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Syndemics of depression, alcohol use, and victimisation, and their association with HIV-related sexual risk among men who have sex with men and transgender women in India

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\textbf{ABSTRACT}

We examined the presence and co-occurrence of psychosocial health conditions (depression, frequent alcohol use, and victimisation) among men who have sex with men (MSM) and transgender (TG) women in India, and their cumulative association with sexual risk. A survey questionnaire was administered among a convenience sample of 600 participants (MSM = 300; TG women = 300) recruited through six non-governmental organisations in four states. Prevalences of the number of psychosocial health conditions among MSM were: none = 31.3\%, one = 43\%, two = 20\%, and three = 5.7\%; and among TG women: none = 9\%; one = 35.33\%, two = 38.33\%, and three = 17.33\%. In bivariate and multivariate models, these conditions were positively and additively related to sexual risk, providing evidence for a syndemic of psychosocial health conditions among MSM and TG women and their synergistic effect on sexual risk. In addition to the number of syndemic conditions, resilient coping and social support were significant predictors of sexual risk among MSM and TG women, respectively. HIV preventive interventions in India should screen for and address co-occurring psychosocial health conditions – experiences of violence, mental health issues, and alcohol use – among MSM and TG women.

\textbf{ARTICLE HISTORY}

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\textbf{KEYWORDS}

Syndemics; HIV/AIDS; men who have sex with men; transgender women; India

\section*{Introduction}

Men who have sex with men (MSM) and transgender (TG) women in India, as in most other countries, are disproportionately affected by the HIV epidemic (Baral et al., 2013; Beyrer et al., 2012). In 2010/2011, the national average HIV prevalence was estimated at 4.4\% among MSM and 8.8\% among TG women, 11–22 times higher than that among the general population (0.4\%), and about 2–3 times higher than that among female sex workers (2.7\%) (Department of AIDS Control [DAC], 2013). The ‘national average’ HIV prevalence of MSM and TG women, however, masks the very high HIV prevalence in certain sites – as high as 10–15\% among MSM, and 18.8\% among TG
women (National AIDS Control Organisation [NACO], 2012). In fact, the Indian government states that while in general the national average HIV prevalence among MSM is declining, ‘rising trends of HIV prevalence among MSM are observed’ (NACO, 2012) in certain sites in various Indian states, including major urban areas such as Mumbai and Delhi where HIV interventions among MSM have been implemented for over a decade.

NACO has given specific attention towards scaling up of HIV interventions among TG women since 2013, the beginning of the fourth phase of the Indian National AIDS Control Program (NACP-IV). However, there has been a steady scaling up of HIV preventive interventions among MSM from the beginning of the third phase of the National AIDS Control Program (NACP-III: 2006–2012), with 181 HIV interventions among MSM in 2012 (DAC, 2013) and plans to further scale up HIV interventions among MSM in the ongoing fourth phase (NACP-IV: 2013–2017). The persistence of relatively high HIV prevalence among MSM thus is unlikely to be explained completely by virtue of a lack of targeted interventions; however, these interventions predominantly focus on the individual level – aiming to increase HIV knowledge and risk perception, to promote and distribute condoms, and to encourage HIV testing (NACO, 2007). Given the lack of adequate attention to mental health issues (Math & Seshahdri, 2013) and to violence against MSM and TG women (Chakrapani, Boyce, & Dhanikachalam, 2011; People’s Union for Civil Liberties-Karnataka [PUCL-K], 2003; Shaw et al., 2012), one possible explanation for ongoing HIV risk may be the presence of multiple psychosocial health conditions, such as depression and victimisation, which interact with one another synergistically (‘syndemics’), thereby increasing vulnerability to HIV infection. The purpose of this study is to test this hypothesis as posited by syndemic theory (Brennan et al., 2012; Dyer et al., 2012; Mustanski, Garofalo, Herrick, & Donenberg, 2007; Stall et al., 2003).

Syndemics refer to the co-occurrence and interactions between two or more diseases or psychosocial public health problems that disproportionately affect the health and well-being of marginalised communities, including MSM (Singer & Clair, 2003; Talman, Bolton, & Walson, 2013) and TG women (Brennan et al., 2012; Operario & Nemoto, 2010). The syndemic approach takes into account the contribution of psychosocial health conditions to the emergence of diseases or other interrelated psychosocial health conditions. Based on this reasoning, a syndemic approach draws attention to the need to prevent the occurrence or mitigate co-occurring problems if one wants to prevent or mitigate a particular public health problem that is part of a syndemic (Singer & Clair, 2003). For example, an increasing number of studies from Western countries have demonstrated that the HIV epidemic among MSM and TG women is associated with syndemic factors, such as depression, childhood sexual abuse, sexual compulsivity, and intimate partner violence (Brennan et al., 2012; Parsons, Grov, & Golub, 2012; Stall et al., 2003). These studies have shown that as the number of psychosocial health conditions increase, there is a corresponding increase (additive or synergistic effect) in sexual risk behaviours and/or HIV prevalence.

Data related to syndemics among MSM and TG women in India are virtually non-existent. A few studies from India have documented the presence of psychosocial health conditions among MSM and their influence on HIV risk: the association between HIV-related stigma and sexual risk (Thomas et al., 2012), the influence of sexual minority-related stigma and HIV-related stigma on depression (Logie, Newman, Chakrapani, & Shunmugam, 2012), an association between depression and sexual risk (Mimiaga et al., 2013;
Safren et al., 2009; Sivasubramanian et al., 2011), and alcohol use and HIV-related sexual risk behaviours (Mimiaga et al., 2011; Yadav et al., 2014); as well as epidemic rates of harassment and sexual violence (Chakrapani et al., 2011; Chakrapani, Newman, Shunmugam, McLuckie, & Melwin, 2007; Newman, Chakrapani, Cook, Shunmugam, & Kakinami, 2008). Limited data are available on psychosocial conditions among TG women, but the available data indicate high levels of physical and sexual violence from police and ruffians (PUCL-K, 2003), and discrimination in health-care settings (Chakrapani, Babu, & Ebenezer, 2004; Chakrapani et al., 2011).

While previous Indian studies have documented associations between individual psychosocial health conditions and HIV risk, we are aware of no studies that have explored multiple co-occurring psychosocial health conditions, or the synergistic relationships between syndemics and sexual risk. The present study aims to address this gap. First, we examined the presence and co-occurrence of depression, alcohol use, and victimisation among Indian MSM and TG women. Second, we assessed whether an increased occurrence of psychosocial health conditions was associated with sexual risk.

**Methods**

Between October 2011 and January 2012, we conducted a cross-sectional survey among MSM and TG women across six study sites in India. The study received ethics approval from the institutional review board of the Humsafar Trust.

Data were collected in collaboration with six non-governmental organisations (NGOs) located in four states (Tamil Nadu, Maharashtra, Delhi, and West Bengal). These agencies offer services (e.g. drop-in centre, support groups, HIV prevention outreach) to MSM and TG women. Three NGOs are in urban locations (The Humsafar Trust [Mumbai], Pahal Foundation [Delhi], and SAATHII [Kolkata]) and three in semi-urban or rural locations (Social Welfare Association for Men [Kancheepuram], Lotus [Kumbakonam], and Moo-knayak[Sangli]).

A convenience sample of participants were recruited through NGOs by trained field research interviewers. Interviewers screened potential participants for eligibility and those who were eligible were enrolled. Inclusion criteria were: age 18 years and over, capability of providing informed consent, and self-identification as from any subgroup of MSM or TG women. The indigenous self-identities among MSM and TG women in India are complex. In general, MSM who identify as kothis are feminine and receptive partners in sexual counters with men, double-deckers are insertive and receptive, and panthis are masculine and insertive (Brahmam et al., 2008; Chakrapani, Newman, Mhaprolkar, & Row Kavi, 2007). Some MSM may identify as gay or bisexual, and are more likely to have post-secondary education and be middle/upper socioeconomic class. Similarly, several identities exist among TG women in India that include hijras, jogta/jogappa and aravani/thirunangai, who have distinct geographical and subcultural backgrounds (Chakrapani & Narrain, 2013; Reddy, 2005).

Survey questionnaires were administered in native languages (Tamil, Hindi, Marathi, and Bengali) by field research interviewers under the supervision of research assistants at the respective study sites. Interviews were conducted in private rooms at the community agencies or in private places that were mutually convenient for the interviewees and interviewers. No personal identifying information was collected.
**Measures**

**Participant characteristics**
Sociodemographic information such as age, income, education, marital status, sexual/gender identity, and self-reported HIV status were collected.

**Sexual risk**
For the main outcome variable, we assessed inconsistent condom use for anal sex in the past month with regular, casual, paying or paid male partners. Participants who reported using condoms every time for anal sex with all partner types were considered to be consistent condom users; others were considered as engaging in high-risk sexual behaviour (hereafter, ‘sexual risk’).

**HIV status**
HIV status was self-reported by participants (positive, negative, or unknown). Those who self-reported being HIV-positive were included as HIV-positive in this analysis.

**Psychosocial health conditions**

*Depression.* We used Beck’s Depression Inventory – Fast Screen scale. The Cronbach’s alpha was .84 for MSM and .83 for TG women, with 6 items and empirical range from 0 to 18. Scores >7 were indicative of moderate/severe depression (MSM: mean = 5.12, SD = 4.1; TG women: mean = 5.98, SD = 4.29).

*Victimisation.* It was characterised by the experience of physical or sexual violence and assessed with three items (‘been hit or beaten up [by anyone]’, ‘physical harassment by police’, ‘sexual harassment by police’). Endorsement of any one of these items was categorised as having been victimised.

*Frequent alcohol use.* Alcohol use was measured with one item: ‘During the past 3 months, what was the average number of days per week in which you drank alcoholic beverages?’ We classified participants as frequent alcohol users if they reported alcohol use more than once a week (‘every day, most days of the week, or a few days a week’), as in previous studies among Indian MSM (Go et al., 2004; Yadav et al., 2014).

**Syndemic variable**
A syndemic variable was created to denote the number of psychosocial health conditions (from 0 to 3). It was included in the multivariable logistic regression analyses to assess whether there is an increase in sexual risk with an increase in the number of problems.

**Analyses**
In line with the analytic strategies used in previously published papers on syndemics (Parsons et al., 2012; Stall et al., 2003), we conducted analyses in four steps. First, we calculated the prevalence of each psychosocial health condition – depression, frequent alcohol use, and victimisation, as well as sexual risk (inconsistent condom use with any type of male partner). Second, we calculated bivariate odds ratios for each pair of variables to determine whether the psychosocial health conditions clustered together. Third, we used a set of multivariable logistic regression models to create separate profiles of MSM
and TG women on depression, frequent alcohol use, victimisation, self-reported HIV-positive status, and sexual risk. Each of these models used the same set of sociodemographic variables. We ran the same logistic model for each of the psychosocial health conditions (depression, frequent alcohol use, and victimisation), self-reported HIV-positive status, and sexual risk, but excluded measures of a given problem from the logistic regression models that assessed that problem as the dependent variable. Finally, to test for synergistic relationships, we calculated the prevalence of sexual risk for each possible count score of psychosocial conditions (from 0 to 3) and used the Chi-square test for linear trend and Gamma (γ) to test the direction and strength of those associations. Hierarchical logistic regression analyses were then conducted to predict sexual risk practices (consistent condom use in the previous month) from a syndemic variable (number of psychosocial health conditions), first controlling for sociodemographic variables, and second, controlling for social support and resilient coping. Mediation analyses (Iacobucci, 2012) were used to test whether social support and resilient coping mediated the relationship between syndemics and sexual risk. The interaction terms (created from the product of the syndemic variable and the proposed moderators – social support and resilient coping) were included in the final step of the regression analyses to assess if social support and resilient coping moderated the relationship between syndemics and sexual risk. We conducted analyses using IBM SPSS version-21. Mediation tests were conducted using the Excel Macro provided by Iacobucci (2012).

Results

Sample characteristics

Table 1 shows characteristics of the sample (n = 600: MSM = 300, TG women = 300). Among MSM, the age of the participants ranged from 18 to 60 years (mean = 30.0; SD = 8.4), and among TG women, from 18 to 75 years (mean = 29.5; SD = 7.8). The self-identities reported by MSM were: kothi = 58.0%, double-decker = 14.3%; panthi = 9.0%; gay = 8.7%; and bisexual = 6.0%. Among TG women, self-identities reported were: hijra = 66.7%, ‘transgender’ (as an identity term) = 24.7%, and jogta = 8.3%. Ten per cent of MSM and 9.3% of TG women self-reported as HIV-positive.

A total of 44.4% of MSM and 50.7% of TG women reported inconsistent condom use with any type of male partner in the past month. The data revealed a high prevalence of psychosocial health conditions. Among MSM, 35.3% had moderate/severe depression, 49.7% had ever experienced physical or sexual violence (victimisation), and 15.0% reported frequent use of alcohol. Among TG women, 42.7% had moderate/severe depression, 84.0% had ever experienced physical or sexual violence (victimisation), and 37.3% reported frequent use of alcohol.

Bivariate associations among psychosocial health conditions (unadjusted odds ratios – UOR) and sexual risk

Among both MSM and TG women, sexual risk was significantly associated with the presence of depression (MSM: UOR = 2.16, p < .01; TG: UOR = 1.84, p < .05) and frequent
alcohol use (MSM: UOR = 2.00; p < .05; TG: UOR = 3.85, p < .001). Among MSM, victimisation was also significantly associated with sexual risk (UOR = 1.66, p < .05).

### Table 1. Sociodemographic characteristics of participants (n = 600).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Overall sample (n = 600)</th>
<th>MSM (n = 300)</th>
<th>TG people (n = 300)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Range</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Age (years)</td>
<td>29.7 (8.1)</td>
<td>18–75</td>
<td>30.0 (8.4)</td>
</tr>
<tr>
<td>Monthly Income (INR)</td>
<td>7323 (5930)</td>
<td>500–40000</td>
<td>6268 (5393)</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>375 62.5</td>
<td>175 58.3</td>
<td>200 66.7</td>
</tr>
<tr>
<td>Semi-urban</td>
<td>225 37.5</td>
<td>125 41.7</td>
<td>100 33.3</td>
</tr>
<tr>
<td>Highest level of completed education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>53 8.8</td>
<td>10 3.3</td>
<td>43 14.3</td>
</tr>
<tr>
<td>5th grade</td>
<td>223 37.1</td>
<td>96 32</td>
<td>127 42.3</td>
</tr>
<tr>
<td>10th grade</td>
<td>143 23.8</td>
<td>75 25</td>
<td>68 22.6</td>
</tr>
<tr>
<td>12th grade</td>
<td>104 17.3</td>
<td>67 22.3</td>
<td>37 12.3</td>
</tr>
<tr>
<td>College degree</td>
<td>72 12</td>
<td>50 16.7</td>
<td>22 7.3</td>
</tr>
<tr>
<td>Other (diploma course)</td>
<td>5 0.8</td>
<td>2 0.7</td>
<td>3 1</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organised sector employee (Public and Private agencies)</td>
<td>156 26</td>
<td>108 36</td>
<td>48 16</td>
</tr>
<tr>
<td>Sex worker</td>
<td>92 15.3</td>
<td>13 4.3</td>
<td>79 26.3</td>
</tr>
<tr>
<td>Unemployed</td>
<td>43 7.1</td>
<td>37 12.3</td>
<td>6 2</td>
</tr>
<tr>
<td>Other (including daily wage laborer, self-employed)</td>
<td>309 51.5</td>
<td>142 47.3</td>
<td>167 55.6</td>
</tr>
<tr>
<td>HIV status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV-positive</td>
<td>58 9.7</td>
<td>30 10</td>
<td>28 9.3</td>
</tr>
<tr>
<td>HIV-negative</td>
<td>446 74.3</td>
<td>217 72.3</td>
<td>229 76.3</td>
</tr>
<tr>
<td>Never tested</td>
<td>90 15</td>
<td>50 16.7</td>
<td>40 13.3</td>
</tr>
<tr>
<td>Don’t want to report/No response</td>
<td>6 1</td>
<td>3 1</td>
<td>3 1</td>
</tr>
<tr>
<td>Been paid for sex in the past 3 months</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>275 45.8</td>
<td>187 62.3</td>
<td>88 29.3</td>
</tr>
<tr>
<td>Yes</td>
<td>325 54.2</td>
<td>113 37.7</td>
<td>212 70.7</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not married</td>
<td>434 72.3</td>
<td>180 60</td>
<td>254 84.7</td>
</tr>
<tr>
<td>Married</td>
<td>166 27.6</td>
<td>120 40</td>
<td>46 15.3</td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No children</td>
<td>49 29.5</td>
<td>25 20.8</td>
<td>24 52.1</td>
</tr>
<tr>
<td>Children</td>
<td>117 70.4</td>
<td>95 79.1</td>
<td>22 47.8</td>
</tr>
<tr>
<td>Current living situation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living alone</td>
<td>185 30.8</td>
<td>44 14.7</td>
<td>141 47</td>
</tr>
<tr>
<td>Living with parents and wife</td>
<td>298 49.6</td>
<td>232 77.3</td>
<td>66 22</td>
</tr>
<tr>
<td>Living with male sexual partner</td>
<td>44 7.3</td>
<td>15 5</td>
<td>29 9.7</td>
</tr>
<tr>
<td>Living with friends/peers</td>
<td>36 6</td>
<td>2 0.7</td>
<td>34 11.3</td>
</tr>
<tr>
<td>Other</td>
<td>37 6.2</td>
<td>7 2.3</td>
<td>30 10</td>
</tr>
</tbody>
</table>

Multivariable logistic regression analyses among intersecting psychosocial health problems

Table 2 shows the multivariable logistic regression models for separate profiles of MSM and for TG women who reported moderate/severe depression, frequent alcohol use, victimisation, HIV-positive status, and sexual risk.
<table>
<thead>
<tr>
<th>Independent variables</th>
<th>MSM (n = 300)</th>
<th>Transgender women (n = 300)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Depressed (AOR, 95% CI)</td>
<td>Frequent Alcohol Use (AOR, 95% CI)</td>
</tr>
<tr>
<td>Depression</td>
<td>1.47 (0.67–3.25)</td>
<td>3.03 (1.69–5.40)*</td>
</tr>
<tr>
<td>Frequent alcohol use</td>
<td>1.38 (0.63–3.01)</td>
<td>0.95 (0.43–2.08)</td>
</tr>
<tr>
<td>Victimisation</td>
<td>2.99 (1.67–5.36)*</td>
<td>0.96 (0.43–2.18)</td>
</tr>
<tr>
<td>Self-reported HIV-positive status</td>
<td>3.38 (1.26–9.12)*</td>
<td>0.53 (0.12–2.33)</td>
</tr>
<tr>
<td>Sexual risk*</td>
<td>2.15 (1.22–3.80)*</td>
<td>1.76 (0.84–3.82)</td>
</tr>
</tbody>
</table>

Note: Controlled for sociodemographic factors such as age, education, occupation, income, marital status, and urban/rural sites.

*Inconsistent condom use (past month) with any type of male partners.

*p < .05.
Among MSM, victimisation (adjusted odds ratio [AOR] = 2.99, 95% confidence interval [CI] 1.67–5.36), self-reported HIV-positive status (AOR = 3.38, 95% CI 1.26–9.12), and sexual risk (AOR = 2.15, 95% CI 1.22–3.80) were significantly associated with higher odds of depression. Similarly, depression (AOR = 3.03, 95% CI 1.69–5.40) was significantly associated with higher odds of victimisation; and depression (AOR = 2.23, 95% CI 1.26–3.95) and HIV-positive status (AOR = 0.20, 95% CI 0.07–0.63) were significantly associated with sexual risk (the lower odds with HIV-positive status possibly indicating that once aware of their status, people living with HIV are less likely to engage in sexual risk behaviours).

Among TG women, sexual risk (AOR = 2.04, 95% CI 1.15–3.60) was significantly associated with higher odds of depression; victimisation (AOR = 3.25, 95% CI 1.11–9.57) and sexual risk (AOR = 4.70, 95% CI 2.52–8.79) were significantly associated with higher odds of frequent alcohol use; frequent alcohol use (AOR = 3.50, 95% CI 1.21–10.13) was significantly associated with higher odds of victimisation; and depression (AOR = 2.12, 95% CI 1.19–3.78), frequent alcohol use (AOR = 4.82, 95% CI 2.58–9.01), and self-reported HIV-positive status (AOR = 0.24, 95% CI 0.08–0.70) were significantly associated with sexual risk.

Additive effects of co-occurring psychosocial health conditions (syndemics) on sexual risk of MSM and TG women

We assessed the additive effects of the three psychosocial health conditions on the likelihood of engaging in sexual risk (i.e. inconsistent condom use with any type of male partners). We created a count score for the number of psychosocial health conditions (0–3) reported by each participant. The prevalence of each number of psychosocial health conditions (depression, frequent alcohol use, and victimisation) among MSM was: none = 31.3%, one = 43.0%, two = 20.0%, and three = 5.7%; and among TG women: none = 9.0%; one = 35.3%, two = 38.3%, and three = 17.3%. A higher number of conditions was significantly and positively associated with sexual risk. Among MSM, 31.6% of men experiencing no psychosocial health conditions reported sexual risk; and 40.9% who had one condition, 59.6% who had two conditions and 76.5% who had three conditions reported sexual risk (Figure 1). Among TG women, 28.0% who had no psychosocial health condition reported sexual risk; and 34.9% who had one condition, 56.6% who had two conditions and 81.3% who had three conditions reported sexual risk (Figure 1). The Chi-square test for linear trend that assessed the association between the number of problems and percentage of persons who reported sexual risk (Gamma for MSM = 0.38, p < .001 and TG women = 0.52, p < .001) showed a strong and significant association for both MSM and TG women.

These same analyses were conducted in multivariable logistic regression models adding controls for age, education, income, and study sites, and we obtained similar findings. In general, among both MSM and TG women, as the number of psychosocial health conditions increased, the adjusted odds ratios also increased (compared with participants who reported no psychosocial health conditions) for sexual risk (Table 3). For example, among TG women, the odds of inconsistent condom use with any type of male partner increased with the number of conditions: 1 condition, AOR = 1.42, 95% CI 0.53–3.80; 2 conditions, AOR = 4.12, 95% CI 1.54–11.00; 3 conditions, AOR = 15.77, 95% CI 4.71–52.84 (Table 3).
When resilient coping and social support were included in the models for MSM, resilient coping was significantly (AOR = 0.33, 95% CI 0.15–0.55) associated with lower odds of sexual risk and social support was not a significant predictor. In mediation analyses, resilient coping was a significant mediator of the relationship between syndemics and sexual risk.
risk among MSM (1 syndemic condition: $z_{\text{Mediation}} = 1.57, p = .11$; 2 syndemic conditions: $z_{\text{Mediation}} = 2.76, p = .005$; 3 syndemic conditions: $z_{\text{Mediation}} = 2.54, p = .011$). Resilient coping fully mediated the relationship between two syndemic conditions and sexual risk, and partially mediated the relationship between three syndemic conditions and sexual risk. Social support was not a significant predictor of sexual risk among MSM.

Among TG women, social support (AOR = 0.50, 95% CI 0.25–0.99) was similarly a significant predictor of sexual risk (Table 3); however, resilient coping was not a significant predictor. Social support and resilient coping did not significantly mediate or moderate the relationship between syndemics and sexual risk among TG women.

**Discussion**

We identified high prevalence of co-occurring psychosocial health conditions among MSM and TG women in India, as well as a positive linear trend (dose-response effect) between the number of syndemic conditions and HIV-related sexual risk, providing evidence for the synergistic relationship between the number of syndemic conditions and sexual risk.

The high prevalence of two or more co-occurring psychosocial conditions (depression, alcohol use, and victimisation) among MSM and TG women in this study appear to reflect the challenges faced by these marginalised communities at multiple levels – individual, family, institutional, and structural levels – as documented in published qualitative studies from India (Chakrapani et al., 2011; Chakrapani, Newman, Mhaprolkar, et al., 2007; Chakrapani, Newman, & Shunmugam, 2008; PUCL-K, 2003; Safren et al., 2009). Non-acceptance of people with non-heterosexual sexualities and TG identities by the larger society and one’s own family may contribute to internalised stigma among same-sex attracted persons and TG persons, as well as enacted stigma, including physical and sexual violence (Chakrapani, Newman, Shunmugam, et al., 2007; PUCL-K, 2003), all of which are associated with psychological distress (Logie et al., 2012; Math & Seshahdri, 2013).

Our findings are consistent with other studies among MSM in India that have shown a high prevalence of depression (Logie et al., 2012), sexual harassment and violence (Newman et al., 2008), and alcohol use (Yadav et al., 2014). Results corroborate prior studies that report associations between depression and sexual risk (Mimiaga et al., 2013; Safren et al., 2009; Sivasubramanian et al., 2011) and between alcohol use and sexual risk (Yadav et al., 2014). Our findings are also consistent with studies from India’s neighbouring countries, including Nepal (Deuba et al., 2013; Singh, Pant, Dhakal, Pokhrel, & Mullany, 2012; Wilson, Pant, Comfort, & Ekstrand, 2011), Bangladesh (Khan et al., 2009), and Pakistan (Bhanbhro & Wassan, 2013), which documented that human rights violations and societal stigma targeting sexual minorities are negatively associated with mental and sexual health. These important studies from developing and developed countries examined associations between single psychosocial health conditions and sexual risk; we build on this evidence base by introducing a syndemic approach and examining associations between multiple psychosocial health conditions and sexual risk.

While some studies conducted among MSM in India have included TG women in the sample, they do not provide disaggregated data on TG women that indicate the prevalence of psychosocial conditions and their associations with sexual risk. We are aware of only
one published study that reported high prevalence of sexual violence (25.9%) among ‘kothi/hijras’ in Karnataka state in India (Shaw et al., 2012), but the data are not disaggregated by gender identity. Thus, our study is among the first to provide information on the prevalence of depression, victimisation, and sexual risk among TG women in India, and to indicate the association between syndemic conditions and sexual risk.

Our finding that an increase in the number of syndemic conditions is associated additively with an increase in sexual risk is consistent with findings from studies conducted among MSM and TG women in both developing (Biello, Colby, Closson, & Mimiaga, 2013; Yu et al., 2013) and developed countries (Ferlatte, Hottes, Trussler, & Marchand, 2013; Herrick et al., 2013; Wim, Christiana, & Marie, 2014). Few studies from Western countries (e.g. Brennan et al., 2012) have documented syndemics and sexual risk among TG women. The present study thus contributes to understanding syndemics among this understudied population (Operario & Nemoto, 2010).

In line with syndemic theory, our findings strongly suggest that HIV prevention efforts among MSM and TG women need to move beyond individual-level sexual behaviour change approaches (such as sexual risk reduction counselling and condom distribution) to more comprehensive, multilevel approaches through intervention components that address mental health concerns – including internalised stigma and victimisation experiences. In addition, structural interventions that address societal negative attitudes towards same-sex attracted people and TG women, and efforts to combat laws that effectively criminalise people with non-heterosexual sexualities and TG identities, are also needed. Mental health professionals in India have similarly drawn attention to the importance of addressing the mental health of sexual minorities (Math & Seshadri, 2013). In some current pilot HIV interventions among MSM and TG women, ‘special’ counsellors have been hired to address mental health issues, such as family pressure to get married to a woman, and internalised stigma (India HIV/AIDS Alliance, 2014).

Generally, support services for victims of sexual violence are provided by community-based agencies that link survivors with government hospitals; however, gaps in violence support services in the form of lack of understanding of sexual minorities among health-care providers, lack of sensitive post-violence counselling, and lack of post-sexual exposure prophylaxis to prevent HIV infection have been documented (Chakrapani et al., 2011). Steps need to be taken to address these gaps by training and sensitising health-care providers, and ensuring the availability of post-exposure prophylaxis and long-term follow-up mental health counselling. At the time of conducting the study, Section-377 of the Indian Penal Code that criminalises adult consensual same-sex relations was not enforced and ‘read down’ (i.e. was not being used against consensual same-sex adult relations). However, after the widely publicised 2013 Supreme Court judgement, which recriminalised non-penovaginal sexual practices between consenting adults, sexual minorities appear to be increasingly viewed as ‘deviant’ and as criminals by the general public, further exacerbating discrimination from society as well as self-stigma. Therefore, a multi-pronged strategy is needed to effectively address HIV epidemics among sexual minorities in India in terms of improving their mental health, preventing violence, and offering support services for victims of violence, sensitising the general public and health-care providers, and creating a legal environment that protects the fundamental human rights of sexual minorities.
The finding that resilient coping may mediate the impact of syndemics on sexual risk among MSM and social support may mediate the impact of syndemics on sexual risk among TG women indicate that interventions to promote social support and cultivate and sustain resilience might be of help. These interventions might include psychoeducational support groups that are culturally competent in addressing the specific concerns of sexual minorities. However, among our sample of TG women, resilient coping and social support did not offer protection against sexual risk in the presence of syndemics; this reinforces the importance of addressing structural factors (such as societal negative attitudes and presence of criminal laws) that place sexual minorities at risk. Even as some hijras have highly connected social support networks (Chakrapani, Newman, Mhaprolkar, et al., 2007), these may not be sufficient to mitigate the pervasive impact of syndemics on sexual risk.

Future research should identify other potential syndemic conditions, and how various syndemic conditions interact in contributing to HIV-related sexual risk among probability-based samples of MSM and TG women, and in settings beyond community-based agencies in India. Future investigations might adopt respondent-driven sampling (Carballo-Dieguez et al., 2011) or time-location sampling (Brahmam et al., 2008; Newman, Chakrapani, Weaver, Shunmugam, & Rubincam, 2014) used to successfully recruit MSM and TG women in prior studies, to increase the generalisability of findings. Further investigations are also needed to identify feasible and effective public health models that include a combination of individual-, community-, and structural-level HIV interventions for MSM and TG women in order to address syndemic conditions that are associated with sexual risk. The identification and evaluation of protective factors and interventions to promote resilience and social support among MSM and TG women also may contribute to comprehensive prevention strategies.

Limitations

We used convenience sampling among MSM and TG women who were connected to community-based organisations; thus the results are not generalisable to the larger population of MSM and TG women in India. However, we recruited a diverse sample of MSM and TG women from urban and semi-urban/rural sites in four different regions in India among whom we found evidence for the association between syndemics and sexual risk. As in any study of sexual and drug using behaviours, social desirability bias may have led to underreporting of sexual risk and alcohol use. Additionally, HIV status was self-reported; and we did not perform confirmatory lab tests to verify HIV status. This may have resulted in underreporting of HIV-positive status (misclassification bias). Despite such possible underreporting, we still found significant associations between sexual risk and the number of syndemic conditions. The measures of depression and alcohol use relied on a recent time frame, which helps to mitigate difficulties in recall; lifetime prevalence of depression and problematic alcohol use would likely have been higher among MSM and TG women, contributing cumulatively to sexual risk, and thus lending further support to the significant associations we identified. The use of a three-item measure for victimisation and a single-item measure of alcohol use may have affected the validity of these measures. Also, the prevalence of victimisation might be an underestimate as we did not include items on physical or sexual harassment by persons other than
police. The cross-sectional survey design also limits us to identifying associations rather than causation; however, our findings are aligned with our conceptual model based on syndemic theory, which predicts that an increase in the number of syndemic conditions contributes to increases in sexual risk. Another limitation to our study was insufficient power to test combinations of syndemics most strongly correlated with sexual risk. Future research could explore specific combinations of syndemic conditions that contribute to sexual risk among MSM and TG women.

**Conclusion**

We have presented the first evidence from India on the presence of syndemics among MSM and TG women; and we have also demonstrated that as the number of co-occurring psychosocial conditions increases, HIV-related sexual risk also increases. These findings strongly suggest that to decrease the risk of HIV transmission and acquisition among sexual minorities in India, HIV preventive interventions need to augment traditional individual-level sexual behaviour change approaches (condom distribution and sexual risk reduction counselling), with screening for various psychosocial problems (such as experiences of sexual and physical violence, depression, and alcohol use) and develop intervention components that address these problems, as well as implementing structural interventions to change society’s negative attitudes towards sexual minorities and create an enabling legal environment. Future investigations should develop and test multilevel and multicomponent HIV intervention models that address key syndemic conditions among diverse subgroups of MSM and TG women in India.

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