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ORIGINAL PAPER

HIV Testing by Gender Identity Among Sexually Active Transgender-, Intersex-, and Hijra Individuals Reached Online in India

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Abstract

Online outreach may be an important strategy to reach Indian gender minority (GM) populations for HIV testing. However, little is known about Indian GM populations reached online who are sexually active and their HIV testing behaviors. We conducted a secondary analysis of an India wide online cross-sectional survey to assess HIV testing and identify associated factors. The 467 GM respondents identified their gender as transgender women (29.6%), Hijra (5.1%), intersex (37%), or gender non-binary (28.3%). Overall, almost half (47.5%) had never been tested for HIV; among respondents having condomless anal sex, half (50%) reported never testing for HIV. A decreased odds of ever HIV testing was associated with being unsure how to access free testing (compared to being easy; AOR = 0.36, 95%CI 0.20, 0.63) and unaware of comfortable testing sites (AOR = 0.32, 95% CI 0.20, 0.63). Increased odds of testing were associated with identifying as Hijra (compared to transgender women; AOR = 4.07, 95%CI 1.18–16.92) and disclosing sexual behaviors to a doctor (AOR = 3.20, 95% CI 1.91, 5.46). In this GM sample recruited online, HIV testing rates were low. Online interventions are needed to engage individuals with diverse GM identities in India for linkage to accessible and acceptable HIV testing options.

Keywords Transgender · HIV testing · India · Social media · Gender identity

Introduction

India has the third largest number of people living with HIV globally, with the epidemic being disproportionately concentrated in marginalized communities (e.g. transgender women, men who have sex with men [MSM], sex workers, and injection drug users). Similar to the global HIV epidemic, transgender women have amongst the highest rates of HIV in India and are particularly hard hit. Recent data from 2021 estimates HIV prevalence among transgender women to be 3.78% (95% CI 3.24–4.33%), more than 17 times the prevalence (0.22%) among the overall Indian population [1].

The concept of defining gender identities beyond the spectrum of binary in research has been relatively recent, with limited health data on gender-diverse individuals in India. India's National AIDS Control Program (NACP) [2] initially categorized transgender women and Hijras (an identity unique to South Asia, and often used interchangeably with transgender woman in the literature) as a population at increased risk of HIV in 2007. However, the need for tailored HIV prevention models for transgender people was only identified by the NACP in 2012 [3]. While there have been various government supported HIV prevention interventions [4] directed towards transgender women (TGW) and Hijra populations, none of them have had programs to explicitly focus on people identifying as intersex or gender non-conforming/non-binary—groups with likely unique challenges in accessing HIV prevention, treatment, and support services [5]. Studies reporting on the prevalence rates and HIV risk factors, generalize the Indian transgender community into either Hijras or transgender women [6–8] failing to recognize intersex and gender non-conforming/non-binary individuals, which negatively impacts their visibility and possibly discounting their experiences and issues with accessing HIV associated health care.

Even though there has been overall increases in HIV testing services [4], there are limited data about India-wide HIV

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testing uptake among gender-diverse populations such as intersex and gender non-conforming/non-binary identities. The limited studies that do exist, which primarily focus on transgender women, report that fear of discrimination or having experienced discrimination from health care providers [9] hinders access to HIV testing [10, 11] and sexual health [12] services. However limited additional data exist on the factors influencing HIV testing—information needed to develop interventions to promote HIV testing.

Earlier studies of Indian TGW have recruited participants using in-person approaches that have often restricted participation to TGW who are reachable via known physical venues (e.g., people engaged in sex work); hence, excluding other gender-diverse groups that could be reached online or have internet access, do not use sex work as their major source of living, and have higher literacy levels. Although several studies exist on HIV prevention among sexual minority individuals reached online in India, most report on men who have sex with men (MSM) and often from select Indian cities [13–15]. To our knowledge, there are no studies about Indian transgender women or other gender minority individuals (who are a different and unique population from MSM) reached online or their HIV testing behaviors. To help address these gaps in information about HIV testing among diverse gender minority individuals reachable online, we conducted a secondary analysis of an India wide cross-sectional HIV prevention survey. This analysis focuses on sexually active gender minority individuals who have sex with men and recruited completely online (i.e., geospatial dating apps and web-based LGBTQ+ social pages) and explores factors associated with HIV testing.

Methods

Study Design, Setting, Respondents

This study used a web-based, self-administered, cross-sectional survey administered from 6 January 2017 to 5 February 2017. We recruited respondents by placing banner, pop-up advertisements and posts on multiple Indian LGBTQ+ social media pages and three sexual minority-specific mobile geospatial dating applications to reach individuals anywhere in India. Advertisements contained links to the survey site, which provided study information, informed consent, a brief screening survey, and the main questionnaire. People could choose between Hindi and English versions of the survey, which was optimized for mobile phones and hosted by SurveyGizmo (Boulder, Colorado, USA). We limited duplicate respondents using web browser cookies and restricted multiple responses from one IP address. Respondents could stop the survey at any time or choose to skip questions. Upon survey completion, respondents were directed to a webpage with HIV prevention and testing resources, including contact information for The Humsafar Trust. Participation was anonymous, with the option to enter contact information (not linked to survey responses) for a drawing for one of ten 1000 Indian Rupees (approximately $15 USD) Amazon India gift cards. The participants had a 1 in 465 chance of receiving reimbursement for participation in the survey.

Inclusion & Exclusion Criteria

Inclusion criteria for this analysis were: (1) 18 years of age or older, (2) assigned male at birth, (3) identifying their gender identity as not male, (3) anal sex with male or transgender partners in the past 2 years, and (4) living in India at the time of the study. Individuals born outside South Asia (India, Pakistan, Nepal, Sri Lanka, or Bhutan) were excluded. The study was reviewed and approved by the human subjects research review boards at The Humsafar Trust (Mumbai, India) and Albert Einstein College of Medicine (Bronx, United States).

Measures

Our study team adapted the survey used in this study from a previous online survey of MSM in the USA [16]. The team included research, program staff, and peer outreach workers from the partner LGBTQ+ community-based organization (The Humsafar Trust) in India and experts in sexual and gender minority health research. We ensured that all survey items and response choices were relevant to the Indian context. English questions were professionally translated into Hindi and then refined by consensus with four bilingual Humsafar staff members and a monolingual Hindi speaker to ensure conceptual equivalency [17]. Both English and Hindi language surveys were pre-tested with five peer outreach staff and then further refined for clarity and comprehension.

Demographic Characteristics

Respondents reported their age, gender identity, sex assigned, education, current town/city and state, the cities were categorized into tier 1, tier 2 and tier 3 based on population size (tier 1: ≥ 100,000 population; tier 2: 50,000–99,999 population; and tier 3: < 50,000 population).

Sexual Health and Behaviors

We asked if they currently had concerns about their sexual health and in the past 6 months, the number of anal sex partners, paid male sex partners (yes/no), condomless anal sex (CAS) (yes/no), and alcohol or drug use during sex in the past 12 months (yes/no).

Structural Factors

We assessed the ease of access to free HIV testing using a five-point Likert scale (very difficult to very easy) and then categorized the responses as difficult, unsure, and easy. We also asked about awareness of a clinic or laboratory where they would feel comfortable accessing HIV testing (yes/no), and access to sexual health care was indicated by answering if respondents had ever discussed their sexual health with a doctor (yes/no).

HIV Testing (Primary Outcome) and Reasons for Not Testing

We asked "Have you ever been tested for HIV?" and dichotomized the responses as yes versus no/don't know. Among the respondents who answered no, we asked them to select from a list of reasons for not HIV testing. Reasons were enumerated from prior studies [10], HIV testing monitoring reports by The Humsafar Trust, and inputs from HIV testing and peer outreach staff. The choices provided as reasons for not testing were: not being at risk of HIV, felt scared to get tested, did not know where to get tested, plan to get tested soon, and not having time.

Data Analysis

This was a secondary analysis using data collected from a larger nationwide survey [18]. We calculated frequencies and means to describe the sample and their HIV-testing behaviors. Then, we conducted bivariate and multivariable analyses to determine factors associated with ever having an HIV test, using logistic regression. We included all variables that were significant ($p < 0.05$) in the bivariate analysis in the multivariable model, and report results using adjusted odds ratios (AOR) and 95% confidence intervals (CI). We assessed missing data patterns for the variables of interest and assumed the data to be missing at random. To account for missing data in the covariates of interest, we used multiple imputation with chained equations and imputed 20 sets [19]. In sensitivity analyses, we examined models using complete case analyses and multiple imputation. R Studio was used for all analyses.

Results

Overall, the survey link was clicked 16,290 times, 7941 consented, 4646 completed the survey, of which 467 met inclusion criteria and were included in this analyses.

Demographic Characteristics

Of the 467 respondents, 29.6% identified as a transgender woman, 37% identified as being intersex, 5.1% as Hijra, and 28.3% as gender non-conforming/non-binary (see Table 1). The mean (SD) age was 26.3 (6.7) years, 74% of the respondents had attended college and obtained higher educational degrees. Majority of respondents (58%) lived in a Tier 1 city (large metropolitan city). Respondents were from 16 states and one territory, most frequently from Maharashtra (26.6%), Delhi (18.2%), Karnataka (7.5%), Gujarat (7.1%), and Uttar Pradesh (6.2%) (see supplementary table for frequency of all states).

Sexual Health and Behaviors

Sexual health concerns were reported by 124 (26.6%) respondents. In the past 6 months, respondents reported a mean (SD) of 9.8 (13.8) men/Hijra/transgender anal sex partners, 140 (43.3%) reported having condomless anal sex (CAS), and 31 (9.3%) had sex with a paid male partner. In the past 12 months, 32.8% reported using alcohol or drugs before or during sex.

Structural Factors

Overall, 36.6% reported difficulty in accessing free or low cost HIV testing, while 26.4% were unsure or lacked knowledge of the availability of free or low cost HIV testing clinics or laboratories. 43.7% reported to not having testing centers/clinics/laboratory in their town/city where they feel comfortable going for testing. 72.1% of the respondents reported that they have never told any doctor about having sex with other men or transgender individuals.

HIV Testing and Associated Factors

Table 1 shows the frequency of HIV testing by demographic and other characteristics. Overall, almost half of the sample (47.5%) reported never testing for HIV. Among respondents reporting condomless anal sex in the past 6 months, 70/140 (50%) had never tested for HIV, while 36/105 (34.3%) individuals who used alcohol or drugs surrounding sex in the past 12 months also reported never having an HIV test. Most respondents identifying as Hijra had ever tested for HIV (83.4%) with ever HIV testing ranging from 44 to 55% for other gender identities (transgender women, intersex, gender non-conforming/non-binary). Respondents from metropolitan, urban and semi-urban/rural areas had similar rates of HIV testing (52%, 48%, 58% respectively).

In multivariable analysis (shown in Table 1), ever HIV testing was significantly associated with identifying as Hijra compared to transgender woman (AOR = 4.07, 95% CI 1.18,

Table 1 Participant characteristics and factors associated with HIV testing among transgender women, Hijras, intersex and gender non-binary individuals reached online in India, 2017

	Total	Ever tested	Odds of ever testing for HIV	
	N (%)[a]	n (%)	OR (95% CI)	aOR (95% CI)
Demographic characteristics				
Age mean (SD)	26.3 (6.7)	27.7 (7.3)	**1.08 (1.05, 1.12)***	**1.06 (1.02, 1.10)***
Gender identity	467	245 (52.5)		
Transgender woman	138 (29.6)	72 (52.2)	Ref	Ref
Intersex	173 (37.0)	95 (54.9)	1.12 (0.71, 1.75)	1.20 (0.71, 2.02)
Hijra	24 (5.1)	20 (83.4)	**4.58 (1.63, 16.38)***	**4.07 (1.18, 16.92)***
Gender non-conforming/non-binary	132 (28.3)	58 (43.9)	0.72 (0.44, 1.16)	0.59 (0.33, 1.04)
Education	305	176 (57.7)		
High school or less	81 (26.6)	44 (54.3)	Ref	Ref
College or more	224 (73.4)	132 (58.9)	1.2 (0.79, 1.80)	1.45 (0.88, 2.40)
City size[b]	467	245 (52.5)		
Tier 1 (metropolitan)	269 (57.6)	140 (52.0)	Ref	Ref
Tier 2 (urban)	100 (21.4)	48 (48.0)	0.85 (0.54, 1.35)	0.92 (0.53, 1.59)
Tier 3 (semi-urban/rural)	98 (20.9)	57 (58.2)	1.28 (0.80, 2.05)	1.30 (0.75, 2.29)
Sexual health and behaviors				
Concern about sexual health	467	245 (52.5)		
No	343 (73.4)	185 (53.9)	Ref	Ref
Yes	124 (26.6)	60 (48.4)	0.8 (0.53, 1.21)	0.97 (0.59, 1.61)
Anal sex partners in past 6 months mean (SD)	9.8 (13.8)	11.2 (14.9)	**1.02 (1.01, 1.04)***	1.01 (0.99, 1.02)
Paid male sex partner	336	192 (57.1)		
No	305 (90.7)	171 (56.1)	Ref	Ref
Yes	31 (9.3)	21 (67.7)	1.75 (0.95, 3.32)	1.39 (0.66, 2.99)
Condomless anal sex in past 6 months	323	183 (56.7)		
No	183 (56.7)	113 (61.7)	Ref	Ref
Yes	140 (43.3)	70 (50)	**0.6 (0.42, 0.87)***	0.74 (0.47, 1.16)
Drug or alcohol use during sex in past 12 months	320	182 (56.9)		
No	215 (67.2)	113 (52.6)	Ref	Ref
Yes	105 (32.8)	69 (65.7)	1.45 (0.98, 2.13)	1.10 (0.69, 1.75)
Structural factors				
Accessible HIV testing clinics	295	163 (55.3)		
Difficult	108 (36.6)	56 (51.9)	**0.54 (0.35, 0.83)***	0.77 (0.45, 1.33)
Unsure	78 (26.4)	29 (37.2)	**0.27 (0.16, 0.44)***	**0.36 (0.20, 0.63)****
Easy	109 (36.9)	78 (71.6)	Ref	Ref
Comfortable HIV testing clinics	295	163 (55.3)		
No	166 (56.3)	66 (39.8)	**0.3 (0.20, 0.44)****	**0.32 (0.20, 0.63)****
Yes	129 (43.7)	97 (75.2)	Ref	Ref
Discussing sexual health with doctor	462	242 (52.4)		
No	333 (72.1)	142 (42.6)	Ref	Ref
Yes	129 (27.9)	100 (77.5)	**4.67 (2.96, 7.54)****	**3.20 (1.91, 5.46)****

*$p < 0.01$, **$p < 0.001$

[a]N varies due to missing data

[b]Tier 1 have ≥ 100,000 population; Tier 2 cities have 50,000–99,999 population and Tier 3 < 50,000 population

16.92), older age (AOR = 1.06 per year, 95% CI 1.02, 1.10), and discussing with their doctors about having sex with other men or transgender individuals (AOR = 3.20, 95% CI 1.91, 5.46). On the contrary, a significantly decreased odds of ever HIV testing was associated with participants who were unsure about accessing free/low-cost HIV testing centers (AOR = 0.36, 95% CI 0.19, 0.83; reference: easy to access free HIV testing), and those unaware of a HIV testing

center they could feel comfortable to go (AOR = 0.32, 95% CI 0.20, 0.63). In sensitivity analyses, results were similar by complete case analysis and multiple imputation (not shown).

Reasons for Not Testing for HIV

Among respondents who had never tested for HIV and answered questions about reasons for not testing (n = 196), 36% reported not being at risk of HIV as a reason to not getting HIV testing, 26% felt scared to get tested, 14% did not know where to get tested, 13% planned to get tested soon, and 12% reported not having time.

Discussion

In a sample of gender-diverse individuals consisting of transgender women, Hijras, intersex, and gender non-conforming/non-binary individuals from across India, we report on potentially modifiable or intervenable factors associated with HIV testing. To our knowledge, this is one of the first studies to report on HIV testing prevalence and associated factors among Indian gender minority individuals reached online. Notably, we found that only half of the respondents reported ever being tested for HIV, including among those who reported condomless anal sex. However, despite the high educational attainment of our online sample, HIV testing rates were low and represent a unique group in need of attention to increase HIV testing uptake.

In this study, access related factors were significantly associated with HIV testing. Respondents who were unsure about accessing low-cost or free HIV testing had lower odds of ever being tested for HIV. This is consistent with in-person studies that report a lack of access to low-cost or free HIV testing as a barrier to HIV testing among GM in India [8, 11]. Travel time, distance, and travel cost to these HIV testing centers along with stigma associated with these facilities were other barriers reported in these studies [8, 11]. Additionally, respondents who reported not being aware of a clinic or laboratory where they felt comfortable being tested for HIV had lower odds of ever being tested for HIV. HIV testing sites that participants were aware of may not be a comfortable or preferred option for a variety of reasons including negative attitudes and discrimination by staff towards gender minority populations, inconvenient or long waiting times, and burdensome registration and pre-counseling processes [8, 10, 11]. Our findings suggest the need for online outreach to link Indian GM individuals to free, convenient, and gender-affirming and safe testing sites, as well as the likely need to increase such options [20, 21]. Additionally, increasing HIV testing options (e.g., self-testing) may help increase accessibility and merit further research.

We also found that respondents who reported discussing their sexual behaviors with doctors had higher odds of ever being tested for HIV. This finding may reflect that participants who had access to doctors or providers who either asked GM individuals about their sexual behaviors and with whom respondents felt comfortable enough to discuss their sexual behaviors, were perhaps more likely to be recommended for and accept an HIV test. Prior research has found that provider attitudes and beliefs, provision of gender-affirming care, and a sex-positive care environment likely play an important role in provision of clinical care, including HIV testing. In contrast, stigma and a lack of cultural and clinical competency among providers has been cited as reasons for lower uptake of HIV testing among GM individuals [10, 11]. Competency and gender-affirming care training could orient the staff and doctors to provide a more comfortable clinic or laboratory environment, influencing the uptake of testing services and rate.

Interestingly, we also found differences in testing by gender identity. Respondents identifying as Hijra had a significantly greater likelihood of HIV testing compared to transgender women. This could be due in part to the explicit focus on Hijra communities by national HIV prevention programs. For example, community mobilization and outreach campaigns such as 'Pehchan', an initiative of the National AIDS Control Program appear to have been associated with increased HIV testing and HIV awareness and education among Hijra communities [4], and India's National AIDS Control Program has continued to support targeted interventions for Hijra communities. This finding could also be in part due to Hijras being a visible and distinct sociocultural group existing in Indian and other South Asian societies for centuries with organized hierarchical social systems and thus historically identifiable by public health initiatives. On the other hand, individuals identifying as transgender women, intersex, and gender non-conforming/non-binary have not had such organization and visibility [22, 23]. Our findings suggest a need for better gender identity data in program indicators and research and further research is needed to determine best approaches to collect information about diverse gender minority identities in India and likely globally. Additionally, our findings on differences in HIV testing by identity suggest a likely need for tailored outreach and engagement strategies for different GM individuals and warrant further program development and research.

Surprisingly, the study sample had very high educational attainment. This may have been due to the survey being available only in Hindi or English and a lack of other local languages. The high educational status may also reflect the limited reach of our recruitment methods and the lack of gender-minority specific dating apps and social media sites (all of which primarily use English for registration and navigation) at the time of study. This may

also reflect a digital divide at the time of study with individuals with lower educational attainment less engageable online. Despite this sampling bias, HIV testing rates were low in our sample suggesting that the individuals reached likely represent a population in need of online interventions. Additionally, given the widespread adoption of mobile phones, including smartphones, among all segments of the Indian population (likely including gender-minority individuals), ongoing research is needed to understand how to better reach and engage more socioeconomically diverse GM populations including with online strategies [24].

Strengths and Limitations

There are several strengths of this study. Globally and in India, gender minority individuals who have sex with men have often been either grouped with MSM or the Hijra community [7, 8, 11]. First, we report separately by diverse gender minority identities (i.e., transgender woman, intersex, Hijra, gender non-conforming/non-binary) and found significant differences by identity, which has previously not been done or reported on to our knowledge, and has implications for practice and research. Second, this is one of the first studies in India to our knowledge to recruit online a sample of gender minority individuals. Finally, that data we report are novel given that there have been no country wide data published on HIV testing rates of the gender-diverse individuals reachable online or reporting on likely modifiable factors associated with testing.

This study also has several limitations to consider. First, recruitment methods included geospatial dating apps and LGBTQ+ social media webpages used mostly by cis-gender men which likely limited the reach to diverse gender minority respondents. However, at the time of the study, there were no geospatial dating apps or websites specific to gender-minority individuals in India. Next, participation in the survey also required access to internet services and a degree of digital literacy, making this sample not representative of individuals with poor internet access or low digital literacy. Research methods are needed for online surveys to better understand and minimize impact of low digital literacy. Due to resource limitations, the survey was available only in Hindi or English, which excluded participation by individuals who were only fluent in other Indian languages. However, despite this bias, our findings show a group in need of attention and likely reflect on gender minority individuals who were fluent in Hindi and English and reachable via geospatial dating apps and LGBTQ+ social media pages in India. Finally, this was a cross-sectional study and thus causality cannot be inferred.

Conclusion

In conclusion, we found that only about half of the gender minority respondents who were sexually active with men from across India had ever had an HIV test, and identified potentially modifiable factors and targets for future intervention. Our findings suggest a likely need for tailored outreach interventions for diverse gender minority identities reachable online. Finally, Internet-based outreach and engagement to Indian GM individuals using online platforms along with increasing access and linkage to free and comfortable HIV testing options may help increase HIV testing and merits further program development and research.

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Author Contributions VVP, AD, SR—Conception, design and data collection. DD—Initial drafting with critical input and revisions from all authors. VVP, DD, RK—Analyses. All authors contributed to interpretating the results, editing, and approved the final version submitted.

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Data Availability The authors confirm that the data supporting the findings of this study are available within the article.

Code Availability N/A.

Declarations

Conflict of interest The authors have no conflicts of interest.

Ethical Approval Approval from Albert Einstein College of Medicine Institutional Review Board and Humsafar Trust Institutional Review Board.

Consent to Participate All participants provided informed consent.

Consent for Publication All authors approve of this manuscript.

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