

Migration, Mobility and Sexual Risk Behavior in Mumbai, India: Mobile Men with Non-Residential Wife Show Increased Risk

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Abstract This paper examines the relationship of migration and mobility of husband and wife to sexual risk behaviors among married men living in economically marginal communities in Mumbai, India. Non-migrant men reported significantly more often than the migrant men that they had one or more sex partners other than their wives in the last year. Further, men with occupational mobility reported significantly more often than the men who were not mobile that they had one or more non-spousal sexual partners in the last 1 year. Married men living in Mumbai with wives residing in their area of origin and who reported occupational mobility had the highest sexual risk behaviors, controlling for socio-demographic characteristics and migration. Interventions aimed at prevention of HIV among men require special focus on both migrant and non-migrant men with greater occupational mobility, with particular emphasis on migrant men whose wives have remained in their pre-migration home areas.

Keywords Migration · Mobility · Sexual behavior · Sexually transmitted infections · Men · India

Introduction

HIV infection has now spread to all parts of India and the rates of infections are found to be particularly high in those cities with a greater number of migrants. Migration, particularly the relocation of individuals and families from rural areas to cities for economic opportunity, has been viewed as a strong co-factor in accelerating HIV prevalence in India (APSACS 2007; Verma et al. 2007). The rationale that has been advanced for the association between migration and HIV transmission lies in the nature of the migration process itself; the great majority of migrants are men who leave their home communities to find employment in other places and who are not yet married or if married, often migrate without their wives and families. As a result of being away from their home villages for long periods of time, they are seen as being attracted to the greater availability of risky sex in the urban area.

An extensive literature on factors affecting the spread of HIV has documented the relationship between migrants and their sexual risk behaviors in various parts of India (Halli et al. 2007; Rego et al. 2002; Saggurti et al. 2008; Singh et al. 2006; Thappa et al. 2002; Vemuri and Bhattacharya 2004). This research suggests that migrant men living predominantly in male settings and groups (Poudel et al. 2004) and those who drink alcohol are substantially more likely to engage in risky sexual behaviors such as unprotected sex and sex trade involvement (Mishra 2004). Other contributing factors of HIV vulnerability include limited knowledge of HIV transmission and prevention (Gupta and Mitra 1999), low perception of vulnerability to HIV/STIs (Mishra 2004), and existing cultures of risky sexual behaviors (Saggurti et al. 2008), for example among long distance truckers (Rao et al. 1994, 1999).

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Despite the prevailing views in the literature and among policymakers, the link between migration and HIV vulnerability may be more an assumption than an empirically validated finding. Many research and intervention programs proceed to target migrant population groups to the questionable exclusion of non-migrants in the same locales. A study in an economically marginal area in Mumbai has shown that it is non-migrants who are involved in greater risk behavior (Schensul et al. 2006a) and a Center for AIDS Prevention Studies (CAPS) study in Mumbai found a rate of 27% HIV positivity among non-migrants compared to only 9% among migrant populations (Madhivanan et al. 2005).

Part of the problem of assessing the role of migration in HIV vulnerability is the imprecision of definitions of what constitutes migrant status. Many studies categorize all individuals not born in a destination community as migrants; yet it is clear that migrating as a child with the natal family is significantly different than coming to the city to seek work on one's own. The age of the migrant and the circumstances of migration play an important role in sorting out a migrant from a non-migrant, despite the place of birth.

A second problem is the confusion between migration and mobility. Mobility can be defined as short-term commuting involving at least one regular overnight stay away from home in the course of income generation (e.g., short and long distance truckers) or meeting social requirements (e.g., visiting family). While these groups are mobile, they are not seeking to change residence (and are therefore not migrating) and may spend long periods of time in their residential home between trips. Thus, mobility related to employment can cross-cut migrant and non-migrant groups.

Another factor that has been associated with risk related to the migration process has been the presence or absence of wives, children and other family members in the migration destination. Some migrant workers may be away from their families for months or even several years before bringing their wives and children to their work locations. Studies have found that male migrants who are settled with their families engage in less risky sexual behavior than their counterparts who migrate without their families (Mishra 2004; Poudel et al. 2004; Savara and Sridhar 1994).

The present study seeks to: (1) redefine migration categories to better capture a comparison of migrants and non-migrants and examine the relationship of these groups to sexual risk; (2) identify the subgroups of both migrants and non-migrants who are occupationally mobile in order to assess mobility as a factor in sexual risk; (3) explore the effects of a "resident" versus "non-resident" wife in relation to men's sexually risky behaviors; and (4) examine

the multivariate relationships among migration, mobility, residential location of wife and sexual risk behavior as they affect the STI status of individuals.

Methods

This paper reports on research conducted as a part of 6-year (2001–2007) Indo-US collaborative project funded by the National Institute of Mental Health (USA). The project, known as RISHTA ("relationship" in Hindi/Urdu and an acronym for "Research and Intervention in Sexual Health: Theory to Action") sought to reduce unsafe sexual risk behaviors among married men in economically marginal communities in Mumbai, India. The overall design of the RISHTA project has been described in detail elsewhere (Schensul et al. 2004, 2006b).

Participants

This study is based in three communities with a household population of 80,000 and a total population of 700,000 people located on the edge of the Mumbai metropolitan area. These communities consist of multi-family housing with durable cement floors and walls as well as large numbers of illegal settlements with crude housing materials in close proximity to environmentally deteriorated areas. Most families, whether nuclear or joint, share the same single room. Sewage outlets, toilets and sources of clean water are limited. A majority of the population are migrants from the impoverished northern India states and from rural parts of the State of Maharashtra in which Mumbai is located. Most of the men in these communities are employed in low-paying daily wage work, workers in small factories in the vicinity and as small-scale vendors.

Between 2003 and 2006, two rounds of behavioral and biological surveys were conducted. The baseline study took place from May to October, 2003 and the end-line survey from February to April, 2006. The baseline survey consisted of interviews with a random sample of 2,408 married men aged 21–40 years and the end-line survey had an independent random sample of 2,730 married men aged 21–40 years in the same three communities. In both the surveys, respondents were interviewed using a core of the same items. The survey instrument collected information on socio-demographics, migration history, mobility, sexual risk-taking, STI knowledge, reported symptoms of sexual health problems (including the symptoms that correspond to STIs), health care seeking behavior, marital relationships and attitudinal scales concerning masculinity. At the baseline, a randomly selected sub-group of 641 men was asked to give blood (to assess HSV-2 and syphilis status) and urine samples (to assess gonorrhea and Chlamydia

status); and an end-line sample of 903 men who were asked to provide urine samples only for gonorrhea and Chlamydia testing since acute rates for syphilis and HSV-2 were low; (1.3 and 0.9%, respectively) of the total blood samples tested in baseline (Schensul et al. 2007).

The selection of participants for STI testing was based on a systematic random sub-sample from the surveyed samples. At baseline, serum was tested for syphilis using RPR (Tulip Diagnostics, Verna, Goa, India) and TPPA (Sirocha, Fujire Bio Inc., Tokyo, Japan), and for the presence of IgM and IgG antibodies to HSV2 (Vircell, Santase Granada, Spain). Urine samples were tested to detect *C. trachomatis* (CT) and *N. Gonorrhoea* (NG) infection using Multiplex Amplicor PCR assay (Roche Diagnostic Systems, Branchburg, NJ, USA). At endline, only STI testing for CT and NG was conducted due to the low rates of acute syphilis and HSV2 in the baseline. As a result, data on STIs in this paper refers to CT and NG only. Data from the baseline and endline surveys were combined to increase the statistical power while understanding the influence of migration, mobility and sexual risk behaviors in low STI prevalence populations.

Measures

A series of questions in the survey instruments concerning migration and mobility have guided the data analyzes reported here. Questions on migration included: age at arrival in Mumbai, number of years of residence in the community, “home state” from which the individual migrated, the companion(s) at the time of arrival, first time living arrangements, and the residential location of the wife. Duration of migration was computed by subtracting the age at arrival in Mumbai from the current age of the respondent.

Analysis of the demographic data concerning men who arrived in the destination communities prior to their 15th birthday indicated they had come to Mumbai with their natal family and other family members at an average age of 8 years. Migration for these men was a consequence of the search for employment in Mumbai by their parents. The behaviors and socio-demographic characteristics of those men were closely similar to that of men who were born in Mumbai. As a result, men who reported that they had arrived in Mumbai below the age of 15 years were clustered with those men who were born in Mumbai. Men in the sample were defined as migrants if they had arrived in Mumbai at the age of 15 years or greater.

In the survey each man was asked about his mobility in relation to his current employment. The question asked whether the respondent, “stays away from home overnight for work purposes,” with a response pattern of frequently, sometimes or never. In this study, a man was considered to

be mobile, if he stays away from home overnight for work purposes either frequently or sometimes.

A question was asked about whether the respondent’s wife is currently living with him. Based on the responses, the sample was classified as men with and without resident wives. In all, 17% of men were living without their wives, with a mean time of separation of 9.7 months.

The dependent measures of sexual risk behaviors used in this paper to assess the impact of migration, mobility and residence status of wives included: number of sexual partners, sex with a sex worker and sex with either a regular non-spousal or casual partner in the last 12 months.

Data Analysis

Calculations of proportions, chi-squared tests and Fisher exact tests were used to assess the significance of bivariate relationships. Multiple logistic regression techniques were employed to assess the separate significance of migration, mobility, and wife presence as predictors of sexual risk behaviors and STI test results, after adjusting for age, education and religion of the respondent. Analyzes were conducted using SPSS15.0.

Results

Of the sample of 5,130 men, 2,074 (40%) were migrants, 3,056 (60%) were non-migrants (both by birth and by migrating with their families at a young age). Of the total sample, 1,127 (22%) were mobile (sometimes or frequently traveled overnight for work in the last 1 month). Occupational mobility was found to be slightly higher but not significantly different among the migrants (496/2,074, 23.9%) than the non-migrants (631/3,056, 20.6%). Specific occupational groups were more mobile than others. Those occupations included: heavy vehicle drivers (68%: 62 are mobile out of 91 interviewed), auto rickshaw/taxi drivers (37%: 122/327), salaried private/government employees (34%, 272/801), industrial workers (28%, 55/200), daily wage/construction workers (20%, 431/2,112) and businessmen (12%, 185/1,538). Approximately, 17% (861/5,130) of men were living alone in Mumbai with their wives continuing to live in their home areas.

Mobility was high among men having more than middle school education (25%) and among men belonging to either Hindu (25%) or Christian/Buddhists (32%) religions. Comparatively, a higher proportion of married men below 25 years of age were staying alone (32%) in Mumbai when compared to men in other age groups (See Table 1).

The proportion of men having extramarital sex with regular or casual non-spousal partners in the last 1 year shows significant variation between migrants and non-

Table 1 Socio-demographic profile and percent migrants, mobile, having resident wife of married men in Mumbai, India

Characteristics	Percent	Migration duration			Mobility		Wife is currently staying with respondent in Mumbai	
		≤5 years	>5 years	Non-migrant	Non-mobile	Mobile	Yes	No
Sample size	5,130	212	1,862	3,056	3,944	1,127	4,269	861
Total %	100.0	4.1	35.9	60.1	77.8	22.2	83.2	16.8
Age group								
21–25	14.1 (722)	15.4	19.8	64.8	76.3	23.7	67.7	32.3
26–30	28.1 (1,444)	3.7	31.9	64.4	79.6	20.4	84.0	16.0
31–35	30.2 (1,548)	2.0	40.4	57.6	76.8	23.2	86.0	14.0
36–40	27.6 (1,416)	1.1	44.6	54.3	77.8	22.2	87.3	12.7
Education								
Illiterates	17.5 (897)	4.4	40.1	55.5	79.1	20.9	80.3	19.7
Literate—upto primary	11.4 (585)	2.1	30.3	67.6	78.3	21.7	88.0	12.0
Literate—upto middle	27.3 (1,398)	2.6	32.5	64.9	80.7	19.3	84.3	15.7
Above middle school	43.8 (2,250)	5.5	38.7	55.8	75.3	24.7	82.4	17.6
Religion								
Hindu	41.8 (2,142)	6.8	47.6	45.6	75.3	24.7	74.6	25.4
Muslim	54.5 (2,797)	2.2	29.0	68.8	80.3	19.7	89.1	10.9
Christian and Buddhists	3.7 (191)	2.5	16.9	80.6	67.6	32.4	93.7	6.3

Table 2 Migration, mobility, residential status of partner and sexual risk behaviors and STI status

Characteristics	Total men	Sex worker ^a	Non-spousal partner ^b	Two or more sex partners ^a	Sample of men tested	Gonorrhea/Chlamydia prevalence ^c	STI prevalence ^d
Migration duration			***	***			
Migrant ≤ 5 years	212	1.4	3.8	4.2	44	2.3	9.1
Migrant > 5 years	1,862	2.1	4.0	6.1	532	2.3	7.1
Non-migrants	3,056	2.5	6.3	8.4	957	3.0	8.8
Mobility		**	***	***			
Non-mobile	3,944	2.0	5.0	6.8	1,201	2.6	7.7
Mobile	1,127	3.3	6.9	9.6	319	3.4	9.7
Residential status of wife				**			
Resident wife	4,269	2.2	5.2	7.1	1,291	2.8	8.6
Non-resident wife	861	2.9	6.1	8.9	242	2.5	6.2
Mobility and residential status of wife combined		**	**	***			**
Non-mobile and resident wife	3,279	1.9	4.8	6.5	1,003	2.5	7.8
Non-mobile and non-resident wife	946	2.4	5.6	8.3	277	3.0	7.6
Mobile and resident wife	665	3.0	6.7	9.1	198	4.0	11.2
Mobile and non-resident wife	181	5.0	8.3	12.2	42	0.0	0.0
Total	5,130	2.3	5.4	7.4	1,533	2.7	8.2

Values represent percentages. Differences between the categories were tested using Chi-sq. test

*** $P < 0.01$; ** $P < 0.05$; * $P < 0.10$

^a Reported over the last 1 year

^b Non-spousal partner is a non-sex worker and is either regular or casual non-spousal partner reported over the last 1 year

^c Combined gonorrhea/Chlamydia prevalence from baseline and endline

^d Combined prevalence of 4 STIs (GC, CT, syphilis and HSV-2) from both baseline and endline

Table 3 Relation between mobility status, partner presence and sexual risk behavior and STI status, by migration duration

Mobility and Residential status of wife	Total men	Sex worker ^a	Non-spousal partner ^b	Two or more sex partners ^a
Migrants ≤ 5 years				
Mobility			**	**
Non-mobile	143	0.7	2.1	2.8
Mobile	59	3.4	8.6	12.1
Wife is currently staying with respondent in Mumbai				*
Yes	100	0.0	3.0	2.0
No	111	2.7	4.5	6.3
Migrants ≥ 5 years				
Mobility				
Non-mobile	1,412	2.0	4.0	5.9
Mobile	436	2.5	4.1	6.9
Wife is currently staying with respondent in Mumbai				**
Yes	1,394	1.9	3.8	5.5
No	460	2.6	4.6	8.0
Non-migrants				
Mobility		**	***	***
Non-mobile	2,382	2.1	5.7	7.6
Mobile	630	3.8	8.7	11.6
Wife is currently staying with respondent in Mumbai			**	**
Yes	2,766	2.3	6.0	8.1
No	288	3.5	9.0	11.5

Values represent percentages. Differences between the categories were tested using Chi-sq. test
 *** $P < 0.01$; ** $P < 0.05$;
 * $P < 0.10$

^a Reported over the last 1 year
^b Non-spousal partner is a non-sex worker and is either regular or casual non-spousal partner reported over the last 1 year

Table 4 The effect of mobility coupled with resident partner presence on sexual behavior and sexually transmitted infections (STI): use of logistic regression

	Two or more sex partners ^a	
	Adjusted odds ratio ^b	95% CI
Migration duration		
Migrant ≤ 5 years	1.00	
Migrant > 5 years	1.87*	0.92–3.84
Born in Mumbai	2.59***	1.28–5.26
Mobility and residential status of wife in Mumbai		
Non-mobile and has resident wife	1.00	
Non-mobile and has no resident wife	1.51**	1.09–2.09
Mobile but has resident wife	1.50**	1.15–1.95
Mobile and has no resident wife	2.46***	1.51–4.01

*** $P < 0.01$; ** $P < 0.05$;
 * $P < 0.10$

^a Reported over the last 1 year
^b Controlled for age, education and religion of the respondent into a multivariate logistic regression model

migrants (Table 2). The data indicate that non-migrant men reported significantly more often than the migrant men that they had one or more sex partners other than their wives in the last year (8.4 vs. 5.2%; $\chi^2 = 13.1$; $df = 1$; $P < 0.01$).

In addition, men showing greater occupational mobility reported significantly more often than men who were not mobile that they had one or more non-spousal sexual partners in the last 1 year (9.6 vs. 6.8%; $\chi^2 = 8.8$; $df = 1$; $P < 0.01$). A higher proportion of men with mobility

reported sex with a sex worker in the last 1 year as compared to the men who were not mobile (3.3 vs. 2.0%, $\chi^2 = 6.5$; $df = 1$; $P < 0.05$).

Residential location of wife independently did not show any significant association with sexual risk behavior. However, when the residential location of the wife is combined with mobility, the differences are significant. For men who are not mobile and have a resident wife, 1.9% reported having seen a sex worker in the last 1 year. The

corresponding percentage for men with mobility and without resident wife is 5% ($\chi^2 = 7.8$; $df = 1$; $P < 0.05$). Also, mobile men without resident wives reported significantly more sex with non-spousal regular or casual partners (8.3 vs. 4.8%; $\chi^2 = 4.3$; $df = 1$; $P < 0.05$) and multiple sex partners (12.2 vs. 6.5%; $\chi^2 = 10.1$; $df = 1$; $P < 0.01$) than the non-mobile men with resident wives.

Those men who were mobile showed a trend towards higher rates of STI prevalence (9.7%) than those who were not mobile (7.7%). When we combine the mobility of men with the residence of their wives, we find a significant difference with mobile men with resident wives (11.2%) as opposed to non-mobile men with (7.8%) resident wives ($\chi^2 = 3.35$; $df = 1$; $P < 0.05$).

The data were further analyzed to understand the relationships among mobility, residential location of the wife and sexual risk behaviors in relation to migration duration (Table 3). The proportion of men having sex with more than one partner differs significantly between mobile and non-mobile men across various migration durations. Mobile men reported more often than non-mobile men that they had extramarital sex with at least one non-spousal partner in the last year among recent migrants (12.1 vs. 2.8%; $\chi^2 = 6.9$; $df = 1$; $P < 0.01$). The percentage of mobile men reporting sex with a sex worker shows no significant difference between non-migrants (3.8%) and the recent migrants (3.4%).

Table 4 presents the results of the multiple logistic regression analysis. The results show that even after controlling for socio-demographic characteristics and migration, sexual risk behavior is highest when men are mobile and not living with their wives. The odds of reporting extramarital sex within the last 12 months for mobile men without a resident wife is 2.5 times (95% CI: 1.5–4.0; $P < 0.01$) more as compared to non-mobile men who have resident wives.

Discussion

The present study provides evidence for the proposition that migrants are at higher risk for HIV/STI than non-migrants does not hold for these study communities. We would suggest that these results indicate that the men who were born in or who came at an early age to the study communities have more familiarity with the opportunities for risky sex and have the peer relationships to facilitate these activities. In addition, most migrants are committed to establishing themselves economically and work long hours for limited income precluding the time and expenses associated with risky sexual behavior.

In addition to migrant status as a covariate, these analyses have shown that greater occupational mobility has

emerged as a significant factor in sexual risk. Compared with non-mobile men, those who reported occupational mobility were engaged in greater sexual risk activities that were likely to expose them to HIV/STI infection. Furthermore, living separately from their wives in combination with mobility was seen as predictive of higher rates of risky sexual behaviors. Mobile men without a resident wife reported more contacts with sex workers in the previous year, in comparison with non-mobile men with resident wives. This result is consistent with studies in India that have shown that migrants who are settled with their families often have less risky sexual behavior than those migrants who migrate without their families (Mishra 2004; Saggurti et al. 2008; Singh et al. 2006).

Research that has compared sexual and other behaviors between migrants and non-migrants has been underemphasized in India (World Bank 2002). The one study that has made such a comparison was conducted in the rural areas of south India and concluded that married male migrants were not significantly different from non-migrants in visiting sex workers and having sex with non-regular partners (Halli et al. 2007). More research needs to be conducted in testing the assumptions that have characterized migrants versus non-migrants.

The findings in this study suggest an important subgroup that needs to be the focus for future research and intervention programs; i.e., men who are away from home (occasionally or regularly) for work purposes. Researchers need to further examine factors such as extent of mobility, patterns of mobility, and companions during these trips and associated sexual risk behaviors, if effective interventions for the prevention of HIV/STI are to be developed for these occupationally mobile sub-populations.

Although findings from the current study offer important understanding into migration, mobility and sexual risk behavior in urban slum communities in Mumbai, the results must be interpreted in the light of certain study limitations. Sexual risk behavior outcomes were based on self-reports. The STI prevalence that was measured using laboratory procedures did not show an association with migration, mobility and residential status of the partner; these results were consistent with our earlier analysis (Schensul et al. 2007). One possible explanation for lack of association may lie in the extensive availability and relatively low cost of antibiotics in urban poor communities, which can be self-prescribed by men, prescribed by proprietors of local pharmacies, or prescribed in the absence of an STI test by both private allopathic and non-allopathic doctors in the communities (Schensul et al. 2007). A further limitation relates to lower sample sizes for STI in some of the categories of mobility and residential status of the partner that limit the ability to establish conclusive results. Finally, findings are specific to men in urban slum communities in

Mumbai, and cannot be generalized to men in other cities or rural areas within India. Despite these caveats, the results of this study do carry important implications for all those concerned with migration and the control of STIs in India and suggest a research agenda that needs to be conducted in multiple areas in India.

In conclusion, this study has shown that men who were not migrants or who migrated at an early age had higher sexual risk behavior than those who were migrants. In addition, men with occupational mobility and wife's non-residential status, irrespective of their migration status, also had greater sexual risk behaviors and higher rates of STI infections in these Mumbai study communities. The results of this study call for targeting both non-migrants and those who are occupationally mobile in economically marginal communities for reduction in sexual risk behavior and prevention of HIV/STI. The data in this paper encourage us to continue to look beyond simple definitions of migration status to vigorously test other crucial variables that lead us to more effective and useful definitions of sub-populations at HIV/STI risk and allow us to develop more targeted interventions, which can reduce that risk.

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