

Letter-to-Editor

The syndemic of structural vulnerabilities & HIV risk among men who inject drugs in India: Reflections from a population-based study

Sir,

The article by Chakrapani *et al*¹, titled ‘The syndemic of incarceration, violence victimisation, needle/syringe sharing & HIV infection: A population-based study of men who inject drugs in India’, published in the March 2025 issue of the Indian Journal of Medical Research addresses a much-needed application of syndemic theory to a nationally representative dataset of people who inject drugs (PWID) in India.

However, some methodological concerns limit the generalisability and contemporary relevance of the findings. The reliance on data collected in 2014-15 raises questions about the study’s applicability in 2025, especially given the substantial developments in India’s HIV prevention landscape over the past decade. Expanded opioid substitution therapy, broader needle–syringe programmes, and evolving legal and social responses to drug use likely influenced behaviours and risk patterns, potentially altering the relationships explored in the study^{2,3}. Additionally, the cross-sectional design provides valuable prevalence data but cannot establish causal relationships between incarceration, violence, needle sharing, and HIV infection. This limitation risks conflating correlation with causation, particularly in a complex syndemic framework, where temporality is critical. For example, it remains unclear whether incarceration precedes or follows needle-sharing behaviours, a distinction vital for designing targeted interventions. Additionally, reliance on self-reported data for sensitive behaviours such as needle sharing and violence victimisation introduces recall bias and social desirability bias. Given the stigma surrounding drug use and HIV in India, underreporting of these behaviours is likely, which may underestimate the true prevalence of risk factors and weaken the observed associations⁴. Also, the operationalisation of ‘severe violence victimisation’ as six or more incidents in a year seems arbitrary and may have misclassified individuals who experienced fewer but equally traumatic events.

While the study offers valuable insights, the exclusion of female PWID, who often face compounded risks including sexual violence, limits the generalisability of findings. Moreover, selection bias cannot be completely ruled out, the time-location cluster sampling approach may have excluded PWID in more private or hidden settings, thereby underrepresenting more marginalised subgroups. The potential influence of unmeasured confounders such as mental health conditions, recent harm reduction access, or socioeconomic deprivation further complicates the interpretation of findings⁵.

Although the authors tested additive and multiplicative interactions, the interpretation of semi-elasticities as percentage point changes may confuse readers unfamiliar with such statistical methods. The subgroup driving the significant three-way interaction represented only 0.3 per cent of the sample, raising concerns about statistical power and the stability of estimates. In addition, while HIV programme exposure was included as a covariate, the study did not examine its potential moderating effects on the syndemic relationships, an omission that reduces programmatic relevance given India’s longstanding targeted interventions for PWID.

To advance this important line of inquiry, future research should prioritise the use of recent, longitudinal data to capture evolving patterns and establish causal pathways. Inclusion of female and rural PWID would broaden applicability, and triangulating self-reported behaviours with objective measures such as HIV test records would strengthen validity. Advanced statistical models, including structural equation modelling, could better capture complex syndemic interactions. Finally, ethical considerations, especially in research involving criminalised populations must be revisited in light of changes in India’s legal and policy environment.

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Authors' Response

Sir,

We thank the authors for their correspondence¹. We appreciate this opportunity not only to reinforce for the journal audience how our findings were interpreted in full consideration of the inherent limitations of cross-sectional survey methodology, which we explicitly

outlined in our paper², but also to expand upon the pertinent issues raised.

As detailed in our article (p. 254) and Supplementary Material 2, we had already discussed the relevance and limitations of using data from 2014/15, including the potential impact of changes in exposures and outcomes over time. However, available evidence suggests that the structural and policy landscape for human immunodeficiency virus (HIV) prevention among people who inject drugs in India has remained essentially unchanged. National surveillance data indicate that HIV prevalence among this population has stayed high and relatively stable (9.9% in IBBS 2014/15² vs. 9% in HSS-Plus 2021³), and opioid substitution therapy coverage remains limited (14.9% in HSS-Plus 2021³). Structural barriers to accessing healthcare services due to stigma, including fear of violence, are still reported by people who inject drugs at higher levels (24.4% in 2021³). Needle and syringe programmes under NACO's targeted HIV interventions may have contributed to the national decline in needle/syringe sharing among people who inject drugs (national average: 17.8% in IBBS 2014/15² vs. 4.2% in HSS-Plus 2021³); however, sharing remains substantial in certain regions, for example, 36.8 per cent in Arunachal Pradesh in 2021³. Importantly, needle/syringe programmes are still not available in prisons, the incarceration rate of drug users (who used drugs for personal consumption) is reported to have increased from 2017 to 2021⁴, and opioid substitution therapy is not universally accessible in these settings, except certain prisons like Tihar⁵. Thus, while some behavioural indicators have improved, key structural, legal and policy contexts have not changed significantly since the IBBS 2014/15 survey. Accordingly, the main findings and implications of our study remain relevant to current programmatic and policy efforts. Nonetheless, we agree that periodic, comprehensive studies are needed to monitor trends and inform future interventions.

We agree with Dr. Nagar that the inability of our analysis to shed light on temporal relationships is a generic limitation of all cross-sectional studies, which we noted in our article (p. 254 and Supplementary Material 2). While the IBBS's cross-sectional design limits definitive temporal ordering, the differing recall periods are relevant. Participants were asked about incarceration experience related to drug use 'in the last 12 months' (p. 250). In contrast, needle/syringe sharing was assessed with respect to the last time a study participant injected drugs. Given that injection drug use