



HIV related risk behaviour and prevalence of HIV/AIDS among injecting drug users in India: A district-wise analysis

Sharma S^{1*}, Vishwakarma D²

¹ Senior Research Fellow, International Institute for Population Sciences, Deonar, Mumbai, Maharashtra, India

² International Institute for Population Sciences, Deonar, Mumbai, Maharashtra, India

Abstract

Background: The study aims to understand the changes in HIV related risk behavior among IDUs between two points of time and which factor is influencing their behavior.

Methods: Analyses are based on 2075 and 1977 respondents who participated in round I and II of the Integrated Behavioral and biological assessment (IBBA). IBBA collected the information among IDUs from the districts of Maharashtra, Manipur and Nagaland.

Results: Results shows that almost three-fourths IDUs in the districts of Nagaland and Manipur initiated injecting drug use by age of 25 years out of which majority have initiated injecting drug use even at age 20 years or below. In Maharashtra, however, the scenario is little different, approximately half of the IDUs in round-2 initiated injecting drug use at age 26 years and above. Majority of IDUs initiated injecting drug use within the first of drug use in each of the three states. Further, findings revealed that IDUs sharing of needle/syringes with another partners, inconsistent condom use in the last sex with regular and casual partners were more likely to have STI/HIV prevalence.

Conclusions: The Gap between transitions from first drug use to first injecting drug use is very narrow as a substantial proportion of drug users initiate injecting drug use within a year. In all the districts, the transition plays a key role and those initiated injecting drug use within one year of taking drugs are more likely to have HIV sero-positivity than the others. And those who's multiple sexual partners as a IDUs are more likely to have HIV sero-positivity. Interventions should be designed to identify, reach and work with the potential IDUs through network based approach to ably suspend the transition those initiated injecting drug use below age 25 years and within first years of drug use.

Keywords: IDUs, HIV risk, needle sharing, condom

Introduction

In the current stage of HIV epidemic, an increasing advocacy for strategic shift from 'prevention, control and care & support' to 'treatment as prevention' is rooted in the fact that addressing HIV/AIDS is a priority issue in achieving SDGs. In fact, HIV/AIDS impact negatively almost all the other SDGs and hence in a larger frame work of achieving SDGs, combating HIV/AIDS is a goal in itself as it underpins other developmental goals. However, any structural changes required to adopt the strategy of treatment as prevention may have inter as well as intra country variation in view of recourse of the epidemic, nature of high risk group (HRG), variation in modes of HIV transmission, nature of discordance among couples, adherence to ART for prevention etc. It is within this context, Injecting drug users (IDUs) across the globe who are at dual risk of HIV infection due to sharing of infected needles as well as unsafe sexual behaviour, may require a distinct approach of treatment prior to ART though treatment as prevention has been advocated uniformly for all HRGs.

It is worth mentioning that millions of people worldwide are injecting drug users (IDUs), and blood transfer through the sharing of drug taking equipment, particularly infected needles, is an extremely important means of transmitting HIV. The illegal nature of injection drug use can also create barriers to accessing adequate treatment and prevention services making IDUs more

vulnerable to HIV and its effects. The crossover with prostitution further means they are in positions to transmit the virus among other at-risk population ^[1]. Injecting drug users (IDUs) are vulnerable to HIV infection both because of the sharing of contaminated injection equipment and their practice of high risk sexual behaviors. HIV is transmitted through injecting when drug users share injection syringes that have been contaminated with small amount of infected blood ^[2].

According to UNAIDS 2011, At the end of 2010, an estimated 34 million people (31.6 million–35.2 million) were living with HIV worldwide, up 17 percent from 2001 ^[3]. Approximately, 10 percent of HIV infections worldwide are attributable to injecting drug use ^[4], and many countries in Asia, including Thailand, Myanmar, Indonesia, Bangladesh, Nepal and India are confronting serious HIV epidemics among IDUs ^[5]. According to estimates from NACO, an estimated 2.31 million people in India were living with HIV/AIDS in the year 2009 (88.7 percent adults in 15-49 years, 7.5 percent aged 50 and above and 3.5 percent children below 15 years). The data revealed that about 0.1 percent of adult males from the general population reported having injected drugs for non-medical reasons at least once in their lifetime ^[6].

Nagaland and Manipur are two states that consistently report of a

high risk of HIV prevalence, and in the case of Manipur, the highest in India according to 2009 sentinel surveillance figures, HIV prevalence among general population in Manipur was 1.4 percent, and in Nagaland was 0.8 percent. Integrated Biological and Behavioural Assessment (IBBA) conducted in 2006-2007, in Manipur and Nagaland reported comparable HIV prevalence figures 23 percent and 32 percent in Bishnupur and Churachandpur in Manipur and 1.1 percent and 1.8 percent in Phek and Wokha in Nagaland [7]. The HIV epidemic in Manipur is older than in Nagaland. Data from the facility-based targeted intervention surveillance system in India documented HIV prevalence among IDU in Manipur over 20 percent since 2003; whereas in Nagaland it ranged from 8 percent in 2003 to 2 percent in 2006 [8]. In Mumbai, the 2006 surveillance data indicated an HIV prevalence of 20 percent among IDU compared with 20 percent for female sex workers (FSW) and 16 percent for men who have sex with men [9]. Most IDU in Mumbai/Thane reported first injection drug use at older ages than in northeast, with one third being newer injectors [9, 11-13].

IDUs which were focused in the golden horizon of the country and concentrated mostly in the two north eastern states, Nagaland and Manipur, are gradually expanding in the other parts of the country mostly in metro cities. Recent estimates show that currently there are approximately 30,000 IDUs in 3 major metropolitan cities of Mumbai, Delhi, and Chennai. IDUs are at the dual risk of needle sharing and risky sexual behaviour, becoming more vulnerable to STI and HIV. Thus, studying the interface of injecting drug use and risky sexual behaviour is important to curb the pace of HIV epidemic among IDUs. The aim of this study is to understand HIV related risk behavior and prevalence of HIV/AIDS among IDUs in three states of India. More specifically, 1) To analyze the changes in the initiation of injecting drug use and dynamics of transition from drug abuse to injecting drug use in three states, 2) To examine the changes in HIV related risk behaviours among IDUs at two point of time and 3) To study the socio-demographic and behavioural correlates of HIV sero-positivity also the observed changes overtime among IDUs.

Materials and Methods

Data

In order to understand the changes in HIV related risk behavior and prevalence of HIV/AIDS among IDUs, data from *Integrated Behavioral and Biological Assessment (IBBA)* round 1 and round 2 is used. The first round of IBBA was conducted in year 2005-06 and second round was done in 2009-10 by the Indian Council of Medical Research, National AIDS Research Institute, in partnership with Family Health International and was implemented in close collaboration with National AIDS Control Organization (NACO) and State AIDS Control Societies (SACS). The IBBA is funded by the Bill and Melinda Gates Foundation (BMGF) and was conducted in Avahan project states of Andhra Pradesh, Maharashtra, Tamil Nadu, Karnataka, Manipur and Nagaland and along the selected stretch of National Highways.

IBBA collects the information of IDUs from the six districts that were purposely selected because of their socio-cultural background and size of IDUs from among the districts where Avahan was intervening. The district were selected,

Churachandpur and Bishnupur in Manipur, Phek and Wokha in Nagaland, and Mumbai/Thane combined in Maharashtra. IDUs from these six districts were recruited from a cross sectional survey on HIV risk behaviours and HIV and STI biological markers. IDUs were selected on the criteria of those who were 18 years or older, who injected addictive substances/drugs for non-medical purposes at least once in past six month.

The sample size for each district was approximately 400 (a combined sample size of 400 was used for Mumbai and Thane (termed 'Mumbai/Thane') and respondent driven sampling was the method used to sample eligible respondents. A total of 2,075 IDUs in round one and 1,977 in round two were interviewed in the IBBA.

Statistical analysis

The study used descriptive and bivariate analysis to understand the HIV related risk behaviour among IDUs in high HIV prevalence districts in India. Binary logistic regression have been used to determine the factor associated with STI/HIV among IDUs. All results presented in this article are unweighted univariate measures.

Results

Socio-Demographic Profile of Injecting Drug Users

Table 1 shows the demographic profile of IDUs in Manipur, Nagaland, and Maharashtra. It was observed that more than one third of IDUs in the North-east states were in the age group of 21-25 years in IBBA round-1, whereas in round-2 approximately one fourth injecting drug users were in this age group. On the other hand, it highlights the fact that the entry into IDU behavior is still happening at the younger age despite of all the efforts made by various programmes with this group. An increasing trend was observed in the proportions of IDUs with increasing educational level in each of the districts of Manipur and Nagaland in both the rounds however, it was not true for IDUs of Mumbai/Thane where more than half of IDUs were illiterate while in the districts of Manipur and Nagaland, majority of IDUs are having at least secondary or higher secondary education.

Majority of IDUs reported to be unmarried in each of the districts of Manipur, Nagaland and Maharashtra in both the rounds however, a large proportion of these men from all the districts reported to be married too, which puts the spousal partners of these men at risk. Further, analyzing the living arrangement of IDUs shows that more than 60 percent of IDUs were living with their partner or spouse. This fact underlines the above-motioed fact of increased risk to their spousal partners. A district analysis of living status shows that 75 percent IDUs in Phek were living with their partner in IBBA round-2 as compared to 83 percent in IBBA round-1. It was found that the demographic profile of IDUs in Mumbai/Thane is quite different from the IDUs from Nagaland and Manipur. Adding to this difference is the Occupation, where the majority of IDUs in Nagaland and Manipur reported as not working whereas this proportion was very small in Mumbai/Thane where a large majority reported other occupations in their work category (Table 1).

Age at initiation of drug use

A comparison between IBBA round -1 and IBBA round -2 clearly brings out the fact that in each of the districts of Manipur,

Nagaland and Maharashtra, the drug use is initiated at younger ages i.e. below 20 years. The median age of initiating drug use is 22 years for all the districts. A considerable decline was observed in the proportion of IDUs those who have stated drug use at 20 years or below from IBBA round 1 to IBBA round 2 in each of the districts. In Mumbai/Thane age at starting drug use declined from 60 percent to 43 percent from 2005-06 to 2009-10. District-wise analysis of Manipur shows that the proportion of IDUs who started drug use at age 20 years or below declined from 44 percent to 64 percent in Bishnupur and 61 percent to 38 percent in Churachandpur from IBBA round-1 (2005-06) to IBBA round-2 (2009-10) respectively. Similarly, the proportions of IDUs also showed considerable decline in initiation of drug use those who started drug use at age 20 years or below as it decreased from 83 percent to 50 percent in Phek and 85 percent to 52 percent in Wokha from IBBA round-1 to IBBA round-2 respectively (Table 2).

Age at initiation of injecting drug use

Initiation of injecting drug in most of the districts was reported at younger ages but at the same time a declining trend was observed between the two rounds. The median age of initiating injecting drug use was approximately 21 years in each of the selected district of Manipur and Nagaland in both the rounds, while the median age of initiation of injecting drugs was 25 years in Maharashtra in IBBA round-2 (2009-10). Results shows that almost three-fourths IDUs in the districts of Nagaland and Manipur initiated injecting drug use by age of 25 years out of which majority have initiated injecting drug use even at age 20 years or below. In Maharashtra, however, the scenario is little different, approximately half of the IDUs in round-2 initiated injecting drug use at age 26 years and above (Table 2).

Transition from drug use to injecting drug use

This section discusses the behavioral transition among IDUs from using drugs in other forms into injecting drugs (Table 2). The mean duration of drug use and injecting drugs were different in each district. In Mumbai/Thane, the mean duration of transition from drug use to injecting drugs was 5 years in round 2 (2009-10), which was higher as compared to IBBA round 1 (2005-06) and shows a delay in the transition into injecting drugs from using drugs in other forms. In Manipur, Churachandpur districts showed the considerable change in the duration transitioned from drug use to injection drugs approximately 0.5 to 6.7 years from IBBA round-1 to IBBA round-2. Among IDUs in Wokha and Mumbai/Thane, the majority of the injecting drug users transitioned from drug use to injecting drugs within 1 to 5 years. The duration between first drug use and first injecting drug use in round -2 depicts that approximately 25 percent of the respondents in Maharashtra reported to have initiated injecting drug use within first year of starting drug use. The corresponding proportion for Bishnupur and Churachandpur, Phek and Wokha in the same duration was 61 percent, 36 percent, 61 percent and 15 percent respectively.

In most of the districts majority of IDUs did not shared needle/syringe with any partner in the past month. In Mumbai/Thane, 17 percent IDUs shared the needle /syringes with one or two partner in IBBA round-2 (2009-10), whereas this

proportion was 18 percent IBBA in round-1 (2005-06). The corresponding proportion for Bishnupur, Churachandpur and Phek was 13 percent, 15 percent and 20 percent in IBBA round-2 respectively. Wokha was showing an increasing trend of sharing the needle/ syringe with one or two partner and with 5 or more partners. A very rapid decline was observed in Churachandpur district of Manipur from round-1(45%) to round-2 (15%). An enquiry into frequency of sharing reveals that most of the injecting drug users sometimes shared needle/ syringe, which was previously used by someone else. In Mumbai/Thane, 9 percent IDUs reported sharing needle most of the times in round-2 which has almost doubled from 4 percent in round-1. In Wokha districts, nearly 32 percent of users were using used needle/syringe most of the times, which is almost three times as compared to round-1 (Table 2).

Cleaning of needle shows quite an encouraging picture as majority or IDUs reported cleaning their needle/ syringe either all the times or at least most of the times in all the districts. It is important to mention here that the behavior of cleaning every time has reduced in all the districts between round-1 to round-2 whereas the cleaning most of the time has shown marked improvement.

Majority of injecting drug users procured the needle/ syringe from the NGO drop-in center in most of the districts except for Wokha where chemist shop was the main source of procurement. It may be the result of non-availability of syringes at NGO drop-in center, in Wokha as maximum (81%) IDUs procured the needle/syringe from chemist shop.

Changes in Sexual Behaviours of Injecting Drugs User

Table 3 shows the changes in sexual behaviour of injecting drug users in the district of Manipur (Bishnupur and Churachandpur), Nagaland (Phek and Wokha), and Maharashtra (Mumbai/Thane combined) from IBBA round 1 (2005-06) to IBBA round 2 (2009-10). Results shows that about 65 percent of the injecting drug user had sex with the female partner in last 12 month in Maharashtra during IBBA round 2. In Bishnupur and Phek, this proportion was 96 percent and 82 percent respectively. In Maharashtra about 70 percent of the injecting drug users in IBBA round 2 had ever sex with paid partner as compared to 65 percent in IBBA round 1. Further, it was found that sexual partner of IDUs was also an injecting drug users. Around 19 percent IDUs in Mumbai/Thane reported that their sexual partner was a drug users in IBBA round 2, whereas this proportion was higher in IBBA round 1 (2005-06). Similarly, around 14 percent in Bishnupur, 11 percent in Churachandpur & Phek, and 22 percent in Wokha reported that their sexual partners in the past 12 months in IBBA round 2 (2009-10) was also a drug users. It was also observed that the proportion of IDUs having sexual partners in Phek and Wokha districts of Nagaland considerably increase over the period of time.

Results shows that condom use in last sex with different type of partners has significantly increased. Approximately 70 percent of the injecting drug users in round two reported that they had used condom at last sex with paid partner in Mumbai/thane, whereas 97 percent and 91 percent in Bishnupur and Churachandpur in Manipur, 91 percent and 47 percent in Phek and Wokha in Nagaland respectively (Table 3).

Knowledge and prevalence of STI and HIV among IDUs

Table 4 shows the knowledge and prevalence of sexually transmitted infections (STIs) and Human immunodeficiency virus (HIV) in the districts of Manipur, Nagaland, and Maharashtra. In Maharashtra, 45 percent of the IDUs in both the round had heard about STIs. The prevalence of STI in Maharashtra shows a marked reduction in round two as compared to round 1, as the prevalence has reduced to 12 percent from 21 percent. In Manipur, Bishnupur has reported 89 percent in round 1 and 88 percent in round 2 had heard about STIs. The prevalence of STI in Bishnupur shows a marked reduction in round two as compared to round one as prevalence has reduced to 5 percent from 33 percent; whereas in Churachandpur, it was 74 percent and 78 percent in round 1 and round 2 had heard about the STI. The prevalence of STI in Churachandpur shows very slightly reduced to 5 percent from 7 percent. In Nagaland, Phek has reported 80 percent and 90 percent in round 1 and in round 2 respectively. The prevalence of STI in Phek showed a marked reduction I round two as compared to round one as the prevalence has reduced to 3 percent from 13 percent. Whereas in Wokha the prevalence of STI was reduced to 0.5 percent from 10 percent.

It was observed that majority of IDUs in the selected districts of Manipur, Nagaland, and Maharashtra heard about HIV. The proportions has increased among IDUs who feels that they are at risk for becoming infected with HIV/AIDS in each of the selected districts of the states over the period of time. Results also shows that HIV testing among IDUs has significantly increased from IBBA round-1 (2005-06) to IBBA ound-2 (2009-10) in Bishnupur (21% to 51%), Churachandpur (30% to 57%), Phek (7% to 42%), Wokha (11% to 12%), and Mumbai/Thane (22% to 48%). It was observed that collection of HIV test results also improved from IBBA-round-1 to IBBA round 2.

HIV prevalence was very low among IDUs in Phek (1.2%) and Wokha (1.7%) districts of Nagaland in IBBA round-2 (2009-10). HIV prevalence has significantly increased from 16.5 percent in IBBA round-1 (2005-06) to 17.7 percent in IBBA round-2(2009-10). Similarly, HIV prevalence has also increased among IDUs in Churachandpur district of Manipur from 36 percent to 39 percent from 2005-06 to 2009-10, while Bishnupur district of Manipur showed a declining prevalence of HIV among IDUs from 28 percent to 22 percent from IBBA round-1 (2005-06) to IBBA round 2 (2009-10).

Logistics regression analysis of experienced any STI symptoms in the past 12 months indicate that IDUs, literate (AOR=1.878, $p<0.10$), age at first injecting drugs 26 years and above (AOR=2.192, $p<0.05$) and sharing needle/syringes in the past month (AOR=2.218, $p<0.01$) were significantly more likely to have any STI symptoms in the past 12 months than their counterparts. Consistent condom use with Female Sex Workers also illustrates the factor associated with HIV seropositivity among injecting drug users. The multivariate analysis reported that IDUs, 30 years and above (AOR=15.951, $p<0.01$), literate (AOR=3.42) and shared needle/syringes in the past one month were significantly more likely to have HIV seropositivity. IDUs age at first injecting drugs 21 and above years and has main regular partner were less likely to have HIV infection (Table 5).

Discussion

The study has clearly brought out that there is a considerable decline in the age at initiation of drugs among the young men below age 25 years. These changes seem to be primarily due to intensified programmes to address dual risk of STI/HIV among injecting drug users. In the older ages, however, this change is negligible, which may be mainly due to larger drug dependency restricting behavioral changes at relatively older ages. Similar findings was also reported in a study conducted in the districts of Manipur and Nagaland [14]. Many of these men are entering into injecting drug use during their adolescent years, and studies have demonstrated that younger age and earlier age of initiation into injecting are associated with HIV infection [15-18]. This raises policy and programming challenges, some of which may be sensitive in this very conservative context. On the other hand, the gap between transition from first drug use to first injecting drug use is very narrow as a substantial proportion of drug users initiate injecting drug use within a year in all the three states. The proportions of such drug users are much higher in Manipur and Nagaland as compared to Maharashtra. The IDU behavior demands for a great deal of mobility from a drug user for acquiring/buying drugs to using drugs. As the behavior is illegal it involves lot of secrecy and constant efforts to keep the behavior concealed there is a regular change in the places or joints where these groups meet and use the drugs. Thus, making studying their mobility is very critical. As expected, mobility is extremely high among the groups from all the districts except for the districts from Nagaland.

In order to understand the severity in dynamics of injecting drug use the sharing of needle/syringes is extremely important for any harm reduction Programme. Sharing injecting equipment is associated with a number of factors including the type of drug being injected, place of injection, availability of clean injecting equipment and awareness of the risks of sharing [14]. The needle/syringes sharing behavior in last one month with the number of partners showed a dramatic improvement in most of the districts. It may be the result of interventions programmed, which was carried out by NACO along with various other institutes.

It is encouraging to observed that in almost all the districts included in the study except Wokha in Nagaland, there has been a significant decline in proportion of needle/sharing during two rounds of IBBA but a very rapid decline was observed in Churachandpur district of Manipur from 45 percent in round-1 to 15 percent in round-2 seek special explanation, which is seldom with the secondary data analysis. In fact, a small scale qualitative exploration may be suitable to precisely understand why there has been such a profound decline within a short period of even less than three years and lessons can be used in other districts/ states. Further, it is important to mention that the behaviour of cleaning syringes has also improved considerably in all the districts where the cleaning most of the times has shown marked improvement though it is far from achieving universal practices of using cleaned injecting equipment. It is also important to mention that majority of injecting drug users from most of the districts procure the needle/ syringe from the NGO drop-in center except for

Wokha, where chemist shop was the main source of procurement. Thus, a relatively lower access and utilization of IDUs based programmes in Wokha may be one of the important reasons behind a lower success of programmes for IDUs.

In addition to reduction in needle sharing behaviours and universal use of clean syringes, another important issue is access and utilization of de-addiction Programme in order to improve the quality of life of IDUs. IBBA collected information on medication for drug use and results portray that there is a reduction in proportion of IDUs who sought treatment for drug use in Churachandpur, Wokha and in Mumbai and Thane. In Mumbai/ Thane only one-fifth of the injecting drug users in round-2 have undergone any kind of treatment for drug use as against 33 percent in round-1.

Reaching IDUs with safe sex messages is in many ways a greater challenge for harm reduction programs than promoting safe injecting behaviours. In terms of risky sexual behaviour, the proportion of paid sex has been increased among the IDUs in all the districts from round 1 to 2. In this study, there was no real increment was observed in the proportion reporting condom use

during last sex with regular partner (non-paid partner), but an increase in the proportion using condoms in the last sexual encounter with paid partners was evident in all districts of Manipur, Nagaland and Maharashtra.

IDU participation in HIV testing is an important part of HIV prevention. Findings of the study revealed that HIV testing has improved in all the district over the period. It may be due to the intensified government program which are promoting HIV testing among IDUs in the selected states. On the other way round, the prevalence of STI in Maharashtra shows a marked reduction in round -2 as compared to round-1, as the prevalence has reduced to 12 percent from 21 percent. In Manipur and Nagaland the scenario of any STI follow the same path. While talking about the knowledge about the prevention of HIV Manipur and Nagaland are in advantageous position as compared to Maharashtra. Further, findings of the study revealed that IDUs revealed that IDUs sharing of needle/syringes with another partners, inconsistent condom use in the last sex with regular and casual partners were more likely to have STI/HIV prevalence.

Table 1: Demographic Profile of Injecting drug users in in Manipur, Nagaland, and Maharashtra

Background Characteristics	Manipur				Nagaland				Maharashtra	
	Bishnupur		Churachandpur		Phek		Wokha		Mumbai/Thane	
	R1		R2		R1		R2		R1	
N (all respondent)	420	410	419	411	440	419	420	412	376	327
Age (years)										
18-20	12.6	2.9	10.0	2.7	37.5	23.9	18.3	5.6	5.1	3.7
21-25	37.9	25.6	34.4	19.7	37.0	35.3	36.0	26.5	21.3	19.6
26-30	22.1	35.1	33.4	38.7	21.1	28.6	33.1	34.5	24.2	26.9
31-35	16.4	19.8	14.3	24.6	3.0	9.1	9.0	19.7	19.9	19.9
≥36	11.0	16.6	7.9	14.4	1.4	2.9	3.6	13.6	29.5	30.0
Education (years)										
Illiterate	4.5	6.8	6.7	4.9	5.0	5.7	16.2	26.9	48.7	56.6
1-8	20.7	13.7	32.5	36.3	34.8	30.5	34.0	24.0	41.2	34.3
9-10	37.4	30.0	35.8	32.1	29.1	24.6	30.7	29.1	8.5	5.5
11+	37.4	49.5	25.1	26.8	31.1	39.1	19.0	19.9	1.6	3.7
Marital status										
Unmarried	67.4	55.1	64.4	46.2	84.1	71.9	69.8	56.2	60.1	58.3
Married	28.3	39.0	24.1	36.5	14.3	20.9	27.6	37.0	31.4	19.9
Divorce/separated/widower	4.3	5.9	11.5	17.3	1.6	7.2	2.6	6.8	7.4	21.8
Living Status										
Live with a partner/spouse	59.0	60.7	61.8	37.5	83.9	75.1	71.0	62.8	72.9	18.0
Don't have/live with a Partner/spouse	41.0	39.3	38.2	62.5	16.1	24.6	29.0	37.0	26.1	82.0
Occupation										
Not working	42.1	23.2	37.0	59.2	47.1	32.9	64.0	56.3	0.0	6.2
Agriculture	16.5	20.9	7.5	10.4	10.8	13.4	16.9	11.0	18.0	1.2
Professionals	3.7	9.4	2.6	5.4	3.1	13.2	8.4	7.1	12.6	12.7
Others	37.7	46.4	52.9	25.0	39.1	40.5	10.7	25.6	69.5	79.9
Migration										
Migrants	78.3	62.4	71.6	48.7	60.7	16.0	48.6	59.4	2.9	11.0
Mobility										
No	24.8	3.7	32.9	49.1	55.2	65.5	3.3	65.5	28.4	29.7
Yes	75.2	96.3	67.1	50.9	44.8	34.5	96.7	34.5	71.6	70.3
Frequency of visit to the other places										
Almost everyday	37.8	30.8	43.0	64.2	9.6	1.4	0.5	1.4	54.2	48.9
Once a week or more	62.2	69.2	57.0	35.8	90.4	98.6	99.5	98.6	45.8	51.1

Note: R1: 2005-2006, R2:2009-2010

Table 2: Drug use profile of injecting rug users in Manipur, Nagaland, and Maharashtra

Response categories	Manipur				Nagaland				Maharashtra	
	Bishnupur		Churachandpur		Phek		Wokha		Mumbai/Thane	
	(%)		(%)		(%)		(%)		(%)	
N	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
	420	410	419	411	440	419	420	412	376	327
Age at first drugs (years)										
Median age of first drug use	19	22	19	23	17	20	17	20	18	22
≤20	64.5	44.1	60.9	38.4	83.2	50.4	85.0	52.4	60.6	42.8
21 - 25	22.4	19.3	29.1	21.2	13.2	25.5	13.1	28.6	21.0	22.9
26 - 30	9.3	7.6	8.1	7.3	2.7	6.7	1.7	10.9	8.5	12.8
31 - 35	1.9	1.2	1.7	1.7	0.5	1.7	0.2	4.9	5.6	7.6
≥36	1.9	27.8	0.2	31.4	0.5	15.8	0.0	3.2	4.3	13.8
Age at first injecting drugs (years)										
Median age of first injecting drug use	21	21	21	22	19	21	21.2	24	26	25
≤20 or less	44.8	39.3	48.7	38.0	72.5	48.0	48.8	17.0	22.1	25.1
21 - 25	32.9	38.0	36.0	38.4	20.2	34.4	37.6	39.8	23.9	27.2
26 - 30	13.8	16.1	12.4	16.8	6.1	12.4	11.0	24.0	20.5	20.2
31 - 35	5.0	3.7	2.6	5.1	0.7	2.6	2.1	13.3	15.2	13.5
≥36	3.6	2.9	0.2	1.7	0.5	2.6	0.5	5.8	18.4	14.1
Duration between first drug use and first drug injection (years)										
Mean duration	1.0	2.5	0.5	6.7	2.3	4.5	4.3	6.7	3.5	4.9
≤1	55.7	60.7	65.6	36.2	50.5	61.0	15.7	15.1	14.1	24.1
2-5	29.5	33.4	28.2	53.8	37.3	33.3	54.0	46.0	31.4	45.9
6-9	8.1	4.2	4.5	4.3	8.6	1.6	24.3	24.8	23.9	21.8
≥10	6.7	1.6	1.7	5.6	3.6	4.1	6.0	14.1	30.6	8.3
N	313	341	408	408	345	378	394	323	350	282
No. of partners shared needle/syringe in the past month										
None	61.0	81.2	31.4	77.9	36.2	63.5	37.8	49.5	53.4	68.4
1-2	20.1	13.2	44.6	14.5	29.9	20.1	18.3	22.6	18.0	17.0
3-4	13.7	4.1	18.4	4.2	23.5	9.0	29.2	10.2	14.0	6.4
5 and above	5.1	1.5	5.6	3.4	10.4	7.4	14.7	17.6	14.6	8.2
Used Needle/syringe previously someone else has injected with										
Every time	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.8	3.4	3.2
Most of the times	10.1	3.2	2.3	0.9	3.7	2.3	11.6	31.6	4.0	9.6
Sometimes	46.4	44.6	81.5	73.9	64.5	39.1	70.0	28.0	41.0	32.9
Never	42.9	52.2	16.1	25.2	31.8	58.6	18.3	39.6	51.7	54.3
Needle/ syringe cleaning practices										
Every time	39.4	31.2	61.1	43.3	53.7	43.0	51.7	25.6	50.4	26.2
Most of the times	35.3	50.0	36.5	50.9	33.0	23.1	32.1	50.6	6.4	34.8
Sometimes	4.6	5.2	1.9	3.6	11.0	15.8	12.9	10.8	28.6	11.1
Never	20.8	13.6	0.5	2.2	2.3	18.1	3.3	13.0	14.7	28.0
Procurement of syringe/ needle										
NGO drop-center	44.5	69.8	83.1	94.6	12.3	82.0	19.1	17.0	57.9	55.4
chemist' shop	49.5	23.2	15.3	4.9	85.6	17.5	80.7	81.5	40.3	42.5
drug dealer	3.3	2.0	1.4	0.0	1.6	0.2	0.2	1.2	1.3	0.9
Other	2.6	5.1	0.2	0.5	0.5	0.2	0.0	0.2	0.5	1.2

Note: R1: 2005-2006, R2:2009-2010

Table 3: Sexual behaviours of injecting drug user in Manipur, Nagaland, and Maharashtra

Table 3: Sexual behaviours of injecting drug user in Manipur, Nagaland, and Maharashtra										
Sexual Behaviour	Manipur				Nagaland				Maharashtra	
	Bishnupur (%)		Churachandpur (%)		Phek (%)		Wokha (%)		Mumbai/Thane (%)	
	R1	R2	R1	R2	R1	R2	R1	R2	R1	R2
Ever had sex with female										
No	30.0	14.9	20.3	10.5	15.7	6.5	8.1	5.4	11.5	7.0
Yes	70.0	85.1	79.7	89.5	84.3	93.5	91.9	94.6	88.5	93.0
Ever had sex with different type of female partner										
Paid partner	47.3(294)	55.3(349)	9.2(334)	25(368)	4.6(369)	8.9(390)	7.5(386)	11.5(389)	65.1(332)	69.9(103)
Non paid partner	53.1(294)	65.0(349)	46.7(334)	47.0(368)	74.3(370)	85.6(390)	84.5(386)	67.7(387)	34.0(332)	19.7(76)
Other non-paid partner	11.3(292)	12.0(349)	41.6(334)	15.8(368)	66.2(370)	48.5(389)	50.8(386)	29.9(387)	83.3	45(33)
Had sex in the last 12 month with female partner										

No	28.6	18.9	21.3	29.9	5.7	4.1	2.8	24.4	44.0	34.9
Yes	71.4	81.1	78.7	70.1	94.3	95.9	97.2	75.6	56.0	65.1
Had sex in the last 12 month with different type of female partner										
Paid partner	46.0(139)	38.3(193)	51.6(31)	71.7(92)	52.9(17)	65.7(35)	65.5(29)	57.7(45)	50.7(215)	57.5(179)
Non paid partner	100(2)	79.6(54)	100(2)	95.6(23)	57.1(7)	87.5(48)	0(0)	95.8(24)	17.7(96)	61.4(44)
Other non-paid partner	81.8(33)	83.3(42)	88.5(139)	98.3(58)	99.2(245)	99.5(189)	98.9(196)	99.1(116)	20(20)	90.9(33)
Sexual partner as a drug user in the last 12 month										
No	86.7	86.2	88.6	89.5	95.1	89.4	90.7	77.8	65.1	80.8
Yes	13.3	13.8	11.4	10.5	4.9	10.6	9.3	22.2	34.9	19.2
No. of female sex partner had sex with in the past 12 month										
No partner	28.6	18.9	21.3	29.9	5.7	4.1	2.8	24.4	44.0	34.9
Single partner	41.8	58.5	46.7	46.7	26.2	21.5	24.4	32.6	23.5	23.4
2-3 partner	18.0	15.5	22.8	18.8	40.5	37.4	34.7	24.4	12.7	20.1
≥4 partner	11.6	7.2	9.3	4.6	27.6	36.9	38.1	18.5	19.9	21.7
No. of female partner had sex in the past one year Paid partner										
None	1.6	0.0	0.0	0.0	0.0	0.0	63.2	0.0	2.8	2.9
1-2 partner	54.7	63.5	75.0	72.7	66.7	52.2	31.6	76.9	39.4	39.8
3-4 partner	26.6	29.7	12.5	21.2	33.3	26.1	5.3	19.2	27.5	28.2
5 and above partner	17.2	6.8	12.5	6.1	0.0	21.7	0.0	3.8	30.3	29.1
Total	64.0	74.0	16.0	66.0	9.0	23.0	19.0	26.0	109.0	103.0
Other non-paid partner										
None	18.2	16.7	11.5	1.7	0.8	0.5	1.0	0.9	80.0	9.1
1-2 partner	39.4	76.2	71.9	70.7	62.0	51.3	45.4	64.7	15.0	51.5
3-4 partner	21.2	7.1	15.1	25.9	21.6	26.5	34.2	21.6	0.0	18.2
5 and above partner	21.2	0.0	1.4	1.7	15.5	21.7	19.4	12.9	5.0	21.2
Total	33	42	139	58	245	41	196	116	20	33
Condom use at last sex with different female partner										
Paid partner	81.3(64)	97.3(74)	75.0(16)	90.9(66)	66.7(9)	91.3(23)	52.6(19)	46.2(26)	63.9(108)	69.9(103)
Non paid partner	32.1(156)	43.1(216)	34.0(156)	36.8(171)	32.4(262)	51.4(327)	37.9(322)	27.0(256)	100(6)	19.7(76)
Other non-paid partner	51.5(33)	61.9(42)	39.6(139)	45.6(57)	71.8(245)	74.5(188)	49.2(195)	51.3(115)	NA	45.5(33)

Table 4: Knowledge and Prevalence of STI and HIV in Manipur, Nagaland, and Maharashtra

	Manipur				Nagaland				Maharashtra	
	Bishnupur		Churachandpur		Phek		Wokha		Mumbai/Thane	
	(%)		(%)		(%)		(%)		(%)	
N (all respondent)	R1 420	R2 410	R1 419	R2 411	R1 440	R2 419	R1 420	R2 412	R1 376	R2 327
Knowledge of STI										
No	11.0	12.2	26.3	21.7	20.7	8.6	48.8	47.0	54.3	55.4
Yes	89.0	87.6	73.7	78.1	79.3	90.9	51.2	52.3	44.9	44.6
Experienced of any STI symptom in the past one year										
No	67.1	95.1	93.6	95.6	86.4	96.7	90.0	99.5	79.3	87.2
Yes	32.9	4.9	6.4	4.4	13.6	3.3	10.0	0.5	20.7	12.8
Knowledge of HIV										
Knowledge about prevention of HIV	92.0	88.9	98.3	98.8	70.2	97.3	82.7	79.7	43.4	74.3
Feel at risk for becoming infected with HIV/AIDS	43.5	54.1	60.5	65.1	30.0	52.3	23.3	42.6	32.5	45.0
Any drug that can help treat who have HIV/AIDS	51.4	79.1	46.2	86.9	7.9	54.8	2.5	32.8	16.0	24.1
HIV testing										
Ever taken an HIV test	21.3	50.7	30.1	56.9	7.0	41.6	10.8	11.9	22.3	47.8
Collection of test result	65.2	86.5	72.2	82.5	10.8	86.0	68.3	45.0	79.5	88.4
Prevalence of HIV										
Positive	28.1	22.4	36.3	38.9	0.5	1.2	1.7	1.7	16.5	17.7
Negative	71.9	77.6	63.5	61.1	99.5	98.6	98.3	98.1	77.9	82.3

Note: R1: 2005-2006, R2:2009-2010

Table 5: Factors of any STI symptoms in past 12 months and HIV among Injecting drug users, India

Background Characteristics		Experienced at least one STI symptom in the past one year			HIV seropositivity	
		Yes (%)		AOR	Yes (%)	AOR
Current Age	<24 years	10.5			5.2	
	25-29 Years	9.6		0.986	12.9	1.818
	30 and above years	12.3		0.969	31.3	15.951***

Literacy	No	11.2		13.6	
	Yes	10.8	1.878*	17.5	3.415***
Marital Status	Currently not married	10.4		14.7	
	Currently married	10.5	1.331	23.2	0.778
Main Occupation	Unemployed	10.1		14.9	
	Student	8.6	1.026	1.9	1.002
	Employed	12.0	0.939	20.8	1.427
Age at starting drug use (years)	20 or less	11.8		13.4	
	21 - 25	10.1	0.581	18.0	1.759
	26 and above	8.9	0.382	25.3	1.487
Age at first injecting drugs (years)	20 or less	11.3		15.3	
	21 - 25	9.7	1.388	16.2	0.464**
	26 and above	11.7	2.192**	19.7	0.173***
Duration between first drug use and first drug injection	Below 2 years	12.0		16.7	
	2 and above	10.3	0.601**	16.7	0.819
Shared needle/syringe in the past month	No	7.8		18.0	
	Yes	13.7	2.218***	17.2	1.694**
Number of sexual partner in the last 12 month	<2	10.4		21.1	
	>=2	14.4	1.003	8.8	0.753
Are sexual partner also injecting drug users	No	10.9		16.5	
	Yes	20.8	1.542	17.3	1.694
Paid for sex in the last 12 month	No	17.0		23.6	
	Yes	22.0	0.736	18.5	0.657
Casual sex in the last 12 month	No	9.7		21.4	
	Yes	12.5	1.427	8.8	1.068
Has regular sexual partner	No	13.3		20.9	
	Yes	10.6	0.649	14.7	0.495**
Any STI Symptom in past one year	No			16.0	
	Yes			22.9	1.179

@Reference *** p<.01, **p<.05, and * p<.10 Dependent variable STI and HIV

Conclusions

Findings of the study concluded that despite district level differences, HIV related risk behaviour has reduced among IDUs over the period of time due to predominantly delivered HIV prevention services by different needle/exchange programmes, harm reduction programmes. These findings are a noteworthy achievement in a very challenging context, however there are still some adjustments are required to further increase participation in HIV testing among IDUs to deliver interventions that target the real routs of transmission STI and HIV through peer based and network based approach.

Abbreviations

IDUs Injecting Drug Users
 IBBA Integrated Behavioural and Biological Assessment
 STI Sexually Transmitted Infections
 HIV Human Immunodeficiency Virus

Ethics approval and consent to participate

The study used Integrated behavioural and biological assessment (IBBA) data, which is publicly available. Before conducting the survey IBBA had taken ethical approval. For the present study, ethical approval is not required.

Consent for publication

Not applicable for this study.

Availability of data and materials

The datasets generated and/or analysed during the current study are available in the NARI-ICMR website.

Competing interests

Authors do not have any competing interest.

Funding

This work is a part of Ph.D. work, so the authors do not have funding source. Funding for this paper is not available

Authors' contributions

SKS conceived the idea.
 SKS analysed the data and prepared the tables.
 SKS prepared the draft.
 DV commented on the draft and made necessary changes.

Acknowledgements

Authors sincerely acknowledge the National AIDS Research Institute for providing data for the study

Authors' information (optional)

Not required

References

1. Avert. People who inject drugs and HIV, 2012. Retrieved from http://www.avert.org/people-inject-drugs-hiv-aids.htm#footnote2_j6s7buw
2. Huizhen L, William G, Shui Shan L. Multilevel analysis of HIV related risk behaviors among heroin users in a low prevalence community. BMC Public Health. 2009; 9:137. doi:10.1186/1471-2458-9-137
3. UNAIDS World AIDS Day Report, 2011. <https://www.unaids.org/en/resources/presscentre/featurestories/2010/december/20101230unaidsin2011>

4. Mathers BM, Degenhardt L, Ali H, Wiessing L, Hickman M, Mattick RP, *et al.* HIV prevention, treatment, and care services for people who inject drugs: a systematic review of global, regional, and national coverage. *Lancet.* 2010; 375(9719):1014-1028.
5. Sharma M, Oppenheimer E, Saidel T, Loo V, Garg R. A situation update on HIV epidemics among people who inject drugs and national responses in South-East Asia Region. *AIDS.* 2009; 23(11):1405-1413.
6. NACO. 'HIV sentinel surveillance and HIV estimation in India 2007: A technical brief', 2007.
7. Mahanta J, Medhi GK, Paranjape RS, Roy N, Kohli A, Dzuwachu B, *et al.* Injecting and sexual risk behaviours, sexually transmitted infections and HIV prevalence in injecting drug users in three states in India. *Aids.* 2008; 22:S59-68.
8. Avahan India AIDS Initiative: From hills to valleys: Avahan's HIV prevention program among injecting drug users in Northeast India. New Delhi: Bill & Melinda Gates Foundation, 2009.
9. National AIDS Control Organization. HIV sentinels surveillance and HIV estimation 2006. Available at, 2008: www.nacoonline.org.
10. Indian Council of Medical Research and Family Health International 360, Integrated Behavioural and Biological Assessment: Repeated surveys to Assess Changes in Behaviours and Prevalence of HIV/STIs in Populations at Risk of HIV, Round 2 (2006-2007) National Summary Report, National AIDS Research Institute, Bhosari; FHI 360, New Delhi.
11. HIV prevention among injecting drug users (UNAIDS, Paper to the 24th Meeting of the UNAIDS Programme Coordinating Board, 2009.
12. National AIDS Control Organization. Manipur: HIV surveillance fact sheets 2003–2006. Available at: www.nacoonline.org. Accessed, 2008.
13. National AIDS Control Organization. Nagaland HIV surveillance fact sheets 2003–2006. Available at: www.nacoonline.org. Accessed, 2008.
14. Armstrong G, Humtsoe C, Kermod M. HIV risk behaviours among injecting drug users in Northeast India following scale-up of a targeted HIV prevention programme. *BMC Public Health.* 2011; 11(6):S9.
15. Becker Buxton M, Vlahov D, Strathdee SA, Des Jarlais DC, Morse EV, Ouellet L, *et al.* Association between injection practices and duration of injection among recently initiated injection drug users. *Drug Alcohol Depend.* 2004; 75(2):177–183. doi: 10.1016/j.drugalcdep.2004.01.014.
16. Fuller CM, Vlahov D, Latkin CA, Ompad DC, Celentano DD, Strathdee SA. Social circumstances of initiation of injection drug use and early shooting gallery attendance: implications for HIV intervention among adolescent and young adult injection drug users. *J Acquir Immune Defic Syndr.* 2003; 32(1):86–93. doi: 10.1097/00126334-200301010-00013.
17. Fennema JS, Van Ameijden EJ, Van Den Hoek A, Coutinho RA. Young and recent-onset injecting drug users are at higher risk for HIV. *Addiction.* 1997; 92(11):1457–1465. doi: 10.1111/j.1360-0443.1997.tb02867.x.
18. Carneiro M, Fuller C, Doherty MC, Vlahov D. HIV prevalence and risk behaviors among new initiates into injection drug use over the age of 40 years old. *Drug Alcohol Depend.* 1999; 54(1):83–86. doi: 10.1016/S0376-8716(98)00142-2.