



## Research Paper

## Overlap between harm reduction and HIV service utilisation among PWID in India: Implications for HIV combination prevention

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## ABSTRACT

**Background:** In some regions, HIV incidence is rising among people who inject drugs (PWID). Combination prevention approaches are well suited to PWID who face multiple sources of HIV risk. This analysis investigates patterns of utilisation to basic HIV services (HIV counselling and testing [HCT], antiretroviral therapy [ART]) as well as harm reduction programs (needle and syringe exchange programs [NSEP] and opioid agonist therapy [OAT]) among PWID and how utilisation of harm reduction services is associated with HIV-related care seeking behaviours.

**Methods:** Respondent-driven sampling was used to recruit 14,481 PWID across 15 cities in India. Sampling-weighted multilevel logistic regression models assessed associations between utilisation of harm reduction service and HCT and ART use among those indicated (90.3% and 5.0% of full sample, respectively). We considered both recent (prior year) and ever use of services.

**Results:** Overall, 42.3% reported prior HIV testing and 57.9% of eligible persons reported ART initiation, but overlap with NSEP and OAT use was limited. In adjusted models, recent and ever use of both NSEP and OAT were significantly associated with recent and ever HCT utilisation, respectively; however, harm reduction utilisation was not associated with ART initiation among eligible participants.

**Conclusions:** Harm reduction services may play a key role in linking PWID with HIV testing; however, they were not associated with ART initiation among eligible individuals. Moreover, a large majority who utilised NSEP and OAT were not engaged in optimal HIV care or prevention, highlighting missed opportunities and a need for stronger linkages between NSEP/OAT and HIV care and treatment, particularly among those actively injecting. These findings provide key insights to better understand how services can be linked or combined to optimise service utilisation among PWID.

## Introduction

The unprecedented efficacy of novel tools for HIV prevention, including treatment as prevention (Cohen et al., 2011), pre-exposure prophylaxis (Vargas et al., 2010), and medical male circumcision, (Gray et al., 2007) have fuelled calls for an “AIDS-free generation” and strategies for “Getting to Zero” (PEPFAR, 2013; UNAIDS, 2013). Indeed, at the same time that some reports suggest a gradual slowing of the global

HIV pandemic (Nagelkerke et al., 2014; World Bank Group, 2016), others indicate that HIV transmission remains persistent in certain sub-regions such as Eastern Europe and Central Asia (UNAIDS, 2016). The same reports also indicate the epidemic may even be increasing in vulnerable populations such as men who have sex with men (MSM; Beyrer et al., 2013, 2016) and persons who inject drugs (PWID), particularly for those living in low- and middle-income settings (Beyrer et al., 2010; Dolan et al., 2015). Future HIV elimination strategies will

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therefore need to address the prevention challenges specific to these sub-epidemics, success of which will depend on tailored interventions capable of delivering locally relevant and sustainable services that are accessible to these hard-to-reach populations.

India's population of about PWID (estimated at about 1.1 million in 2014; National AIDS Control Organisation, 2014) is one of the largest in the world, among whom national estimates place HIV prevalence at around 10.0%, with reported prevalence in some regional epidemics as high as 31.1% (Aceijas, Hickman, & Rhodes, 2004; Lucas et al., 2015). Government-led HIV prevention efforts in India have historically been focused on services for female sex workers (Steinbrook, 2007), and as a result coverage of relevant programs for PWID such as needle and syringe exchange programs (NSEP), opioid agonist therapy (OAT), HIV counselling and testing (HCT), and antiretroviral therapy (ART), has been uneven and poorly integrated across healthcare settings (Solomon et al., 2016). In addition, fear of drug-use related stigma and discrimination (Chakrapani, Velayudham, Shunmugam, & Newman, 2013; Ekstrand, Ramakrishna, Bharat, & Heylen, 2013; Latkin et al., 2010) and low HIV awareness among PWID (Chakrapani, Newman, Shunmugam, & Dubrow, 2011; Panda, Chatterjee, Ba, & Ray, 1998) have created additional barriers for care access in this population (Mehta et al., 2015; Solomon et al., 2009). As the HIV epidemic in PWID continues to expand, a challenge for future HIV control in India will be prevention programs addressing PWID's multifaceted sources of risk (i.e. sexual and drug use-related transmission risk, including the intersection of these risks (Solomon et al., 2010; Solomon et al., 2011; Suohu et al., 2012) as well as structural barriers such as poor access to clean needles, OAT, or HIV testing (Degenhardt et al., 2010; Go et al., 2015)), while also addressing their long standing barriers to care. Integral to this will be a better understanding of existing patterns of utilisation of HIV-related health services and predictors of these patterns.

This study uses cross-sectional data collected as part of the baseline survey for a cluster-randomised trial exploring the effect of bundling multiple HIV prevention and treatment services for PWID on HCT utilisation and HIV incidence (ClinicalTrials.gov Identifier: NCT01686750; Solomon et al., 2016). The goal of this analysis is to characterise patterns and correlates of service utilisation among PWID prior to the intervention in order to better understand how services can be linked or combined to optimise service utilisation among PWID.

## Materials and methods

### Study setting and population

As previously described, (Solomon et al., 2016) this cross-sectional survey among PWID from sites in 15 cities (Fig. S1), includes 7 sites in North-eastern India where injection drug use has been endemic for decades, and 8 sites in North and Central India where increases in injection drug use have recently been reported (Lucas et al., 2015). Preliminary ethnographic research conducted with local non-governmental organisations informed details of the respondent-driven sampling (RDS) approach, a chain-referral recruitment method particularly well-suited for sampling hard-to-reach populations (Heckathorn, 2002). Approximately 1000 participants were recruited at each site starting with 2 "seeds" per site.

Eligible individuals 1) were at least 18 years of age, 2) reported injection drug use in the previous 2 years, 3) provided informed consent, and 4) presented a valid recruitment coupon (except for the seeds). Each participant who completed a survey questionnaire and biological testing received two coupons for recruitment of new individuals from his or her network. Participants received compensation for taking part in the study, as well as for recruiting other eligible participants. Barcoded coupons allowed study staff to track chains of recruitment, and a biometric system that converted fingerprint images to unique hexadecimal codes prevented duplicate enrolment of PWID at

**Table 1**

Median site-level characteristics of people who inject drugs (PWID) across 15 sites in India (N = 14,481).

	Median <sup>a</sup>	Range
Access of needle exchange program		
Past year (%) <sup>b</sup>	41.3	(9.3–69.6)
Ever (%)	45.1	(9.6–71.7)
Never (%)	54.9	(28.3–90.4)
Access of opioid substitution program		
Past year (%) <sup>b</sup>	18.7	(0–53.3)
Ever (%)	16.2	(0–45.2)
Never (%)	81.3	(46.8–100)
Age (years)	29	(24–34)
Male (%)	98.3	(79.2–99.9)
Education		
Primary school or less (%)	32.8	(5.8–66.8)
Secondary school (%)	61.2	(32.8–86.8)
High school and above (%)	4.6	(0.4–14.7)
Monthly income (Indian rupees)	5000	(0–30,000)
Currently married or cohabitating <sup>c</sup> (%)	42.2	(18.7–61)
Age at first injection (years)	21	(9–54)
Injection frequency in last 6 months		
None (%)	8.5	(0.5–28.3)
Less than daily (%)	29.4	(10.9–71)
Daily (%)	58.0	(13.8–84.3)
Alcohol use <sup>d</sup>		
None/non-hazardous use (%)	60.1	(34.8–88.1)
Hazardous use (%)	20.4	(7.3–34.3)
Dependence (%)	15.6	(4.6–45.5)
Unprotected hetero sex in the past 6 months (%)	53.3	(36–76.1)
Drugs injected in last 6 months		
None (%)	8.8	(0.5–28.3)
Heroin only (%)	6.6	(0–94.3)
Buprenorphine & other pharmaceuticals only (%)	23.4	(0.2–87.3)
Combination/other drugs (%)	37.1	(2–74.6)
Needle sharing		
At most recent use (%)	61.5	(26.2–81)
Before last use (%)	37.0	(18.5–71.1)
Never (%)	2.5	(0.4–7.4)

<sup>a</sup> All site-level characteristics weighted using RDS-II weights.

<sup>b</sup> Those who reported service utilisation in the past year were a subset of those who have ever utilised this service; the two categories are therefore not mutually exclusive.

<sup>c</sup> Those not considered married or cohabitating were those reporting that they were widowed, divorced, never married, or who did not live with their long-term partner.

<sup>d</sup> Hazardous use defined by score  $\geq 8$  on Alcohol Use Disorder Identification Test (AUDIT) and dependence defined by AUDIT score  $\geq 15$ .<sup>19</sup>

any site in the trial.

### Procedures

Consenting individuals took part in face-to-face electronic interviewer-administered surveys that captured information on demographic factors, network size, drug and alcohol use, use of NSEP and OAT, sexual behaviours, (Saunders, Aasland, Babor, De la Fuente, & Grant, 2006) and history of prior HIV testing, HIV diagnosis, and ART use (among those with confirmed HIV diagnoses). Rapid HIV testing was performed on-site, and blood samples were shipped to the YR Gaitonde Centre for AIDS Research and Education (YRGCARE) laboratory in Chennai, India for additional testing. Participants who tested positive were referred to free local HIV treatment centres, and were invited to return within two weeks for their CD4 cell counts.

### Laboratory methods

Participants' HIV status was determined through an algorithm informed by results of three rapid HIV testing kits: Alere™ Determine™ HIV-1/2 (Alere Medical Co., Ltd., Chiba, Japan), First Response HIV

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