

# HIV risk behavior and acceptability of microbicides in chennai, India

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**Abstract.** To determine and compare the HIV/STI risk perceptions and behavior among men and women with traditionally high-risk and low-risk behavior in Chennai, India. To explore knowledge of HIV and Sexually transmitted infections (STI) and interest in and acceptability of potential microbicides and their characteristics in various subgroups. A cross-sectional survey investigating HIV knowledge, risk behavior and microbicide acceptability was conducted among 2072 participants. Participants were recruited from five target populations traditionally viewed as high- and low-risk: truck drivers, STI clinic patients, sex workers, married monogamous women, and the general population. Most participants were aware of HIV and its transmission routes, though many participants who engaged in risk behavior did not perceive themselves to be at risk for infection. Overall interest in microbicides was high. Most female participants reported willingness to use a microbicide to prevent HIV/STI transmission, but not pregnancy. Men were willing to let other sexual partners, but not primary partners, use microbicides to prevent HIV/STI. HIV/STI risk is high in men and women with high risk behavior as well as those generally considered low risk. Risk perceptions and condom use reflect concordance only in high-risk women. Interventions should be tailored to different subgroups of the population to improve accurate perceptions of risk while decreasing risky behaviors and promoting use of prevention methods and women's ability to negotiate their use. Microbicides were acceptable in some situations, but not others. Microbicides should come in multiple formulations with and without contraceptive properties and interventions should target increasing acceptability within primary partnerships.

Key words: HIV risk behavior, microbicide, India

## 1. Introduction

At the end of 2008, the National AIDS Control Organization estimated that there were about 2.5million people, in India, infected with the Human Immunodeficiency Virus (HIV), mostly through heterosexual transmission (1-3). Although female sex workers (FSW) have had a higher prevalence of HIV infection (4-8), married monogamous women and other monogamous women have also been shown to be

vulnerable to HIV infection due to their socio-economic disempowerment, pressure to bear children, and the risk behaviors of their male partners (4,8-12). Among men, truck drivers and men attending sexually transmitted infections (STI) clinics have been found to have a higher prevalence of sexual risk behaviors and, higher rates of HIV and other sexually transmitted infections (STIs) compared to the general population (7,8,13,14). It is essential to understand the behavioral risk factors driving this epidemic and in which populations these are widespread in order to develop effective targeted interventions. This study examined the level of HIV/STI risk behavior in men and women generally considered at varying degrees of risk in the community, their knowledge of and risk perceptions towards HIV/STI and their interest in

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Table 1.

	Male (1242)		Female (829)	
	N**	%	N**	%
<b>Age</b>				
18-25	180	14.48	194	23.4
26-33	553	44.49	366	44.15
34 -45	509	40.95	263	31.72
<b>Risk population</b>				
Men with high risk behavior	604		-	
Women with high risk behavior			352	
Men with low risk behavior	638			
Married monogamous women	-		477	
<b>Education/Training</b>				
No schooling	182	14.64	223	26.9
Primary	349	28.08	281	33.9
Secondary	490	39.42	238	28.71
High school and up	211	16.98	82	9.89
Vocational training	8	0.64	-	
<b>Did not respond</b>	2		5	
<b>Monthly income</b>				
Less than Rs.1000	222	17.86	158	19.06
Rs.1000 – Rs.3000	743	59.77	582	70.21
Rs.3000 and above	249	20.03	75	9.05
<b>Marital status</b>				
			=816	
Married	1021	82.14	800	96.5
Unmarried	221	17.78	16	1.93
<b>Location</b>				
	1234		825	
Metro/Urban	525	42.24	657	79.25
Semi-urban/Taluk	178	14.32	73	8.81
Rural	531	42.72	95	11.46
<b>Religion</b>				
	1237		824	
Hindu	1114	89.62	668	80.58
Christian	37	2.98	53	6.39
Muslim	82	6.6	98	11.82
Others	4	0.32	5	0.6

\*\$1 US is approximately equivalent to Rs 45.5 Indian, January 2004

\*\* where categories do not add up to N, differences are accounted for by data not reported

and acceptability of potential microbicides. Several products are currently being investigated (10,15-20), which when available, could help curb the HIV/STI epidemic.

## **2. Material and methods**

A cross-sectional survey was conducted among 2072 participants recruited from May to July 2000, in and around Chennai, India. Institutional review boards approved all study activities. Participants included individuals from groups generally considered to engage in high-risk behavior: truck drivers, STI clinic patients and women in sex work, as well as those considered to be low risk (housewives, and the general population). Participants must have had a history of sexual intercourse, and been between 18 and 45 years old.

### *2.1. Recruitment*

Participants were recruited from three areas of Chennai through varying methods. Truck drivers from truck sites were included based on their availability and travel schedule. Men were also recruited from STI clinics at the Government General Hospital and YRG CARE. Sex workers were recruited from several NGOs. Street-based sex workers were interviewed at venues identified by NGOs. For housewives, every third household was selected from a city map and women from those households were recruited. In order to recruit individuals from the general population, men were visited at bus stops, train stations, and college campuses. All participants were given unique identifiers. No cash incentives were offered to participants; sex workers were reimbursed for time lost during working hours.

### *2.2. Measures*

The survey assessed the following domains: demographics, HIV knowledge, history of drug/injection-related risk, exposure to blood products, sexual risk, STI/HIV diagnosis, testing, and treatment, vaginal product acceptability, and personal care and hygiene practices.

### *2.3. Survey administration*

Participants were consented and interviewed in one session. Staff of the same gender, verbally administered interviews privately. Questionnaire administration took approximately 20-30 minutes. Microbicides were described to the participants as a health product which provides dual protection, bi-directionally. All surveys were conducted in Tamil, Malayalam or Telugu (local regional languages). Demonstrations were done

using hypothetical products (lubricating gel and vaginal applicators).

### *2.4. Data analysis*

Participants were categorized by gender and self-reported occupation. Females who reported sex work as an occupation were categorized as high-risk population and those who reported as housewife and other occupations were categorized as low risk. Males who reported being truck, auto, car, or bus drivers or cleaners, as well as STI clinic attendees were categorized as high risk population; all others were categorized as low risk population. Statistical analyses were performed with SPSS Software version 10.05. Multivariate regression, contingency tables and chi-square statistical test were used.

## **3. Results**

There were 2072 participants, 1242 men (605 men with high risk behavior and 638 men with low risk behavior) and 829 women (352 women with high risk behavior and 477 married monogamous women), in the study. Demographics are reported in Table 1.

### *3.1. Knowledge*

Most participants (95.6% men with high risk behavior, 99.2% men with low-risk behavior, 98.8% women with high risk behavior, 87.0% married monogamous women) had heard of HIV. Most participants knew correct routes of transmission (84-98%), but some had misconceptions that HIV could be transmitted through air or water (5.4%), saliva or cough (13.9%), mosquitoes (20.6%), bugs (9.9%), and food (6.3%). Men were more likely than women to have misconceptions about how HIV is transmitted ( $p = 0.001$ ).

### *3.2. Medical risk and substance abuse*

Few participants (2.8%) had blood transfusions, but many (62.8%) reported medical injections in the last five years. Men (84.7%) were more likely than women (38.6%) to report ever using any substance. In addition, men with high-risk behavior (87.7%) were more likely than other men (81.9%) to report substance abuse. Women with high-risk behavior (75.2%) were more likely than other women (14.8%) to report substance abuse and all were statistically significant ( $p = 0.05$  or less).

### *3.3. Sexual behaviors*

Thirty-nine percent (39%) of respondents were less than 18 years old at their first sexual

experience, 52% were 18-25 years old, and 9% were 26-37 years old. Women were more likely than men to be younger ( $p= 0.05$  or less) at first sexual experience with women with high risk behavior younger ( $p= 0.05$  or less) than those

with low risk behavior. Most men (75%) reported having more than one sexual partner in their lifetime and 15% reported having more than one partner in the last six months. Among women, women with high risk behavior (98%)

Table 2. Risk perceptions

HIV risk perception	Men: High risk behavior	Men: Low risk behavior	Women: High risk behavior	Married monogamous women:
(N)	(604)	(638)	(352)	(477)
Participant's perception of personal risk in past, ever	85 (14%)	188 (29%)	202 (58%)	65 (14%)
Participant's perception of personal risk in recent past, last 6 months	47 (8%)	92 (15%)	139 (40%)	38 (8%)
Participant's perception of partner risk in past, ever	90 (18%)	98 (16%)	105 (42%)	329 (73%)
Participant's perception of future risk:				
“no chance” to “small chance”	547 (96%)	607 (98%)	221 (64%)	419 (91%)
“likely to “absolutely”	24 (4%)	15 (2%)	122 (36%)	40 (9%)

were significantly more likely than married monogamous women (10%) to report having more than one sexual partner in their lifetime and in the last six months (97% vs. 6%) ( $p \leq 0.05$ )

Eighty-nine percent (89%) of participants reported vaginal sex with a primary partner in the last six months, while 22% reported oral sex, and 7% reported anal sex. Among men, those with high risk behavior reported significantly more ( $p= 0.05$  or less) vaginal sex than other men, but there was no significant difference in reports of oral or anal sex.

Among women, those with high risk behavior were significantly more likely to report vaginal, receptive oral, active oral and anal sex than the married monogamous women. Women with high-risk behavior were the only group with high rates of condom use with their primary partner; 86-91% reported “often use” for all types of sex. Sixty-nine percent (69%) of men with high-risk behavior, 79% men with low-risk behavior, 7% of women with high-risk behavior, and 89% married monogamous women reported “never” using condoms for vaginal sex with primary partners.

Among men that reported sex with other partners, those with high-risk behavior (41%) reported that they “sometimes”, “often” or “always” used condoms with partners other than their primary partner as compared to men with low-risk behavior (20%) ( $p=0.001$ ). Among

females who reported sex with other partners, women with high-risk behavior (88%) were more likely to report using condoms “often” or “always” with other sexual partners than those with married monogamous women (77%) ( $p \leq 0.05$ ).

Men (33%) were more likely than women (23%) to feel comfortable encouraging condom use with primary partners, and men (9%) were more likely than women (5%) to report that they would refuse sex without a condom with their primary partners ( $p= 0.05$  or less). Of those reporting sex with other partners, women (96%) were significantly more likely than men (73%) to feel comfortable encouraging condom use and women (67%) were significantly\*\* more likely than men (32%) to refuse sex without a condom with other partners ( $p= 0.05$  or less). Among women, those with high-risk behavior were significantly\*\* more comfortable encouraging condom use than married monogamous women but were not different in refusing sex without a condom.

#### 4. STI history

Fifteen percent (15%) of men with high-risk behavior, 44% of men with low risk behavior, 54% of women with high-risk behavior, and 17% of married monogamous women reported having had an STI in their lifetime. Only 5% of participants reported that their primary partners

had an STI, but 10% reported that they did not know and 11% refused to answer this question. Nine percent (9%) of men with high-risk behavior, 15% of men with low risk behavior, 59% of women with high-risk behavior and 12% of married monogamous women reported that they had been tested for HIV.

## 5. Risk perceptions

Risk perceptions for contracting HIV are listed in Table 2. Women were more likely\*\* than men to perceive past personal risk ever, personal risk

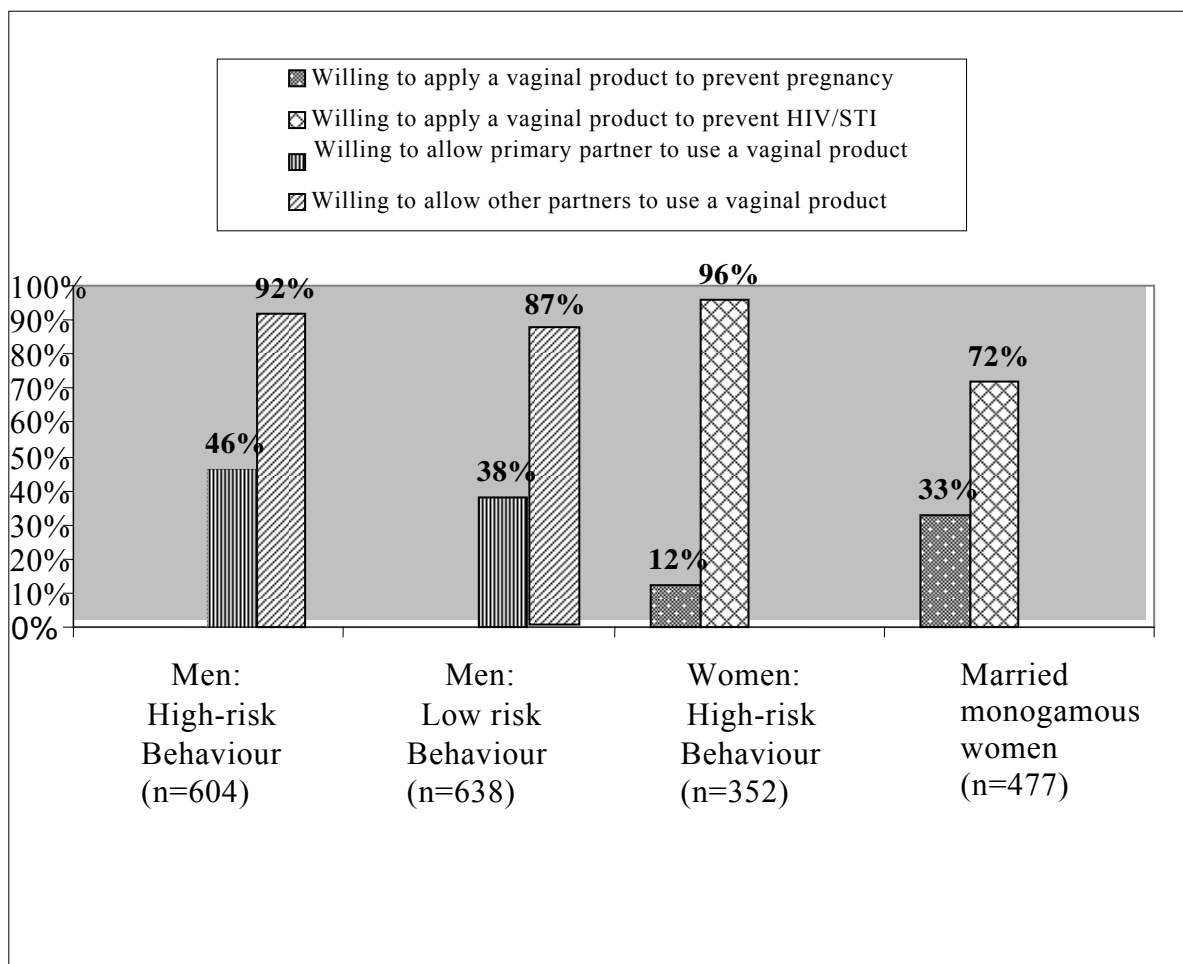


Fig. 1. Microbicide Willingness.

in the last six months, past partner risk, and future personal risk. Among men, those with low risk behavior were more likely ( $p=0.05$  or less) than those with high risk behavior to perceive past personal risk ever and personal risk in the last six months, but there were no significant differences between the groups in their perceptions of partner risk or personal future risk. Women with high-risk behavior were more likely ( $p=0.05$  or less) than those with low-risk behavior to perceive personal risk in the past ever, last six months, and future. However, married monogamous women were more likely ( $p=0.05$  or less) than those with high-risk behavior to

perceive that their primary partners had ever been at risk.

### 5.1. Microbicide acceptability

Most participants wanted to know more about microbicides and were particularly interested in products that prevent HIV/STI. Willingness to use or allow use of microbicides is shown in Figure 1.

## 6. Women's willingness to use microbicides

Among women, willingness to use microbicides to prevent HIV/STI was associated with older

age, multiple partners, perceived personal HIV risk, personal or partner STI history, and comfort applying medication to the vagina ( $p= 0.05$  or less). Younger age, monogamy, and use of temporary methods of contraception were associated with willingness to use a microbicide that also prevents pregnancy ( $p= 0.05$  or less).

#### 6. 1. Men's willingness to allow microbicide use

Men's willingness to allow primary partners to use a microbicide to prevent HIV/STI was associated with occupation, multiple partners, and personal or partner history of STI ( $p= 0.05$  or less). Occupation, multiple partners, and perceived personal HIV risk were also associated ( $p= 0.05$  or less) with willingness to allow non-primary partners to use a microbicide to prevent HIV/STI.

#### 6. 2. Focus group discussion

63 men and women participated in the same sex group discussions stratified by marital status and level of risk. Though men and women wanted a product that could be used covertly 75% of them felt that a decision to use microbicide should be made jointly by man and woman. A concern for some married women is that using a microbicide may encourage their husbands to have extramarital affairs because his wife is now protected! Women were not keen on products which had contraceptive effects since majority had either tubal ligation or intra uterine device. They preferred a microbicide which will protect them from HIV/STD. Men concurred with the women. Quote: "It's enough if it prevents diseases. I have 4 children, undergone surgery and so pregnancy is no issue for me anymore, so this product should prevent diseases." (Married high risk) In addition to preferring a gel, several women suggested that an oral tablet be used instead of products that will be applied vaginally. Quote: "The wife could tell the husband that the doctor has asked her to eat this". (Married low risk) Women preferred that the gel be unnoticeable, as a noticeable product could lead to marital problems if the husband becomes aware that his wife is using the product without his knowledge. Men also preferred colorless products like water. Both men and women preferred the scent of jasmine, but a few wanted odorless gel. Quote: "Usually men and women when they are having sex will have jasmine flower with them. So that smell can be there" (Married high risk) Women were embarrassed to discuss oral sex and those who spoke out

suggested a sweet taste. Married women felt using an applicator was a good idea, but were concerned that single use applicators would be expensive. Reuse may cause infection. On discussion about time of application women needed a product which can be applied between 5 minutes-2 hours prior to having sex. Quote: "When I am going to the customers say about before 5 minutes I can go to the bathroom and apply this" (Unmarried high risk) Most of the women and men had a major concern about the side effects especially if they had to use it often and for extended period of time. Sexual behavior and sexuality vary across international sites and hence culturally specific adaptations may be required for multi-country studies.

## 7. Discussion

Most participants were aware of HIV and its modes of transmission. However, there were misconceptions that HIV can be transmitted through other routes such as air, water, food, and insects (21-23). Educational interventions should continue to target these misconceptions and develop creative ways of reaching the underserved communities where illiteracy is common.

Reports of blood transfusions and injection drug use were low. However, more than half of participants reported having at least one medical injection in the last five years, highlighting a need to establish and maintain sterile injection procedures in all medical facilities (24-26).

As described previously in other cohorts, heterosexual sex was the highest risk factor in this population (1-3). Most married monogamous women reported only one partner, their husbands, yet almost a fifth of them reported having had an STI. This is most likely due to the fact that most men, whether from the low- or high-risk behavior categories, reported multiple sexual partners.

Although reported levels of condom use were higher than found in previous studies (3), condom use was still low. Low condom use may be due to low perceptions of risk, or inability to negotiate condom use or refuse sex without a condom. In other studies, women expressed fears about insisting on protected sex and misconceptions exist that individuals who appear healthy and respectable cannot be infected with HIV (27). These factors as well as stigma associated with condom use and issues of cost and access to condoms could contribute to low condom use (28).

High levels of condom use by women with high-risk behavior with both primary and other

partners as well as higher comfort in negotiating condom use may demonstrate that targeted interventions have been successful. Men with high-risk behavior, who have been a recently targeted group, do not demonstrate similar success. Effective prevention programs are also needed for women and men from groups traditionally considered to be at low-risk.

Despite the rapidly growing HIV epidemic in India and the reported risks in this study, overall perceptions of HIV risk remain low. However, those who reported medical risk factors, substance abuse, sexual risk behaviors, and previous STIs were more likely to perceive personal risk. Married monogamous women perceived that their primary partners were at risk for contracting HIV, but these partner risk perceptions did not translate to personal risk perceptions. Comparatively, women with high-risk behavior perceive their risk and their paying partners' risk to be so high that they are less concerned about their primary partner's risk. Clearly, personal risk and partner risk are not translating to each other in these populations and low risk perceptions are potentially problematic. Risk perceptions must more accurately estimate risk and reduce the stereotypic images of men and women generally considered having high-risk and low-risk behavior in order to potentiate behavioral changes that may slow the epidemic.

Overall interest in the idea of a microbicide to prevent or reduce HIV/STI infections is high. Some men and women were also interested in products that would prevent pregnancy as well as provide dual prevention against HIV/STI and pregnancy. A variety of microbicides appear to be necessary to suit the needs and desires of these communities.

The majority of female participants reported that they were willing to use a microbicide to prevent HIV/STI transmission, but not pregnancy. Many were already using other methods of contraception, such as a Tubectomy, which is quite common in India (29-30) and would not need a microbicide for this purpose.

Comfort and willingness to use microbicides varied across women. Counseling, education, and marketing of microbicide use should be tailored to women of differing backgrounds, socio-economic status, reproductive desires, and sexual behaviors.

Most men were willing to allow non-primary partners to use microbicides. Therefore, microbicides may provide an acceptable method of reducing HIV/STI transmission during premarital and extramarital sex acts, including

commercial sex. However, less than half were willing to let their primary partner use microbicides. This may be because the use of microbicides in primary relationships could be viewed as unfaithfulness or lack of trust. Unfortunately, risk of HIV/STI transmission between primary partners is high in India and for many women, sex with their husbands or primary partners represents their highest or only risk factor (4-11). Development of an effective microbicide may be critical in settings where domestic violence is pervasive, especially microbicides that could be used covertly so that women could protect themselves without having to negotiate condom use.

The survey relied on self-report and is thus subject to typical limitations of self-report data. However, highly trained personnel of the same sex as participants administered surveys and information requested generally required recall of either recent or highly significant events. The large sample size surveyed made it easier to capture trends within the community and to distinguish differences between those with varying risk behavior.

Accurate acceptability and utilization information on microbicides will only be determined when actual products are available. However, research on potential products and desired characteristics can aid in development, community education, and marketing. Effectiveness, product characteristics, and cost of microbicides will ultimately determine how widely such products will be used.

## **8. Conclusion**

Most interventions in this South Indian community have been targeted to high-risk groups like sex workers, truckers, and STI clinic patients. However, it is clear from this study that HIV/STI risk behaviors are present to some extent throughout the community. Interventions should be tailored to different subgroups of the population to increase awareness and risk perceptions and reduce stereotyping risk behavior to particular occupations only, while decreasing risky behaviors and promoting use of prevention methods and women's ability to negotiate their use.

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