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Syndemics and gender affirmation: HIV sexual risk in female-to-male trans masculine adults reporting sexual contact with cisgender males

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Abstract

Female-to-male trans masculine adults who have sex with cisgender (non-transgender) males (TMSM) represent an understudied population in relation to HIV/STI risk. This study examined the role of syndemic conditions and social gender affirmation processes (living full-time in one's identified gender) in potentiating sexual risk among TMSM adults in Massachusetts. Cross-sectional data were restricted to TMSM who reported lifetime sexual behaviour with a cisgender male (n = 173; mean age = 29.4, SD = 9.6; 18.5% people of colour; 93.1% non-heterosexual identity; 56.1% hormones/surgery). Sexual risk outcomes were: lifetime STI diagnoses, three or more past-6-month sexual partners, and condomless anal/vaginal sex at last encounter with a cisgender male. Age- and survey mode-adjusted logistic regression models regressed sexual risk outcomes on the main effect of syndemics (six indicators summed: binge drinking, substance use, depression, anxiety, childhood abuse, intimate partner violence), followed by the interaction of syndemics and social gender affirmation. Syndemics were associated with increased odds of all sexual risk indicators (adjusted odds ratios (aORs) = 1.32–1.55; $p < 0.0001$). Social gender affirmation moderated the association between syndemics and condomless anal/vaginal sex at last encounter with a cisgender male ($p < 0.0001$). Syndemics were associated with sexual risk in TMSM who had socially affirmed their gender (aOR = 1.79; 95% CI = 1.42–2.25; $p < 0.001$), but not among those TMSM who had not (aOR = 0.86; 95% CI = 0.63–1.19; $p = 0.37$). Findings suggest that syndemic pathways to sexual risk are similar for TMSM who have socially gender affirmed as for cisgender MSM. Integration of syndemics and gender affirmation frameworks is recommended in interventions to address TMSM sexual risk.

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Keywords

Transgender; HIV/STI risk; TMSM; syndemics; gender affirmation

Introduction

The sexual health of female-to-male (FTM) trans masculine people – individuals assigned a female sex at birth who identify on the trans masculine spectrum (e.g. men, trans men, or other diverse gender identities and expressions) – remains understudied. Historically, research has assumed that trans masculine people have a heterosexual identity and therefore have an HIV and sexually transmitted infection (STI) behavioural risk profile similar to cisgender (non-transgender) females who have sex with cisgender females.[1] However, more recent data suggest that heterogeneity of sexual identities, behaviours, and attractions is the norm, rather than the exception, in trans masculine people.[2-9] According to the U.S. National Transgender Discrimination Survey, among trans masculine adults who reported their sexual orientation (n = 1314), 69.3% were non-heterosexually identified (13.5% gay; 14.9% bisexual; and 40.9% queer).[10] Trans masculine people who have sex with cisgender males (TMSM) represent a unique and understudied population, especially related to HIV/STI behavioural risk.[3,5,10]

Although HIV prevalence in TMSM ranges from 0 to 3% in the small convenience sample studies conducted to date,[1,3-5,11-13] self-reported lifetime STI histories range from 6% to 47%,[3] and current HIV-related sexual risk behaviours from 7% to 69% depending on how risk was operationalised.[3-5] A national study of TMSM (n = 45) found that only 31% reported “always” using a condom during vaginal sex, 40% reported using a condom “always” during anal sex, and 91% had a previous STI diagnosis.[3] Another sample of TMSM in New England (n = 16) found that 43.8% had unprotected receptive vaginal sex with cisgender males of unknown HIV status in the past year, and 37.5% had a lifetime history of one or more STI.[5] High prevalence of STIs and sexual risk behaviours with multiple concurrent partners may be a risk factor and augment HIV and STI rates, particularly in TMSM who partner with cisgender MSM – a group disproportionately affected by HIV.[14]

A syndemics framework has been used to understand the elevated prevalence of HIV and STIs among cisgender MSM in the USA.[15-17] This framework posits that interacting, co-occurring epidemics – such as mental health risks (e.g. depression and substance use) and victimisation (e.g., childhood sexual abuse and intimate partner violence) – synergistically increase HIV risk.[18,19] Multiple studies document syndemic production of elevated HIV infection prevalence in MSM.[15,16,20,21] Although a syndemic framework has been applied to trans masculine health risk for chronic disease (e.g. smoking, alcohol and weight depression),[22] this conceptual framework has not to our knowledge been applied to TMSM sexual risk behaviour; the current study aims to fill this research gap.

In addition to syndemics which potentiate HIV/STI risk behaviours, gender affirmation may represent a social determinant of sexual health unique to TMSM. Gender affirmation has been defined as an interpersonal and shared process through which a person’s identity is

socially recognised.[23] Gender affirmation is thus a dynamic process that can include social (e.g. name, pronoun and gender expression), medical (e.g. cross-sex hormones and surgery) and/or legal (e.g. legal name change and gender marker change) dimensions.[24] Despite multiple dimensions of gender affirmation, this study conceptualises social transition (with or without medical and/or legal transition) as the critical gender affirmation component shaping sexual health behaviours and sexual risk indicators in TMSM. Social transition – living "full-time" in one's identified gender – is a key identity juncture where being authentically seen or recognised (e.g. receiving identity validation by oneself and by others; being socially recognised as a man) becomes prioritised over and above other needs (e.g. sexual safety).

TMSM face many of the same social stressors that place cisgender MSM at-risk for HIV infection, including homophobia and stigma which ultimately fuel syndemics and predispose MSM to engage in high-risk sexual behaviours. However, qualitative data suggest that TMSM contend with added stigma and rejection from cisgender MSM due to being transgender men, including fear or anticipated rejection from cisgender males (e.g. internalised transphobia) for being transgender and not being socially affirmed or recognised for who they are.[3] This fear may manifest behaviourally in TMSM-specific HIV-related risks linked to social gender affirmation.[3] For example, one study noted TMSM's vulnerability to a "gender role trigger" in which a male sex partner's questioning of their gender role increases their risk for condomless sex as a means of demonstrating their masculinity or prioritising social affirmation of their gender ahead of sexual safety.[5] Similarily, TMSM in another study describe how their desire for sexual affirmation from their partners often superseded their desire to protect themselves from HIV and STIs.[3] Understanding whether and how social gender affirmation moderates the relationship between syndemic factors and sexual risk can inform culturally tailored HIV/STI prevention efforts for this community, including those reaching different subsets of TMSM most vulnerable and at highest risk of HIV and STIs.

Applying syndemic and gender affirmation frameworks, this paper sought to (1) examine the distribution and prevalence of sexual risk indicators in TMSM adults, including STI diagnoses, three or more sexual partners in the last six months, and condomless anal or vaginal sex at last encounter with a cisgender male; (2) test whether social gender transition moderated the relationship between syndemics and sexual risk behaviours (Figure 1), such that syndemics would be associated with sexual risk behaviour among TMSM who had socially transitioned, but that the same association would not be observed in TMSM who had not socially transitioned.

Methods

Participants and data analytic sample

Data were from a community-based convenience sample of 452 self-identified transgender and gender nonconforming adults from Massachusetts. Respondents were purposively recruited online and in-person from August to December 2013. Eligible respondents were age 18 years or older, self-identified as transgender or gender nonconforming, and lived in

Massachusetts for at least three months in the past year. Additional details on survey methodology can be found elsewhere.[25]

Gender identity was assessed using a two-step method,[26] based on assigned sex at birth and current gender identity. For this analysis, data were restricted to trans masculine spectrum respondents who reported lifetime sexual behaviour with a cisgender male (n = 173).

Measures

Sexual risk outcomes—(1) A binary variable was created comparing participants reporting three or more sex partners in the past six months to individuals with 0–2 partners. (2) To assess lifetime STI diagnosis, participants were asked to respond to the following statement, “A doctor, nurse or other health professional has diagnosed me with a sexually transmitted disease other than HIV such as syphilis, chlamydia, gonorrhea, herpes, etc.” Participants who indicated that they had received an STI diagnosis were coded as yes for lifetime STI diagnosis (referent = no). (3) Condomless anal or vaginal sex with a cisgender male at last sexual encounter was created by coding participants reporting having anal and/or vaginal sex with a cisgender male and not using a condom during their last sexual encounter as yes (referent = no).

Independent variable—The syndemics variable was created by summing six variables to create a continuous variable ranging from 0 to 6 syndemic conditions. (1) Participants who reported drinking five or more alcoholic beverages over a few hours were coded as yes for binge drinking in the past six months (referent = no). The use of three or more drugs (marijuana, cocaine, crack, club drug, heroin, methamphetamine, poppers, hallucinogens, downers, painkillers, other drug) in the past 12 months was coded as yes for poly-drug use, otherwise it was coded as no. Depression and anxiety were each assessed by asking participants whether they had been diagnosed with the condition (yes/no). Participants reporting that they had been physically or sexually abused as a child (under 15 years old) were coded as yes for childhood abuse (referent = no). Intimate partner violence (IPV) was assessed by asking participants: “Have you ever been slapped, punched, kicked, beaten up, or otherwise physically or sexually hurt by your spouse (or former spouse), a boyfriend/girlfriend, or some other intimate partner?” (yes/no).

Hypothesised moderator—Social gender affirmation was assessed with the following item, “Do you live full-time in your identified gender?” (yes/no). Social gender affirmation was selected as the hypothesised moderator because conceptually social transition represents the psychological desire that one’s felt or internal sense of gender be affirmed by both oneself and others, including sexual encounters, which may potentially influence sexual risk behaviours.

Sociodemographics

Age in years—Race and ethnicity were assessed separately and coded as White (non-Hispanic) vs. people of colour (POC = Black, Latino, multiracial, other race/ethnicity). Survey mode was online vs. in-person. For education, participant responses were dichotomised as some college or less vs. college graduate or more. For employment,

participant responses were coded as employed (employed for wages, self-employed and/or an employed student), student only, unemployed, unable to work, and other. Participant's self-reported income was coded as less than $20,000/year, $20,000 to $50,000/year, and $50,000 or more/year.

An indicator of binary/non-binary gender identity was created to compare respondents with non-binary gender identities (gender variant, genderqueer, androgynous, gender nonconforming) to those with binary gender identities (male, FTM, man). Medical gender transition was assessed with the following item, "Have you accessed any transgender-related medical interventions to affirm your gender (e.g. hormones, surgeries)?" (yes/no). Sexual orientation identity was assessed by asking, "How do you currently identify your sexual orientation?" Participant responses were coded as straight, gay/lesbian, bisexual, queer, other non-binary (questioning, I do not label my sexual orientation, unsure, asexual, other). For relationship, those who reported being in a relationship (i.e. partnered, civil union, married) were coded as being partnered and those not reporting being in a relationship were coded as not partnered (i.e. separated, divorced, widowed).

HIV testing history was coded as having been tested in the past six months, more than six months ago and never. HIV diagnosis lifetime was coded as having received an HIV diagnosis (yes) or not (no). Participants were also asked whether they had heard about pre-exposure prophylaxis (PrEP) before (yes/no). Mental health treatment and utilisation was assessed by asking participants to report whether they were currently taking medicine or receiving treatment from a doctor or other health professional for any type of mental health condition or emotional problem (yes/no).

Data analysis

SAS® version 9.4 statistical software was used to analyse data. Data were multiply imputed using the fully conditional specification method ("chained equations") due to differential missingness.[27-31] Univariable descriptive statistics were obtained for all variables of interest. To empirically test whether syndemics were associated with sexual risk behaviour and whether there was an interaction effect by social gender affirmation, a series of adjusted logistic regression models were fit adjusting for age and survey mode. Specifically, three or more sexual partners (model 1a), STI diagnosis (model 1b), and unprotected anal or vaginal sex with a cisgender male (model 1c) were each independently regressed on syndemics to examine the main effects of syndemics on sexual risk behaviour. Next, the three sexual risk variables (models 2a–c) were each regressed on syndemics and social gender affirmation, and a multiplicative interaction term was added to examine whether effect modification by social gender affirmation (syndemic × social gender affirmation) was seen in the effects of syndemics on sexual risk behaviour.

Results

Table 1 descriptively presents sociodemographic characteristics by social transition. TMSM had a mean age of 29.4 (SD = 9.6); range 18–57 years. The majority (81.5%) were White (non-Hispanic), 18.5% were people of colour (POC): 7.5% Hispanic, 2.9% Black, 6.9% Multiracial, 1.2% Other Race. In terms of gender identity, 51.4% had a binary gender

identity (female-to-male, transgender man, man, or male) and 48.6% endorsed a non-binary gender identity (genderqueer, gender variant, or gender nonconforming). The vast majority of the sample (93.1%) identified as non-heterosexual (57.2% queer, 10.4% bisexual, 7.5% other label, 6.9% gay/same-gender attracted, 6.4% did not label their sexual orientation, 2.3% questioning, 2.3% asexual). The majority (82.7%) had socially affirmed their gender, and 67.8% of those who had socially affirmed their gender had also medically affirmed their gender.

The prevalence of sexual behaviours and sexual risk indicators is presented in Table 2 stratified by social gender affirmation. Overall, 5.8% reported a lifetime STI diagnosis, 32.9% reported three or more sexual partners in the last six months, and 8.1% reported condomless anal or vaginal sex last time had sex with a cisgender male. Nearly 40% of participants had been tested for HIV in the past six months and the majority of TMSM had heard of PrEP (59.0%). The distribution of syndemic conditions is shown in Table 3. The mean number of syndemics (range 0–6) reported was 2.3 (SD = 1.5). The distribution of each syndemic factor by sexual risk outcome is presented in Table 4.

As shown in Table 5, models first tested main effects of syndemics on sexual risk. Syndemics were associated with an increased odds of all sexual risk indicators (aORs from 1.32 to 1.55; $p < 0.0001$) (Table 5, Models 1–3A). Social gender affirmation was found to moderate the association between syndemics and condomless anal or vaginal sex at last encounter with a cisgender male ($p < 0.0001$) (Table 5). Specifically, syndemics were associated with sexual risk in TMSM who had socially affirmed their gender (aOR = 1.79; 95% CI = 1.42, 2.25; $p < 0.0001$), but not among those TMSM who had not socially affirmed their gender (aOR = 0.86; 95% CI = 0.63, 1.19; $p = 0.37$) (Table 6).

Discussion

This study found that syndemic conditions are associated with sexual risk in TMSM – including having three or more sexual partners in the last six months, lifetime STI diagnosis and condomless anal and/or vaginal sex with a cisgender male in the last six months – corroborating previous research with cisgender MSM.[15-17] Social gender affirmation was found to be associated with increased odds of lifetime STI diagnosis and three or more sexual partners in the past six months, but with decreased probability of condomless anal and/or vaginal sex with a cisgender male in the last six months. Indeed, TMSM who had *not* socially transitioned had a higher prevalence of condomless sex with a cisgender male partner at last sexual encounter than to those who *had* socially transitioned. This finding suggests that sexual health research and programming seeking to reach at-risk TMSM remain inclusive and promote diversity, not limit trans masculine samples to individuals who have affirmed their gender in any particular way. In this sample, TMSM who had not socially transitioned were younger age and more likely to report a genderqueer/gender variant/or gender nonconforming gender identity – these individuals were engaging in the highest current sexual risk behaviours.

In testing the hypothesis that syndemic dynamics are moderated by social gender affirmation in TMSM, syndemics were found to be associated with condomless vaginal and/or anal sex

among those TMSM who had socially affirmed their gender, but not in those who had not socially affirmed their gender. This finding suggests similar sexual risk patterns for TMSM who have socially affirmed their gender identity as for cisgender MSM. TMSM face many of the same sexual minority stressors that place cisgender MSM at-risk for HIV infection, such as homophobia and stigma.[32,33] These social stressors ultimately fuel syndemics and appear to predispose TMSM and cisgender MSM alike to engage in high-risk sexual behaviours.[15,34] However, TMSM face other gender-related experiences that cisgender MSM do not, for example, those related to social gender affirmation.[3,5,23]

TMSM may engage in sexual risk behaviours with cisgender MSM (e.g. condomless receptive anal sex) as a means of socially affirming their gender as male and their sexual orientation identity as a gay male.[5] TMSM may engage in condomless vaginal or frontal sex. Among TMSM in this sample who reported last sex with a cisgender male, 21% reported anal sex and 79% reported vaginal sex. Vaginal/frontal sex has heterogeneous meanings for TMSM: vaginal/frontal sex may potentially affirm TMSM in their sexual role preference as a “bottom” (receptive partner) or may affirm their expression of a “transgender sexuality” which includes embracing trans masculine bodies and pleasures without genital surgery – a TMSM-specific sexuality.[2] However, vaginal/frontal sex may also activate gender discordance given the dissonance between bioanatomical structure and gender identity as transgender men. Such discordance may be heightened if TMSM’s sexual partners perceive vaginal/frontal sex as discordant with their masculinity and therefore disaffirming of their social gender. Moreover, TMSM who experience genital dysphoria (i.e. unease and discomfort with their own genitals) may be reluctant to call attention to their bodies by insisting on condom use during sex. Additionally, cisgender MSM may make assumptions about what consistutes “safer sex” because for many gay men, condoms are only viewed as necessary during anal sex. These discussion points are merely speculative and data were not measured to test these hypotheses in the current study; more research is needed to understand the mechanisms through which gender affirmation processes potentiate or impede sexual risk for TMSM.

Social gender affirmation (i.e. presenting/living full-time in one’s identified gender) may give TMSM access to cisgender MSM spaces to meet sex partners where they may be exposed to MSM social and sexual norms, particularly for TMSM who pass in their affirmed masculine gender. In these spaces, non-verbal communication and cues may create in-group identity.[35-37] TMSM may feel that they need to conform to the social-sexual expectations of their gay male partners, including condomless anal sex, which they perceive to be normative in gay male relationships.[5] TMSM may also value the perceived affirmation as gay males in gay male spaces and forego sexual safety out of fear of rejection. Research exploring cisgender MSM attitudes towards sex with TMSM is needed. While qualitative work has been conducted to formatively examine the role of gender affirmation in sexual risk taking among TMSM,[3,5] to the authors’ knowledge, no research has been conducted with the male sexual partners of TMSM. Future research exploring the knowledge, attitudes and behaviours of cisgender MSM who engage in sex with trans masculine people is warranted in order to inform the development of interventions to increase awareness, reduce stigma, and promote sexual safety for TMSM.

A number of limitations deserve to be mentioned. First, due to the cross-sectional nature of the survey, results are associational and causal inferences cannot be made. Other temporal limitations also exist – for example, some recent measures (e.g. past six months) were used in the statistical prediction of lifetime outcomes that may have preceded them. Second, while this study gathered information from TMSM from all major regions of Massachusetts and utilised bimodal sampling methods to ensure a diverse community-based sample, the true representativeness and generalisability of this non-probability convenience sample cannot be determined. Third, some TMSM individuals may not conceptualise social transition as it was operationalised in this study – youth, in particular, may not relate to the rubric of "living full-time" due to endorsing non-binary gender identities. Fourth, when assessing sexual risk with participants' most recent partner, we did not assess the relationship status of that partner or their partner's HIV status. Thus, it is possible that the condomless sexual acts reported may have been in lower-risk relationships (e.g. mutually monogamous and sero-concordant).

Fifth, depression was assessed by asking participants whether they had been diagnosed by a healthcare provider in their lifetime; thus, healthcare access is a confounder. Lifetime diagnosis may not reflect current mental health status and may also fail to capture individuals suffering from depression but unable to access medical care to obtain a diagnosis. Finally, the health outcomes comprising the syndemic variable were examined among TMSM in the sample, as these conditions have each been linked to sexual risk behaviour among transgender individuals and have been shown to syndemically interact and create additive HIV risk in cisgender MSM. However, no set of health conditions are universally syndemic and thus it is possible that these syndemic conditions may operate differently among some TMSM, including those in our sample.

Despite this study's limitations, this is one of the first studies the authors are aware of to demonstrate that social gender affirmation moderates the relationship between syndemic factors and sexual risk in TMSM. This study adds to the small, but growing body of research beginning to document sexual risk behaviours in TMSM – behaviours that could increase this community's risk for acquiring HIV or other STIs. Findings have implications for future research and interventions to ensure sexual safety for TMSM. TMSM are vulnerable to psychosocial factors such as increased risk of experiencing syndemic dynamics modified by social gender affirmation – as well as biological risk (e.g. condomless anal and/or vaginal sex) that may potentiate HIV/STI risk. While syndemic risk should be considered for all MSM, including TMSM who have socially affirmed their gender, it is also vital to promote sexual health in trans masculine individuals who have not socially affirmed their gender, who may not live full-time in their identified gender, and/or who may endorse diverse gender presentations and expressions. Prevention programs tailored to address the unique psychosocial and sexual health needs of diverse TMSM are needed, including those which explore the dynamic processes of gender affirmation in different contexts and settings, and discuss managing pressures to conform to gender role expectations in sexual encounters. Sexual health programming for TMSM that is integrated with research and evaluation activities represents an important way forward given that TMSM remain under-studied and underserved in HIV and STI prevention and service delivery. Longitudinal projects are recommended to understand more about sexual risk, psychosocial factors, and gender

affirmation processes in TMSM over time, including examination of HIV testing behaviours, knowledge and acceptability of PrEP, and the extent to which testing counselors and other healthcare providers are discussing bio-behavioural prevention interventions with at-risk TMSM.

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References

1. Kenagy G, Hsieh C. The risk less known: female-to-male transgender persons' vulnerability to HIV infection. AIDS Care. 2005; 17:195–207. [PubMed: 15763714]
2. Bockting W, Benner A, Coleman E. Gay and bisexual identity development among female-to-male transsexuals in North America: emergence of a transgender sexuality. Arch Sex Behav. 2009; 38:688–701. [PubMed: 19330439]
3. Sevelius J. "There's no pamphlet for the kind of sex I have': HIV-related risk factors and protective behaviors among transgender men who have sex with nontransgender men. Am Psychiatr Nurses Assoc. 2009; 20:398–410.
4. Clements-Nolle K, Marx R, Guzman R, et al. HIV prevalence, risk behaviors, health care use, and mental health status of transgender persons: implications for public health intervention. Am J Public Health. 2001; 91:915. [PubMed: 11392934]
5. Reisner SL, Perkovich B, Mimiaga MJ. A mixed methods study of the sexual health needs of New England transmen who have sex with nontransgender men. AIDS Patient Care STDS. 2010; 24:501–513. [PubMed: 20666586]
6. Adams, A.; Lundie, M.; Marshall, Z., et al. Getting primed: informing HIV prevention with gay/bi/queer trans men in Ontario. Ontario Ministry of Health and Long-Term Care; Ontario, Canada: 2008.
7. Bauer GR, Travers R, Scanlon K, et al. High heterogeneity of HIV-related sexual risk among transgender people in Ontario, Canada: a province-wide respondent-driven sampling survey. BMC Public Health. 2012; 12:292. [PubMed: 22520027]
8. Bauer GR, Redman N, Bradley K, et al. Sexual health of trans men who are gay, bisexual, or who have sex with men: results from Ontario, Canada. Int J Transgend. 2013; 14:66–74. [PubMed: 24971043]
9. Schulden JD, Song B, Barros A, et al. Rapid HIV testing in transgender communities by community-based organizations in three cities. Public Health Rep. 2008; 123:101. [PubMed: 19166094]
10. Reisner SL, Pardo ST, Garamel KE, et al. Substance use to cope with stigma in healthcare among U.S. female-to-male trans masculine adults. LGBT Health. in press.
11. Herbst JH, Jacobs ED, Finlayson TJ, et al. Estimating HIV prevalence and risk behaviors of transgender persons in the United States: a systematic review. AIDS Behav. 2008; 12:1–17. [PubMed: 17694429]

12. Bockting W, Huang C-Y, Ding H, et al. Are transgender persons at higher risk for HIV than other sexual minorities? A comparison of HIV prevalence and risks. Int J Transgend. 2005; 8:123–131.
13. Reisner SL, Murchison G. A global research synthesis of HIV and STI biobehavioral risks among female-to-male (FTM) transgender adults. Glob Public Health. in press.
14. Centers for Disease Control and Prevention. HIV Surveillance Report, 2013. Feb.2015 25 [accessed 4 August 2015] http://www.cdc.gov/hiv/library/reports/surveillance.
15. Stall R, Mills TC, Williamson J, et al. Association of co-occurring psychosocial health problems and increased vulnerability to HIV/AIDS among urban men who have sex with men. Am J Public Health. 2003; 93:939–942. [PubMed: 12773359]
16. Mustanski B, Garofalo R, Herrick A, et al. Psychosocial health problems increase risk for HIV among urban young men who have sex with men: preliminary evidence of a syndemic in need of attention. Ann Behav Med. 2007; 34:37–45. [PubMed: 17688395]
17. Mimiaga MJ, O'Cleirigh C, Biello KB, et al. The effect of psychosocial syndemic production on 4-year HIV incidence and risk behavior in a large cohort of sexually active men who have sex with men. J AIDS. 2014
18. Singer M. AIDS and the health crisis of the U.S. urban poor; the perspective of critical medical anthropology. Soc Sci Med. 1994; 39:931–48. [PubMed: 7992126]
19. Oldenburg CE, Perez-Brumer AG, Reisner SL. Poverty matters: contextualizing the syndemic condition of psychological factors and newly diagnosed HIV infection in the United States. AIDS. 2014; 28:2763–2769. [PubMed: 25418633]
20. Parsons JT, Grov C, Golub SA. Sexual compulsivity, co-occurring psychosocial health problems, and HIV risk among gay and bisexual men: further evidence of a syndemic. Am J Public Health. 2012; 102:156–162. [PubMed: 22095358]
21. Mimiaga MJ, Noonan E, Donnell D, et al. Childhood sexual abuse is highly associated with HIV risk-taking behavior and infection among MSM in the EXPLORE Study. JAIDS. 2009; 51:340–348. [PubMed: 19367173]
22. Reisner SL, Gamarel KE, Dunham E, et al. Female-to-male transmasculine adult health: a mixed-methods community-based needs assessment. Am Psychiatr Nurses Assoc. 2013; 19:293–303.
23. Sevelius JM. Gender affirmation: a framework for conceptualizing risk behavior among transgender women of color. Sex Roles. 2013; 68:675–689. [PubMed: 23729971]
24. Scheim AI, Bauer GR. Sex and gender diversity among transgender persons in Ontario, Canada: results from a respondent-driven sampling survey. J of Sex Res. 2015; 52:1–14. [PubMed: 24750105]
25. Reisner, S.; White, J.; Dunham, E., et al. Discrimination and health in Massachusetts: a statewide survey of transgender and gender nonconforming adults. Fenway Health; Boston, MA: 2014.
26. Reisner SL, Conron KJ, Tardiff LA, et al. Monitoring the health of transgender and other gender minority populations: validity of natal sex and gender identity survey items in a U.S. national cohort of young adults. BMC Public Health. 2014; 14:1224. [PubMed: 25427573]
27. Allison PD. Missing data techniques for structural equation modeling. J Abnorm Psychol. 2003; 112:545–557. [PubMed: 14674868]
28. Lee KJ, Carlin JB. Multiple imputation for missing data: fully conditional specification versus multi-variate normal imputation. Am J Epidemiol. 2010; 171:624–632. [PubMed: 20106935]
29. Reisner SLCK, Scout Nfn, Mimiaga MJ, et al. Comparing in-person and online survey respondents in the U.S. National Transgender Discrimination Survey: implications for health research. LGBT Health. 2014; 1:98–106. [PubMed: 26789619]
30. van Buuren S, Brand JP, Groothuis-Oudshoom C, et al. Fully conditional specification in multivariate imputation. J Stat Computat Simul. 2006; 76:1049–1064.
31. van Buuren S. Multiple imputation of discrete and continuous data by fully conditional specification. Stat Meth Med Res. 2007; 16:219–242.
32. Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. Psychol Bull. 2003; 129:674–697. [PubMed: 12956539]
33. Meyer IH. Minority stress and mental health in gay men. J Health Soc Behav. 1995; 36:38–56. [PubMed: 7738327]

34. Herrick A, Stall R, Egan J, et al. Pathways towards risk: syndemic conditions mediate the effect of adversity on HIV risk behaviors among young men who have sex with men (YMSM). J Urban Health. 2014; 91:969–982. [PubMed: 25146488]

35. Rieger G, Linsenmeier JA, Gygax L, et al. Dissecting "gaydar": accuracy and the role of masculinity-femininity. Arch Sex Behav. 2010; 39:124–140. [PubMed: 18810629]

36. Shelp SG. Gaydar: visual detection of sexual orientation among gay and straight men. J Homosex. 2002; 44:1–14. [PubMed: 12856753]

37. Woolery LM. Gaydar: a social-cognitive analysis. J Homosex. 2007; 53:9–17. [PubMed: 18032284]

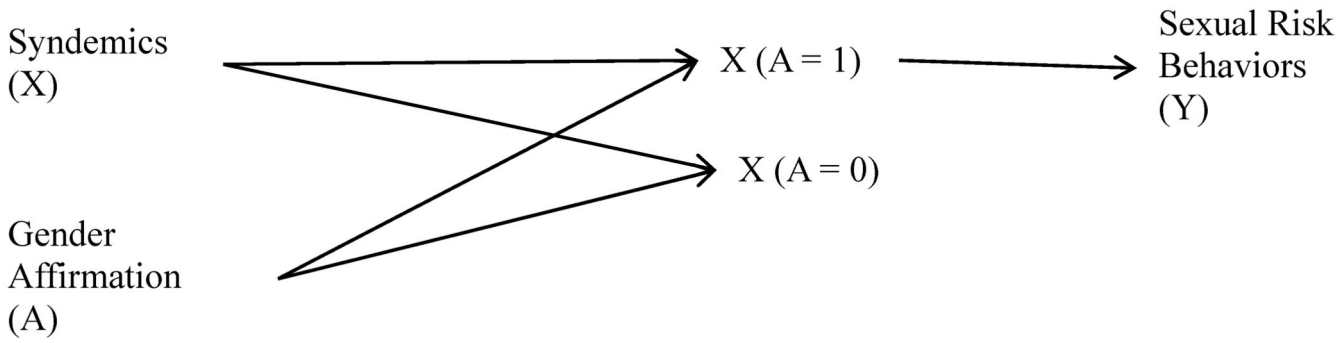

Figure 1.
Graphical display of study hypothesis.

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Table 1

Sociodemographic Characteristics Among Sexually Active Trans Masculine People Who Have Sex with Men in Massachusetts (n=173).

	Total N=173		Social Gender Transition N=143		No Social Gender Transition N=30		Comparing TMSM with and without social gender transition	
DEMOGRAPHICS	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**t-test (df)**	**p-value**
Age (Range: 18-57 Years)	29.4	9.6	30.1	9.9	26.2	6.8	−4.58 (863)	<**0.0001**

	N	%	N	%	N	%	χ^2 (df)	p-value
Binary/Non-Binary Gender Identity								
Female-to-Male (FTM)/ Transgender Man/ Male	89	51.4	82	57.3	7	23.3	55.80 (1)	<0.0001
Genderqueer, Gender Variant, or Gender Nonconforming	84	48.6	61	42.7	23	76.7		
Race/Ethnicity								
White (Non-Hispanic)	141	81.5	115	80.4	26	86.7	1.87 (1)	0.17
People of Color (POC)	32	18.5	28	19.6	4	13.3		
Education								
Some College or Less	58	33.5	44	30.8	14.0	46.7	10.87 (1)	0.001
College Graduate or More	115	66.5	99	69.2	16.0	53.3		
Employment								
Employed (wages, self-employed and/or employed student)	124	71.7	104	72.7	20	66.7		
Student only	19	11.0	15	10.5	4	13.3	1.53 (2)	0.46
Unemployed, unable to work, other	30	17.3	24	16.8	6	20.0		
Income – Annual								
<20k	83	48.0	68	47.6	15	50.0		
20k to <50k	50	28.9	39	27.3	11	36.7	7.47 (2)	0.02
50k +	40	23.1	36	25.2	4	13.3		
Gender Affirmation								
Social Transition Only	46	26.6	46	32.2	0	0.0		
Social and Medical Transition	97	56.1	97	67.8	0	0.0	865.00 (2)	<0.0001
No Social Transition	30	17.3	0	0.0	30	100.0		
Sexual Orientation Identity								
Straight/Heterosexual	12	6.9	11	7.7	1	3.3	3.72 (1)	0.05
Non-Heterosexual identity	161	93.1	132	92.3	29	96.7		

	N	%	N	%	N	%	χ^2 (df)	p-value
Binary/Non-Binary Gender Identity								
Relationship Status								
Partnered	93	53.8	82	57.3	11	36.7	18.86 (1)	<0.0001
Non-Partnered	80	46.2	61	42.7	19	63.3		

Table 2

Sexual Health and Risk-Taking Among Sexually Active Trans Masculine Adults Who Have Sex with Men in Massachusetts (n=173).

	Total N=173		Social Gender Transition N=143		No Social Gender Transition N=30		Comparing TMSM with and without social gender transition	
HIV & STI HISTORY	**N**	**%**	**N**	**%**	**N**	**%**	**χ^2 (df)**	**p-value**
Last Tested for HIV								
Never	20	11.6	13	9.1	7	23.3		
Within Last 6 Months	69	39.9	63	44.1	6	20.0	46.13 (2)	<**0.001**
6 Months Ago or More	84	48.6	67	46.9	17	56.7		
HIV Status								
Negative	165	95.4	137	95.8	28	93.3	1.65 (1)	0.20
Don't Know	8	4.6	6	4.2	2	6.7		
STI Diagnosis – Lifetime								
Never Received a Positive STI Diagnosis	163	94.2	134	93.7	29	96.7	4.83 (1)	0.03
Received a Positive STI Diagnosis	10	5.8	9	6.3	1	3.3		
Heard of Pre-Exposure Prophylaxis (PrEP)								
No	71	41.0	54	37.8	17	56.7	20.77 (1)	<**0.0001**
Yes	102	59.0	89	62.2	13	43.3		
SEXUAL HISTORY & BEHAVIOR								
Number of Sex Partners Last 6 Months								
0 to 2 Partners	116	67.1	90	62.9	26	86.7	17.20 (1)	<**0.0001**
3 or More Partners	57	32.9	53	37.1	4	13.3		
Gender of Sexual Partners – Lifetime								
Cisgender Male	173	100.0	143	100.0	30	100.0	---	---
Cisgender Female	158	91.3	134	93.7	24	80.0	40.15 (1)	<**0.0001**
Transgender Man (FTM)	84	48.6	71	49.7	13	43.3	1.28 (1)	0.26
Transgender Woman (MTF)	37	21.4	31	21.7	6	20.0	0.25 (1)	0.62
Gender Nonconforming (Female assigned sex at birth; FAB)	95	54.9	83	58.0	12	40.0	17.02 (1)	<**0.0001**
Gender Nonconforming (Male assigned sex at birth; MAB)	43	24.9	36	25.2	7	23.3	0.28 (1)	0.60
Gender of Most Recent Sexual Partner								

	Total		Social Gender Transition		No Social Gender Transition		Comparing TMSM with and without social gender transition	
	N=173		N=143		N=30			
	N	%	N	%	N	%	χ^2 (df)	p-value
HIV & STI HISTORY								
Cisgender Male	49	28.3	33	23.1	17	56.7		
Cisgender Female	72	41.6	66	46.2	5	16.7	78.45 (6)	**<0.0001**
Transgender Man (FTM)	28	16.2	24	16.8	4	13.3		
Transgender Woman (MTF)	4	2.3	4	2.8	0	0.0		
Gender Nonconforming (Female assigned sex at birth; FAB)	16	9.2	13	9.1	3	10.0		
Gender Nonconforming (Male assigned sex at birth; MAB)	3	1.7	2	1.4	1	3.3		
Intersex Person	1	0.6	1	0.7	0	0.0		
Sexual Risk with Cisgender Male – Last Sexual Encounter								
Protected Anal or Vaginal Sex	35	20.2	24	17.1	11	36.0	2.59 (1)	0.10
Condomless Anal or Vaginal Sex	14	8.1	8	5.7	6	19.3		

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Table 3

Syndemic Conditions Among Sexually Active Trans Masculine Adults Who Have Sex with Men in Massachusetts (n=173).

	Total N=173		Social Gender Transition N=143		No Social Gender Transition N=30		Comparing TMSM with and without social gender transition	
Syndemic Variables	**N**	**%**	**N**	**%**	**N**	**%**	**χ^2 (df)**	**p-value**
Drank 5 or More Drinks at 1 Time – Last 3 Months	70	40.5	56	39.2	14	46.7	3.27 (1)	0.07
Polydrug Use – 3 or More Drugs	17	9.8	14	9.8	3	10.0	0.12 (1)	0.73
Depression Diagnosis – Lifetime	95	54.9	78	54.5	17	56.7	0.54 (1)	0.46
Anxiety Diagnosis – Lifetime	86	49.7	69	48.3	17	56.7	3.17 (1)	0.08
Intimate Partner Violence – Lifetime	71	41.0	60	42.0	11	36.7	1.77 (1)	0.18
Childhood Abuse (Physical and/or sexual age < 15)	86	49.7	69	48.3	17	56.7	2.02 (1)	0.16

Syndemic (range 0-6)							**t-test (df)**	**p-value**
Mean (SD)	2.3	1.5	2.3	1.5	2.5	1.4	1.83 (172)	0.07
Median (IQR)	2	2.0	2	2.0	2	2.0		

Number of syndemics	**0**	**18**	**10.4**	**17**	**11.9**	**1**	**3.3**	**χ^2 (df)**	**p-value**
	1	38	22.0	31	21.7	7	23.3	41.25 (6)	<**0.0001**
	2	45	26.0	35	24.5	11	36.7		
	3	33	19.1	29	20.3	4	13.3		
	4	21	12.1	18	12.6	3	10.0		
	5	14	8.1	9	6.3	5	16.7		
	6	3	1.7	3	2.1	0	0.0		

Table 4

Syndemic Conditions by Sexual Risk Outcomes Among Sexually Active Trans Masculine People Who Have Sex with Men in Massachusetts (n=173).

	Sexual Health Indicator 1: 3 or More Sexual Partners – Last 6 Months						Sexual Health Indicator 2: STI Diagnosis - Lifetime						Sexual Health Indicator 3: Unprotected Anal or Vaginal Sex with a Cisgender Male – Last Sex					
	No=135		Yes=38		χ^2	aOR	No=163		Yes=10		χ^2	aOR	No=159		Yes=14		χ^2	aOR
	N	%	N	%	(df)	95% CI	N	%	N	%	(df)	95% CI	N	%	N	%	(df)	95% CI
Drank 5 or More Drinks at One Time – Last 3 Months	48	35.6	22	57.9	34.54** (1)	2.18*** 1.54-3.07	67	41.1	3	30.0	0.92 (1)	1.18 0.62-2.27	65	40.9	5	35.7	0.71 (1)	0.85 0.50-1.44
Polydrug Use – 3 or More Drugs	10	7.4	7	18.4	20.30** (1)	2.17** 1.34-3.51	17	10.4	0	0.0	5.78* (1)	---	15	9.4	2	14.3	1.71 (1)	1.53 0.73-3.18
Depression Diagnosis – Lifetime	69	51.1	26	68.4	17.94** (1)	2.02*** 1.34-3.51	86	52.8	9	90.0	26.39*** (1)	7.43*** 2.88-19.15	87	54.7	8	57.1	0.15 (1)	1.00 0.60-1.65
Anxiety Diagnosis – Lifetime	62	45.9	24	63.2	17.61** (1)	1.73** 1.23-2.45	79	48.5	7	70.0	8.74** (1)	1.76* 1.03-3.00	77	48.4	9	64.3	6.47** (1)	1.76* 1.03-3.00
Intimate Partner Violence – Lifetime	53	39.3	18	47.4	5.13* (1)	1.48* 1.06-2.06	64	39.3	7	70.0	18.07*** (1)	3.27** 1.73-6.19	63	39.6	8	57.1	7.92** (1)	1.93* 1.17-3.18
Childhood Abuse (Physical and/or sexual age < 15 years)	67	49.6	19	50.0	0.01 (1)	1.3 0.93-1.82	79	48.5	7	70.0	8.74** (1)	1.80 0.93-3.47	75	47.2	11	78.6	25.38*** (1)	4.37*** 2.40-7.99

aOR = Adjusted odds ratio. Adjusted for age and survey mode (online vs. in-person). 95% CI = Confidence Intervals

Note: The bivariate association of polydrug use by lifetime STI diagnosis could not be assessed due to low cell count.

****P-Value* = p<0.0001

***P-Value* = p<0.01

**P-Value* = p<0.05

Table 5

Multivariable Logistic Regression Models: Regressing Sexual Health Indicators on Syndemic Factors, Social Gender Transition, and Their Interaction (Age and Survey Mode-Adjusted).

	Sexual Health Indicator 1: 3 or More Sexual Partners – Last 6 Months			**Sexual Health Indicator 2: STI Diagnosis - Lifetime**			**Sexual Health Indicator 3: Unprotected Anal or Vaginal Sex with a Cisgender Male – Last Sex**		
	Model 1A	**Model 1B**	**Model 1C**	**Model 2A**	**Model 2B**	**Model 2C**	**Model 3A**	**Model 3B**	**Model 3C**
Statistical Predictors:	**aOR (95% CI)**	**aOR (95% CI)**	**B (SE)**	**aOR (95% CI)**	**aOR (95% CI)**	**B (SE)**	**aOR (95% CI)**	**aOR (95% CI)**	**B (SE)**
Syndemic Factors	**1.32 *** (1.18, 1.47)**	--	**0.42 * (0.19)**	**1.55 *** (1.26, 1.91)**	--	−0.05 (0.41)	**1.37 *** (1.17, 1.62)**	--	−0.12 (0.15)
Social Gender Transition	--	**4.06 *** (2.27, 7.28)**	**1.95 ** (0.74)**	--	2.71 (0.82, 9.00)	−0.46 (1.19)	--	**0.24 *** (0.14, 0.40)**	**– 3.39 *** (0.59)**
Syndemic × Social Gender Transition	--	--	−0.13 (0.20)	--	--	0.53 (0.42)	--	--	**0.69 *** (0.19)**

aOR = Adjusted Odds Ratio. 95% CI = 95% Confidence Interval. B = Beta. SE = Standard Error. All models adjusted for age and survey mode (online versus in-person).

Note = Socially transitioned indicates those who report living full-time in their gender identity.

*** *P-Value* = p<0.0001

** *P-Value* = p<0.01

* *P-Value* = p<0.05

Table 6

Multivariable Logistic Regression Models: The Association of Syndemics and Unprotected Anal or Vaginal Sex with a Cisgender Male at Last Sex, Stratified by Social Gender Affirmation.

	Social Gender Transition (n=143)		**No Social Gender Transition (n=30)**	
	aOR (95% CI)	**p-value**	**aOR (995% CI)**	**p-value**
Syndemic Factors	**1.79 (1.42, 2.25)**	<**0.0001**	0.86 (0.63, 1.19)	0.37

aOR = Adjusted Odds Ratio. 95% CI = 95% Confidence Interval. Models were adjusted for age and sampling method (online versus in-person).

Note = Socially transitioned indicates those who report living full time in their gender identity.