

# HIV-Risk Behavior Among the Male Migrant Factory Workers in a North Indian City

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## ABSTRACT

**Background:** Male migrants act as a bridge for transmitting infection from core risk groups to general population and hence this group becomes essential for the HIV control program. Migrant workers constitute a large proportion of workforce in India and HIV/AIDS epidemic in them would cause huge economic losses. **Objectives:** The aim of this study was to ascertain the HIV-risk behavior among male migrant factory workers. **Materials and Methods:** This was a cross-sectional facility based survey conducted in 2011. Male migrant workers aged  $\geq 18$  years, who were born outside Haryana, who had moved to current location after 15 years of age, who had worked in the current factory for at least one year, who were willing to participate and able to give valid consent were eligible. A consecutive sampling was done. Descriptive, bivariate and multiple logistic regression analyses were done. **Results:** A total of 755 male subjects completed the interview. About 21.5% had experienced non-spousal sexual intercourse in last one year. Nearly 60% did not use a condom at the last non-spousal sex. Factors associated with recent non-spousal sex were being unmarried, younger age at migration, recent migration to Haryana, greater number of places migrated and lesser total duration of migration and those associated with non-use of condom at the last non-spousal sex were older age, lower education, lesser number of places migrated and lower level of HIV/AIDS knowledge. **Conclusion:** Unprotected, recent non-spousal sex was common among male migrants, which could increase their HIV/AIDS vulnerability.

**Keywords:** Factory workers, HIV/AIDS risk behaviour, India, migrant workers

## Introduction

The overall velocity of Human Immunodeficiency Virus/Acquired Immunodeficiency Disease Syndrome (HIV/AIDS) epidemic appears to have stabilized both globally and in India, but the numbers of new infections are still high.<sup>(1,2)</sup> The Indian National AIDS Control Programme (NACP) places highest priority on preventive efforts among high risk groups including male migrants and long distance truckers. Male migrants are specifically known as 'bridge' population because they act as a bridge for transmission between core risk

groups like Female Sex Workers (FSWs) and the low risk general population, who are mostly their spouses. HIV prevalence among male migrants was estimated to be 0.99% in 2008-09, which was three times higher than the general population.<sup>(3)</sup>

HIV/AIDS shows its adverse impact on businesses in several ways and causes reduction in profits.<sup>(4)</sup> International Labour Organisation (ILO) estimates that over 90% of people with HIV are adults of working age.<sup>(5)</sup> Workplace offers a valuable entry point, which could facilitate access to prevention services.<sup>(6,7)</sup>

In India, there has been a constant increase in the efflux of adult males from less developed rural areas to urban areas for better livelihood. These migrant males are considered to have higher HIV risk behavior. The socially isolated situations under which male migrants work result in behaviors such as unsafe sex that increase risk of exposure. Where there are still opportunities early

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action will reap tremendous savings.<sup>(8)</sup> In keeping with this, India has also committed itself to the control of HIV/AIDS in workplaces as evidenced by the policy document 'National policy on HIV/AIDS and the world of work',<sup>(7)</sup> which aims at preventing transmission of HIV infection among workers. The aim of this study was to ascertain the HIV-risk behavior among male migrant factory workers and to assess its association with selected socio-demographic variables.

## Materials and Methods

This was a facility based cross-sectional survey conducted in two factories located at Ballabgarh block of Haryana in 2011. Male migrant workers aged 18 years or above, who were born outside Haryana, who had moved to current location after 15 years of age, who had worked in the current factory for at least one year, who were willing to participate and able to give valid consent were eligible for inclusion in the study. Face-to-face interview was conducted using pretested semi-structured questionnaire. Two dependent variables were included for the analysis, separately: Recent, non-spousal sex (i.e. in the last 1 year) and non-use of condom at the last (i.e. most recent) non-spousal sex that represented HIV-risk behavior. 'Recent' means in the last 1 year, and 'Ever' means lifetime experience and 'last non-spousal sex' means the most recent non-spousal sex. Main independent variables identified from the literature review and considered here include age, residence, marital status, education, migration characteristics and HIV knowledge variables. HIV/AIDS knowledge score was assessed by 22 questions on transmission routes, preventive methods and curative services available. This was converted into a score out of 22 and was classified based on proportion of the maximum possible score obtained, into three categories as  $\geq 80\%$  (comprehensive), 50% to 79% (moderate) and  $\leq 49\%$  (poor). The question asked for assessing non-spousal sex was 'Have you ever had sex with a person other than your wife (for married men) or any person (for unmarried men)?' and the options were 'Yes, in the last one year', 'Yes, but not in the last one year' and 'No'. For sample size calculation, we assumed that the prevalence of unprotected recent non-spousal sex (last one year) was 15%. For an absolute precision of 3%, alpha error of 5%, power of 80% and non-response rate of 20%, the final sample size was calculated as 710 using the formula  $n = 4pq/d*d$ . The sampling strategy adopted was the one similar to that used in HIV sentinel surveillance<sup>(9)</sup> activities in India i.e., consecutive sampling. Workers attending the factory clinic were approached to take part in the study in a consecutive manner and not more than 20 interviews were conducted in a single day. Ethical approval was obtained from the Ethics Committee of the All India Institute of Medical Sciences, New Delhi. Informed

written consent was obtained from all the participants. The interview was conducted in a separate room within the clinic and privacy was ensured during the interviews. No information on the person's identification, such as name or employee number, was collected to ensure confidentiality.

## Statistical analysis

All analyses were done using Stata/IC 11.1 (StataCorp LP, College Station, TX). Data were described in terms of proportions, means, Standard Deviations (SD), median, Inter Quartile Range (IQR) and 95% Confidence Intervals (CI) wherever applicable. Multivariable logistic regression was done by backward stepwise method. The *P* value for entry of variable into the model was kept at 0.20 and *P* value for removal was kept at 0.05. The variables retained in the final model were presented with adjusted odds ratios (aOR) and 95% CIs. Statistical significance was set at *P* value less than 0.05.

## Results

### Socio-demographic characteristics and HIV/AIDS knowledge

A total of 767 men were approached for participation and 755 completed the interview. Site 1 contributed 547 and site 2 contributed 208 participants. Distribution of source states was as follows: Bihar-45.4%, Uttar Pradesh-37.2%, Rajasthan - 13.2% and others-4.1%. The mean (SD) age of the participants was 31.4 (8.2) years. Nearly 90% were literate and almost 90% were semi-skilled workers. Three-fourth of the men were married, but among them nearly half were not staying with their spouses at the current residence. The mean (SD) age at migration was 21.8 (4.9) years, mean (SD) number of places migrated for work related purposes was 3.6 (2.9), and mean (SD) total duration of migration was 9.5 (6.7) years. Only 40% of participants had a comprehensive HIV/AIDS knowledge.

### Experience of non-spousal sex

Nearly 90% of men were sexually experienced. The median age at first sexual intercourse was 18 years (IQR 13 to 31). Nearly half (45.5%) of the participants had experienced non-spousal sexual intercourse (ever), among whom nearly half (47%) had involved in such behavior in the last one year i.e., recent non-spousal sex and this proportion was higher in unmarried persons as compared to married persons. Eighty-five percent of men who reported non-spousal sex (ever) also reported having non-spousal sex in their hometown. Nearly one fourth of those reporting non-spousal sex (ever) also reported having paid money for sex in the last one year, which was higher among unmarried men as compared to married men [Table 1].

**Table 1: HIV-risk behavior among male migrant workers in selected factories of Faridabad**

Variable	Married men		Unmarried men		All men	
	Nos.	% (95% CI)	Nos.	% (95% CI)	Nos.	% (95% CI)
Non-spousal sex (ever)	262/580	45.2 (41.2, 49.2)	81/175	46.3 (39.1, 53.7)	343/755	45.5 (41.9, 49.0)
Recent non-spousal sex at destination	85/580	14.7 (12.9, 17.8)	77/175	44.0 (36.9, 51.4)	162/755	21.5 (18.7, 24.5)
Non-spousal sex in home town <sup>†</sup>	210/262	80.2 (75.0, 85.0)	77/81	95.1 (88.0, 98.1)	287/343	84.0 (79.4, 87.2)
Paid money for sex in the last one year <sup>†</sup>	60/262	22.9 (18.2, 28.4)	31/81	38.3 (28.5, 49.2)	91/343	26.5 (22.1, 31.4)
Ever used condom <sup>‡</sup>	298/577	51.6 (47.6, 56.0)	51/81	63.0 (52.1, 72.7)	349/658	53.0 (49.2, 56.8)
Used condom during last sex with spousal partner <sup>‡</sup>	134/298	45 (39.4, 51.0)	—	—	—	—
Used condom during last sex with non-spousal partner <sup>§</sup>	62/121	51.2 (42.4, 59.9)	41/51	80.4 (67.5, 89.0)	103/172	60.0 (52.4, 67.0)
Used condom during last sex with non-spousal partner <sup>  </sup>	26/85	30.1 (21.8, 41.1)	40/77	52.0 (41.0, 62.8)	66/162	40.7 (33.5, 48.4)

<sup>†</sup>Among those men who reported non-spousal sex, <sup>‡</sup>Among sexually experienced men and those who had heard about condoms, <sup>§</sup>Among married men who had ever used a condom,

<sup>||</sup>Among those men who had ever used a condom and had reported ever having non-spousal sex, <sup>||</sup>Among those men who had ever used a condom and had reported having non-spousal sex in the last one year

### Condom use pattern

Among participants who were sexually experienced, only 53% had ever used a condom, which was higher in unmarried men as compared to married men. Among married men who had used a condom, more than half did not use condom at the last sex with spousal partner. Among men who reported ever use of condom and experience of non-spousal sex (ever), 40% did not use a condom at the last sex with a non-spousal partner and this percentage was higher among married men as compared to unmarried men. Among men who reported ever use of condom and experience of non-spousal sex (recent), nearly 60% did not use a condom at the last sex with a non-spousal partner and this percentage was much higher among married men as compared to unmarried men [Table 1]. Among married men who had used a condom, only half (48.3%) reported using condoms always or most times during sex with spousal partner. The major reason given by them for not using condom during sex with spousal partner was 'didn't think it was necessary' followed by 'don't like them' and 'partner objected'. The major reason given by them for not using a condom during sex with a non-spousal partner was 'there was no time' followed by 'didn't think of it', 'didn't think it was necessary' and 'don't like them'. The major reason given by unmarried men for not using a condom during sex with a non-spousal partner was 'don't like them' and 'partner objected' (data not shown). The mean (SD) time reported by the participants to get a condom close to their house or workplace was 22.2 (7.4) minutes.

### Bivariate analysis

Bivariate analysis showed that factors that were significantly associated with experience of recent

non-spousal sex were younger age (<25 years), being unmarried, younger age at migration, greater number of places migrated, lesser total migration duration, higher mobility and recent migration to Haryana [Table 2]. Factors that were found to be significantly associated with non-use of condom at last non-spousal sex were older age, being married, older age at migration, greater number of places migrated, greater total migration duration, lower education, being semiskilled/unskilled worker, lower income, having a roommate and lower level of HIV/AIDS knowledge [Table 2].

### Multivariable analysis

Factors independently associated with experience of recent non-spousal sex were being unmarried, younger age at migration, recent migration to Haryana, greater number of places migrated and lesser total duration of migration [Table 3]. It is important to note that the HIV/AIDS knowledge was not significantly associated with this outcome. The model had a good fit to the data as assessed by the area under the ROC curve (0.8) and the goodness of fit chi square test ( $P$  value = 0.07). Factors independently associated with non-use of condom at the last non-spousal sex were older age, lower education, lesser number of places migrated and lower level of HIV/AIDS knowledge [Table 4]. The model had a good fit to the data as assessed by the area under the ROC curve (0.8) and the goodness of fit chi square test ( $P$  value = 0.21).

### Discussion

The study population was relatively younger and more literate because men like them were more likely to be employed in such factories. This background is likely to be true for men working in similar setups across a range of factories.

**Table 2: Bivariate analyses — effect of independent variables on the experience of recent non-spousal sex at destination and non-use of condom at last non-spousal sex among male migrant workers in selected factories of Faridabad**

Independent variables	Category	Unadjusted OR			
		Nos.	Recent non-spousal sex at destination	Nos.	Non-use of condom at last (recent) non-spousal sex
Age of the participant (in years)	18-24	88/563	1	194/253	1
	≥25	74/192	0.30 (0.20, 0.42)***	46/90	3.14 (1.89, 5.21)***
Place of origin	UP	55/281	1	80/121	1
	Bihar	74/343	1.13 (0.76, 1.67)	109/154	1.24 (0.74, 2.07)
	Rajasthan	24/100	1.30 (0.75, 2.23)	36/48	1.53 (0.72, 3.26)
	Others	9/31	1.68 (0.73, 3.85)	15/20	1.53 (0.52, 4.52)
Marital status	Married and staying with spouse	44/318	1	111/153	1
	Married but not staying with spouse	41/262	1.15 (0.72, 1.83)	89/109	1.68 (0.92, 3.07)
	Unmarried	77/175	4.90 (3.16, 7.56)***	40/81	0.36 (0.21, 0.64)***
Age at which migrated for work purposes (years)	<21	113/406	1	139/209	1
	21-25	35/206	0.53 (0.34, 0.81)	55/81	1.06 (0.61, 1.84)
	>25	14/143	0.28 (0.15, 0.50)***	46/53	3.30 (1.42, 7.07)**
Number of places been for work	1	31/167	1	29/47	1
	2-5	88/449	1.07 (0.67, 1.68)	106/176	0.93 (0.48, 1.82)
	>5	43/139	1.96 (1.15, 3.34)**	105/120	4.34 (1.95, 9.66)***
Number of years of migration (completed)	<6	81/264	1	58/108	1
	6-10	42/192	0.63 (0.41, 0.97)	61/90	1.81 (1.01, 3.24)
	11-15	24/164	0.39 (0.23, 0.64)	63/74	4.93 (2.34, 10.38)
	>15	15/135	0.28 (0.15, 0.51)***	58/71	3.84 (1.89, 7.82)***
Mobility index	<0.26	12/234	1	37/57	1
	0.26-0.50	44/287	3.30 (1.72, 6.50)	87/111	1.95 (0.96, 3.97)
	>0.50	106/234	15.3 (8.11, 28.9)***	116/175	1.06 (0.56, 1.99)
Duration of stay in Haryana (years)	1-2	113/292	1	116/175	1
	3-4	27/226	0.21 (0.13, 0.34)	58/79	1.40 (0.77, 2.53)
	>4	22/237	0.16 (0.09, 0.26)***	66/89	1.45 (0.82, 2.57)
Number of home visits in the last one year	≤ 3	93/416	1	132/192	1
	>3	69/339	0.88 (0.62, 1.26)	108/151	1.41 (0.71, 1.82)
Kind of work	Skilled	20/92	1	13/34	1
	Semiskilled/ unskilled	142/663	0.99 (0.57, 1.66)	227/309	4.47 (2.14, 9.33)***
Net salary received last month (INR)	≤6000	134/624	1	219/292	1
	>6000	28/131	0.99 (0.62, 1.57)	21/51	0.23 (0.12, 0.43)***
Educational Status	Illiterate	7/70	1	29/32	1
	Primary	42/177	2.80 (1.19, 6.57)	91/98	1.34 (0.32, 5.53)
	Middle	34/119	3.60 (1.49, 8.64)	57/69	0.49 (0.12, 1.88)
	Secondary	21/154	1.42 (0.57, 3.51)	30/55	0.12 (0.03, 0.45)
	Higher secondary	35/144	2.88 (1.21, 6.88)	21/54	0.06 (0.01, 0.24)
	Graduate	23/91	3.04 (1.22, 7.58)	12/35	0.05 (0.01, 0.21)***
Place of stay	House	73/278	1	77/120	1
	Hostel	32/118	1.04 (0.64, 1.69)	39/53	1.55 (0.76, 3.18)
	Company premises	13/41	1.30 (0.64, 2.65)	13/17	1.81 (0.55, 5.91)

(Continued)

**Table 2: Bivariate analyses — effect of independent variables on the experience of recent non-spousal sex at destination and non-use of condom at last non-spousal sex among male migrant workers in selected factories of Faridabad (Continued)**

Independent variables	Category	Unadjusted OR			
		Nos.	Recent non-spousal sex at destination	Nos.	Non-use of condom at last (recent) non-spousal sex
Sharing your room or house?	No	42/191	1	40/71	1
	Yes	76/246	1.58 (1.03, 2.45)*	89/119	2.29 (1.23, 4.29)**
If sharing, with whom?	Friends	70/209	1	78/104	1
	Relatives	6/37	0.38 (0.15, 0.96)*	11/15	0.91 (0.26, 3.12)
Have you heard of HIV/AIDS?	Yes	155/713	1	221/323	1
	No	7/42	0.72 (0.31, 1.65)	19/20	8.76 (1.15, 66.40)*
AIDS can be spread by having sex without condom	Yes	146/663	1	198/298	1
	Don't know	9/50	0.77 (0.36, 1.63)	23/25	5.80 (1.34, 25.12)*
AIDS can be spread from mother to child	Yes	110/488	1	130/208	1
	No	20/88	1.01 (0.58, 1.73)	36/50	1.54 (0.78, 3.03)
AIDS can be spread by infected blood	Don't know	25/137	0.76 (0.47, 1.24)	55/65	2.13 (1.59, 6.84)***
	Yes	140/620	1	180/277	1
AIDS can be prevented by regular condom use	No	4/26	0.62 (0.21, 1.83)	12/14	3.23 (0.70, 14.74)
	Don't know	11/67	0.67 (0.34, 1.32)	29/32	5.20 (1.54, 17.53)**
AIDS can be prevented by having one faithful partner	Yes	146/662	1	198/298	1
	Don't know	9/51	0.76 (0.36, 1.59)	23/25	5.80 (1.34, 25.12)**
Total knowledge score	Yes	146/660	1	198/298	1
	Don't know	9/53	0.72 (0.34, 1.50)	23/25	5.80 (1.34, 25.12)**
	≥80%	65/308	1	51/114	1
	50-79%	75/311	1.18 (0.81, 1.73)	132/168	4.52 (2.68, 7.63)
	≤49%	22/136	0.72 (0.42, 1.22)	57/61	17.60 (5.98, 51.77)***

\*\*\*P value < 0.001, \*\*P value < 0.01, \*P value < 0.05, the P value refers to trend wherever there are ordered categories

### Experience of non-spousal sex

About 88% of men were sexually experienced, which was comparable to that reported (80%) by Deb *et al.*, in a similar study setting, in Kolkata.<sup>(10)</sup> The median age at first sexual intercourse was 18 years, which was comparable to that reported as by Lurie *et al.*, among migrant workers in South Africa,<sup>(11)</sup> but lower than that reported by Huy *et al.*, among non-contract worker in Vietnam<sup>(12)</sup> and National Behavioural Sentinel Surveillance Survey, 2006 (BSS) for the general population.<sup>(13)</sup> This indicates that this was a sexually active group that had an early sexual initiation as compared to the national survey estimates for general population. About one-fifth of the participants reported having experienced recent non-spousal sexual intercourse (last one year) and this proportion increased to 46% when the reference period was increased to lifetime. A number of studies<sup>(14-16)</sup> reported similar prevalence among male migrants. A slightly higher proportion (24 to 65%) was reported by Halli *et al.*, among workers of various sectors.<sup>(17)</sup> The BSS, 2006<sup>(13)</sup> reported a much lower prevalence of 9% among the general population and 6% among the laborer

sub group. Similarly, National Family Health Survey, 2005-06 (NFHS-3)<sup>(18)</sup> also reported a lower prevalence of 6% among all men, 10% among 'men away from their homes for more than a month' subgroup and 6% among 'production workers' subgroup. This fact suggests that our study population displayed a higher prevalence of risky behavior. The Population Council study<sup>(19-22)</sup> reported a prevalence of non-spousal sex of 11 to 41% among married men and 12 to 49% among unmarried men across different study states. Among 'industrial workers' subgroup the corresponding figures were 11 to 49% and 10 to 41%. These findings were similar to that of our study results.

A large proportion of men were found to have involved in recent non-spousal sex. Gras *et al.*,<sup>(23)</sup> reported that about 23% of male migrants in the Netherlands reported having sex in the country of origin in the last five years. The Population Council study<sup>(19-22)</sup> reported that 21 to 34% men in the 'industrial workers' subgroup reported non-marital sex in the place of origin. NFHS-3<sup>(18)</sup> reported that the prevalence of paid sex in the last one year was

**Table 3: Multiple logistic regression — independent factors associated with recent non — spousal sex at destination among male migrant workers in selected factories of Faridabad**

Independent variables	Category	Nos.	Adjusted OR (95% CI)
Marital status	Married and staying with spouse	44/318	1
	Married but not staying with spouse	41/262	0.94 (0.56, 1.59)
	Unmarried***	77/175	5.29 (2.55, 10.99)
Age at which migrated for work purposes (years)	<21	113/406	1
	21-25***	35/206	0.49 (0.29, 0.83)
	>25***	14/143	0.35 (0.17, 0.71)
Duration of stay in Haryana (years)	1-2	113/292	1
	3-4***	27/226	0.29 (0.17, 0.50)
	>4***	22/237	0.41 (0.21, 0.77)
Number of places been for work	1	31/167	1
	2-5***	88/449	3.47 (1.85, 6.50)
	>5***	43/139	13.64 (5.38, 34.54)
Number of home visits in the last one year	≤3	93/416	1
	>3	69/339	0.76 (0.50, 1.17)
Number of years of migration (completed)	1-5	81/264	1
	6-10	42/192	0.97 (0.48, 1.96)
	11-15	24/164	0.50 (0.20, 1.20)
	>16**	15/135	0.27 (0.09, 0.74)
Educational status	Illiterate	7/70	1
	Primary	42/177	2.38 (0.89, 6.38)
	Middle**	34/119	3.45 (1.25, 9.50)
	Secondary	21/154	1.12 (0.38, 3.27)
	Higher secondary	35/144	2.33 (0.77, 7.04)
Total knowledge score	Graduate	23/91	2.53 (0.78, 8.22)
	≥80%	65/308	1
	50-79%	75/311	1.13 (0.63, 2.04)
	≤49%	22/136	0.63 (0.29, 1.36)

\*\*\*P value &lt; 0.001, \*\*P value &lt; 0.01, \*P value &lt; 0.05

0.6% among general population, 1.4% among men in the 'more than one month away from their homes' subgroup and 1.1% among 'production workers' subgroup. The high prevalence of non-spousal sex in the hometown underscores that these migrant men were actively involved in risky behavior in their hometowns as well, but whether this behavior was acquired pre or

**Table 4: Multiple logistic regression — independent factors associated with non-use of condom at last (recent) non-spousal sex among male migrant workers in selected factories of Faridabad**

Independent variables	Category	Nos.	Adjusted OR (95% CI)
Age of the participant (in years)	18-24	194/253	1
	≥25***	46/90	3.07 (1.54, 6.12)
Educational status	Illiterate	29/32	1
	Primary	91/98	2.63 (0.58, 11.83)
	Middle	57/69	0.91 (0.22, 3.73)
	Secondary	30/55	0.39 (0.09, 1.61)
Higher secondary**	Graduate**	12/35	0.19 (0.04, 0.89)
	Number of places been for work	1	29/47
	2-5**	106/176	0.39 (0.16, 0.91)
	>5	105/120	0.86 (0.29, 2.50)
Total knowledge score	≥80%	51/114	1
	50-79%	132/168	1.61 (0.80, 3.23)
	≤49%**	57/61	6.29 (1.80, 21.92)

\*\*\*P value &lt; 0.001, \*\*P value &lt; 0.01, \*P value &lt; 0.05

post migration could not be answered from this study. If this behavior was acquired post-migration, then the intervention must be targeted at the workplace; otherwise, it should be directed to the places of origin, in the form of migration welfare centers, migration counsellors or via similar mechanisms.

It was interesting to note that HIV/AIDS knowledge was not a significant factor associated with recent non-spousal sex. It is indicated that even though migrant men may have HIV/AIDS knowledge, they still indulged in non-spousal sex. Factors associated with non-spousal sex or commercial or multiple partner sex reported by other authors included lower education,<sup>(24-26)</sup> being married,<sup>(26,27)</sup> younger age,<sup>(24,28)</sup> being a contract worker,<sup>(28)</sup> living without family,<sup>(28-30)</sup> frequent travellers,<sup>(24)</sup> increased mobility,<sup>(27)</sup> greater number of jobs held,<sup>(27)</sup> and lower income.<sup>(26)</sup> The findings may enable us to devise an intervention plan that is specifically targeted to the factors mentioned above. Young, unmarried, recently migrated and highly mobile men should be given top priority for intervention.

### Condom use pattern

Among the sexually experienced men, 47% had never used a condom, which was lower than that reported by Saggurti *et al.*,<sup>(14)</sup> and Li *et al.*,<sup>(27)</sup> among migrant workers. It was an alarming finding because in spite of large scale IEC (Information, Education and Communication) activities directed to promote the use of condoms, almost half of these men had never used a condom. This requires further detailed investigation as to why men do not prefer to use condom.

Only 45% of married men, who had ever used condoms, did use a condom in the last sex with their spouse. Among men who had reported non-spousal sex in the last one year, only 40% used a condom at last sexual encounter with non-spousal partner. In other words, the prevalence of unprotected non-spousal sex intercourse in this study population was about 60%. The BSS, 2006<sup>(13)</sup> reported that prevalence of condom use during last sex with non-regular partner was 58% in general population, and 56% among 'laborer' subgroup. The NFHS-3<sup>(18)</sup> reported, a prevalence of 32% among 'men who stayed more than one month away from their homes' subgroup and 53% among 'production workers' subgroup. Saggurti *et al.*,<sup>(15)</sup> reported 11 to 20%, Halli *et al.*,<sup>(17)</sup> reported 8 to 68%, Li *et al.*,<sup>(25)</sup> reported 36%, Buregyeya *et al.*,<sup>(28)</sup> reported 36%, Huy *et al.*,<sup>(12)</sup> reported 30% for the same. This shows that this study population had higher risk behavior as compared to other studies. Men who engage in unprotected non-spousal sex are at a high risk for HIV acquisition and thereby require priority attention from policy makers and IEC planners.

Among married participants, who have ever used a condom, about 46% had used condoms consistently, which is in contrast to the 14% reported by the BSS, 2006<sup>(13)</sup> among general population. The prevalence of inconsistent condom reported in other studies was 42% by Saggurti *et al.*, 2008<sup>(14)</sup>, 33 to 67% among married men and 27 to 78% among unmarried men in a study by Population Council.<sup>(19-22)</sup> Deb *et al.*,<sup>(10)</sup> reported that 55% of married men, never used a condom with commercial sex worker. Consistent condom use is more important than ever use of condom with a non-spousal partner, therefore apart from promoting use of condoms, consistent use of condoms should also be emphasized in targeted intervention packages.

The mean time required to obtain a condom was reported as 22 minutes, which was similar to the finding in BSS, 2006<sup>(13)</sup> in which 80% laborer 'subgroup' reported that it took less than 30 minutes to obtain a condom. The widespread availability of condom distribution facilities was probably responsible for this finding. The social marketing strategy adopted for the sale of condoms also must have had an impact on the easy availability of condoms. Engaging in constant informed dialogue with professional associations of industries will probably bring about a positive policy change.

Four factors namely older age, lower education, lesser number of places migrated and having lower HIV/AIDS knowledge were independently associated with non-use of condom during non-spousal sex. Studies have reported that age less than 30 years,<sup>(28)</sup> being single,<sup>(28,31)</sup>

having a steady partner, higher education<sup>(26)</sup> were associated with condom use during non-spousal sex. Men who are relatively older, generally tend to be averse to condom use, probably due to inadequate knowledge about HIV/AIDS. Migration related factors were not found to be associated with condom use, like they were with non-spousal sex. This probably means that the process of migration does not play much of a role in the determining condom use pattern. The most important factors that influence condom use during non-spousal sex seem to be the level of education and HIV/AIDS knowledge.

From the several findings of this study, it is possible to discern a chain of interconnected events that explain the vulnerability of migrant men. Young men often migrate alone, leaving behind their families. At the destination, several factors like boredom, lack of entertainment facilities, peer pressure, lack of social support, the cover of anonymity, expendable cash, the biological drive for sex, and the availability of networks of commercial sex workers work together to enable these men to seek non-spousal, casual or multiple partner sex. The lack of comprehensive knowledge regarding HIV/AIDS and aversion to condom use puts them at risk of involving in risky sexual behavior such as unprotected sexual intercourse, thus increasing their vulnerability to HIV infection. To tackle this problem several measures can be adopted such as peer educator programs in factories could be introduced, co-ordination with local Integrated Counselling and Testing Centers (ICTCs) for voluntary counseling and testing can be ensured, regular refreshment courses at workplace and forming alliances with industry associations to provide overall support to HIV/AIDS related activities within factories can be sought.

There are certain limitations in this study. Firstly, the consecutive sampling strategy limits generalizability. Since the results closely corroborated by other studies done in similar settings, external validity of this study would be adequate. Secondly, partner related socio-demographic information was not obtained and hence their confounding effect could not be studied. Thirdly, temporality of behavior with respect to pre/post migration status could not be studied. Finally, since much of the information on sexual behavior was self-reported, social desirability bias could not be ruled out.

## Conclusion

It can be stated that unprotected recent non-spousal sex was common among male migrants, which increases their HIV/AIDS vulnerability. Promotion of consistent condom use and reduction of non-spousal sex by intensive interpersonal communication and other

channels of behavioral change could help in reducing this vulnerability. Intervention must also be targeted at the sites of origin of the migrants for a comprehensive and successful preventive strategy.

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