated no breast-feeding because they felt that it could transmit infection from mother to child. Further, a high proportion of women had incorrect knowledge about modes of transmission. Nearly 83% believed that mosquitoes could transmit HIV. In a study conducted in Iraq, nearly 99.3% women and 20.3% teachers believed that mosquitoes could transmit infection.^{23,24} Similarly a study conducted in Papua New Guinea

reported that 36% of women attending prenatal care in Port Moserby believed that HIV can be spread by mosquitoes.²⁵ We know that mosquitoes do not transmit HIV infection, but are not sure what the implications of the myth are. On the one hand, if people avoid mosquito bites even in belief that HIV could be avoided in that way, public health gains may be achieved through protecting them from various tropical diseases in this part of India including malaria, filarial, visceral leishmaniasis, dengue, Japanese encephalitis etc. Another myth about HIV, as observed in this study that nearly 60% of women had the opinion that eating nutritious food provides protection from HIV infection, because of the fact that nutritious foods boost ability to fight infection, which actually does i.e. low nutrition associated with poor immune response. There is a need to develop a strategy to target these women to eliminate these kinds of myths in relation to transmission and prevention of HIV/AIDS because these women can be educated easily compared to those who have no knowledge about HIV/AIDS. Further, this group of women can be used as a “Peer Educator” for educating less knowledgeable women about HIV/AIDS in rural areas.

The study showed that nearly 98% of women knowing about HIV/AIDS had a negative attitude towards those males having immoral behavior. This could be not due to HIV only but mainly due to greater impact of unacceptable socio-cultural behavior in Indian society in general and particularly in rural areas. HIV infection is associated with behaviours (such as homosexuality, drug addiction, prostitution or promiscuity) that are already stigmatised in Indian societies. In India, the majority of HIV infections, nearly 87.4%, are caused through heterosexual routes or through sex, which often carries moral baggage. HIV infection is often thought to be the result of personal irresponsibility. Religious or moral beliefs lead some people to believe that being infected with HIV is the result of moral fault (such as promiscuity or 'deviant sex') that

deserves to be punished. Fear of contagion coupled with negative, value-based assumptions about people who are infected leads to high levels of stigma surrounding HIV and AIDS.²⁶

The study showed that nearly 58% of women reporting knowledge about HIV/AIDS had a positive attitude towards HIV/AIDS and towards HIV/AIDS patients. These women were found to be sympathetic towards HIV/AIDS patients as majority of them had opinion that HIV/AIDS person should continue living with their family, ready to share meal, allowing their children to visit school with HIV-infected children and infected teacher should continue teaching. Further, they should not be prohibited from taking part in the social function and their jobs. Again the high proportion of positive attitudes among women could be due to some level of education. Many studies have reported good knowledge on HIV/AIDS but along with negative attitude. In this study, women aware of HIV/AIDS had good level of knowledge but at the same time they had reasonable level of positive attitude towards HIV/AIDS. Knowledge alone is not enough to change attitudes towards people having HIV/AIDS, but deep seated social and cultural factors such as religion, attitude towards ill-health and risk behaviours especially sexual behaviours can affect attitude too.²⁷ Hence, education plays a very important role in improving level of knowledge and inculcating a positive attitude toward HIV-infected individuals.

We observed that 85% of these women perceived themselves to be at very low risk of getting HIV infection. Eighty per cent of these women thought that their husbands were also at very low level of risk. Married women in India generally have a low risk perception for HIV despite high risk behavior of their husbands.²⁸⁻³⁵ Wives of migrant male workers may be no different and therefore may be unlikely to protect themselves from infection from their husbands. Also young women are biologically more vulnerable to HIV/AIDS infection than young man and this situation further gets aggravated by their lack of knowledge and awareness on HIV/AIDS.

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.³⁶

³⁷ Both early marriage and sexual debut are considered risk factors for HIV transmission, especially among the impoverished and illiterate section of the society.³⁸⁻⁴⁸

We observed a very low proportion of condom use, less than 5%, among the wives and migrant workers. The most obvious reasons for not using condoms, as told by the women, were disliked by both partners. Such a low proportion of condom use among these couples could be considered as highly risky as because nearly 1% of the migrant workers of Bihar were found HIV positive in a recent study being carried out in textile and diamond industries workers in Surat, Gujrat.⁴⁹ The national estimate about the HIV prevalence among migrant workers in 2011 was 2.36%. Most of these migrant workers themselves have no knowledge about their HIV status. In such situation low use of condoms can make the wives more vulnerable to HIV infection.

The main limitation of the study is that all information, especially sensitive information, was collected through structured interviews. The overall sensitivity of the response is considered to be around 55-65% on average. There are no ways to validate the response related to sexual behavior. Measurement error could be an important source of bias in this study which generally occurs in this kind of survey when respondents are supposed to answer questions related to their personal sexual behavior or sensitive behavior. This could be an important limitation of the study. Unlike confounding and some forms of selection bias that can be corrected in analysis, misclassification due to measurement error, especially when misclassification affects multiple variables, is impractical, if not impossible, to fix.^{50,51}

This study reveals a need to convince vulnerable women that they are at risk and should take appropriate precautions.

Table-5.1 : Distributions of levels of HIV/AIDS-related Knowledge among the wives of migrant workers of Muzaffarpur district

Factor	Answered Correct(%)	Answered Wrong(%)
HIV can be avoided	110 (84)	22 (16)
A healthy-looking person can be infected with HIV	85 (64)	47(36)
HIV can be transmitted from mother to child	92 (70)	40 (30)
Breastfeeding can cause HIV infection to child	42 (32)	90 (68)
Unprotected Sex with multiple partners can cause HIV infection	103 (78)	29 (22)
Males with only high risk behavior can get infected with HIV	48(36)	84 (64)
Sex-workers have high risk of getting infected with HIV	108 (82)	24 (18)
HIV-infected couple should avoid conceiving	121 (92)	11 (8)
Tattooing in village fare can cause HIV-infection to women	116 (88)	16 (12)
Knowledge about HIV-testing centre Cronbach's Alpha for 10-items = 0.72	67 (51)	65 (49)
Abstaining sex with unknown	94 (71)	38 (29)
Single Sex- partner	98 (75)	34 (25)
Always use a condom while sex	110 (80)	22 (20)
Avoid sharing injecting syringes/needles	120 (91)	12 (9)
Blood test before blood/BP transfusion	92 (70)	40 (30)
Avoid being bitten by mosquito/insects	23 (17)	109 (83)
Don't use shared clothes or utensils	91 (69)	41(31)
Eat nutritious foods Cronbach's Alpha for 8-items = 0.60	53(40)	79 (60)
Overall Cronbach's Alpha for 18-items = 0.78		

Table-5.2: Distribution of knowledge level and mean knowledge scores by socio-demographic and economic characteristics

Factors	Knowledge Level		Total (N)	Mean \pm SD	p-value
	Good Knowledge (>10) n(%)	Poor Knowledge (0-10) n(%)			
All	95 (72)	37(28)	132	12 \pm 2.45 Median = 12 IQR = 10-14	
Age Group					
15-24	42(79)	11(21)	53	12.35 \pm 2.08	0.19
25-34	40(70)	17(30)	57	11.91 \pm 2.52	
35-49	13(62)	9 (38)	21	11.40 \pm 2.87	
Education					
Literate	79(71)	32(29)	111	13.0 \pm 2.37	0.39
Illiterate	16 (76)	5 (24)	21	12.2 \pm 2.27	
Religion					
Hindu	82 (71)	34(29)	116	11.9 \pm 2.37	0.14
Muslim	13 (81)	3 (19)	16	12.7 \pm 2.04	
Caste					
General	2 (50)	2 (50)	4	10.75 \pm 2.87	0.02
OBC	64 (80)	16(20)	80	12.46 \pm 2.21	
SC	29 (60)	19 (40)	48	11.35 \pm 2.37	
Living Index					
Low	66 (58)	48 (42)	114	11.97 \pm 2.37	0.90
Medium	10 (59)	7 (41)	17	12.0 \pm 2.12	
High	1 (100)	0	1	16	

*Chi-square test; significant at the 0.05 level

Table-5.3: Factor Analysis of 10-items questions pertaining to knowledge about transmission of HIV among wives of migrant workers

Factor	Eigenvalues	Difference	Proportion	Cummulative
Factor 1	2.2825	1.73859	0.8417	0.8717
Factor 2	0.54395	0.15273	0.2077	1.0795
Factor 3	0.39122	0.22915	0.1494	1.2289
Factor 4	0.16208	0.08261	0.0619	1.2908
Factor 5	0.07947	0.09500	0.0304	1.3212

LR test: independent vs. saturated: $\chi^2(45) = 232.91$ Prob> $\chi^2 = 0.000$

Table-5.4 Factor loadings (pattern matrix) and unique variances of all the components of knowledge related to transmission

Knowledge about Transmission of HIV (Variables)	Factor1	Factor2	Uniqueness
HIV can be avoided	0.4867	0.1414	0.6932
A healthy-looking person can be infected with HIV	0.3288	0.3288	0.6457
HIV can be transmitted from mother to child	0.7258	0.0826	0.4390
Breastfeeding can cause HIV infection to child	0.5557	0.2758	0.6082
Unprotected Sex with multiple partners can cause HIV	0.5773	0.0366	0.6154
Males with only high risk behavior can get infected with HIV	0.2955	0.1523	0.8212
Sex-workers have high risk of getting infected with HIV	0.2494	0.2833	0.7600
HIV-infected couple should avoid conceiving	0.5940	-0.2144	0.5817
Tattooing in village fare can cause HIV-infection to women	0.4631	-0.1996	0.6487
Knowledge about HIV-testing centre	0.2277	0.3473	0.7277

Table-5.5: Factor Analysis of 8-items questions pertaining to knowledge about prevention of HIV among wives of migrant workers

Factor	Eigenvalues	Difference	Proportion	Cummulative
Factor 1	1.5696	0.44818	0.5654	0.5654
Factor 2	1.21145	0.34341	0.4039	0.9639
Factor 3	0.7780	0.67653	0.2802	1.2495
Factor 4	0.10152	0.16778	0.0366	1.2861

LR test: independent vs. saturated: $\chi^2(28) = 236.03$ Prob> $\chi^2 = 0.0000$

Table-5.6 Factor loadings (pattern matrix) and unique variances of all the components of knowledge related to prevention

Knowledge about Prevention of HIV (Variables)	Factor1	Factor2	Uniqueness
Abstaining sex with unknown	0.6281	-0.1214	0.5327
Single Sex- partner	0.7129	-0.1114	0.4278
Always use a condom while sex	0.5465	0.0217	0.6890
Avoid sharing injecting syringes/needles	0.5133	0.0269	0.6934
Blood test before blood/BP transfusion	0.5891	-0.0299	0.5422
Avoid being bitten by mosquito/insects	-0.2302	0.7164	0.4319
Don't use shared clothes or utensils	0.2454	0.6383	0.5119
Eat nutritious foods	0.4104	0.4302	0.6006

Table-5.7: Distribution of correct attitude of wives of migrant workers of Muzaffarpur district during 2011-12 towards HIV/AIDS

Statement	Number responding (%) who agree or disagree with the statement		
	Agree (%)	Partially Agree(%)	Disagree(%)
1. People get HIV/AIDS due to Immoral behavior	103(78)	27(20.5)	2(1.5)
2. PLWAH have a right to decide who should know it	73 (55.3)	50(37.8)	9 (6.8)
3. Sex workers only women to worry about HIV	24 (18.2)	103 (78)	5 (3.8)
4. Men who go to sex workers or use drugs only men who have to worry about getting HIV/AIDS	84 (63.6)	47 (35.6)	1 (0.75)
5. Willing to take care of HIV Infected relatives	36 (27.4)	51 (38.6)	45 (34)
6. People with HIV/AIDS should continue living with their family	38 (28.8)	52 (39.4)	42 (31.8)
7. Sharing Meal with HIV infected person	43 (32.6)	55 (41.6)	34 (25.8)
8. Sending children to school with HIV-children	40 (30.3)	69 (52.3)	23 (17.4)
9. HIV infected teacher should continue teaching	42 (31.8)	64 (48.5)	26 (19.7)
10. Maintain secrecy of family member HIV-status	79 (60)	43 (32)	10(8)
11. Moving in a home with HIV-family neighbor	40 (30)	35 (26.5)	57 (43.2)
12. HIV/AIDS people should not be allowed to continue their work	37 (28)	22 (16.6)	73 (55.4)
13. HIV/AIDS people should not be allowed to participate social function	31 (23.5)	30 (22.7)	71 (53.8)
14. HIV/AIDS infected couple should not plan for the next pregnancy	99 (75.1)	22 (16.6)	11 (8.3)
15. HIV infected mother should not breast feed	90 (68.2)	33 (25)	9 (6.8)
16. HIV/AIDS infected women should not be allowed for tattooing	53 (40.2)	63 (43.7)	16 (12.1)
Cronbach's Alpha for 16-items = 0.875			

Table-5.8: Distribution of attitude level and mean attitude scores by socio-demographic and economic characteristics

Factors	Attitude Level		Total (N)	Mean \pm SD	p-value*
	Positive attitude (>30 score) n(%)	Negative attitude (16-30 score) n(%)			
All	77 (58)	55(42)	132	31 \pm 4.07 Median = 31 IQR = 21-35	
Age Group					
15-24	31(58)	22(42)	53	31.13 \pm 3.99	0.49
25-34	35(62)	21(38)	56	31.41 \pm 3.93	
35-49	11(48)	12 (52)	23	30.65 \pm 4.71	
Education					
Literate	65(58)	46(42)	111	31.14 \pm 4.02	0.54
Illiterate	12 (57)	9 (43)	21	31.28 \pm 4.42	
Religion					
Hindu	70 (60)	46(40)	116	31.14 \pm 4.13	0.28
Muslim	7 (44)	9 (56)	16	31.31 \pm 3.78	
Caste					
General	2 (50)	2 (50)	4	30.0 \pm 5.83	0.85
OBC	48 (60)	32(40)	80	31.45 \pm 3.82	
SC	27 (56)	21 (44)	48	30.79 \pm 4.38	
Living Index					
Low	64 (56)	50 (44)	114	31.10 \pm 4.18	0.77
Medium	11 (65)	6 (35)	17	31.71 \pm 3.12	
High	1 (100)	0	1	31	

*Chi-square test; significant at the 0.05 level

Table-5.9: Factor Analysis of 16-items questions pertaining to attitude towards HIV/AIDS among wives of migrant workers

Factor	Eigenvalues	Difference	Proportion	Cummulative
Factor 1	5.61842	3.394302	0.6234	0.6237
Factor 2	1.67540	0.80405	0.1860	0.8096
Factor 3	0.87135	0.16991	0.0967	0.9063
Factor 4	0.70144	0.18482	0.0779	0.9842

LR test: independent vs. saturated: $\chi^2(120) = 1236.26$ Prob> $\chi^2 = 0.0000$

Table-5.10 Factor loadings (pattern matrix) and unique variances of all the components of attitude of women

Statement			
	Factor 1	Factor 2	Uniqueness
1. People get HIV/AIDS due to Immoral behavior	-0.3827	0.3694	0.5596
2. PLWAH have a right to decide who should know it	0.2102	-0.1260	0.6978
3. Sex workers only women to worry about HIV	0.1230	-0.0720	0.7148
4. Men who go to sex workers or use drugs only men who have to worry about getting HIV/AIDS	-0.3368	0.2340	0.6172
5. Willing to take care of HIV Infected relatives	0.7888	-0.1030	0.2329
6. People with HIV/AIDS should continue living with their family	0.8407	-0.0733	0.1350
7. Sharing Meal with HIV infected person	0.8413	0.1057	0.1923
8. Sending children to school with HIV-children	-0.7874	0.3839	0.1192
9. HIV infected teacher should continue teaching	0.7760	0.2905	0.1406
10. Maintain secrecy of family member HIV-status	-0.2974	0.3118	0.7208
11. Moving in a home with HIV-family neighbor	0.8084	-0.1639	0.2584
12. HIV/AIDS people should not be allowed to continue their work	0.6562	0.3943	0.1653
13. HIV/AIDS people should not be allowed to participate social function	0.6657	0.4507	0.1722
14. HIV/AIDS infected couple should not plan for the next pregnancy	0.3983	-0.4679	0.4904
15. HIV infected mother should not breast feed	0.4125	0.5888	0.3244
16. HIV/AIDS infected women should not be allowed for tattooing	-0.3105	0.3950	0.5955

Table-5.11: Distribution of risk perception and practices among wives of migrant workers

Variables	N=132 (%)
Perception	
i. Level of self-perceived risk of HIV(low)	112 (85)
ii. Husband risk of HIV	17 (13)
iii. Level of husband's risk of HIV (low)	106 (80)
Practices	
i. HIV-test ever (yes)	33 (25)
ii. Sex Before Marriage	4 (3)
iii. Sex other than vaginal	2 (1.5)
iv. Never Used condoms	33 (25)
v. Used condoms sometimes	92 (70)
vi. Condom use not necessary while sex with husband	93 (71)
vii. Husbands dislike condoms	122 (92)

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CHAPTER – 6

DISCUSSIONS -CONCLUSIONS

This is the first population-based study ever conducted among women who are wives of single male migrant workers of Muzaffapur district in Bihar, India. These wives are considered highly vulnerable to HIV infection because of the promiscuous behavior of their husbands, who live for more than 6-9 months away from family in industrial areas and cities mainly situated in high to medium endemic zones of HIV in India. Both qualitative and quantitative methods were employed for the study. The data from both the quantitative and qualitative studies provide insight about the matrix of sexual practices and behaviors along with the relationship characteristics that play important roles in acquiring and transmitting HIV infection. The study further highlighted the level of knowledge and awareness, attitude and risk perceptions among wives of migrant workers.

Collecting information on sensitive topics such as the pattern of sexual behavior and intimate relationships using face-to-face interview was a very challenging task. Four trained, married female investigators/counselors were appointed to conduct both the in-depth and structured interviews directly asking non-sensitive and administering the audio-recorded technique for sensitive questions.

The analysis based on in-depth interviews of 24 wives helped to identify important socio-cultural practices and myths related to marriage and sex in rural areas of Bihar, which further helped in outlining and designing the structured questionnaire used for the main interview. We collected some important information related to changing views of acceptable sexual behavior among the young generation in rural areas from the in-depth interviews, which were not known before the study. This study further highlighted changing feeling about strictly monogamous

relationship in rural areas. However, a majority of the women reported a high level of satisfaction in their marital relationship.

From the qualitative study mainly the in-depth interviews we observed that a high proportion of wives, nearly 62.5% , had awareness about HIV/AIDS as compared to only 15.52% as observed in the structured interviews. Second, the likely reason was that nearly 58% of the respondents of in-depth interviews had more education varying between middle to high level, whereas in the structured interview only 21% had any formal education at schools. The sample of in-depth interviews cannot be considered as representative of the source population because of non-probabilistic sampling.

Analysis of the quantitative data showed that the education status of wives and their husband, 15-24 years, and the presence of a TV set in the household were significant factors associated with higher levels of knowledge about HIV among wives of migrant workers. Lack of awareness about HIV/AIDS in nearly 85% of the study population is a serious matter of concern for this highly vulnerable population. Those who had prior information about HIV were educated indicating that educating these women helps to increase their HIV/AIDS awareness level. We observed that very low proportions of these couples reported using condoms, though most of them had awareness about use of condom as protective measure.

The prevalence of HIV among the wives of migrant workers was only 0.59%, but was more than three folds higher compared to 0.19% prevalence of women in Bihar in 2009-10 indicating that the wives of migrant workers had more than 3-times higher risk of getting HIV as compared to the women of general population. The low HIV prevalence among the wives of migrant workers could be due to less number of sexual intercourse with the husbands as their husband come for a short duration in a year. Hence, the chance of getting exposed to HIV

infection is very low. We did not observed significant association with any of the socio-economic factors, possibly because of low prevalence leading to sparse-data bias in the study.

The primary strength of this study is that it was population-based combining both the qualitative and quantitative methods. The sample size was adequate enough to precisely estimate most of the parameters. The overall response rate was very high nearly 95% for both interview and specimen collection. The sampling frame of the wives should have been representative of the source population as it was constructed by making house-to-house search in each village cluster by the investigators with the help of local health worker/volunteer.

This study has some limitations. First no mechanism was available to validate the response of wives related to sensitive questions due to social-desirability bias even it was collected using audio-recorded and color-coded questionnaire. Hence, there could be information bias due to misclassification. Second, missing observations occurred despite our second attempt to collect data from the respondents, but there were relatively few non-responses. Hence, we substituted the missing observation by the median value of the response. Third, the low proportion of HIV prevalence did not allow for establishing any associations with some known risk factors. Perhaps, the sample size needed for establishing this was not adequate probably in part because of resource constraints and an expected large prevalence of HIV. Fourth, since it was a cross-sectional study so our inability to ascertaining temporality was a major constrain. Fifth, most of the information on their past and current (in last 6 months) sexual and risk behavior might not have been recalled properly due to difficulty in remembering. This could lead to recall bias, however, it was probably non-differential between comparison groups. Attempts were taken to ask the questions by the interviewer in similar manner such as using the local dialects by all the four women interviewers but still there could be some intra-observational

variation leading to interviewer bias. Last but not the least, we could not assess the HIV infection status of husbands of infected wives as their husbands were not available at the time of our survey. Our team made some attempt to visit their houses during festival season, but none of them could be contacted. These women had no idea about the HIV status of their husband. Hence it was difficult to assess the proportion of discordant couple, because if wives were positive only it could reflect a different scenario of transmission dynamics of HIV in rural areas of Bihar.

This study has highlighted several areas requiring further research. The findings of the study will certainly fill help some of the existing gaps in information and understanding of the behavioural and socio-cultural factors related to the risk of HIV among the wives of migrant workers. Based on analysis and discussions, we would like to make some recommendations to the health policy makers of the state, especially for HIV/AIDS, as follows:

- i. Considering vulnerability to HIV infection among the wives through their husbands who are migrant workers, there is a need to conduct a periodic surveillance among the returning migrant workers of the state.
- ii. Wives of HIV positive migrant workers should also be tested during the periodic surveillance.
- iii. Wives of migrant workers should be especially targeted for developing a specially designed information, education and communication (IEC) strategy.
- iv. Non-governmental organizations (NGO's) are mainly working on high risk groups in the state. Some NGO's should target migrant workers and their wives during the time when these workers come back to their native place, especially during festival seasons.
- v. The HIV prevalence was lower than expected but the higher prevalence observed in this survey compared to the 2009-10 prevalence of HIV among women in the general population suggest that HIV may be increasing in this group of women in the state.

These recommendations will certainly help the policy makers, both at the national as well as the state level, in evolving and implementing suitable and effective prevention interventions among the migrant workers and their wives in order to slow down the spread of the HIV/AIDS epidemic.