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Is Migration a Risk Factor for HIV Spread in Urban Settings? An Exploratory Study of International Bordering District in West Bengal

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Abstract:
Over the years, migration has been recognized to have a profound link with health and development of people, both in the places of origin as well as at destinations. However, the problem of HIV/AIDS has deep social and economic roots and hence its impact reaches far beyond the health sector with severe socio-economic consequences. Therefore, a comprehensive understanding of various pathways linking migration and HIV/AIDS and the socio-demographic and contextual determinants of STI/HIV risk behaviour is critical for devising suitable programmatic response to curb the pace of epidemic. Use of case-control design, primary data of 620 samples has been collected from the district of Darjeeling in West Bengal and the situation of Darjeeling attain special importance in the context of being a tourist center and also being an important international corridor having higher influx of migrants from bordering countries of Bangladesh Nepal and Bhutan. Bi-variate and multivariate analysis including generalized ordered logistic regression and discriminant function analysis have been employed. Discriminant function analysis portrays that more than one casual sex act in last 30 days has emerged as the single most factor contributing to the discriminant function followed by more than one casual partner in last 30 days, casual sex, unprotected casual sex in last 30 days and ever sex with commercial/paying partner, are next in importance as predictors while defining the involvement into risk behaviour. Result depicts that, as compared to non-migrants, migrants are more likely to have moderate to higher composite risk behaviour. Result of bi-variate and multivariate analysis confirms that young aged respondents are more likely to have moderate or higher composite risky sexual behaviour as compared to their older counterparts. Among two indicators of social influence, risk behaviour by friend is coming significant, who have reported their friends involved in risk behaviour are more likely to have higher risk in a composite index. Therefore, all intervention programs for curbing down HIV risk should be of multi targeted on the behavioural aspect. Community outreach programmes among migrants communities and work place interventions can be instrumental in reducing the vulnerability of migrant workers to STI / HIV.

Keywords: Migration, International corridor, Social influence, Risky sexual behavior, STI/HIV

1. Importance of the Problem

Migration has always been a characteristic of human society and one that has probably always been carried with continuous developing health challenges. These developments have also shaped the global spread of HIV/AIDS, making the movement of individuals and populations an important factor in the spread of the virus (Haour-Knipe and Rector, 1996). In the present context, HIV/AIDS has emerged as a serious challenge for both developing as well as developed world.

A substantial proportion of migrants may have elevated risk behaviour due to their separation from family and interaction with new environment having liberalized sexual norms and environment. As a result, they not only acquire the virus themselves but are also likely to transmit it to their spouses (Singh & Gupta 2002). However, in the current era of HIV/AIDS, it has also been recognized as a serious challenge bridging the low and high HIV risk population. In fact, the problem of HIV/AIDS has deep social and economic roots and hence its impact reaches far beyond the health sector with severe socio-economic consequences.

Migration is fueling India's HIV epidemic. National AIDS Control Organization's latest figures show that besides high risk populations like sex workers (FSWs), injecting drug users (IDUs), men sex with men (MSMs), the highest burden of HIV is among migrants - 3.6 percent, which is 10 times the HIV prevalence amongst the general population. Therefore, a comprehensive understanding of various pathways linking migration and HIV/AIDS is critical for devising suitable programmatic response to curb the pace of HIV/AIDS epidemic and also for changing its recourse.

Using data from the Kenya Demographic and Health Survey, Brockerhoff et al. (1999), found that migration was a critical factor in high risk sexual behaviour and its importance varies by gender and by the direction of movement. A study by Lurie et al. (2003) on migration and HIV epidemic in South Africa has shown a strong correlation between migration status and HIV infection. A

deterministic mathematical model was used to evaluate the interactions between mobility, sexual behaviour and sexually transmitted infections including HIV.

Soskolne and Shtarkshall (2002) have found that migration is one of the structural factors associated with HIV infections, in their paper Migration and HIV prevention programmes: linking structural factors, culture, and individual behaviour an Israeli experience. This paper represented a multi-level framework for analysis of the links between migration and HIV. It includes the association of migration with structural macro factors - lower socio-economic status and limited power in the new society, intermediate structural factors- limited social capital and bi-directional interaction of cultural norms; and individual-level factors- stressors unique to the migration context, depleted psychosocial resources, loss of cultural beliefs and low use of health services and found that all these factors affect risky sexual behaviour and transmission of HIV.

Singh et al (2009) examined how safe is the workplace in India with respect to HIV/AIDS by taking case study of diamond industry in Surat and highlighted the relative influence of contextual, social and personal factors in enhancing the risk behaviour of HIV/AIDS. They concluded that migration is the main factor that led to their HIV related risk behaviour because HIV is a manifestation of the inequalities and deprivation faced by migrants. Saggurti et al. (2008) have studied another group of labour migrants and concluded that contracted labourers were significantly more likely to report alcohol use and HIV risk behaviour than non-contracted labourers. Further they have added that the contracted labour who sex with a non- spousal unpaid female partner had reported that the sexual partner was a workmate. Gupta et al. 2010 have also concluded that alcohol consumption among mobile men, especially those who consumed alcohol daily had higher sexual risk behaviour and STI infection.

2. Theoretical Premises
The Health Belief Model and the AIDS Risk Reduction Model also provide the theoretical orientation for this research. *Health Belief Model:* The Health Belief Model was proposed by Rosenstock (1966) and later revised by Becker and Maiman (1975). The model assumes that an individual behaviour is guided by expectation of the consequences of adopting new practices. According to the model, a number of factors operate to either promote or retard the desired change in behaviour. Such factors include knowledge of health risks and health promoting behaviour, perceived effectiveness of behaviour change and response efficiency, belief in the power of technology of cure or prevention, social demographic variable and social network affiliation and group norm.

Another model that can be useful in explaining the behavioural change affecting risk of HIV/AIDs is the *AIDS Risk Reduction Model (ARRM).* The AIDS Risk Reduction Model was proposed by Catania et al. (1990). The model provides framework for explaining and predicting behaviour change efforts of individuals specifically in relations to the STIs and HIV/ AIDS. The AIDS Reduction Model is useful in explaining HIV/AIDS, because it can explain how people adopt or change HIV related risk behaviour. Thus, the AIDS reduction model can be useful in explaining people's perception or feeling of involving in risky sexual behaviour and the demonization of engaging in risky sexual behaviour that can expose people to contracting HIV/AIDS in the society.

3. Research Questions, Objectives and Hypotheses
Is migration a risk factor for HIV Spread in Urban Settings? Examining the specific context this study addresses two aspects of the link between migration and HIV/AIDS, i.e.-
1.   How does mobility and migration heighten the HIV related risk behaviour?
2.   What are different pathways through which migrants and non-migrants are likely to be infected with HIV/AIDS?
3.   What is the role of migration in enhancing the vulnerability of HIV among men and women?

Therefore, a comprehensive understanding of various pathways linking migration and HIV/AIDS and the socio-demographic and contextual determinants of HIV sero-positivity is critical for devising suitable programmatic response to curb the pace of epidemic and also for changing its recourse as well as to unearth the behavioural transition among migrants, focusing at the HIV related risk behaviour.

The following hypotheses have been formulated for the study based on the objectives, that -
1.   Single male labour migrants working in informal sectors are more vulnerable to STI/HIV in urban settings and
2.   Migrants are more likely to be engaged in STI/HIV related risk behaviour due to social influence.

4. Study Area
The present study was carried out in Darjeeling district of West Bengal, which shares international borders with Bangladesh, Bhutan and Nepal. West Bengal witnesses large-scale migration, both national and international. The state receives migrants from all neighboring states and countries. According to the Comprehensive National Survey on Migration (1993) conducted by National Sample Survey Organization, Darjeeling is one of the top five migration happening districts in West Bengal (these migrant populations account for 24.68% of the total population of the state. The districts covered include Darjeeling, Birbhum, Howrah, Murshidabad and Purulia).

Darjeeling is the most vulnerable district in West Bengal as it shares the international border with Bangladesh and Nepal and is the corridor which receives a chunk of international migrants from these two countries. In Darjeeling district second highest sero-positive cases are found (4033) after Kolkata. Therefore findings of this study are expected to be crucial for evidence based answer that why Darjeeling is vulnerable in the context of HIV – due to large number of migration or another factor?

5. Data and Methods

Use of case-control design, primary data of 620 samples has been collected from Darjeeling, India and the situation of Darjeeling attain special importance in the context of being a tourist center and also being an important international corridor having higher influx of migrants from bordering countries of Bangladesh, Nepal and Bhutan. To execute the study objectives appropriate bivariate and multivariate techniques (generalized ordered logistic regression and discriminant function analysis)have been carried out to evaluate the relationship between different variables. Chi-square test has been applied to show the association between the variables under the study.

Social influences of risky sexual behaviour will be measured by two dichotomous variables. The first indicates the influence of family and is coded 1 if respondents self-reported knowing any of their parents, siblings, and close relatives having multiple sexual partners, homosexual behaviour, or exchanged sex for money or drugs, and 0 otherwise. The second indicates the influence of peers and is coded 1 if respondents self-reported knowing any close friends or peers having any of the three risky sexual behaviours and 0 if none. Having family members or peers with any risky sexual behaviour is expected to increase respondent's own risky sexual behaviour.

This Index with 8 item dichotomous measure is more accurate measure than any single dichotomous measure to quantify the risky sexual behavior of the respondents (Williams et al. 2001). The eight risky sexual behaviour measures are basically dichotomous, indicating whether the respondent had casual sex, unprotected casual sex, commercial sex, more than one casual sexual partner, more than one casual sexual act, any episode of drinking while having sex, any episode of taking drugs while having sex, and known IDU (injection drug use) sexual partner in the 30 days prior to the survey. The scores of these eight dichotomous risky sexual behaviours will be first combined to form a *composite risky sexual behaviour index*, by summing non missing responses across the eight dichotomous (0 and 1) sexual behaviours with equal weight. The higher the behaviour index more will be the risky sexual behaviour of a respondent.

6. Results and Discussions

6.1. Indicators of Risky Sexual Behaviour

Table 1 represents two indicators of risky sexual behaviour, i.e., involvement in casual sex and unprotected casual sex in last 30 days prior to the survey by some selected characteristics among migrants and non-migrants and those who came for their HIV test in ICTCs in a certain period of time. Noteworthy fact is that here also migrants are more likely to be involved in casual as well as unprotected casual sex as compared to non-migrants counterparts. It is evident from the table that 44 percent have been involved in casual sexual intimacy whereas among non-migrants less than one third have reported for the same sexual relation. Other than this important fact is that, 41 percent migrant have done unprotected casual sex which may increase the chance of STI/HIV and among non-migrants 27 percent have had unprotected casual sex.

Half of the migrants and near about two-thirds of the non-migrants in the age group below age 25 years are involved in unsafe sexual practices. Among the sex group more than four-fifths of the transgender respondents are involved in unprotected sex in last 30 days measure. Education is negatively associated here, as with increasing level of education casual sex and unprotected casual sex is increasing among both the groups may be due to the fact is that classmate and work mate is reported as the casual partner in most of the cases. As compared to unmarried migrants (68 percent) unmarried non-migrants are reported more to have unprotected casual sex but the similarity is that in both the groups, as comparison with ever married, unmarried respondents have risky sexual behaviour in terms of unprotected casual sex. Among the migrants, 60 percent have been involved in casual sex, those who involved in construction related work and they have reported that their workmate as their casual sexual partner in many cases while in case of non-migrants 67 percent of student are reported to engage in unprotected casual sex in last 30 days prior to survey.

Influence of alcohol reduces the safe sexual practice, and it is visible from the table that moderate to high level of drinkers are more likely to report unprotected casual sex as compared to others among both the groups as well as among migrants those who never consume alcohol only 18 percent have casual sex than usual/occasional drinkers (50 percent). There is a wide gap between attitude and behaviour, though they have higher positive attitude towards condom but at the time of practice they do not use the safe sexual practice as migrant and non-migrant respondents those who have higher positive condom attitude are more likely to report unprotected casual sex (65 and 48 percent respectively) in last 30 days prior to survey. The noticeable fact is that peer pressure is more influential to involve in casual sex at not using protective measure among migrants but among non-migrants familial influence is more prominent. More than half of the migrant respondents have reported casual sex, those who have the peer influence whereas,more than one-third of the non-migrant respondents have done unprotected casual sex in last 30 days who have the background that any of their family members are involved in risk behaviour and family level social influence make them daring and vulnerable.

The third indicator of risk behaviour is ever sex with or ever visited to CSWs place and this indicator is considered as life time measure indicator to judge the risky sexual behaviour among the respondents came for their HIV test. Surprisingly a quite large variation is observed among migrants and non-migrants are in the table. More than four-fifths of the migrants have ever visited or sex with CSWs as compared to non-migrants (40 percent). Therefore various parameters are selected to get a better picture about this variation and the comparison may be useful for the programmatic response. Table 2 represents the percentage of migrants and non-migrants reported to have ever sex with CSWs by some selected characteristics. age is considered as one of the most important determinants in this study in order to understand at what age they have poising themselves as high risk group.

Among migrants below age 25 years, 91 percent have reported to sex with CSWs which declines to 76 percent among the migrants in the age group 25-29 years, similarly among non-migrants younger aged respondents are more likely (56 percent) have sex with CSWs as compared to their older counterparts (20 percent). There is not as such variation among male currently married and unmarried

migrants to have the experience of commercial sex but among the non-migrants larger proportion of unmarried respondents are involved (58 percent) in commercial sexual relation than currently married respondents (29 percent). Those who have no education are more likely to visit CSWs place in comparison to those having higher education among both the groups.

It is imperative to get insights into the sexual behaviour pattern of respondents, specifically migrants as they are one of the emerging high risk group and bridge population for the spread of STI/HIV. And while discussing about risky sexual behaviour one should not fail to pay attention to the occupational type of respondents and the pattern of sexual behaviour in which they are involved. It has emerged from this study that those migrants who are working in hotels, construction related work and transportation, more than nine-tenth have reported to ever visited to CSWs place. Among other predictors, interface of alcohol and engagement in risk behaviour is visible in this table, for instance, usual/occasional drinker are more likely (96 and 58 percent for migrants and non-migrants respectively) to sex with commercial partner as compared non-drinkers, not only that but also with increasing frequency of alcohol consumption, percentage of respondents reporting more to involvement in sexual relation with CSWs. As compared to non-migrants natives, the larger proportion of migrants feel lonely often (84 percent) in the new environment and that indulging in risk and visiting CSW's place is one of the ways of recreation for them. On the other hand, 91 percent of migrants and 50 percent of non-migrants have reported visiting CSW's place, those who aware that their friends or peers have risky sexual behaviour as compared to others, so social influence by peers heightens respondents own risky sexual behaviour.

6.2. Discriminant Function Analysis of Involvement in Risk Behaviour among Migrants and Non-Migrants

It is worth mentioning that the discriminant analysis provides a powerful statistical technique for examining the differences between two or more groups with respect to several variables simultaneously. Therefore an attempt has been made in this section to analyze the relative contribution of different predictors in explaining the group differences between two groups included in the study, i.e. migrants and non-migrants and results are presented in table 3.Test of Equality of Group Means provides strong statistical evidence of significant differences between means of two groups for all independent variables with life time measure, i.e., alcohol consumption, ever sex with commercial/paying partner and ever sex with non-regular/non-paying partner and short term measure i.e., commercial sex in last 30 days, IDU sexual partner in last 30 days and taking drugs before sex in last 30 days high values of F.

Table depicts the feature of one function discriminating the group differences based on their Eigen value of the function. Based on the relative contribution of the factor in explaining the overall group differences, it is visible that 100 percent of the total variation in group differences is explained by the function. The canonical correlation is the multiple correlations between the predictors and the discriminant function. For the function, the value for canonical correlation is 0.601 and the Eigen value is 0.566.

Another part of the table presents the values of Wilks' lambda, which is also known as U statistics along with its significance level. Therefore, Wilks' lambda indicates the significance of the discriminant function. However, it also shows that the effectiveness of predictors in discriminating the group differences. This table indicates the highly significant functions (p<0.000). Theoretically, the value of lambda may vary from a minimum zero, denoting high discrimination i.e. group centroid are greatly separated and vary distinctly relative to amount of dispersion within groups.

The fourth panel of the table represents Standardized Canonical Discriminant Function Coefficients showing relative contribution of different variables in explaining scores on the function, which depends on the magnitude of the standardized coefficients ignoring the sign because sign indicates the direction of the relationship. In case of the discriminant function, more than one casual sex act in last 30 days has emerged as the single most factor contributing to the discriminant function followed by more than one casual partner in last 30 days, casual sex, unprotected casual sex in last 30 days and ever sex with commercial/paying partner, are next in importance as predictors while defining the involvement into risk behaviour.

The last panel of the table shows the structure matrix correlations because it gives more accurate results than the Standardized Canonical Discriminant Function Coefficients. The structure matrix table shows the co-relations of each variable with each discriminate function. In other words, it presents the simple bivariate correlation and hence free from the effect of other variables in contributing to the discriminant function. It is evident that the findings of the standardized discriminant coefficients are confirmed through the total structure coefficient.

6.3. Composite Risky Sexual Behaviour

This Index with 8 item dichotomous measure is more accurate measure than any single dichotomous measure to quantify the risky sexual behaviour of the respondents (Williams et al. 2001). The eight risky sexual behaviour measures are basically dichotomous, indicating whether the respondent had casual sex, unprotected casual sex, commercial sex, more than one casual sexual partner, more than one casual sexual act, any episode of drinking while having sex, any episode of taking drugs while having sex, and known IDU (injection drug use) sexual partner in the 30 days prior to the survey. The higher the behaviour index more will be the risky sexual behaviour of a respondent. Cronbach's alpha for the composite index with the survey data was 0.80, indicating high internal reliability of the index.

Table 4 presents variation in the proportion of respondents having composite risky sexual behaviour by some selected socio-demographic characteristics. It is evident from the table that among migrants, more than one-third have higher composite risky sexual behaviour as compared to non-migrants (24 percent) where majority of the non-migrants came for their HIV test have lower risk (62 percent) and in contrary to that small proportion of migrants (26 percent) have lower composite risky sexual behaviour. It is interesting to show that among both the groups' larger proportion of young aged respondents below age 25 years have risky behaviour (44 and 55 percent among migrants and non-migrants respectively) as compared to their older counterparts. Among transgender the risk behaviour is more, whereas female migrants have lower risky sexual behaviour (44 percent) than the male migrants (20 percent).

On the other hand, male non-migrants (21 percent), belonging to other religion (57 percent) and scheduled tribes (53 percent) have more composite risky sexual behaviour as compared to their respective counterparts.

Educational attainment is inversely associated with the risky sexual behaviour, because among migrants, small proportion of respondents (25 percent) have higher risky sexual behaviour with no education but higher educated respondents have higher risky sexual behaviour (40 percent).In case of non-migrants, it follows in a similar manner. Variation in the composite risky sexual behaviour by marital status portrays that more than half of the unmarried migrants are significantly more likely to have higher risk behaviour than the ever married counterparts. While, over eight-tenth of currently married non-migrants have lower risk behaviour in comparison with unmarried and others. Further, it may of be great concern that among migrants working in transportation or other occupation and migrant students, display higher risky sexual behaviour as compared to those who are engaged in other occupation, in a way among non-migrants those who are working in hotels or transportation are more likely (50 percent) to have composite risky sexual behaviour.

The eight dichotomous STI/HIV risk behaviour outcome variables to form a composite risky sexual behaviour index, may be a more accurate measure of STI/HIV risk than any single dichotomous measure (Williams et al. 2001). To explore the main causes about the chances of STI/HIV among migrants and non-migrants came for their HIV test, their engagement in risky sexual behaviour in past by different behavioural and contextual determinants is more imperative to get the insight. It is evident from the table 5 that more than one-third of the migrants have higher composite risky sexual behaviour under the absence of comprehensive knowledge about STI/HIV but among non-migrants the difference is not prominent. Variation in the composite risky sexual behaviour by leisure time activities and number of close friends among migrants presents a larger proportion of respondents with higher risky sexual behaviour among those who have six and above close friends (59 percent), and leisure time activities for instance, going out with friends often (56 percent) and frequency of visiting places other than work regularly (59 percent) than their respective counterparts. More number of close friends and often going out with friends is also an important determinant of higher risk behaviour among non-migrants.

Social influence is measured by two parts, one is influence by friends or peers and second is influence by family members Results portray that as compared to non-migrants (41 percent), a larger proportion of migrants have higher composite risky sexual behaviour, who reported that their friends have risk behaviour (48 percent) and this may heightens respondents own risk behaviour. Among non-migrants, more than two-thirds of respondents have lower risk behaviour whose no one of the family members have any involvement in risk behaviour but it is other way round among migrants, 39 percent of migrants have lower composite risky sexual behaviour instead of knowing that their family members have risk behaviour as compared to those who have no influence by their family (22 percent).

Risk perception and risk behaviour is significantly associated in this table. Results depict that there is a wide gap between risk perception and risk behaviour, and risk perception is inversely related with risk behaviour, for instance migrants with higher positive condom attitude and perceived that engaging into unprotected sex is extremely risky have higher composite risky sexual behaviour (65 and 51 percent respectively), it may be because of gap between perception and behaviour, and it against the notion that perception reflects behaviour. Similarly, among the non-migrants higher risky sexual behaviour have found among those who have high perception but at the time of actual behaviour they are not follow the safe sexual practice and indulge into risky sexual behaviour. Social isolation is one of the important predictors while discussing about the respondent's risk behaviour specifically among the migrants. And results found that irrespective of migrants and non-migrants loneliness and depression are significantly associated with the risk behaviour. Higher proportions of respondents who often feel lonely are more likely to have higher composite risk behaviour (58 and 67 percent among migrants and non-migrants respectively) as compared to those who never feel lonely (7 and 8 percent among migrants and non-migrants respectively).

6.4. Determinants of Composite Risky Sexual Behaviour

Given the ordered nature of the dependent variable of risky sexual behaviour, a generalized order logistic regression is used. The results of generalized order logistic regression analysis for composite risky sexual behaviour are presented in the table 6. Chi square test shows that the model is significant. The interpretation of generalized order logistic regression analysis is that the higher odds ratio on the explanatory variable makes it more likely that the respondent will be at a higher risk behaviour as compared to the moderate or lower risk behaviour. Among all the predictor variables, migratory status, age, marital status comprehensive knowledge, number of close friends, social influence by friends, and risk perception are significant predictors for determining the composite risky sexual behaviour. Result depicts that, as compared to non-migrants, migrants are more likely to have moderate to higher composite risk behaviour. Result of bi-variate and multivariate analysis confirms that young aged respondents are more likely to have moderate or higher composite risky sexual behaviour as compared to their older counterparts. On the other hand, ever married respondents and those who have comprehensive knowledge about STI/HIV are 0.004 and 0.245 times less likely to have moderate to higher risk behaviour than others. Among two indicators of social influence, risk behaviour by friend is coming significant, regression presents that those who have reported that their friends have involved in risk behaviour are 4.951 times more likely to have higher risk in a composite index. Whereas positive perception does not change their behaviour, though they perceive engaging in unprotected sex is extremely risky but at the time of behaviour they do not follow this and are 3.024 times more likely to have moderate or higher risk behaviour.

7. Conclusions and Recommendations

In conclusion, it is imperative to mention that migrants are more likely than non-migrants to have risky sexual behaviour and migration is one of the indispensable factors associated with HIV infections. More than half of migrants are engaging themselves in

high risky sexual behaviour as compared to their counterparts. *Social influence* is another important predictor to describe the involvement in risky sexual behaviour. Results depicted that the social influences of friend and family members have positive influence among the respondent to coddle into risky behaviour which leads to STI/HIV.Peer group effect, availability of disposable income and easy availability of sex avenues, lower socio-economic status and limited power in the new society, all these factors affect risky sexual behaviour and transmission of HIV. The formation of close relationships and the development of multiple sexual intimacy are important predictor of risky sexual behaviour and risk of STI/HIV. Separation from family, freedom associated with living away from home, disposable income, peer influence and larger social network may act as a catalyst to make them vulnerable to STI/HIV risk. Similarly, in both the groups, larger proportions of young respondents are vulnerable in terms of engaging themselves into paid sexual intimacy in last 30 days prior to the survey due to their frequently adopt risky sexual behavior to procure the maximum gratification of their sexual desires.

Study recommends a composite program on safe sex awareness among both migrants and non-migrants which should be routed through peer model among young men. Further looking at the social anonymity as a booster of acceptance of risk behaviour, it is advocated that work place based model will be able to deliver much more effective intervention than the place of residence based intervention. All intervention programs for curbing down HIV risk should be of multi targeted on other behavioural aspect like alcohol and other substance use. Community outreach programmes among migrants communities and work place interventions can be instrumental in reducing the vulnerability of migrant workers to STI/ HIV.

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Annexure

Characteristics	Migrant		Non-migrant	
	Casual sex	Unprotected casual sex	Casual sex	Unprotected casual sex
Age				
<=24	50.0	50.0	63.6	63.6
25-29	48.7	43.6	0.0	0.0
30-34	26.1	17.4	37.5	31.3
35-39	50.0	50.0	0.0	0.0
40 & above	0.0	0.0	0.0	0.0
Sex				
Male	44.5	40.9	28.6	26.2
Female	30.4	30.4	16.0	16.0
Transgender	83.3	83.3	100.0	100.0
Education				
Illiterate	25.0	25.0	19.0	19.0
Primary (up to five)	44.7	40.0	11.8	11.8
Secondary (six to ten)	53.8	53.8	37.0	33.3
Higher (more than ten)	40.0	40.0	66.7	66.7
Marital status				
Never married	70.8	68.1	73.7	73.7
Currently married	19.0	16.7	12.6	10.5
Wid/Div/Sep/Des	50.0	50.0	0.0	0.0
Occupation				
Student	40.0	40.0	66.7	66.7
Unemployed	0.0	0.0	0.0	0.0
Agriculture	30.0	30.0	0.0	0.0
Working in Hotel	27.3	27.3	50.0	50.0
Construction	60.0	46.7	23.5	23.5
Self employed	50.0	50.0	0.0	0.0
Transport	51.9	44.4	100.0	50.0
Others	70.6	70.6	72.7	72.7
Consume Alcohol				
Never drank/ex-drinker	17.6	11.8	0.0	0.0
Usual/Occasional drinker	50.0	48.5	51.3	48.7
Frequency of alcohol consumption				
Low	0.0	0.0	26.3	26.3
Moderate	53.7	51.2	27.8	27.8
High	46.9	46.9	76.9	69.2
Comprehensive Knowledge				
No	42.9	41.2	23.8	23.8
Yes	44.9	40.8	34.5	31.0
Attitude towards condom				
Lower	40.4	38.2	10.8	10.8
Moderate	33.3	28.9	40.0	20.0
Higher	64.7	64.7	48.3	48.3
Loneliness				
Never	7.1	7.1	8.0	8.0
Rarely	46.3	41.5	19.5	14.6
Sometimes	46.8	42.6	44.4	44.4
Often	57.7	57.7	66.7	66.7
Depression				
Minimal	55.0	50.0	21.9	18.8
Mild	42.6	42.6	40.0	40.0
Moderate	43.8	39.6	42.9	42.9
Severe	30.3	30.3	25.0	25.0
Risk behaviour by friend				
No	13.6	9.1	6.3	6.3
Yes	54.0	52.4	46.2	43.6
Risk behaviour by family				
No	51.2	48.0	25.9	24.1
Yes	19.5	19.5	35.3	35.3
Perception about engaging in unprotected sex				
Not at all risky	32.0	32.0	5.9	5.9
Somewhat risky	36.6	34.1	26.3	21.1
Risky/extremely risky	57.4	54.1	40.0	40.0
Total	**43.5**	**41.1**	**28.2**	**26.8**
	(146)	(138)	(80)	(76)

Table 1: Percentage of migrants and non-migrants, who reported to involve in any casual sex and unprotected casual sex in last 30 days according to some selected characteristics

Characteristics	Ever Visited to CSWs Place	
	Migrant	Non-migrant
Age		
<=24	91.4	56.0
25-29	76.0	0.0
30-34	100.0	100.0
35-39	100.0	0.0
40 & above	0.0	20.0
	Pearson chi square = 68.153 pr = 0.000	*Pearson chi square= 75.333 pr = 0.000*
Sex		
Male	88.4	42.4
Female	0.0	0.0
Transgender	0.0	0.0
	Pearson chi square= 26.390 pr = 0.000	*Pearson chi square = 5.657 pr = 0.059*
Education		
Illiterate	100.0	40.0
Primary (up to five)	76.1	40.0
Secondary (six to ten)	100.0	42.4
Higher (more than ten)	80.0	33.3
	Pearson chi square = 22.198 pr = 0.000	*Pearson chi square = 0.606 pr = 0.895*
Marital status		
Never married	92.3	58.3
Currently married	88.9	28.9
Wid/Div/Sep/Des	0.0	100.0
	Pearson chi square = 54.372 pr = 0.000	*Pearson chi square = 14.352 pr = 0.001*
Occupation		
Student	80.0	33.3
Unemployed	0.0	0.0
Agriculture	71.4	100.0
Working in Hotel	95.2	100.0
Construction	100.0	33.3
Self employed	75.0	0.0
Transport	92.6	100.0
	Pearson chi square = 43.019 pr = 0.000	*Pearson chi square = 73.333 pr = 0.000*
Consume Alcohol		
Never drank/ex-drinker	37.5	0.0
Usual/Occasional drinker	96.3	58.3
	Pearson chi square = 79.595 pr = 0.000	*Pearson chi square = 42.778 pr = 0.000*
Comprehensive Knowledge		
No	81.5	43.5
Yes	96.9	33.3
	Pearson chi square = 34.984 pr = 0.000	*Pearson chi square = 1.353 pr = 0.245*
Frequency of alcohol consumption		
Low	16.7	33.3
Moderate	87.5	33.3
High	100.0	85.7
	Pearson chi square = 65.678 pr = 0.000	*Pearson chi square = 24.016 pr = 0.000*
Loneliness		
Never	50.0	28.6
Rarely	78.1	41.7
Sometimes	100.0	33.3
Often	84.0	75.0
	Pearson chi square = 24.625 pr = 0.000	*Pearson chi square = 10.635 pr = 0.014*
Risk behaviour by friend		
No	72.7	23.1
Yes	90.7	50.0
	Pearson chi square = 9.434 pr = 0.002	*Pearson chi square = 9.872 pr = 0.002*
Risk behaviour by family		
No	91.3	43.8
Yes	64.7	0.0
	Pearson chi square = 17.024 pr = 0.000	*Pearson chi square = 8.750 pr = 0.003*
Total	**86.6**	**40.0**
	168	56

Table 2: Percentage of migrants and non-migrants reported to visit to CSWs place ever by some selected characteristics

Tests of Equality of Group Means			
	Wilks' Lambda	F	Sig.
Consume alcohol	0.929	47.093	0.000
Ever had sex with non-regular/non-paying partner	0.876	87.505	0.000
Ever had sex with commercial/paying partner	0.868	93.781	0.000
Casual Sex in last 30 days	0.975	15.867	0.000
Unprotected casual Sex in last 30 days	0.978	14.221	0.000
More than one casual partner in last 30 days	0.988	7.520	0.006
More than one casual sex act in last 30 days	0.983	10.652	0.001
Commercial sex in last 30 days	0.965	22.297	0.000
Drinking alcohol before sex in last 30 days	0.921	52.975	0.000
Taking drugs before sex in last 30 days	0.933	44.666	0.000
Known IDU sexual partner in last 30 days	0.925	50.356	0.000

Eigen values				
Function	Eigen value	% of Variance	Cumulative %	Canonical Correlation
1	0.566	100.0	100.0	0.601

Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 3	0.639	274.599	11	0.000

Standardized Canonical Discriminant Function Coefficients	
	Function 1
Consume alcohol	0.045
Ever had sex with non-regular/non-paying partner	0.295
Ever had sex with commercial/paying partner	0.545
Casual Sex in last 30 days	0.905
Unprotected casual Sex in last 30 days	-1.029
More than one casual partner in last 30 days	-1.174
More than one casual sex act in last 30 days	1.794
Commercial sex in last 30 days	-0.018
Drinking alcohol before sex in last 30 days	-0.360
Taking drugs before sex in last 30 days	-0.322
Known IDU sexual partner in last 30 days	-0.364

Structure Matrix	
	Function 1
Ever had sex with commercial/paying partner	0.518
Ever had sex with non-regular/non-paying partner	0.500
Drinking alcohol before sex in last 30 days	-0.389
Known IDU sexual partner in last 30 days	-0.380
Consume alcohol	0.367
Taking drugs before sex in last 30 days	-0.357
Commercial sex in last 30 days	-0.253
Casual Sex in last 30 days	-0.213
Unprotected casual Sex in last 30 days	-0.202
More than one casual sex act in last 30 days	0.175
More than one casual partner in last 30 days	0.147

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions Variables ordered by absolute size of correlation within function.

Table 3: Results of Discriminant Function Analysis of involvement in risk behaviour among migrants and non-migrants

Characteristics	Migrant			Non-Migrant		
	Composite risky sexual behaviour index			Composite risky sexual behaviour index		
	Lower	Moderate	Higher	Lower	Moderate	Higher
Age						
<=24	14.7	41.2	44.1	36.4	9.1	54.5
25-29	5.1	64.1	30.8	57.1	42.9	0.0
30-34	34.8	39.1	26.1	37.5	31.3	31.3
35-39	50.0	10.7	39.3	100.0	0.0	0.0
40 & above	100.0	0.0	0.0	100.0	0.0	0.0
	Pearson chi square = 119.310 pr = 0.000			Pearson chi square = 153.374 pr = 0.000		
Sex						
Male	20.0	48.2	31.8	71.4	7.1	21.4
Female	43.5	26.1	30.4	56.0	28.0	16.0
Transgender	16.7	0.0	83.3	0.0	0.0	100.0
	Pearson chi square = 49.877 pr = 0.000			Pearson chi square = 76.399 pr = 0.000		
Religion						
Hindu	29.6	37.0	33.3	62.6	16.5	20.9
Muslim	25.0	31.3	43.8	70.0	0.0	30.0
Others	21.8	45.5	32.7	28.6	14.3	57.1
	Pearson chi square = 5.584 pr = 0.232			Pearson chi square = 17.521 pr = 0.002		
Caste						
SC	27.5	41.2	31.4	71.4	12.2	16.3
ST	50.0	0.0	50.0	46.7	0.0	53.3
OBC	15.7	29.4	54.9	56.5	26.1	17.4
Others	32.3	46.8	21.0	62.5	6.3	31.3
	Pearson chi square = 34.806 pr = 0.000			Pearson chi square = 35.925 pr = 0.000		
Education						
Illiterate	41.7	33.3	25.0	66.7	14.3	19.0
Primary (up to five)	35.3	31.8	32.9	64.7	23.5	11.8
Secondary (six to ten)	10.3	46.2	43.6	63.0	3.7	33.3
Higher (more than ten)	0.0	60.0	40.0	33.3	33.3	33.3
	Pearson chi square = 39.582pr = 0.000			Pearson chi square = 32.374 pr = 0.000		
Marital status						
Never married	0.0	43.1	56.9	26.3	10.5	63.2
Currently married	45.2	40.5	14.3	81.1	8.4	10.5
Wid/Div/Sep/Des	50.0	0.0	50.0	11.1	88.9	0.0
	Pearson chi square = 118.123 pr = 0.000			Pearson chi square = 178.196 pr = 0.000		
Occupation						
Student	0.0	60.0	40.0	33.3	33.3	33.3
Unemployed	100.0	0.0	0.0	76.9	23.1	0.0
Agriculture	70.0	25.0	5.0	100.0	0.0	0.0
Working in Hotel	0.0	72.7	27.3	25.0	25.0	50.0
Construction	13.3	66.7	20.0	76.5	0.0	23.5
Self employed	0.0	75.0	25.0	100.0	0.0	0.0
Transport	22.2	25.9	51.9	0.0	50.0	50.0
Others	11.8	17.6	70.6	0.0	27.3	72.7
	Pearson chi square = 253.477 pr = 0.000			Pearson chi square = 184.163 pr = 0.000		
Total	**26.2**	**38.7**	**35.1**	**62.0**	**14.1**	**23.9**
	88	130	118	176	40	68

Table 4: Percent distribution of respondents having different level of composite risky sexual behaviour according to selected background characteristics

Contextual determinants	Migrant			Non-migrant		
	Composite risky sexual behaviour index			Composite risky sexual behaviour index		
	Lower	Moderate	Higher	Lower	Moderate	Higher
Comprehensive Knowledge						
No	37.0	26.9	36.1	66.7	9.5	23.8
Yes	0.0	67.3	32.7	55.2	20.7	24.1
	Pearson chi square = 65.840 pr = 0.000			Pearson chi square = 7.540 pr = 0.023		
Frequency of visiting places other than work						
Regularly	0.0	41.4	58.6	50.0	16.7	33.3
Occasionally	26.4	38.8	34.7	62.5	14.3	23.2
Rarely	66.7	33.3	0.0	100.0	0.0	0.0
	Pearson chi square = 59.869 pr = 0.000			Pearson chi square = 10.535 pr = 0.032		
Number of close friends						
up to 2	52.2	39.1	8.7	69.2	15.4	15.4
3-5 friends	6.7	43.3	50.0	60.0	18.2	21.8
6 and above	10.3	30.8	59.0	45.5	0.0	54.5
	Pearson chi square = 110.182 pr = 0.000			Pearson chi square = 32.170 pr = 0.000		
Going out with friends						
Often	6.3	37.5	56.3	0.0	0.0	100.0
Occasionally	19.0	45.7	35.3	50.0	20.0	30.0
Never	100.0	0.0	0.0	100.0	0.0	0.0
	Pearson chi square = 138.169 pr = 0.000			Pearson chi square = 84.706 pr = 0.000		
Social influence (friends)						
No influence	63.6	36.4	0.0	84.4	12.5	3.1
Have influence	12.9	39.5	47.6	43.6	15.4	41.0
	Pearson chi square = 105.869 pr = 0.000			Pearson chi square = 61.469 pr = 0.000		
Social influence (family)						
No influence	22.0	37.8	40.2	68.5	7.4	24.1
Have influence	39.0	41.5	19.5	41.2	35.3	23.5
	Pearson chi square = 14.561 pr = 0.001			Pearson chi square = 34.801 pr = 0.001		
Loneliness						
Never	64.3	28.6	7.1	68.0	24.0	8.0
Rarely	24.4	51.2	24.4	80.5	4.9	14.6
Sometimes	25.5	38.3	36.2	55.6	14.8	29.6
Often	7.7	34.6	57.7	25.0	8.3	66.7
	Pearson chi square = 80.281 pr = 0.000			Pearson chi square = 80.037 pr = 0.000		
Depression						
Minimal	15.0	45.0	40.0	78.1	9.4	12.5
Mild	25.5	48.9	25.5	60.0	0.0	40.0
Moderate	10.4	45.8	43.8	14.3	42.9	42.9
Severe	63.6	6.1	30.3	70.0	5.0	25.0
	Pearson chi square = 76.573 pr = 0.000			Pearson chi square = 86.776 pr = 0.000		
Work related stress						
Less	31.6	35.5	32.9	69.0	11.9	19.0
High	21.7	41.3	37.0	51.7	17.2	31.0
	Pearson chi square = 4.186 pr = 0.123			Pearson chi square = 8.828 pr = 0.012		
Perception about engaging into unprotected sex						
not at all risky	32.0	36.0	32.0	94.1	0.0	5.9
somewhat risky	29.3	46.3	24.4	73.7	5.3	21.1
risky/extremely risky	19.7	29.5	50.8	40.0	25.7	34.3
	Pearson chi square = 22.527 pr = 0.000			Pearson chi square = 66.931 pr = 0.000		
Attitude towards condom						
Lower	33.7	34.8	31.5	89.2	0.0	10.8
Moderate	31.1	48.9	20.0	60.0	20.0	20.0
Higher	0.0	35.3	64.7	27.6	31.0	41.4
	Pearson chi square = 49.276 pr = 0.000			Pearson chi square = 110.358 pr = 0.000		
Total	**26.2**	**38.7**	**35.1**	**62.0**	**14.1**	**23.9**
	88	**130**	**118**	**176**	**40**	**68**

Table 5: Percent distribution of respondents having different level of composite risky sexual behaviour according to different contextual determinants

LR chi2(24) =	933.370
Prob > chi2 =	0.000
Log likelihood =	-202.615
Pseudo R2 =	0.697

	Lower	Moderate
Migratory Status		
Migrant		
Non-migrant	0.183	0.582***
Age		
<=24		
25-29	2.834	10.068**
30-34	0.031*	7.962*
35 & above	0.001*	0.835*
Sex		
Male		
Female/ Transgender	0.013	18.393
Marital status		
Never married		
Ever married	0.681**	0.004*
Comprehensive Knowledge		
No		
Yes	2.842***	0.245***
Number of close friends		
up to 2		
3-5 friends	9.275	2.065**
6 and above	1.098	6.700**
Risk behaviour by friend		
No		
Yes	11.795	4.951***
Risk behaviour by family		
No		
Yes	3.970	0.017
Perception about engaging in unprotected sex		
Not at all risky		
Somewhat risky	4.344	0.838
Risky/extremely risky	1.213**	3.024**
Attitude towards condom		
Lower		
Moderate/Higher	6.262***	0.019***
constant	0.001	0.841

Table 6: Results of Generalized Ordered Logistic Regression Analysis for composite risky sexual behaviour