

# Emerging HIV Epidemic in the North-Eastern State of Assam, India: An Exploratory Study Using Mixed-Methods Approach

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## Abstract

**Background:** The national HIV scenario in India has improved impressively during past two decades. Contrastingly, the State-level HIV sentinel surveillance and routine programme data from various testing facilities indicated an increasing HIV prevalence among antenatal clinic attendees and female sex workers (FSWs) in three districts of Assam. **Objectives:** 1) To explore the reasons behind increasing adult HIV prevalence and 2) To understand the role of FSW and Migrants/long distance truckers as drivers of the HIV epidemic in these districts. **Methodology:** Three sources of data were utilized in this concurrent mixed methods study—1) existing programme data for past three years; 2) questionnaire-based data for a case-control study, where during past six months at designated testing facilities HIV(+) married women were “cases” and age-matched HIV(–) women from the same district were “controls”. Spouses of these women were also interviewed separately; and 3) a qualitative study, where focus group discussions were conducted among FSWs, outgoing male migrant labourers and long-distance truckers. **Results:** The study revealed high levels of unsafe sexual practices among the FSWs. Sometimes in poverty-struck areas, women, not identifying themselves as sex workers, sold sex on a part-time basis to earn extra money for financial support and often remained invisible to the programme. The clients of the sex workers, male migrants and truckers also revealed various risk behaviours for

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contracting and transmitting HIV infection. **Conclusion:** Population and context specific programme strategies are required to halt the rising trend of HIV infection in the general population in Assam.

## Keywords

HIV, Assam, Mixed Methods

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## 1. Introduction

The adult HIV prevalence at the national level in India has declined steadily from an estimated peak of 0.38% in 2001-03 through 0.34% in 2007 and then to 0.26% in 2015. Such decline has been consistently noted both among the males and the females. The total number of people living with HIV (PLHIV) in India is estimated at 2.17 million in 2015 compared to 2.23 million in 2007. Two-fifth (40.5%) of these total HIV infections are among females [1].

An estimated 86 thousand new HIV infections occurred in India in 2015, showing 66% decline in new infections from 2000 and 32% decline from 2007, the year set as the baseline under the National AIDS Control Program-Phase IV (NACP-IV). However, it was important to note that while the new HIV infections among adults decreased considerably in the so-called “high-prevalence” states, increasing trends of new infections were noted in some “low-prevalence” states [2]. Although the overall prevalence may still be low in such “low-prevalence” states, the rising trends and vulnerabilities demand more programmatic attention than considering the actual prevalence [3]. Thus, one of the most important challenges under the NACP concerns about emergence of newer vulnerable areas/groups within the country and timely and efficient control of HIV situation in such vulnerable pockets.

The north-eastern state of Assam is one such example, which has long been considered as one of the low HIV prevalence States in India. However, the total number of HIV/AIDS cases in the State has showed a steady increase since 2007, and it nearly doubled to an estimated 12,090 cases in 2015 during this eight-year period. The HIV prevalence among adult populations also increased by 50%: from 0.04% in 2007 to 0.06% in 2015. More importantly, the long-term trend of HIV prevalence appears to be rising among the antenatal clinic (ANC) attendees [4] that serve as a proxy for HIV prevalence among the general population. Unless the reasons for this alarming increase are explored timely and appropriate control measures are taken, such a situation may pave the way for a generalized HIV epidemic in the State.

In Assam, 85% of the HIV infections are reportedly transmitted through heterosexual route [5]. A recent study conducted on the HIV positive clients detected in Assam Medical College, Dibrugarh, also highlighted heterosexual contact and non-use of contraceptives as the major high risk behaviours for HIV

transmission [6]. Notably, the use of modern contraceptive practices has always been very low; among all the States in India, the use of traditional birth control methods is the highest in Assam [7]. On the other hand, HIV Sentinel Surveillance (HSS) data from the consistent sites in Assam during 2003-2011 revealed increasing HIV prevalence among female sex workers (FSWs), although injecting drug users (IDUs) showed a stable prevalence. Thus, the increasing trend of HIV prevalence among the married women could occur through the clients of the FSWs. However, the role of several other risk groups and/or risk factors cannot be ruled out, since sufficient data were unavailable under the HSS to ascertain the trend of HIV prevalence among Men who have Sex with Men (MSM) and no data were available for the bridge populations like the migrants and long-distance truckers in Assam [8]. Although migration from Assam has not been as huge as in the some of the highest recognized “migration corridors” in the country, there have been considerable in/out migration into/from the state for various reasons, especially from the rural/impooverished sections of the populations [9].

Linkages between out-migration from three Indian States and HIV prevalence/vulnerabilities have been demonstrated by a study conducted by the Population Council in Bihar, Odisha and eastern UP [10]. Further, in 2012 a study among attendees of Integrated Counselling & Testing Centres (ICTCs) in Assam highlighted that around 15% of all HIV positive cases in the State were from Nagaon district, where about one-third of the positives were out-migrants. This study also showed that about 25% of the HIV positive cases in Assam were from two southern districts—Cachar and Karimganj [11]. Simultaneously, the ANC attendees in Karimganj also recorded consistently high HIV positivity during HSS 2008-2013 [8].

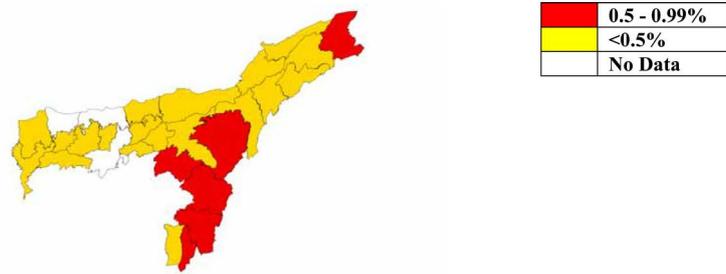
It is noteworthy that despite being labelled as a low-prevalence state, Assam has always been highly vulnerable for HIV transmission because of a) being the gateway to the north-eastern states of India, b) being surrounded by two high prevalent states of Manipur and Nagaland, c) large number of female in-migrants from other states ending up in sex work, and several other reasons [12].

Thus, we conducted a preliminary study to explore the reasons behind increasing HIV prevalence among general populations (as indicated by ANC attendees) in Assam, with special focus on understanding the contributions of FSWs and migration in three select districts, namely Cachar, Karimganj and Nagaon (Figure 1).

## 2. Materials and Methods

### 2.1. Data Collection

The study employed a concurrent mixed methods approach where the convergence model was used for triangulation of results. Two quantitative and one qualitative data collection procedures were utilized—a) *Collection of existing programme data*—Within the National AIDS Control Programme, anyone, irrespective of age and gender, can be tested for HIV in the ICTCs, whereas all



[NACO. State HIV Epidemic Fact Sheets. July 2014. NACO, DAC, MoHFW, Govt. of India]

**Figure 1.** Assam district Map showing HIV Prevalence (%) among ANC Attendees, HSS 2012-13.

consenting pregnant women are tested for HIV in the PPTCTs (Prevention of Parent to Child Transmission centres). Basic socio-demographic information as well as risk categories and HIV test results are captured anonymously in the registers of these centres. We extracted three years' (2012-'13 to 2014-'15) retrospective from ICTCs/PPTCTs in the three study districts; b) *Collection of structured questionnaire-based quantitative data*—through face-to-face interviews from the consenting ICTC/PPTCT married women attendees (who attended during the previous six month period) as well as their spouses to explore sexual and other risk behaviours and practices in greater details; in addition, migration-related history of the spouses of the married women attendees were also obtained. Here, we undertook a case-control approach. Based on the register information, for each HIV(+) married woman we randomly selected two HIV(-) married women belonging to the same district and within  $\pm 5$  years (minimum 18 years) age range; spouses of these women were also asked to participate and provide information through questionnaire-based interview; and c) *Collection of qualitative data*—through Focus Group Discussions (FGD) among selected population groups including female sex workers, long-distance truckers and male migrants. Broadly, the topics included issues on socio-economic and demographics, sexual and other risk behaviors, sexual partnerships, condom use, knowledge of HIV/AIDS and STIs, migration-related information as well as social and programme support. The FGDs were conducted in local language and were audio recorded. The recordings, along with the field notes, were transcribed within a few hours and translated into English later. All participants were aged 18 years or older.

## 2.2. Ethical Statement

This research project was approved by the Institutional Ethics Committee of ICMR-National Institute of Cholera and Enteric Diseases, Kolkata—700,010 vide approval letter no. A-1/2014-IEC dated 09.02.2015. In addition, for extracting existing data from the ICTC/PPTCT registers, approval was taken from the Data Sharing Committee of the Assam State AIDS Control Society as per the NACO Data Sharing Guidelines, 2015. Informed consent was taken from each client while collecting quantitative or qualitative data. Strict Confidentiality of all

data was maintained and no personal identifiers were used in the analysis.

### 2.3. Data Management & Analyses

The extracted program data as well as quantitative data collected through structured interviews were entered into a pre-designed computerized database using MS-Excel. Following data cleaning and editing, descriptive analyses were carried out using STATA statistical software (STATA SE ver. 8.2). Quantitative interview data were analyzed using a case-control approach (HIV+ vs. HIV-), to identify risk/preventive factors for HIV infection. We used a step-by-step participatory procedure to analyze qualitative data thematically. For this, we undertook an iterative process of data collection and analysis through debriefing notes and periodic team meetings to identify emerging themes and follow-up questions. After all FGDs were completed, a data analysis workshop was organized and a codebook was developed based on both a priori and emerging themes. All transcripts were systematically coded using the software NVivo 10.

## 3. Results

The results obtained from the data collected through different methods are presented below.

### 3.1. Results from Extracted ICTC/PPTCT Data

Analysis of retrospective HIV testing data was done for the general clients and pregnant women in the ICTCs and PPTCTs in the three study districts for three years (2012-'13 to 2014-'15). A total of 19640 clients were tested during this period in these three districts. As indicated in **Table 1**, people from other districts

**Table 1.** HIV positivity by place of residence of the ICTC/PPTCT clients tested in the three study districts.

Place of residence	Number tested	Number (%) HIV Positive
<i>From Assam</i>		
Cachar district	15,314	482 (3.15)
Karimganj district	1553	115 (7.41)
Nagaon district	821	35 (4.26)
Hailakandi district	1370	39 (2.85)
Dima-Hasao district	31	1 (3.19)
Other Assam districts	37	0 (0.00)
<i>From other States</i>		
Tripura	381	29 (7.62)
Manipur	87	8 (9.19)
Other states	46	6 (13.17)
<b>Total</b>	<b>19,640</b>	<b>715 (3.64)</b>

of Assam and even from other States also visited these ICTCs and they often had higher prevalence of HIV infection. Among those who visited from different districts of Assam, attendees belonging to Karimganj district showed the highest HIV positivity (7.41%).

**Table 2** presents the gender-disaggregated HIV prevalence among the attendees from the three study districts according to their marital, educational and occupational status. It was found that persons in the middle age groups (20 - 40 years) and those who were divorced or widowed or separated in both genders were most at risk for HIV infection. However, education had no influence on being HIV positive. Truckers among males had the highest rate of HIV positivity.

Limited data were available for prevalence of HIV among the clients according to their reported risk behaviours (**Table 3**). It was very disturbing to note that among both males and females, those who reported unsafe heterosexual practices had unacceptably high HIV positivity, even more than some of the so-called high risk groups.

### 3.2. Results from Questionnaire-Based Interview Data

A case-control approach was undertaken for the questionnaire-based interview.

**Table 2.** HIV prevalence according to socio-demographic characteristics of ICTC/PPTCT clients in the three study districts, by gender.

Characteristics	Male			Female			
	HIV (+) No. (%)	HIV (-) No. (%)	<i>p</i> -Value	HIV (+) No. (%)	HIV (-) No. (%)	<i>p</i> -Value	
Age groups (yrs):	<20	32 (2.1)	1499 (97.9)	<0.00001	25 (1.8)	1372 (98.2)	0.00003
	20 - 30	125 (4.0)	2989 (96.0)		108 (3.6)	2883 (96.4)	
	31 - 40	161 (8.3)	1790 (91.7)		60 (2.9)	2030 (97.1)	
	>40	93 (3.2)	2771 (96.8)		27 (1.5)	1726 (98.5)	
Current marital status:	Unmarried	110 (3.8)	2747 (96.2)		18 (1.3)	1385 (98.7)	<0.00001
	Married	291 (4.4)	6283 (95.6)	<0.00001	171 (2.7)	6049 (97.3)	
	Divorced/Widowed/Separated	10 (40.0)	15 (60.0)		31 (5.1)	577 (94.9)	
Educational status:	Illiterate	26 (5.9)	417 (94.1)	0.7166	19 (1.5)	1273 (98.5)	0.1150
	Primary	31 (5.4)	546 (94.6)		13 (1.5)	883 (98.5)	
	Secondary	14 (4.1)	331 (95.9)		5 (4.0)	119 (96.0)	
	Graduate+	1 (5.6)	17 (94.4)		0 (0.0)	55 (100.0)	
Occupation groups:	Non-agricultural labour	64 (5.0)	1207 (95.0)	<0.00001	3 (3.2)	91 (96.8)	<0.00001
	Agricultural labour	16 (1.7)	904 (98.3)		2 (33.3)	4 (66.7)	
	Service	111 (5.7)	1839 (94.3)		5 (2.8)	171 (97.2)	
	Business	80 (4.6)	1664 (95.4)		2 (3.5)	55 (96.5)	
	Student	14 (1.5)	916 (98.5)		7 (1.1)	604 (98.9)	
	Trucker/Driver	94 (7.8)	1111 (92.2)		0 (0.0)	2 (100.0)	
	Others	5 (7.0)	66 (93.0)		4 (12.5)	28 (87.5)	
	Unemployed	24 (2.8)	844 (97.2)		9 (1.9)	470 (98.1)	
	Housewife	---	---		172 (2.6)	6424 (97.4)	

**Table 3.** HIV positivity (%) among different risk behaviour groups by sex in the study districts.

Reported risk behaviors	Male			Female		
	No. tested	No. positive	% Positive	No. tested	No. positive	% Positive
FSW	0	0	0.00	1964	9	0.46
Heterosexual*	424	68	16.04	44	14	31.82
MSM	22	3	13.64	0	0	0.00
IDU	66	16	24.24	5	0	0.00
Truckers	333	12	3.60	0	0	0.00
General population	927	18	1.94	429	22	5.13

\*Heterosexual risk behavior: Male or Female clients reportedly involved in unsafe heterosexual practices.

**Table 4.** District wise distribution of participants in the case-control study.

Participant type	District			Total
	Cachar	Karimganj	Nagaon	
Case Women	15	04	06	25
Control Women	21	08	12	41
Case Spouse	11	04	06	21
Control Spouse	17	08	12	37
<b>Total</b>	<b>64</b>	<b>24</b>	<b>36</b>	<b>124</b>

All HIV(+) married women who attended the ICTCs/PPTCTs of these three districts during the previous six-month period were asked to participate as “cases”. Two randomly-chosen HIV(–) married women who attended from the same district and were within  $\pm 5$  years of the age of the “case” women were recruited as “controls”. Interview-based data were also collected from their spouses wherever possible. Written informed consent was obtained from each participant before collection of any data.

A total of 25 HIV(+) women (“cases”) and 41 HIV(–) (“control”) women could be recruited in the study. Spouses of 21 “case” women and 37 “control” women could also be interviewed (**Table 4**).

#### *Socio-economic and demographic characteristics of study participants*

**Table 5** shows the major socio-demographic characteristics of the “case” and “control” women. The two groups of women were comparable in terms of their age, education status, religious beliefs, castes, marital status as well as their age at (first) marriage. Overall, almost all the women declared no income of their own; only two women had a monthly income up to Rs. 5000.

The general characteristics of the spouses of the women are shown in **Table 6**. The table highlights that the spouses of the two groups of women were also comparable for these characteristics, except for education status, which showed that a higher percentage of spouses of “control” women had Grade 11 or higher education.

**Table 5.** Socio-demographic characteristics of “case” and “control” women.

Characteristics		Cases	Controls	p-Value
Age (years):	Mean ± SD	24.1 ± 3.9	24.7 ± 3.6	0.55
	Primary (1 - 4)	2/24 (8.3%)	7/41 (17.1%)	
Education (grades completed):	Middle (5 - 8)	6/24 (25.0%)	13/41 (31.7%)	0.60
	Secondary (9 - 10)	7/24 (29.2%)	11/41 (26.8%)	
	Grades 11+	9/24 (37.5%)	10/41 (24.4%)	
	Religion:	Hindu	14/25 (56.0%)	
	Muslim	11/25 (44.0%)	9/41 (21.9%)	
	General	16/25 (64.0%)	24/41 (58.5%)	
Caste:	SC*	6/25 (24.0%)	14/41 (34.1%)	0.64
	OBC*	3/25 (12.0%)	3/41 (7.3%)	
	Currently married	24/25 (96.0%)	40/41 (97.6%)	
Marital status:	Separated	1/25 (4.0%)	---	0.62
	Widowed	---	1/41 (2.4%)	
Age at first marriage (years):	Mean ± SD	21.2 ± 3.9	21.6 ± 3.7	0.72

\*SC = Scheduled castes; OBC = Other backward classes.

**Table 6.** Socio-demographic characteristics of spouses of the “case” and “control” women.

Characteristics		Cases	Controls	p-Value
Age (years):	Mean ± SD	32.6 ± 4.3	31.6 ± 4.7	0.41
	Primary (1 - 4)	4/20 (20.0%)	5/37 (13.5%)	
Education (grades completed):	Middle (5 - 8)	3/20 (15.0%)	12/37 (32.4%)	0.011
	Secondary (9 - 10)	10/20 (50.0%)	5/37 (13.5%)	
	Grades 11+	3/20 (15.0%)	15/37 (40.5%)	
	Up to 5000	6/21 (28.6%)	15/37 (40.5%)	
Average monthly income (Rs.)	>5000 to 10,000	8/21 (38.1%)	18/37 (48.6%)	0.14
	>10,000	7/21 (33.3%)	4/37 (10.8%)	
Age at (first) marriage (years):	Mean ± SD	28.9 ± 4.1	28.3 ± 4.6	0.63

#### *Sexual and other risk behaviours/practices of the study participants*

Our analyses indicated that the “case” and “control” women were comparable in terms of their age (in years) at first sex ( $21.1 \pm 3.9$  vs.  $21.5 \pm 3.7$ ;  $p = 0.64$ ). Only one woman in each group had history of having pre-marital sexual experience while none of the women reported any extra-marital sexual relationships. Again, only one woman in the “control” group gave history of having anal sex ever. Eight percent (2 of 25) of “case” women and 12.2% (5 of 41) “control” women ever experienced any signs/symptoms of sexually transmitted infections ( $p = 0.70$ ). Regarding substance use, 20% (5 of 25) “case” women and 15% (6 of 40) “control” women shared history of smoking cigarettes; however, none of

them gave history of consuming alcohol or any other addictive substance.

**Table 7** demonstrates the patterns of risk behaviours among the spouses of these women. It shows that compared to the spouses of the “control” women, a significantly higher percentage of spouses of the “case” women had pre-marital sexual experience, had sex workers as partners of pre-marital sex, always used condoms during sex with their spouse (may have reflected their own risk perception) and had extra-marital sexual relationships. The patterns of condom use with spouse were also corroborated by the respective groups of women, who also narrated similar distributions. The partners of extramarital sex of the male spouses were female sex workers only and condoms were not always used with them. None of the male spouses also always used condoms during sex with their pre-marital partners. Moreover, spouses of the “case” women had significantly earlier initiation of sex compared to the spouses of the “control” women. Regarding substance use, 47.6% (10 of 21) and 72.9% (27 of 37) spouses of “case” and “control” women respectively, had history of cigarette smoking; alcohol intake was reported by 38.1% (8 of 21) and 32.4% (12 of 37) spouses, respectively. No other substance use, including injecting drugs, was reported.

Thus, the results of the quantitative data suggested that it was mostly the behaviours and practices of the male spouses of the women, especially their indulgence

**Table 7.** Sexual and other risk behaviours of spouses of the “case” and “control” women

Characteristics		Cases	Controls	p-Value
Age at first sex (yrs):	Mean ± SD	24.1 ± 4.0	28.1 ± 4.6	0.002
H/O Pre-marital sex:	Yes	14/21 (66.7%)	4/37 (10.8%)	0.00001
	No	7/21 (33.3%)	33/37 (89.2%)	
Partners of pre-marital sex:	Sex workers	8/14 (57.1%)	1/4 (25.0%)	0.36
	Friends/Relatives	3/14 (21.4%)	3/4 (75.0%)	
	Current spouse	1/14 (7.1%)	---	
	Others	2/14 (14.3%)	---	
	Always	---	2/4 (50.0%)	
Condom use during pre-marital sex:	Mostly	1/14 (7.1%)	---	0.04
	Occasional	6/14 (42.9%)	---	
	Never	7/14 (50.0%)	2/4 (50.0%)	
Condom use with spouse:	Always	7/21 (33.3%)	2/37 (5.4%)	0.05
	Mostly	1/21 (4.8%)	3/37 (8.1%)	
	Occasional	3/21 (14.3%)	6/37 (16.2%)	
H/O Extra-marital sex:	Never	10/21 (47.6%)	26/37 (70.3%)	0.02
	Yes	5/21 (23.8%)	1/37 (2.7%)	
Ever had any sign/symptom of STI	No	16/21 (76.2%)	36/37 (97.3%)	0.61
	Yes	2/21 (9.5%)	2/37 (5.4%)	
	No	19/21 (90.5%)	35/37 (94.6%)	

in pre- and extra-marital sex, having sex workers as their sex partners and negligible use of condoms during high risk sex that might put the women at risk of contracting HIV in these populations. Thus, more programmatic attention may be needed for this section of people, apart from high risk groups and the ante-natal clinic attendees.

### 3.3. Results from Qualitative Data

The purpose of collecting and analyzing qualitative data was to supplement the findings from the above-mentioned quantitative data, in order to enhance our understanding about the possible reasons of increasing HIV prevalence among general population (as indicated by prevalence among ANC attendees) in the three study districts. A total of 12 focus group discussions (FGDs) were conducted to explore relevant issues among different population groups [FSWs (home/street/brothel-based) = 6, Truckers = 3, Male migrant labourers = 3]. Each FGD had 6 - 9 attendees of various age groups.

Analyses of these qualitatively collected data provided clues to explaining some of the findings that emerged from quantitative data analyses. For example, analysis of existing ICTC/PPTCT data revealed a high prevalence of HIV among the housewives, especially in the Nagaon and Karimganj districts (7.71% and 6.5%, respectively); during FGDs with the sex workers in these two districts, it was found that many of them were actually married and were doing the sex work on a part-time basis at a distant place on the pretext of being engaged in some kind of job and without the knowledge of their family members. Many of these women do not consider them as sex workers and told that they indulged in such activities only to earn some extra money for sustaining themselves or their family, as quoted below for example:

FSW (home-based)/45y/Cachar:

*If anybody does sex work, she (usually) has some bindings ... She is doing this work because of her children ... because of her livelihood.*

It was also noted through the FGDs with FSWs that despite having fair to good knowledge about HIV, its transmission and the consequences, many of them would often agree for unprotected sex if they were offered higher amounts of money.

FSW (home-based)/45y/Cachar:

*When sex work is my business, then so many types of people come ... Someone may offer only Rs.10 and someone may offer Rs.1000 ... for the sake of money then, we are forced to do sex without condoms*

FSW (street-based)/38y/Karimganj:

*Forget about customers ... even they (the FSWs) also do not use condoms ... condoms are supplied to them, but still they do not use. Because they need money... without condom, they earn more money*

However, sometimes lack of proper knowledge about the utility of using con-

doms during sex might have also played a role for non-use of condoms, as demonstrated below:

FSW (street-based)/22y/Karimganj:

*HIV can spread if condom is not used. (However), some sex workers do not use condoms, they use Mala tablet (govt. supplied oral contraceptive pills) instead.*

This could be one explanation for rising HIV prevalence among the female sex workers that drove this project to explore its possible reasons.

Through the FDGs conducted with the male migrant (out-migrant) labourers, it was understood that many young people, mostly in the range of 18 to 35 years, worked and stayed away from their families for a considerable period at a distant place (other districts or even in other states, like in Mumbai). Many of them would visit their families during harvesting seasons, but would go back again for work. The main motivation was better earning opportunities. The following accounts will give some perspective:

Male Migrant Labourer/(Age/Educ: 26y/Grade 5; 25y/Grade 7; 24y/Grade 9)/Nagaon

*About 60% - 70% of adult male population of this area seek jobs outside.*

Male Migrant Labourer/(24y/Grade 9)/Nagaon

*Payment is too low here. So, they go outside.*

Male Migrant Labourer/(26y, Grade 7)/Nagaon

*.... Also, there are lack of facilities [so, they go outside for work]*

Male Migrant Labourer/(26y/Grade 5; 22y/Grade 6)/Nagaon

*There are no ... almost no company [industry] in Nagaon.*

Male Migrant Labourer/(24y/Grade 9)/Nagaon

*I can earn almost double there ... it has changed my lifestyle, food habit, and made my health better [other participants also echoed the same]. We can also meet new people, even foreigners, which is not possible if we stay here in the village.*

Many of these young males often indulge in high-risk behaviours like visiting sex workers.

Male Migrant Labourer/(24y/Grade 9)/Nagaon

*When 10 - 12 persons stay together, someone of them may have information about a sex worker's home or workplace in the vicinity ... if one of them visits her, then others also start to see her—it becomes like a habit then.*

Asked about whether they would agree to pay more money to the sex workers to have sex without condoms, almost all of them responded that they would. Like the FSWs as mentioned earlier, these people also possessed misconceptions about condoms and its use, as exemplified below:

Male Migrant Labourer/(24y/Grade 9)/Nagaon

*There is a medication. Whoever doesn't use condom, after eating that [the*

*medication], there will be no need to use condoms. ... I have heard like this, but have not seen yet. There is a medical drug—whatever you do in five minutes, nothing is needed [if that drug is taken].*

Similarly, many of the truckers (especially the long distance truckers) also indulge in different risk behaviours, particularly unprotected sexual contacts with female sex workers. These people also have lower levels of awareness about HIV transmission and its implications.

It was worrisome that during the focus group discussions, especially with the street-based female sex workers, it was stated that there was a growing number of female students being involved in this profession—again, mostly to earn money to meet their personal and/or educational needs. Since many students now often access higher education at a place distant to their home—thus, remain in a comparatively more free environment and with different kinds of entertainment/addiction opportunities—such risk taking behaviours seem not very unusual, specially with peer-pressures.

Putting together, it appears that despite having high level of awareness about HIV-related matters, felt need for additional income is playing a crucial role for the females to indulge in high risk behaviours, although many of them do not identify them as sex worker. On the other hand, lack of adequate facilities and opportunities push the young males to seek job away from their residence, where circumstances facilitate risk-taking behaviours among them. Thus, along with the females themselves to some extent, their spouses or partners who might be a migrant labourer, trucker and/or a client of sex workers, may be playing important roles behind the rising trend of HIV infection among the general population in select districts of Assam.

#### **4. Discussion**

Quite akin to India in general, heterosexual contact has been reported as the commonest mode of transmission of HIV in the north-eastern State of Assam [5]. Previous research indicated that a substantial proportion of heterosexual HIV transmission involved sexual networks that include female sex workers (FSWs) [13] and the number of HIV-infected FSWs was the strongest predictor of HIV prevalence in the general population [14]. Moreover, an increasing prevalence of HIV infection among sex workers could be an indication of increasing probability of a generalized HIV epidemic within that setting [15]. Similar phenomena are being observed in parts of Assam, where increasing prevalence of HIV infection among the FSWs has been noted along with an increasing prevalence among the ANC attendees.

Analyses of existing ICTC data in our study showed a high HIV prevalence among female general clients who reported heterosexual high-risk behaviors. We also noted that a significantly higher proportion of the spouses of the HIV positive women (cases) reported pre-marital and/or extra-marital sex compared to the spouses of HIV negative women (controls). Majority of the pre-marital sex

partners of the “case” spouses were FSWs and all extra-marital sex partners of “case” spouses were FSWs only. Further, consistent condom use during such sexual encounters as well as during sex with their wives was very low. These findings suggest that the spouses of the married women may be playing an important role behind the rising HIV prevalence among the ANC attendees in the State, but detailed profiling of the spouses will be required to ascertain the sub-typologies of such bridge population. It is worth noting in this regard that the recently undertaken National Integrated Biological and Behavioral Surveillance (IBBS) [16] revealed that a large proportion (52.3%) of FSWs in Assam were home-based and another 28.4% operated from rented rooms—making them less visible to the Programme. Our study findings showed higher HIV Positivity (%) among General Female clients tested in ICTC and reporting heterosexual high risk behavior. This group of population may be also FSWs who are yet to be covered by the Programme and needs further investigation. Almost three-fourth of the FSWs practiced sex work either only in rural areas or in both rural and urban areas. They also demonstrated much lower level of knowledge about HIV compared to the national average and reported inadequate and inconsistent condom use. Many of them also experienced physical violence from clients or others (e.g. police) and faced stigma even at healthcare facilities. Another study conducted earlier in Andhra Pradesh in southern India found that almost a third of the home-based FSWs never used condoms or used it inconsistently [17]. Low condom usage among FSWs was also found through the qualitative part of our study, where condom use was compromised by lack of knowledge and/or economic demands. On the other hand, analyses of data from the previously conducted Integrated Behavioral and Biological Assessment (IBBA 2009) highlighted that compared to the clients of brothel-based sex workers, clients of the home-based sex workers had more extensive sexual networks and comparatively higher proportions of them had sex with casual female partners; a higher proportion of them also engaged in anal intercourse with FSWs as well as male partners [18]. Thus, the role of the FSWs and their clients, many of whom may be in a marital or regular sexual relationship, seems to have been further underscored in our effort to understand the reasons behind the rising prevalence of HIV among the ANC attendees in Assam.

The situation appears further grim when we consider the out-migration of young adult males for various reasons. Migrants and migration have strongly been linked with transmission of HIV in the general (source) populations and within the marital relationships in India [19] [20] and elsewhere [21]. As revealed through the qualitative part of this study, a sizeable proportion of young adult males from the study districts migrated to other districts and/or other States (like Mumbai) mainly for economic reasons and they were engaged in a variety of high HIV risk practices. Simultaneously, many of them possessed various misconceptions about critical aspects of HIV infection—thus, making them prone to acquire HIV infection. Although the HIV Programme data shows a

coverage of >95% among the migrant population in the State [22], most of the targeted interventions in Assam are focusing on “destination” rather than “source” migrants [5]. Another important risk group in this context would be the Truckers, who had an estimated HIV prevalence of 2.8% in Kamrup Metropolitan district—the highest in the country [23]. The Kamrup Metropolitan district (Guwahati city) is the gateway of Northeast India with extremely high movement of truckers both from outside as well as within the region. Around 40% of the truckers are yet to be covered by the HIV Programme in the State [22]. Besides, the conventional distance-based NACO definition of truckers may not be applicable in local contexts, since such travels often comprise of comparatively shorter distances but take longer times in the hilly terrains of the north-east.

## 5. Conclusion

The current study was taken up based on the background information of increasing trends of HIV prevalence among the general population (antenatal clinic attendees) and female sex workers (FSWs) in the three districts of Assam, although HIV prevalence in other districts in those population groups did not show a rising trend. The study of course suffered from limitations in terms of available resources, timeline, as well as scopes. Despite all these limitations, this explorative study using a mixed-methods approach could bring out several important points. The female sex workers in these districts probably were serving as the main reservoir for HIV wherefrom the infection was spread through unprotected sex. Although adequate HIV related knowledge was demonstrated by these sex workers, many of whom were married and having families, they indulged in unprotected sex, mostly to earn more. This highlighted the need of an intervention in this area, which might encompass appropriate behavioural as well women empowerment (especially economic empowerment) issues and linkages to social protection schemes. A school-based educational intervention might also help in the context of reportedly increasing number of female students taking up part-time sex work to earn money or otherwise. The (outgoing) migrant labourers and truckers showed comparatively lower levels of awareness about HIV/AIDS and many of them also engaged in high-risk behaviours, indicating the requirement and scopes for future work with these groups too. The study showed the possible role the bridge populations *i.e.*, migrants and truckers may be playing in the rising HIV Prevalence among the ANC attendees in Assam. However, detailed profiling and analysis of the data of spouses of the HIV positive pregnant women will be required to produce more concrete association. Also, the Programme may consider adopting flexible working definitions for the bridge populations while planning the analysis. Lastly, the Programme also needs to consider adopting new strategies for covering the Key populations outside the TI NGOs. Thus, the study could bring out some possible factors that could be behind the observed increasing HIV prevalence among specific groups

of populations in the three study districts and identified scopes for future interventions/studies in this respect.

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