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Research Article

Decoding Migration - HIV Links Using Gender Lens: An Application of Modified Case-Control Design

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Abstract

This paper analyzes Migration- HIV link using a gender lens by interviewing 620 ICTC attendees, adopting a modified Case Control Design from Darjeeling, India in 2014. Findings established that liberalized sexual norms, social isolation and peer influence at destinations enhanced their risky sexual transactions elevating chances of contracting STI/HIV. Significantly higher proportion of migrants reported interfacing of alcohol and sex in the last 30 days prior to the survey. Cox regression analysis portrays that migrants are more likely to initiate sex at early ages. Risky sexual transactions of migrants are also affirmed with significantly higher prevalence of HIV (20%) among migrants than among non-migrants (13 %). Gender and HIV link is affirmed with significantly higher prevalence of HIV among male migrants (22%). However, among non-migrants, there is significantly elevated prevalence of HIV among females (20%) as against their male counterparts. Migration-HIV link has become gender sensitive due to intersection of influx of single male migrants engaged in high risk sexual behaviors as well as increasing vulnerability of left behind women. These findings demonstrate that the policy instruments should focus addressing risky sexual behavior of male migrants, while capacity building of women and ensuring their sexual rights should be the key constructs of the policy instruments at their places of origin.

Introduction

Many developing countries including India have cited increasing mobility and migration as one of the most important factors leading to the rapid spread of STI/HIV (Jochelson, et al., 1991; Brockerhoff et al., 1999; Skeldon, 2000; UNAIDS, 2001; Wolffers et al., 2002; Anderson et al., 2003; Xiushi et al., 2004). Studies in the more developed countries also have highlighted the vulnerability of migrant workers to STI/HIV and the subsequent spread of the diseases through their mobility (McCoy, et al. 1996; Wallace et al., 1997; Guest et al., 1999; Lansky et al., 2000; Wallman, 2001). From an epidemiological perspective, the spread of infectious diseases has always been associated with the movement of people. Migration brings more people into close contact and creates a greater mixing of people at places of destination, which provides a favorable environment for disease transmission.

As such, migration itself does not spread the AIDS virus, and it usually do so only if the process of migration renders migrant's vulnerable to certain STI/HIV risk behaviors and facilitates the diffusion of such behaviors. Accordingly, the search for the migration and HIV link must go beyond migration's roles as virus carrier and population mixer to identify and understand ways by which the process of migration leads to behaviour changes that increases migrants' risk to STI/HIV. This paper highlights the co-variates of HIV related risk behavior as well as the difference in prevalence in HIV infection among the migrants and non-migrants in the context of their life course transition. In fact, the life course perspective can be characterized by trajectories, transitions, turning points, and timing of changes in individual life. Each of these four, alone or in combination, are seen in life course studies. Trajectories are lengthy patterns of change and stability. Transitions are life events that may cause changes in an individual's life and relationships. Turning points are major transitions that cause a

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sharp change in the trajectory of an individual's life course. Timing refers to the historical context or characteristics in a particular period. Sexual initiation is a transitional event in anyone's life and literatures support that, early sexual initiation increases the risk of HIV infection and other sexually transmitted diseases (Tilahun and Ayele, 2013). Therefore, this study includes age at first sex as an important indicator to reflect the life course transition.

The review of exiting literatures highlights that many studies have been carried out on migration and HIV related risk behavior, but almost all the studies have dealt with specific groups of migrants. However, the link between migration and HIV cannot be addressed effectively without having a comparison group of non-migrants living in the similar context and environments, which, of course, may require a larger sample size for adopting any community based design. At the same time, there is a dearth of studies on potential role of gender inequality in enhancing women's vulnerability to STI /HIV in the existing migration process, having dominance of single male migration. Dominance of single male migration plays a significant role in behavioral transition, which in turn enhances the risk of getting HIV through risky sexual behavior in the new places and contexts. The existing data on gender differences in HIV prevalence from different rounds of Sentinel Surveillance as well as National Family Health Survey provide evidence base for continuously narrowing gender gap in new infections.

It is within the context of continuously narrowing gender gap, the major research questions pertaining to migration HIV link are how does gender play a role in HIV related risk behaviour among migrants and non-migrants and what are the factors associated with sexual risk behaviour and HIV seropositivity among migrants and non-migrants? Therefore, the objective of this paper is to understand the life course transition of individuals coming to ICTCs for HIV test irrespective of their HIV status, including analysis of various pathways linking migration and HIV/AIDS focusing the role of migration in transmission of HIV/AIDS from various high risk groups to general population in a gender perspective. It also deals with multiple contexts enhancing frequent interactions between migrants and locals with emphasis at single male migration, where migrants are vulnerable to the place of destination, while left behind women may be vulnerable at the place of origin. The specific objectives of the paper are to understand the covariates of HIV related risk behavior among migrants and non-migrants using gender lens and to determine the factors associated with sexual risk behaviour and HIV seropositivity among migrants and non-migrants.

Data and Methods

The basic data for this study has been collected from some selected ICTCs from Darjeeling district of West Bengal, India in 2014. West Bengal shares International borders with Bangladesh, Bhutan and Nepal. Therefore, West Bengal witnesses large-scale migration, both from neighboring states and international migration corridors from neighboring countries. According to Indian National Commission for Women (2002), Nepal and Bangladesh account for 2.6 percent and 2.8 percent of the female sex workers (FSWs) in India, who are forced to rely on sex work for their livelihood and survival. Darjeeling is well known for tourism and for its tea gardens. There is a huge demand for the laborers in the tea gardens as well as in the hotel industry. Darjeeling district is the home for second highest seropositive cases (4033) after Kolkata in the state of West Bengal.

Among all ICTCs in the district, 700 study subjects were planned to be recruited from 3 randomly selected ICTCs interlinked with Antiretroviral Therapy (ART) centers. The estimation of sample size was based on an approximate prevalence (**p**) of HIV seropositivity among clients of ICTC in Darjeeling district as 12.5 percent (NACO, 2008-09), **q** = 1-p and **α (**the maximum permissible error in the estimate) = 10 percent. A total 620 ICTC attendees have been interviewed, and among them 104 respondents were turned HIV positive cases and the remaining 516 were negative, who have been treated as controls. Thus, the study design followed an implicit unmatched case-control design for selection of respondents, where cases and controls have been decided after linking survey information with the test results. Given below are some of the important statistical tools used in analysis of the data:

Poisson regression analysis

When the outcome variable is numeric in form of counts, Poisson regression can be used to explain the explanatory power of various predictors included in the model. The aim of Poisson regression analysis in such instances is to model the dependent variable Y as the estimate of outcome using some or all of the explanatory variables. The logarithm of the response variable is linked to a linear function of explanatory variables such that,

$$\log_e(Y) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \text{ ...and so } Y = (e^{\beta 0})\,(e^{\beta 1 X1})\,(e^{\beta 2 X2})$$

Where Y denotes the number of times involved in sexual intercourse in last one month and X_1, X_2,.. are the explanatory variables included in the model.

Zero inflated Poisson regression model

Zero inflated Poisson regression has been applied for number of times condom was used during sexual encounter in last one month. Zero-inflated models attempt to account for excess zeros. Zero-inflated models estimate two equations simultaneously, one for the count model and one for the excess zeros. Suppose that case 1 occurs with probability π and case 2 occurs with probability 1-π. Therefore, the probability distribution of the ZIP random variable y_i can be written

$$Pr(y_i = j) = \begin{cases} \pi_i + (1-\pi_i)\exp(-\mu_i) & \text{if } j = 0 \\ (1-\pi_i)\dfrac{\mu_i^{y_i}\exp(-\mu_i)}{y_i!} & \text{if } j > 0 \end{cases}$$

Where π_i is the logistic link function. It is worth mentioning that the Poisson component can include an exposure time *t* and a set of *k* repressor variables (the *x's*). The expression relating these quantities is

$$\mu_i = exp(\ln(t_i) + \beta_1 x_{1i} + \beta_2 x_{2i} + \cdots + \beta_k x_{ki})$$

Often, x_1= 1, in which case $ß_1$ is called the *intercept*. The regression coefficients $ß_1$, $ß_2$…… $ß_k$ are unknown parameters that are estimated from a set of data. Their estimates are symbolized as b_1, b_2,... b_k. This logistic link function π_i is given by

$$\pi_i = \frac{\lambda_i}{1+\lambda_i}$$

$$\lambda_i = exp(\ln(t_i) + \gamma_1 z_{1i} + \gamma_2 z_{2i} + \cdots + \gamma_m z_{mi})$$

Where,

The logistic component includes an exposure time *t* and a set of *m* regressor variables (the *z's*). It is worth mentioning that the *z's* and the *x's* may or may not include terms in common.

Cox Proportional Hazard Model

For the modeling of timing of first sexual intercourse i.e age at first sexual intercourse, Cox Proportional Hazard model has been used. Cox Proportional Hazard model is a multivariate technique for analyzing the effect of two or more metric and/or non-metric variables on survival. It is the most general of the regression models because it is not based on any assumption concerning the nature or shape of the underlying survival distribution. The model assumes that the underlying hazard rate (rather than survival time) is a function of the independent variables (otherwise called the covariates or risk factors); no assumption is made about the nature or shape of the hazard function. Therefore,

Cox's regression model may be considered to be a nonparametric method. The Cox Proportional Hazard model is of the form:

$$\lambda_i (t) = \lambda_0(t)\, e^{\Sigma\beta xi}$$

Where $\boldsymbol{\lambda_i}$ is the rate at which individual i will move to transition to first sexual intercourse during the risk period, given that he or she was a virgin at time **t.** On the right-hand side of the equation, $\boldsymbol{\lambda_0}$ is the baseline hazard rate at time t for all individuals in the sample when all covariates are 0. In Cox proportional hazard models, $\boldsymbol{\lambda_0}$ is undefined. $\boldsymbol{\beta}$ is a vector of parameters associated with a vector of covariates X_i, which contain the independent, intermediate and control variables. For a given covariate, the change in the baseline hazard is given by exp (β).

Results

Covariates of HIV related Risk Behavior

Variation in STI/HIV prevalence in any community/group largely depends on the intensity of HIV related risk behavior irrespective of their migratory status. Therefore, it is highly desirable to analyze the co-variates of high risk sexual behavior, which leads to STI/HIV, among the ICTC attendees. Table 1 portrays different co-variates of STI/HIV related risk behaviors among migrants and non-migrants by classifying them in to two reference periods namely life time measures of risks and short duration measures of their risk indulgence (i.e. 30 days prior to survey).

It is evident that significantly higher proportions of migrants were engaged in HIV related risk behaviors than their non-migrant counterparts in almost every indicator included in this analysis, except in the case of more than one casual partner and more than one casual sex act in last 30 days. More than two-fifths of the migrants reported having unprotected casual sex in the last 30 days as compared to non-migrants (27 percent). Almost half of the migrants reported engaging in commercial sex in one-month prior to the survey, while this proportion was much lower among non-migrants. Substance abuse before sex is considered as risk behavior as it decreases the chance of using condoms, and heightens the chance of STI/HIV. Noticeable fact is that in both the cases of drinking alcohol before sex in last 30 days and taking drugs before sex in last 30 days, migrant surpassed the non-migrant counterparts and hence their susceptibility to deviate from adopting safe sexual practices ,increasing their vulnerability to STI/HIV.

Considering the life time measures of engaging into HIV related risk behavior, significantly larger proportion of migrants reported higher risk behavior as compared to non-migrants in every measure. Visible fact is that more than three-fifths of the migrants had reported to ever having sexual relations with commercial/paid partners and 59 percent ever had sex with non-regular/non-paid partner, the corresponding proportions among non-migrants were 27 percent and 24 percent respectively. Prevalence of alcoholism was also much higher among the migrants (80 percent). Thus, both the lifetime and 30 days measures suggested that migrants are at significantly higher risk of acquiring of STI/HIV. However, the prevalence of STI and HIV depicts statistical significance between migrants and non-migrants even though the prevalence rates are higher for migrants than for non-migrants. Overall, HIV prevalence is 17 percent, whereas, among the migrants the prevalence is 20 percent and among the non-migrants it is 13 percent. On the other hand, more than one-fourth of the migrants reported to have STI problem, which is substantially higher than among non-migrants (21 percent).

Table 1: Covariates of HIV related risk behaviors by Life time measures, 30 days prior to survey measures and prevalence of STI/HIV according to their migratory status among ICTC attendees in Darjeeling, West Bengal, 2014

Risky behaviors and STI/HIV	Migrants	Non-migrants	Total	chi-square test of significance	*P-value*
Life time measures					
Consume alcohol	79.8	54.9	68.4	*43.900*	*0.000*
Consume tobacco	50.0	40.8	45.8	*5.196*	*0.024*
Ever try addictive substances	54.8	43.6	49.6	*49.456*	*0.000*
Had sex for job/promotion	23.8	18.3	21.3	*2.778*	*0.058*
Had sex for gift/money in exchange	14.9	14.1	14.5	*0.079*	*0.435*
Ever had sex with non-regular/non-paid partner	58.9	23.9	42.9	*76.900*	*0.000*
Ever had sex with commercial/paid partner	63.1	26.8	46.5	*81.689*	*0.000*
30 days (prior to survey) measures					
Casual Sex in last 30 days	43.5	28.2	36.5	*15.520*	*0.000*
Unprotected casual Sex in last 30 days	41.1	26.8	34.5	*13.946*	*0.000*
More than one casual partner in last 30 days	9.5	16.9	12.9	*7.454*	*0.008*
More than one casual sex act in last 30 days	8.3	16.9	12.3	*10.505*	*0.001*
Commercial sex in last 30 days	49.4	31.0	41.0	*21.590*	*0.000*
Drinking alcohol before sex in last 30 days	71.4	43.7	58.7	*48.950*	*0.000*
Taking drugs before sex in last 30 days	29.2	8.5	19.7	*41.790*	*0.000*
Known IDU sexual partner in last 30 days	23.8	4.2	14.8	*46.713*	*0.000*
STI/HIV					
Had any STI	26.2	21.1	23.9	*2.2*	*0.004*
HIV positive	20.2	12.7	16.8	*6.3*	*0.001*

Table 2 represents the results of Poisson regression analysis of the number of times involved in sexual intercourse in last one month. Poisson regression analysis has been carried out because the response variable is in count form. Results portray that as compared to non-migrants, migrants are more likely to involve in sexual intercourse, more number of times than their non-migrant counterparts in the last 30 days. On the other hand, age and occupation have also emended to be significant in their higher coital frequency. Interestingly, students and those who belong to the young age cohort are significantly more likely to have their involvement in more number of times in vaginal relation in last 30 days as compared to their respective counterparts.

Females and transgender surpass the male counterparts for their frequent involvement in sexual intercourse in the last one month prior to the survey. Social influence and social isolation are also vital while discussing the number of times involved in sexual intercourse and for instance, visible fact is that those who have felt lonely and reported involvement in the risk behavior by their peers or friends are 1.25 times and 1.34 times more likely to involve in sexual relation as compared to their counterparts. Alcohol consumption and its frequency are other crucial determinants to understand the number of times of involvement in sexual relation. Those who have higher frequency of consumption of alcohol are significantly more likely to get involved in vaginal intercourse, more number of times than others. While respondents who have ever had sex with commercial or paid partner are 1.78 times more likely to have higher involvement in sexual relation in the last one month prior to the survey.

Table 2: Results of Poisson Regression analysis for number of times involved in sexual intercourse in last one month

LR chi2(24) =	597.750
Prob > chi2 =	0.000
Log likelihood =	-799.835
Pseudo R2 =	0.272

	Coefficient	Exp β
Migratory Status		
Migrant [R]		
Non-migrant	-0.227	0.797***
Age		
<=24 [R]		
25-29	0.531	1.701***
30-34	-0.247	0.781
35 & above	-0.627	0.534***
Sex		
Male [R]		
Female/ Transgender	0.778	2.178***
Marital status		
Never married [R]		
Ever married	0.008	1.008
Occupation		
Student [R]		
Unemployed	-1.627	0.197***
Agriculture	-1.042	0.353***
Working in Hotel	-0.698	0.498***
Construction	-0.780	0.458***
Self employed	-0.358	0.699*
Transport	-0.574	0.563***
Others	-1.274	0.280***
Comprehensive Knowledge		
No [R]		
Yes	0.077	1.080
Number of close friends		
up to 2 [R]		
3-5 friends	-0.529	0.589***
6 and above	-0.582	0.559***
Risk behaviour by friend		
No [R]		
Yes	0.290	1.336**
Risk behaviour by family		
No [R]		
Yes	-0.199	0.819
Loneliness		
Never [R]		
Rarely	-0.227	0.797*
Sometimes	0.220	1.246*
Frequency alcohol consume		
Low [R]		
Moderate	0.316	1.371**
High	0.882	2.417***
Ever had sex with non-regular/non-paid partner		
No [R]		
Yes	-0.011	0.989
Ever had sex with commercial/paid partner		
No [R]		
Yes	0.576	1.778***
constant	0.661	1.937

For analyzing the safe sexual practices, condom use is one of the most important predictor. Almost all the programs and interventions to address HIV risk reduction have been focusing at condom use as the central program thrust for addressing the risk (Jain et. al., 2011; UNAIDS 2002). Many studies have also supported the efficacy of condom in reducing the risk of HIV/AIDS transmission in heterosexual intercourse. Therefore, it is crucial to understand the condom use during sexual intercourse in last one month prior to the survey. Table 3 presents the results of zero inflated Poisson regression analysis for number of times condom was used during sexual intercourse in the last one month preceding the survey. After getting the frequency and summary measure, it is found that the response variable have excess zero, therefore, zero inflated Poisson regression has been used for this analysis. From the earlier results, it is visible that, migrants have more number of times involved in vaginal intercourse in the last one month prior to the survey, but interestingly, they have less likely to use condom at the time of sexual intercourse in the last 30 days. As compared to them, non-migrants counterparts report higher condom use at the time of sexual intercourse in last one month. Among all the predictors of condom use included in the analysis, education, marital status, comprehensive knowledge of STI/HIV, and attitude towards condom have emerged to have significant influence on safe sexual practices. Respondents with no education are less likely to use condom in the reference period of last one month, whereas secondary or higher educated respondents are more likely to report higher number of times condom use.

It is worthwhile to mention that ever married respondents are 1.86 times more likely to use condom as compared to their never married counterparts and hence HIV prevention program needs to adopt a differential approach in promoting safe sexual practices among migrants and non-migrants by their marital status. Knowledge and attitude is another imperative predictor of condom use behaviour. For instance, those who have comprehensive knowledge of STI/HIV and higher attitude towards condom use are 1.18 and 1.40 times more likely to use condom in most of their vaginal intercourse in last one month than their respective counterparts.

Event History Analysis is a technique that allows to study the social processes that lead to the occurrence of an event. Many literatures support that early sexual initiation increases the risk of HIV infection and other sexually transmitted diseases. A study done by the FHI and USAID, in Ethiopia, found that those who begin early sexual activity are more likely to have high risk sex or multiple partners and are less likely to use condom. Therefore, it can be said that delaying sexual debut is the pillar for the prevention of HIV and other sexually transmitted diseases. As evidenced by different literatures, the timing of sexual debut is influenced by a wide range of factors including age, gender, residence, and educational attainment, extent of knowledge about STI/ HIV, economic status, watching pornography, and alcohol consumption etc.

Table 4 shows the results of Cox regression indicating factors associated with age at first sexual initiation and the predictors included in the multivariate Cox regression are sex, migratory status, occupation, comprehensive knowledge, risk behaviour by friend and family, consumption of alcohol and tobacco and exposure to pornographic materials. Cox regression analysis portrays that non-migrants are less likely to initiate sex at their young ages as compared to their migrant counterparts. Female and transgender respondents are more likely (HR 2.46 and 1.67 times) to initiate sex at early age. Students are also more likely to have early sexual debut as compared to other counterparts. Respondents who do not have comprehensive knowledge about HIV/AIDS are more likely to initiate sex earlier than those who do have. Another important predictor is social influence, i.e. those respondents who know that any of their family members are engaged in high risk sexual behaviour are 2.88 times (95% CI= 2.24, 3.70) more likely to initiate sex earlier than those who do not have. Compared to respondents who do not take alcohol, those who consume alcohol are 1.14 times (95% CI = 0.85, 1.53) as likely to initiate sex earlier. Similarly, those who have exposure to watch blue films are more likely to have earlier sexual debut.

Table 3: Results of Poisson Regression analysis for number of times condom used during sexual intercourse in last one month

LR chi2(21) =	41.740
Prob > chi2 =	0.001
Log likelihood =	-202.357

	Coefficient	Exp b
Age		
<=24 [R]		
25-29	-0.372	0.689
30-34	0.062	1.064
35 & above	0.067	1.069
Religion		
Hindu [R]		
Muslim	0.298	1.348
Others	-0.586	0.557
Education		
Illiterate [R]		
Primary (up to five)	0.643	1.903*
Secondary (six to ten) & Higher	0.570	1.768*
Marital status		
Never married [R]		
Ever married	0.621	1.860*
Migratory Status		
Migrant [R]		
Non-migrant	0.076	1.079*
Occupation		
Student [R]		
Unemployed	-0.011	0.989
Agriculture	-12.526	0.000
Working in Hotel	-0.001	0.999
Construction	-7.487	0.001
Self employed	0.088	1.092
Transport	0.026	1.027
Others	0.993	2.700
Comprehensive Knowledge		
No [R]		
Yes	0.161	1.175*
Consume alcohol		
never drank/ex-drinker [R]		
usual/occasional drinker	0.080	1.084
Taking Tobacco		
Never chew/ex-chew [R]		
Current chewing	0.056	1.058
Attitude towards condom		
Lower [R]		
Moderate/Higher	0.337	1.401**
constant	-0.821	0.440

Note: **p<0.05, *p<0.10 [R] =reference category.

Table 4: Results of Cox Regression indicating factors associated with age at first sexual initiation

Explanatory Variables	Hazard Ratio	95% CI	
Sex			
Male [R]			
Female	2.457***	1.583	3.814
Transgender	1.669*	0.935	2.981
Migratory Status			
Migrant [R]			
Non-migrant	0.920*	0.785	1.079
Occupation			
Student [R]			
Unemployed	0.276**	0.153	0.497
Agriculture	0.351**	0.228	0.542
Working in Hotel	0.445*	0.304	0.650
Construction	0.299**	0.204	0.436
Self employed	0.146*	0.090	0.235
Transport	0.359*	0.234	0.552
Others	0.683	0.382	1.220
Comprehensive Knowledge			
No [R]			
Yes	0.881*	0.712	1.091
Risk behavior by friend			
No [R]			
Yes	0.974	0.748	1.267
Risk behavior by family			
No [R]			
Yes	2.880***	2.243	3.698
Consume Alcohol			
Never drank [R]			
Usual/Occasional drinker	1.143*	0.851	1.533
Taking Tobacco			
Never chew/ex-chew [R]			
Current chewing	1.174	0.973	1.416
Watch blue films			
Often [R]			
Occasionally	0.191***	0.113	0.321
Never	0.188***	0.112	0.313

Prevalence of STI/HIV among migrants and non-migrants

By reducing the scale of HIV/AIDS epidemic and mitigating its impacts, response to the epidemic has multidimensional implications including developmental impact of HIV/AIDS. In fact, the information about the impact of HIV/AIDS on different segments of population as well as measures to increase awareness, enhance prevention, improve access to treatment and mitigate the economic and social consequences, can be used to improve the quality of life of people living with HIV/AIDS. It may also be useful in modifying the knowledge, strategies and tools to address the epidemic in different sub populations including migrants and non-migrants. Therefore, variation in the prevalence of HIV/AIDS among migrants and non-migrants by some selected socio-demographic and behavioral characteristics are vital to design suitable program and interventions. Table 5 represents the prevalence of HIV/AIDS among migrants and non-migrants by different socio-economic and demographic characteristics. Among 620 ICTC attendees, 104 were found HIV positive and 516 were negative. Further, it is noticeable that among the migrants, the HIV prevalence is much higher (20 percent), compared to non-migrants (13 percent) and the prevalence varies by different socio-demographic characteristics. Among the migrants, the prevalence is higher among the males (22 percent); in contrary to that the HIV prevalence among the females (20 percent). Among the migrants, the HIV prevalence is higher among those who have no education, or education up to fifth standard. Further, those who belong to the poorest wealth group, exhibit the highest HIV prevalence as

compared to the others. In case of non-migrants, infection is found to be more among those who belong to the middle category of the wealth index.

Table 5: Prevalence of HIV/AIDS among migrant and non-migrant respondents according to socio-economic and demographic characteristics

	Migrant		Non-migrant		Total	
Socio-Demographic Characteristics	**Percentage HIV positive**	**Number**	**Percentage HIV positive**	**Number**	**Percentage HIV positive**	**Number**
Sex						
Male	21.8	220	9.5	168	16.5	388
Female	17.4	92	20.0	100	18.8	192
Transgender	16.7	24	0.0	16	10.0	40
Caste						
SC	5.4	102	4.9	98	5.2	200
ST	1.2	8	2.1	30	1.6	38
OBC	5.4	102	1.4	92	3.5	194
Others	8.3	124	4.2	64	6.5	188
Education						
Illiterate	41.7	48	9.5	84	21.2	132
Primary (upto five)	22.4	170	11.8	68	19.3	238
Secondary (six to ten)	12.8	78	18.5	108	16.1	186
Higher (more than ten)	0.0	40	0.0	24	0.0	64
Wealth Index						
Poorest	44.4	36	9.1	88	19.4	124
Poor	23.4	94	0.0	16	20.0	110
Middle	13.6	88	28.0	50	18.8	138
Wealthy	33.3	54	13.5	74	21.9	128
Wealthiest	0.0	64	7.1	56	3.3	120
Total	**20.2**	**336**	**12.7**	**284**	**16.8**	**620**

While analyzing the prevalence of HIV/AIDS among migrants and non-migrants, it is not enough to discuss the prevalence only by their socio-demographic characteristics. But it is a must to address the HIV prevalence among them by different behavioral attributes. Table 6 presents the variation in HIV prevalence by some behavioral characteristics. The estimated prevalence of HIV ranges from 14 percent to 9 percent among migrants and non-migrants, who reported their sexual debut before attaining the age of 21. It is evident from the results that HIV prevalence is higher among migrants who reported to consume alcohol, especially among those who reported higher frequency of alcohol consumption. The prevalence rates of HIV/AIDS are higher among migrants (27%) and non-migrants (15%) reporting alcohol consumption as compared to their counterparts.

Comprehensive knowledge about HIV/AIDS is another precursor of HIV related risk behaviour as well as prevalence of HIV in any community. It is evident from this analysis that the prevalence of HIV is higher among migrants who do not have the comprehensive knowledge about HIV/AIDS. Attitude towards condom and condom use in last sex is considered an important indicator of safe sexual practice reducing the chances of acquiring infections. There is a considerable variation in the prevalence of HIV among migrants by their attitudes towards condom use. The HIV prevalence rate is two times higher among those who have lower attitudes regarding condom use. In case of non-migrants, the prevalence is higher among those who have moderate attitude towards condom use. However, it is surprising to note that prevalence of HIV is significantly higher among those who reported condom use in their last sexual encounter irrespective of their migratory status. This may be primarily due to the fact that many of them may be aware of their HIV status and are making conscious efforts to protect their partners from infection.

Among migrants and non-migrants, those who ever had sex with commercial partner(s) are having considerably higher prevalence of HIV compared to their counterparts. The prevalence rate among non-migrants who ever had sex with commercial or paid partner is 21 percent as against 10 percent who have never experienced this. In case of migrants, the corresponding HIV prevalence rates

are 21 percent and 19 percent, respectively. However, analysis of variation in the HIV prevalence by another indicator i.e. ever had sex with non-regular or non-paid partner portrays that among those who ever had sex with non-regular or non-paid partner the prevalence is 17 percent and 12 percent for migrants and non-migrants, respectively.

Table 6: Prevalence of HIV/AIDS among migrant and non-migrants by some behavioral characteristics

	Migrant		Non-migrant		Total	
Behavioral Attributes	**Percentage HIV positive**	**Number**	**Percentage HIV positive**	**Number**	**Percentage HIV positive**	**Number**
Age at first sex						
Below 18	6.7	60	0.0	16	5.3	76
18-20	13.8	116	9.4	128	11.5	244
21 & above	30.0	160	17.1	140	24.0	300
Consume alcohol						
never drank/ex-drinker	17.6	68	15.6	128	16.3	196
usual/occasional drinker	20.9	268	10.3	156	17.0	424
Frequency alcohol consume						
Low	17.6	34	5.3	76	9.1	110
Moderate	14.6	164	11.1	72	13.6	236
High	26.5	98	15.4	52	22.7	150
Consume tobacco						
never chew/ex-chew	7.1	168	14.3	168	10.7	336
current chewing	33.3	168	10.3	116	23.9	284
Comprehensive Knowledge						
No	24.4	238	11.9	168	19.2	406
Yes	10.2	98	13.8	116	12.1	214
Attitude towards condom						
Lower	30.3	178	5.4	148	19.0	326
Moderate	15.6	90	80.0	20	27.3	110
Higher	0.0	68	10.3	116	6.5	184
Condom use at last sex						
No	19.4	268	12.5	256	16.0	524
Yes	23.5	68	14.3	28	20.8	96
Composite risky sexual behaviour						
Lower	22.7	88	13.6	176	16.7	264
Moderate	16.9	130	20.0	40	17.6	170
Higher	22.0	118	5.9	68	16.1	186
Coital risk						
At no risk	37.5	32	30.4	46	33.3	78
At risk	20.6	272	13.9	158	18.1	430
Ever had sex with non-regular/ non-paid partner						
No	24.6	138	13.0	216	17.5	354
Yes	17.2	198	11.8	68	15.8	266
Ever had sex with commercial/ paid partner						
No	19.4	124	9.6	208	13.3	332
Yes	20.8	212	21.1	76	20.8	288
Total	**20.2**	**336**	**12.7**	**284**	**16.8**	**620**

Discussion and Conclusions

Findings of this study establish that mix of traditional and modern values and liberalized social and sexual norms at the place of destination, social isolation and peer influence in the new settings among migrants at the places of destinations increase the risky sexual behavior among migrants and elevate the chances of STI/HIV. Findings of the present study summarize that more than two-fifths of the migrants reported having unprotected casual sex in last 30 days prior to the survey as compared to

their non-migrants counterparts (27 percent). Similarly, substance abuse before sex is considered as risk behavior because it decreases the chance of using condom, and heightens the risk of contracting STI/HIV infections. Noticeable fact is that in both the cases of drinking alcohol before sex and taking drugs before sex in last 30 days, migrants surpass their non-migrant counterparts. These findings are similar to the results of the study conducted by Saggurti et. al. (2011) which highlighted that migrants' behaviour in destination areas are linked to sex with sex workers and migrants continue to practice such behaviours in the place of origin as well. Further, it has also been evident that unprotected sex in places of destinations with high HIV prevalence settings poses a risk of transmission from high risk population groups to migrants, and in turn to their married and other sexual partners in places of origin. Singh et.al., (2010) in their study conducted in some selected slums of Mumbai have also highlighted similar issues citing that migrant men living in low income communities of Mumbai have intimate relationship with other women (neighbors or girlfriends) with whom they do not use condom. Thus, the norms and practices of condom use by migrants in Mumbai do not extend to neighbors, girlfriends of married men and other non-FSW sexual partners. Thus, there is a need to convince migrants with non-transactional sexual relationships outside of marriage to use condom despite feeling of trust and intimacy with their partners.

Poisson regression analysis for number of times involved in sexual relation in the last one month demonstrates that alcohol consumption and its frequency is another crucial determinant to understand the number of times involvement in sexual relations. Those who have higher frequency of consumption of alcohol are involved more number of times in vaginal intercourse significantly than others. Amongst all the predictors of number of sexual partners in last one month portray that social influence in respect to risky sexual behaviour by friend is becoming significant while analyzing the multiple partner relationship in last 30 days and the coefficient of risky sexual behavior by peers or friends are positively co-related with the risk behaviour in terms of multiple partnership. Social isolation is another important determinant which is positively associated with the number of sexual partners.

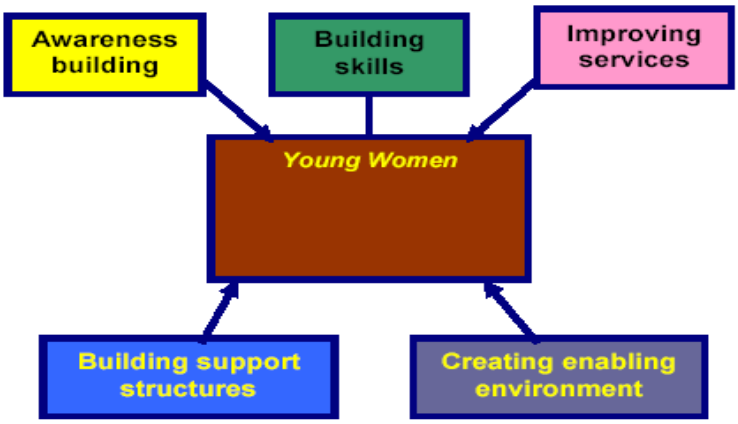
Cox regression analysis portrays that non-migrants are less likely to initiate sex in the early age as compared to the migrant counterparts. The estimated prevalence of HIV varies from 14 percent to 9 percent among migrants and non-migrants respectively, who reported sexual debut below age 21 years. Another important predictor is social influence, i.e. if respondents know that any of their family members engaged in any risk sexual behaviour, are more likely to initiate sex earlier. Moreover, those who have often exposure to watch blue films as compared to those who never watch are more likely to have had an earlier sexual debut.

Study findings represent that overall HIV prevalence among ICTC attendees is 17 percent, whereas, among the migrants the prevalence is 20 percent and among the non-migrants it is 13 percent. Moreover among migrants, the prevalence rate is higher among males (22 percent); in contrary to that of the non-migrants, where the HIV prevalence is higher among females (20 percent). However, among other contextual determinants of HIV related risk behaviour, condom attitude and condom use in last sex are considered as indicators of safe sexual practice as it decreases the chance of acquiring infections through sexual contact. Among migrants the HIV prevalence rate is two times higher among those who have lower attitudes regarding condom use. In case of non-migrants, the prevalence is higher amongst those who have moderate attitude towards condom use. Moreover, the HIV prevalence rate is 19 percent and 13 percent among the migrants and non-migrants who reported not using condom in their last sex. Though it may not be directly related with the HIV prevalence but it may increase the chance of STI/HIV. Amongst migrants and non-migrants those who ever had transactional sex are having considerably higher prevalence of HIV than their counterparts.

The migration-HIV link has nowadays become gender sensitive due to intersection of an influx of single male migrants engaging in risky sexual behaviour as well as increasing vulnerability of left behind women at their places of origin. These findings are also reinforced with the key findings of recently completed National Family Health Survey, which affirms a little decline in the overall prevalence of HIV in the country but the decline is majorly due to a decrease in HIV prevalence among men. During the same period, the prevalence among women remained almost unchanged. A

significantly higher prevalence of HIV among non-migrants women ICTC attendees (20 percent) as against non-migrant men (9.5%) indicates that the left behind women are the silent victims of the risky sexual behavior of their husband/partners, especially when they are severely lacking in their reproductive and sexual rights. These findings are similar to the findings of the study by Singh and Singh (2009), where it has been highlighted that young married women in five states of India, portraying a cross cultural scenario in the country, concluded that lack of woman's empowerment and deep-rooted cultural and traditional factors restricting women from exercising their reproductive and sexual rights are the keys to enhance their vulnerability to STI/HIV in the country.

Fig.1: Framework to address women vulnerability to STI/HIV in India



It is within the context of existing disparities by gender, poverty and other forms of social exclusions, HIV prevention strategies among women through the process of migration and return migration in India should encompass unequal gender norms and lack of women's control over their sex and sexuality. Further, the prevalence of alcoholism among men resulting into masculine behavior, unfavorable environment for young women to exercise their reproductive and sexual rights and their lacking capacity on different aspects of their health seeking behavior are the other priority issues to be addressed through suitable programme and interventions. These strategies may be conceptualized as per the framework presented in Fig.1.

Policy Recommendations

National commitments to address women's vulnerability to HIV/AIDS and policy instruments to minimize chances of infection among young women from their spouse/partner should prioritize addressing the risky sexual behavior of male migrants through dual approach of interventions at destinations as well as origin by identifying some well-defined corridors of single male migration in the country. Another issue emerging based on the study is the capacity building of women and ensuring their sexual rights by creating suitable enabling environment as the key constructs of the policy instruments to minimize their vulnerability to STI/HIV.

Ethical Issue

Ethical issues have been duly taken care of at the time of data collection. Informed Consent was obtained from all the participants and confidentiality of the subjects was completely assured. Due care was taken to ensure that the respondents remain anonymous (by not recording their name and personal identification details). The information provided by the respondents has been kept confidential. This information would only be used for the purpose of research. Moreover, the interviews with the clients were conducted well before the client came to know their HIV status. In this way, the researcher and the clients were unaware about the seropositivity status of the subject at the time of interview.

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