

High burden of hepatitis C & HIV co-infection among people who inject drugs in Manipur, Northeast India

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Background & objectives: It is well documented that the Northeast State of Manipur in India has been dealing with the dual problems of injecting drug use and HIV for the last two decades, but the hepatitis C problem has not been so well characterized. The aim of this study was to assess the prevalence of hepatitis C virus (HCV) infection and HCV/HIV co-infection among people who inject drugs (PWID) in Manipur, and identify factors associated with infection.

Methods: Data were obtained from the Integrated Behavioural and Biological Assessment (2009-2010), a cross-sectional survey among 821 male PWID in two districts of Manipur (Churachandpur and Bishnupur). Information about drug use, sexual and injecting risk behaviours, and exposure to interventions was obtained, and biological specimens tested for HIV and HCV. Logistic regression analyses identified factors associated with HCV infection and HCV/HIV co-infection.

Results: HCV prevalence was 74 per cent (91% Churachandpur, 56% Bishnupur), and HCV/HIV co-infection was 29 per cent (38% Churachandpur, 21% Bishnupur). Among the 31 per cent of HIV positive PWID, 95 per cent were co-infected. HCV infection was associated with district, longer duration of injecting, injecting at least once daily, generally injecting with a used needle and syringe, and having had an HIV test. HCV/HIV co-infection was associated with district, older age, being employed, being widowed/divorced, longer duration of injecting, and feeling at risk of HIV infection.

Interpretation & conclusions: The HCV/HIV co-infection among PWID in Manipur was very high, highlighting the urgent need for effective prevention, diagnosis and treatment.

Key words Co-infection - hepatitis C - HIV - Manipur

People who inject drugs (PWID) are at particularly high risk of infection with hepatitis C virus (HCV)¹, which is transmitted via exposure to infected blood during the act of injecting, not only through sharing

needles and syringes but also other injecting equipment such as filters, spoons, mixing pots and swabs². The prevalence of HCV infection among PWID is higher than that in HIV positive individuals because HCV

is more efficiently transmitted from one person to another, and the pool of infected peers is generally large¹. Of those infected with HCV, about 75 per cent become chronically infected, and of these, 7-18 per cent will develop cirrhosis over a 20 year period, and be at risk of hepatocellular carcinoma (1-6% per year) or liver failure (2-3% per year)³.

It is estimated that approximately 15 per cent of people infected with HIV are co-infected with HCV⁴. HCV/HIV co-infection can accelerate the progression of hepatitis C⁵, and co-infected people have shorter life expectancy than those with HIV alone⁶. HIV/HCV co-infection complicates anti-retroviral therapy (ART) for treatment of HIV infection, as several anti-retroviral drugs are poorly tolerated by co-infected patients. Early detection of co-infection is optimal so that HCV treatment can be commenced before initiation of ART⁷.

It is also the case that HCV treatment is less effective for HIV positive people⁷. Until recently, the most common treatment regimen for HCV infection was pegylated interferon and ribavirin for up to 48 wk. A sustained virological response is possible for approximately 40 per cent of co-infected patients, which is 10-20 per cent lower than patients with HCV mono-infection⁷. The new direct acting antivirals (DAAs) are more effective, can treat more HCV serotypes, are administered orally for a shorter duration of treatment, and have fewer side effects^{8,9}. However, it is not clear if and how HCV-infected people in low and middle income countries will be able to access these life-saving therapies.

The prevalence of HCV infection in India is estimated to be between 0.5 and 1.5 per cent which is five times higher than the prevalence of HIV infection¹⁰. While there is no routine surveillance for HCV infection, a number of cross-sectional bio-surveys have been conducted revealing varying HCV prevalence among PWID in India depending on site and point in time¹⁰. Injecting illicit drugs, most commonly heroin, has played a prominent role in the HIV epidemic in the Northeast State of Manipur¹¹⁻¹⁴, which consistently reports the highest HIV prevalence in the country¹⁵. Less is known about hepatitis C and HCV/HIV co-infection in this State. Of the 250 PWID attending a de-addiction centre in Manipur screened in 2002 for HIV/HCV co-infection, 60 per cent were HIV positive, 90 per cent were HCV positive, and 52 per cent were co-infected¹⁶. The first round of the *Avahan*-funded

Integrated Behavioural and Biological Assessment (IBBA) in 2005-2007 reported an HCV prevalence in Manipur (n=839) of 78 per cent in Churachandpur district and 56 per cent in Bishnupur district¹³.

This study aimed to describe the prevalence of HCV infection and HIV/HCV co-infection among PWID in Manipur, and identify factors associated with HCV infection and HCV/HIV co-infection.

Material & Methods

Avahan was funded by the Bill & Melinda Gates Foundation to provide scaled HIV prevention programmes in selected districts of six high HIV prevalence states, including Manipur¹⁷. Data for this study were obtained from the IBBA (2009-2010), a cross-sectional survey among high risk groups (including PWID) that formed a central component of *Avahan's* evaluation strategy. Detailed description of the survey methods have been published elsewhere^{18,19}. The first round of IBBA was conducted between 2005 and 2007 and the second round between 2009 and 2010. In this study data collected from 821 male PWID in Churachandpur and Bishnupur districts of Manipur during the second IBBA round were analysed.

Sampling: Respondent driven sampling (RDS) was used to recruit study participants. In brief, RDS is a probability sampling method devised for more representative recruitment of hidden populations such as PWID²⁰. It involves chain referral sampling that collects data on social network sizes and recruitment patterns to determine selection probabilities^{21,22}. For this study, a sample size of 400 per district was estimated based on an ability to detect changes in proportions of 15 per cent at follow up surveys from estimated baseline values of 50 per cent (which yield the biggest sample size), an alpha level of 0.05, and power of 90 per cent. A design effect of 1.5 was applied to account for intra-class correlation.

Data collection: A PWID was defined as any male, 18 yr or older, who had injected drugs for non-medical reasons at least once in the past six months. An anonymous, interviewer-administered structured questionnaire was used to gather information regarding socio-demographic information, drug use, sexual and injecting risk behaviours, knowledge of HIV, and exposure to interventions. Additionally, biological specimens (blood and urine) were tested for a range of sexually transmitted infections (STIs) and HIV. Serum

samples were tested for HIV by Microelis (J. Mitra and Company, India), and positive tests were confirmed by Genedia HIV 1/2 ELISA 3.0 (Green Cross Life Science Corporation, South Korea). Dried blood spot samples were tested for the presence of antibodies against hepatitis C by EIA (Murex anti-HCV Version 4.0, Abbott Diagnostics)²³.

Statistical analysis: Data obtained using RDS sampling are usually analysed using RDS software (RDSAT) that generates appropriately weighted estimated proportions with confidence intervals. However, it is not possible to undertake bivariate or multivariate analysis using RDSAT, so the analyses presented here were undertaken using SPSS version 19.0 (SPSS, Inc., Chicago, USA). The Chi-square test was used to examine differences between categorical variables, and the independent-sample t test for differences between continuous variables. Both bivariate and binary logistic regression analyses were conducted. The two outcomes of interest for the regression modelling were HCV infection and HCV/HIV co-infection. The covariates for each model were those significantly associated ($P \leq 0.05$) with the outcome variable on bivariate testing.

Results

The total number of participants was 821 (411 from Churachandpur and 410 from Bishnupur). The mean age was 29.8 ± 6.13 yr (range 18-55 yr). The majority (92.2%) were literate. Just over half (57.0%) were employed, 2.8 per cent were students and 40.2 per cent unemployed. Half of the participants (50.7%) had never been married, 37.8 per cent were currently married, and 11.6 per cent were widowed/divorced/separated (Table I). The majority of PWID (58.5%) were injecting at least once daily, and 97.1 per cent generally injected heroin. A little more than one quarter (26.8%) had begun injecting before 20 yr of age, but the majority (65.2%) commenced injecting between 20-29 yr. Half (51.7%) had been injecting for longer than five years. Sharing of injecting equipment was very common (82.8%), and half (50.4%) reported that they generally injected with a needle and syringe previously used by another (Table I).

Major differences between the two districts were noted. Compared to participants from Bishnupur, participants from Churachandpur were more likely to be unemployed or students (59.6 vs. 26.4%); be widowed, separated or divorced (17.3 vs. 5.9%); inject at least daily (86.9 vs. 30.0%); inject heroin (99.5 vs.

94.6%); share injecting equipment (86.6 vs. 79.0%); generally inject with a needle & syringe previously used by another (60.5 vs. 40.3%); and feel at risk of HIV infection (65.1 vs. 54.1%). Participants from Churachandpur were less likely to be new injectors; only 16.4 per cent had been injecting for ≤ 2 yr compared with 25.4 per cent in Bishnupur (Table I).

HCV infection and HCV/HIV co-infection: The level of HCV infection was particularly high, and significant differences between the two districts were observed; 73.9 per cent of PWID tested positive for HCV (91.5% Churachandpur, 56.3% Bishnupur). HIV/HCV co-infection was prevalent in 29.4 per cent and of participants (37.7% Churachandpur, 21.0 per cent in Bishnupur) (Table I). Among those 30.8 per cent of PWID who were HIV positive (39.2% Churachandpur, 22.4% Bishnupur), co-infection with HCV was very high, with 95.3 per cent being co-infected (96.3% Churachandpur, 93.5% Bishnupur).

Factors associated with HCV infection: Infection with HCV was significantly associated with district, older age, having ever been married, earlier age of first injection, longer duration of injecting, injecting at least once daily, generally sharing injecting equipment, generally injecting with a needle and syringe used by another, feeling at risk of HIV, and having ever had an HIV test (Table II).

After controlling for confounding, district, duration and frequency of injecting, generally injecting with a needle and syringe used by another, and having ever had an HIV test remained independently associated with HCV infection. The PWID in Churachandpur were almost four times more likely to be infected with HCV compared to those in Bishnupur [odds ratio (OR)] 3.75; 95% confidence interval [(CI 2.22-6.35)]. Relative to those who had been injecting for two years or less, those who had been injecting for 6-10 yr were more than twice as likely to have HCV (OR 2.48; 95% CI 1.36-4.51); and those who had been injecting longer than 10 yr were more than five times as likely (OR 5.65; 95% CI 2.16-14.79). Those injecting at least once daily were four times more likely to be HCV infected than those who injected less frequently (OR 4.18; 95% CI 2.56-6.89). PWID who generally injected with a needle and syringe used by another were also at greater risk of HCV infection (OR 1.59; 95% CI 1.03-2.45), and those who ever had an HIV test were twice as likely compared to those who had never had one (OR 2.08; 95% CI 1.37-3.16) (Table II).

Table I. Characteristics of PWID participants in Manipur (2009) by district

Variables	Total (n=821) n (%)	Churachandpur (n=411) n (%)	Bishnupur (n=410) n (%)	<i>P</i> value
Demographic information				
Age group (yr)				
<30	434 (52.9)	206 (50.1)	228 (55.6)	NS
≥30	387 (47.1)	205 (49.9)	182 (44.4)	
Literacy				
Illiterate	64 (7.8)	31 (7.5)	33 (8.0)	NS
Literate	757 (92.2)	380 (92.5)	377 (92.0)	
Employed				
Unemployed/student	353 (43.0)	245 (59.6)	108 (26.4)	<0.001
Employed	467 (57.0)	166 (40.4)	301 (73.6)	
Marital status				
Currently married	310 (37.8)	150 (36.5)	160 (39.0)	<0.001
Widowed, divorced, separated	95 (11.6)	71 (17.3)	24 (5.9)	
Never married	416 (50.7)	190 (46.2)	226 (55.1)	
Drug use patterns				
Age at first injected drug (yr)				
<20	218 (26.8)	114 (27.9)	104 (25.6)	NS
20-29	531 (65.2)	260 (63.7)	531 (65.2)	
≥30	65 (8.0)	34 (8.3)	31 (7.6)	
Duration of injecting (yr)				
≤2	170 (20.9)	67 (16.4)	103 (25.4)	0.016
3-5	223 (27.4)	118 (28.9)	105 (25.9)	
6-10	277 (34.0)	150 (36.8)	127 (31.3)	
>10	144 (17.7)	73 (17.9)	71 (17.5)	
Frequency of injection				
Less than daily	341 (41.5)	54 (13.1)	287 (70.0)	<0.001
At least once daily	480 (58.5)	357 (86.9)	123 (30.0)	
Most common drug injected				
SP/other	24 (2.9)	2 (0.5)	22 (5.4)	<0.001
Heroin	797 (97.1)	409 (99.5)	388 (94.6)	
In general takes drug from common container				
No	237 (28.9)	115 (28.0)	122 (29.8)	NS
Yes	583 (71.1)	295 (72.0)	288 (70.2)	
In general shares injecting equipment				
No	141 (17.2)	55 (13.4)	86 (21.0)	0.004
Yes	679 (82.8)	355 (86.6)	324 (79.0)	
In general injects with needle previously used by other				
No	405 (49.6)	161 (39.5)	244 (59.7)	<0.001
Yes	412 (50.4)	247 (60.5)	165 (40.3)	
HIV and HCV Status				
HCV				
Negative	214 (26.1)	35 (8.5)	179 (43.7)	<0.001
Positive	607 (73.9)	376 (91.5)	231 (56.3)	

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Variables	Total (n=821) n (%)	Churachandpur (n=411) n (%)	Bishnupur (n=410) n (%)	P value
HIV				
Negative	568 (69.2)	250 (60.8)	318 (77.6)	<0.001
Positive	253 (30.8)	161 (39.2)	92 (22.4)	
HIV/HCV co-infection				
Negative	580 (70.6)	256 (62.3)	324 (79.0)	<0.001
Positive	241 (29.4)	155 (37.7)	86 (21.0)	
Other variables				
Feels at risk of HIV infection				
No	309 (40.5)	131 (34.9)	178 (45.9)	0.002
Yes	441 (53.8)	244 (65.1)	210 (54.1)	
Ever had an HIV test				
No	378 (46.2)	177 (43.1)	201 (49.3)	NS
Yes	441 (53.8)	234 (56.9)	207 (50.7)	
Ever been in prison				
No	656 (79.9)	338 (82.2)	318 (77.6)	NS
Yes	165 (20.1)	73 (17.8)	92 (22.4)	
NS, not significant; SP, spasmoproxyvon				

Factors associated with HIV/HCV co-infection: Co-infection with HIV and HCV was significantly associated with district, older age, being employed, having ever been married, earlier age of first injection, longer duration of injecting, injecting at least once daily, generally sharing injecting equipment, generally injecting with a needle and syringe used by another, feeling at risk of HIV, having ever had an HIV test, and having ever been in prison (Table III).

After controlling for confounding, district, age, being employed, marital status, duration of injecting and feeling at risk of HIV infection remained independently associated with HIV/HCV co-infection. The PWID in Churachandpur were more than two times more likely to be co-infected compared to those in Bishnupur (OR 2.35; 95% CI 1.42-3.90). PWID aged 30 yr or older were almost four times more likely to be co-infected relative to those aged less than 30 yr (OR 3.78; 95% CI 2.11-6.75), and the employed PWID were almost twice as likely to be co-infected compared to the unemployed/student group (OR 1.82; 95% CI 1.16-2.86). The widowed/divorced/separated PWID were twice as likely to have co-infection relative to those who were currently married (OR 2.15; 95% CI 1.17-3.94). Compared to those who had been injecting for two years or less, those who had been injecting for 6-10 yr were more than twice as likely to be co-infected (OR 2.60; 95% CI 1.22-5.53); and those who

had been injecting longer than 10 yr were seven times more likely to be co-infected (OR 7.26; 95% CI 2.90-18.16). Those who felt at risk of HIV infection were four times more likely to be co-infected compared to those who did not feel at risk (OR 3.97; 95% CI 2.43-6.48) (Table III).

Discussion

The results from this cross-sectional survey among a large group of PWID in two districts of Manipur indicated a high prevalence of infection with HCV, especially among those who are HIV infected. Of particular concern was the high prevalence of HCV infection among those who were HIV infected (95%), highlighting the importance of testing all HIV infected PWID for HCV before commencing ART. This finding was consistent with the 96 per cent of HIV positive PWID found to be co-infected with HCV in the neighbouring State of Mizoram, having similar patterns of drug use²³.

The finding that HCV infection among these PWID is independently associated with longer duration of injecting, more frequent injecting and generally injecting with a needle and syringe used by another is not a surprising as all of these factors increase the odds of exposure to an HCV-infected peer over time, especially given that needle and syringe sharing remains common. The association between HCV

Table II. Factors associated with HCV infection among PWID in Manipur (2009)

Variables	HCV +ve n (%)	Logistic regression	
		Unadjusted OR (95% CI)	Adjusted OR (95% CI) n=753
<i>Demographic information</i>			
District			
Bishnupur	231/410 (56.3)	---	---
Churachandpur	376/411 (91.5)	8.32 (5.59-12.39)	3.75 (2.22-6.35)
Age group (yr)			
<30	281/434 (64.7)	---	---
≥30	326/387 (84.2)	2.91 (2.08-4.08)	1.28 (0.72-2.23)
Literacy			
Illiterate	52/64 (81.3)	---	---
Literate	555/757 (73.3)	0.63 (0.33-1.21)	---
Employed			
Unemployed/student	259/353 (73.4)	---	---
Employed	347/467 (74.3)	1.05 (0.77-1.44)	---
Marital status			
Currently married	244/310 (78.7)	---	---
Widowed, divorced, separated	87/95 (91.6)	2.94 (1.36-6.37)	1.50 (0.60-3.74)
Never married	276/416 (66.3)	0.53 (0.38-0.75)	0.94 (0.58-1.54)
<i>Drug use patterns</i>			
Age at first injected drug (yr)			
<20	171/218 (78.4)	---	---
20-29	376/531 (70.8)	0.67 (0.46-0.97)	0.90 (0.53-1.54)
≥30	55/65 (84.6)	1.51 (0.72-3.19)	1.85 (0.60-5.70)
Duration of injecting (yr)			
≤2	94/170 (55.3)	---	---
3-5	150/223 (67.3)	1.66 (1.10-2.51)	1.00 (0.59-1.71)
6-10	227/277 (81.9)	3.67 (2.39-5.64)	2.48 (1.36-4.51)
>10	131/144 (91.0)	8.15 (4.27-15.53)	5.65 (2.16-14.79)
Frequency of injection			
Less than daily	176/341 (51.6)	---	---
At least once daily	431/480 (89.8)	8.25 (5.73-11.87)	4.18 (2.56-6.89)
In general takes drug from common container			
No	179/237 (75.5)	---	---
Yes	427/583 (73.2)	0.89 (0.63-1.26)	---
In general shares injecting equipment			
No	90/141 (63.8)	---	---
Yes	516/679 (76.0)	1.79 (1.22-2.64)	0.66 (0.38-1.15)
In general injects with needle previously used by other			
No	265/405 (65.4)	---	---
Yes	339/412 (82.3)	2.45 (1.77-3.40)	1.59 (1.03-2.45)

Contd...

Variables	HCV +ve n (%)	Logistic regression	
		Unadjusted OR (95% CI)	Adjusted OR (95% CI) n=753
<i>Other variables</i>			
Feels at risk of HIV infection			
No	200/309 (64.7)	---	---
Yes	360/441 (79.3)	2.09 (1.51-2.89)	1.39 (0.89-2.18)
Ever had an HIV test			
No	244/378 (64.6)	---	---
Yes	362/441 (82.1)	2.52 (1.82-3.47)	2.08 (1.37-3.16)
Ever been in prison			
No	477/656 (72.7)	---	---
Yes	130/165 (78.8)	1.39 (0.92-2.10)	

infection and having ever had an HIV test is possibly explained by the fact that those who are HCV infected tend to be longer-term injectors, and as such are more likely to have had contact with a harm reduction programme, and these programmes facilitate uptake of HIV testing²⁴. It would be optimal if all PWID who present for HIV testing are tested for HCV at the same time.

Longer duration of injecting was also independently associated with HIV/HCV co-infection, as was older age. The reason for the finding that employed PWID were more likely to be co-infected compared to those who were unemployed/students could be that employed PWID had more money and were therefore, able to inject more frequently and thus at greater risk of infection with a blood-borne virus. However, post-hoc analysis did not support this hypothesis (70% unemployed/students vs. 50% employed injected at least once daily; $P<0.001$). Co-infection was also associated with being widowed/divorced/separated, which was possibly indicative of PWID coming from the more chronic end of the drug using spectrum, and therefore, more at risk of HCV infection. Perceiving oneself as being at risk of HIV infection could be a function of regular unsafe injecting behaviours that also place the person at risk of HCV infection. Post-hoc analysis supported this contention (59% of those who felt at risk of HIV generally injected with a needle and syringe previously used by someone else vs. 35% of those who did not feel at risk; $P<0.001$).

The relatively higher prevalence of HCV infection and HIV/HCV co-infection in Churachandpur compared

to Bishnupur was not unexpected, and the difference was consistent with the Round 1 IBBA results¹³. HIV prevalence was also higher in Churachandpur, given that PWID in Churachandpur were engaged in much riskier injecting behaviours compared with their peers in Bishnupur, *i.e.* they were more likely to inject at least daily, share injecting equipment, and share a needle and syringe previously used by another.

This study had several limitations that should be considered when interpreting the findings. Due to the cross-sectional study design it was not possible to infer causation for outcome variables. Even though respondent driven sampling is probability based, the analyses for this study used unweighted data, and therefore, the representativeness of the sample is similar to that of a large snowball sample. Social acceptability bias may have contributed to an underestimate in the prevalence of unsafe injecting behaviours. Thoroughly mapping currently available HCV testing and treatment services relative to PWID populations, along with an investigation of knowledge and attitudes related to HCV prevention and treatment among PWID would provide a more complete picture of the situation to optimize the design of an evidence-based response.

The findings highlight high HCV positivity in PWID in one Northeast Indian State where prevention, diagnosis and treatment options are limited. It is highly probable that other States with injecting drug use problems are similarly affected. It was also evident that HCV infection was more common than HIV infection. It would be beneficial if all PWID who come for HIV testing are tested for HCV also at the same time. As

Table III. Factors associated with HIV/HCV co-infection among PWID in Manipur (2009)

Variables	HIV/HCV +ve n (%)	Logistic regression	
		Unadjusted OR (95% CI)	Adjusted OR (95% CI) n=753
District			
Bishnupur	86/410 (21.0)	---	---
Churachandpur	155/411 (37.7)	2.28 (1.67-3.11)	2.35 (1.42-3.90)
Age group (yr)			
<30	52/434 (12.0)	---	---
≥30	189/387 (48.8)	7.01 (4.93-9.97)	3.78 (2.11-6.75)
Literacy			
Illiterate	25/64 (39.1)	---	---
Literate	216/757 (28.5)	0.62 (0.37-1.05)	---
Employed			
Unemployed/student	89/353 (25.2)	---	---
Employed	152/467 (32.5)	1.43 (1.05-1.95)	1.82 (1.16-2.86)
Marital status			
Currently married	104/310 (33.5)	---	---
Widowed, divorced, separated	52/95 (54.7)	2.39 (1.50-3.82)	2.15 (1.17-3.94)
Never married	85/416 (20.4)	0.51 (0.36-0.71)	1.20 (0.75-1.93)
<i>Drug use patterns</i>			
Age at first injected drug (yr)			
<20	72/218 (33.0)	---	---
20-29	135/531 (25.4)	0.69 (0.49-0.97)	0.78 (0.45-1.35)
≥30	30/65 (46.2)	1.74 (0.99-3.05)	2.12 (0.80-5.59)
Duration of injecting (yr)			
≤2	14/170 (8.2)	---	---
3-5	38/223 (17.0)	2.29 (1.12-4.38)	1.82 (0.84-3.95)
6-10	90/277 (32.5)	5.36 (2.94-9.79)	2.60 (1.22-5.53)
>10	95/144 (66.0)	21.60 (11.32-41.23)	7.26 (2.90-18.16)
Frequency of injection			
Less than daily	72/341 (21.1)	---	---
At least once daily	169/480 (35.2)	2.03 (1.47-2.80)	1.31 (0.80-2.15)
In general takes drug from common container			
No	70/237 (29.5)	---	---
Yes	171/583 (29.3)	0.99 (0.71-1.38)	---
In general shares injecting equipment			
No	26/141 (18.4%)	---	---
Yes	214/679 (31.5%)	2.04 (1.29-3.21)	1.03 (0.54-1.96)
In general injects with needle previously used by other			
No	100/405 (24.7)	---	---
Yes	140/412 (34.0)	1.57 (1.16-2.13)	0.98 (0.63-1.50)
OTHER VARIABLES			
Feels at risk of HIV infection			
No	36/309 (11.7)	---	---
Yes	186/454 (41.0)	5.26 (3.55-7.81)	3.97 (2.43-6.48)
Ever had an HIV test			
No	89/378 (23.5)	---	---
Yes	152/441 (34.5)	1.71 (1.25-2.32)	1.21 (0.80-1.83)
Ever been in prison			
No	162/656 (24.7)	---	---
Yes	79/165 (47.9)	2.80 (1.97-3.99)	1.41 (0.89-2.24)

ART coverage increases across India, untreated HCV infection may become the major health concern for many PWID.

Conflicts of Interest: None.

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