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Using Syndemics Theory to Examine HIV Sexual Risk Among Latinx Men Who Have Sex with Men in Philadelphia, PA: Findings from the National HIV Behavioral Surveillance

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Abstract

Latinx men who have sex with men (MSM) continue to be disproportionately impacted by HIV/AIDS. Identifying the role of multiple syndemic factors associated with sexual risk behaviors is imperative in order to develop effective prevention and treatment strategies. Cross-sectional data for this study were derived from three cycles of the Philadelphia portion of the National HIV Behavioral Surveillance System. This study explored the impact of syndemic factors – heavy drinking, exchange sex, and homophobic discrimination – on sexual HIV risk behaviors, operationalized as number of male partners, and condomless anal intercourse (CAI) with main and casual partners among Latinx MSM (n=464). Analyses took two forms: a syndemic approach, using the cumulative number of conditions as an independent variable; and a non-syndemic approach, incorporating each condition as a unique factor. In multivariable syndemic analyses, participants with two or more factors reported more male partners and more CAI casual male partners than those with none. In non-syndemic models, homophobic discrimination and exchange sex were significantly positively associated with total number of male partners, while heavy

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Conflicts of Interest:

All authors declare that they have no conflicts of interest.

drinking was associated with more casual CAI partners. Quantitative results indicate that syndemic and non-syndemic approaches vary in their relative capacity to account for sexual risk among Latinx MSM.

Abstract

Los hombres latinos que tienen sexo con hombres (HSH) continúan siendo desproporcionadamente afectados por el VIH / SIDA. Identificar el papel de múltiples factores sindémicos asociados con las conductas de riesgo sexual es imprescindible para desarrollar estrategias efectivas de prevención y tratamiento. Los datos transversales para este estudio se derivaron de tres ciclos de la parte de Filadelfia del Sistema Nacional de Vigilancia del Comportamiento del VIH. Este estudio exploró el impacto de los factores sindémicos (consumo excesivo de alcohol, sexo de intercambio y discriminación homofóbica) en los comportamientos sexuales de riesgo de VIH, operacionalizados como el número de parejas masculinas y las relaciones anales sin condón (IAC) con parejas principales y casuales entre los HSH latinos (n = 464). Los análisis tomaron dos formas: un enfoque sindémico, usando el número acumulado de condiciones como una variable independiente; y un enfoque no sindémico, que incorpora cada condición como un factor único. En análisis sinádicos multivariables, los participantes con dos o más factores informaron más parejas masculinas y más parejas masculinas casuales CAI que aquellos sin ninguno. En los modelos no sindémicos, la discriminación homofóbica y el intercambio sexual se asociaron significativamente positivamente con el número total de parejas masculinas, mientras que el consumo excesivo de alcohol se asoció con parejas CAI más casuals. Los resultados cuantitativos indican que los enfoques sindémicos y no sindémicos varían en su capacidad relativa para dar cuenta del riesgo sexual entre los HSH latinos.

Conductas de riesgo sexual del VIH, Latinos gays y bisexuales, Condiciones sindémicas, Consumo de alcohol de alto riesgo, Intercambio de sexo, Homofobia.

Keywords

HIV sexual risk behaviors; Gay and bisexual Latinxs; Syndemic conditions; Hhigh-risk alcohol consumption; Exchange sex; Homophobia

1. INTRODUCTION

Since early in the HIV epidemic, Hispanics/Latinxs (henceforth: Latinxs) have been impacted disproportionally. Among Latinxs in the U.S., the data are alarming; 25% of new HIV infections occur among Latinxs. Latinx men who have sex with men (MSM) are the only subgroup with increasing rates of new diagnoses in recent years, as compared with other groups (Centers for Disease Control and Prevention, 2019). If this trend continues, as many as one in four Latinx MSM will be diagnosed with HIV in their lifetime (CDC, 2015). In Philadelphia, the HIV prevalence in 2018 was highest among non-Latinx Blacks (1,883.9 per 100,000 population), followed by Latinx (1,579.3). In 2018, the highest rate of new HIV diagnosis was among Latinxs (46.0 per 100,000 population), followed by non-Latinx Blacks (38.9) and non-Latinx Whites (13.9) (Philadelphia Department of Public Health, 2019).

Disparities in HIV risk are attributed to psychosocial and environmental conditions that disproportionately impact gay and bisexual Latinxs (Frye et al., 2014). Numerous factors contribute to an elevated HIV risk for Latinx MSM, including substance use (Deiss et al., 2008; Fernández et al., 2005), discrimination (Diaz, Ayala, & Bein, 2004; Nakamura & Zea, 2010), stigma, social isolation, migration experiences (Bianchi, Reisen, Zea, Poppen, & Shedlin, 2007; Carrillo, 2004), and cultural factors (CDC, 2016; Hoebbel & Fals-Stewart, 2003; Stappenbeck, Hoebbel, & Fals-Stewart, 2004). Latinx MSM may feel fúrther compelled to engage in risky behaviors as a coping mechanism for internalized homophobic feelings as well as real or perceived negative perceptions about their sexual orientation (S. D. Rhodes, Yee, & Hergenrather, 2006; Sandfort, Melendez, & Diaz, 2007) (Ayala, Bingham, Kim, Wheeler, & Millett, 2012). Latinx immigrant MSM, some of whom are in the U.S. without legal documentation, may face additional social stressors that influence sexual behaviors, including the anxiety of not having legal U.S. residency status, the complexity of navigating various cultural contexts (e.g., mainstream U.S. culture, white gay community culture, Latinx culture) and the loneliness, isolation, and depression that often results from “secret-keeping” (i.e., sexual orientation disclosure) and family estrangement (Diaz & Ayala, 1999; Shedlin, Decena, & Oliver-Velez, 2005) (Hess et al., 2015; Javanbakht et al., 2009; Murphy, Gorbach, Weiss, Hucks-Ortiz, & Shoptaw, 2013; Rietmeijer, Wolitski, Fishbein, Corby, & Cohn, 1998).

Syndemic theory may explain high rates of HIV/AIDS among Latinx MSM. This theory posits that multiple risk factors interact synergistically to increase vulnerability (Singer & Clair, 2003). Co-occurring conditions, such as alcohol and other substance abuse, depression, and violence, may collectively influence HIV risk behaviors among Latinx MSM (Mizuno et al., 2012; Wilson et al., 2014). Syndemic theory postulates that assessing the overall impact of psychosocial and other conditions, rather than the additive effects of separate factors, provides a better assessment of risk (Singer & Clair, 2003). The present study extends recent work on syndemics and HIV risk among sexual minorities (Latinx and non-Latinx) (Beymer et al., 2016; Halkitis et al., 2013; O. Martinez et al., 2016; Mimiaga et al., 2015; Mizuno et al., 2012; O’Leary, Jemmott, Stevens, Rutledge, & Icard, 2014; Santos et al., 2014; Wilson et al., 2014) by providing an assessment of the relative predictive power of syndemic and non-syndemic approaches to understanding HIV sexual risk behaviors among Latinx MSM. This is particularly important in light of Mustanski and colleagues’ analysis of HIV/STI incidence and risk behaviors among MSM (2016), which found that the effectiveness of syndemic approaches may vary across racial and ethnic groups.

We explored syndemic conditions leading to HIV risk behaviors among sexual minority Latinxs in Philadelphia, Pennsylvania using data from the National HIV Behavioral Surveillance System (NHBS). We hypothesized that a syndemic of psychosocial conditions would be associated with sexual risk among Latinx MSM. To our knowledge, this is the first study to explore the impact of syndemic conditions on adult sexual HIV risk behaviors among a representative sample of sexual minority Latinxs in Philadelphia. We also compared two analytical approaches, a combined syndemic factor (ie. a syndemic approach) versus separate individual syndemic factors (ie. traditional epidemiological approach), in order to understand their capacity to explain HIV risk among this population.

2. METHODS

This study utilized a multistage approach. Quantitative cross-sectional survey data from Latinx MSM in Philadelphia were analyzed to assess sexual risk behaviors, using both syndemic and non-syndemic approaches.

2.1. Quantitative Methods

Data.—Quantitative analyses relied on data from Philadelphia cycles of the National HIV Behavioral Surveillance (NHBS). In 2003, the Centers for Disease Control and Prevention initiated the NHBS in 20 metropolitan areas, including Philadelphia. Four cycles of NHBS data have been collected on MSM (MSM in 2005, 2009, 2012, and 2014), injection drug users (IDUs in 2006, 2009, 2012, 2015), and heterosexuals (HET in 2007, 2010, 2013, 2016) by the Department of Public Health. Each cycle is comprised of approximately 500 anonymous surveys covering topics including drug-use risk behaviors, sexual risk behaviors, health, and access to HIV prevention services. Data from NHBS cycles have been described in detail elsewhere. (CDC, 2010; German, Linton, Cassidy-Stewart, & Flynn; Kuhns et al., 2015; MacKellar et al.) To maximize the available data, we appended multiple cycles that incorporated our variables of interest: IDU, rounds 3–4; HET, round 3; and MSM, rounds 2–4. Analyses were then restricted to men who self-identified as Latinx gay or bisexual (*N*=464). On occasion, men who identified as gay or bisexual participated in the NHBS cycle of heterosexuals. Therefore, we initially included data from the heterosexual subset of NEBS before screening for sexuality and ethnic identity.

The Philadelphia site followed a standardized national protocol for venue-based time location sampling for MSM and respondent driven sampling for HET and IDU. Formative research identified locations and day/time periods where at least 50% of attendees were likely to be members of target populations (e.g., MSM) and informed locally specific operational considerations such as recruitment and marketing. Potential venue day/time periods were randomly selected for recruitment on a monthly basis. Recruitment took place in 4-hour time blocks, during which recruiters sequentially approached potential participants and invited them to participate. Potential participants completed an eligibility screener and provided informed consent. Eligible participants for MSM, IDU, and HET studies were 18+ years old, resided in the Philadelphia metropolitan area, were able to complete the survey in English or Spanish, and had not previously participated in the current NHBS round. In addition, for MSM, men would have to report ever having sex with a male. For IDU, they had to report injection in the last 12 months. For HET, they had to be <60 age (in addition to >18) and report sex with a person of the opposite sex in the last 12 months.

Trained interviewers administered an anonymous 45-minute socio-behavioral survey and optional HIV test. Participants received $25 remuneration for the survey. All procedures were reviewed and approved by the Institutional Review Board at the Philadelphia Department of Health.

Demographic Characteristics.—These measures included NHBS round (2, 3, or 4), Hispanic ancestry (Mexican, Puerto Rican, Cuban, Dominican, Other), racial identity (White, Black, American Indian or Alaska Native, Asian, Native Hawaiian or other Pacific

Islander; collapsed into White, Black, Other for multivariable analyses), age, sexuality (gay/homosexual, bisexual), employment status, education level, annual income, country of birth, and current health insurance status.

Syndemic Factors.—We considered five psychosocial conditions for inclusion in this study: arrest/detention in the past 12 months, exchange sex in the past 12 months (as a worker or client), homelessness in the past 12 months, heavy drinking in the past month (at least five occasions on which participants engaged in binge drinking, operationalized as the consumption of five or more alcoholic beverages in a single session), and prior experiences of homophobic discrimination. Each factor was operationalized as a yes/no dummy variable.

To build a syndemic factors scale, we ran *t*-tests for each psychosocial condition with outcome measures for sexual behavior (see below). Three factors were significantly associated with at least one outcome ($p<.05$): heavy drinking, exchange sex, and homophobic discrimination. These were combined into a scale ranging from 0 factors to 3 factors. Due to sample size concerns, participants reporting two or three syndemic conditions were collapsed into a single category for regression analyses.

Outcomes.—Three sexual (risk) behaviors were used as outcomes, each measured in reference to the previous 12 months: total number of male partners, total number of main male partners with whom participants engaged in condomless anal intercourse (CAI, and total number of casual male CAI partners. Due to skip patterns in the NHBS survey, sample size varied across each measure ($n=462$, $n=96$, and $n=162$, respectively). For example, participants who did not report having any main male partners in the previous 12 months were not asked about main male CAI partners.

Data Analysis.—This investigation explored the impact of cumulative syndemic conditions on sexual risk behaviors. All outcomes were regressed on the syndemic factors scale in bivariate linear regressions (unadjusted model); and again controlling for NHBS round, race, employment status, education, household income, sexuality, age, health insurance status, and whether participants were born in the U.S. in multivariable linear regressions (adjusted model). The syndemic factors scale was incorporated as categorical, using “0 Factors” as a reference group and “1 Factor” and “2 or More Factors” as comparison groups. To explore the relative value of syndemic approaches to assessing sexual risk behaviors among Latinx MSM, we repeated this process using each syndemic factor as an individual factor. Outcomes were regressed on heavy drinking, exchange sex, and homophobic discrimination in multivariable linear regression. The regressions were then repeated while incorporating the following control variables: NHBS round, race (White, Black, Other), employment status, education, household income, sexuality, age, current health insurance status, and country of birth.

3. RESULTS

Sample characteristics appear in Table 1. The average age of participants was 31 years ($SD=9.01$). Almost half of participants ($n=226$, 49%) completed surveys in NHBS Round 4; the remainder were approximately evenly divided between rounds 2 and 3. Seventy percent

(*n*=310) of participants who provided data for Hispanic ancestry identified as Puerto Rican. More than half of those who provided data for racial identity (*n*=196, 52%) identified as Black or African American, and 35% identified as White (*n*=130). Approximately three-quarters of the sample identified as gay or homosexual (*n*=342, 74%), and the remainder identified as bisexual. A substantial majority were born in the U.S. (*n*=378, 81%), and a smaller majority had health insurance (*n*=302, 65%). Most participants reported either full or part-time employment (*n*=328, 71%), though one-fifth were unemployed at the time of their surveys (*n*=86, 19%). Eighty-nine percent of participants (*n*=412) had completed high school. Almost half reported incomes below $20,000 (*n*=212, 46%), though 20% (*n*=92) reported incomes of $50,000 or higher.

Eight percent of participants (*n*=36) reported engagement in sexual exchange (as a sex worker or client) in the previous 12 months. Nearly half reported heavy drinking in the previous month (*n*=212, 46%), and slightly more than one-third reported prior experiences with homophobic discrimination (*n*=166, 36%). Forty-five percent of participants (*n*=210) reported one of these syndemic factors, and 20% (*n*=94) reported at least two. Of those factors excluded from the syndemic scale, 16% of participants reported homelessness in the past year (*n*=72), and 6% reported arrest or detention in this period (*n*=30). Participants reported a mean of 4.09 male partners (*SD*=6.17) in the past 12 months. Those who reported involvement with main male partners in this period (*n*=96) reported a mean of 1.38 main male CAI partners (*SD*=1.22), and those who reported involvement with casual male partners (*n*=162) reported a mean of 2.23 casual CAI partners (*SD*=4.49)

Syndemic Analysis.

In Table 2, which displays the unadjusted and adjusted models, it can be seen that there were no statistically significant differences between participants who reported 0 factors and those who reported one factor. However, there were numerous significant differences between those who reported 0 factors and those reported at least two factors. In unadjusted models, participants who reported at least two factors reported an average of 4.08 more male partners in the past 12 months ($p<.01$) when adding control variables, this dropped only slightly to 3.96 ($p<.01$). Among participants with main male partners, those who reported at least two syndemic conditions reported an average of 1.00 more main male CAI partner in the unadjusted model ($p<.01$), though this relationship declined in magnitude and attained only marginal significance in multivariable analysis ($b=0.69$, $p<.10$). Finally, among those who reported casual male partners, participants who reported two or more syndemic conditions had an average of 3.43 more casual CAI partners than those with no syndemic conditions ($p<.01$). This increased to 4.73 casual CAI partners when adding control variables ($p<.01$).

Non-Syndemic Approach.

In the unadjusted model, homophobic discrimination ($b=2.44$, $p<.01$) and sex exchange ($b=3.82$, $p<.01$) were both associated with an increase in total male partners. These patterns persisted, and increased somewhat in magnitude, when adding control variables ($b=2.52$, $p<.01$ for homophobic discrimination; $b=4.40$, $p<.01$ for sex exchange). Only homophobic discrimination was associated with main male CAI partners in the unadjusted model ($b=.55$, $p<.05$), and this relationship disappeared after adding control variables ($b=0.55$, $p=.10$).

Heavy drinking (b=2.55, p<.01) and homophobic discrimination (b=1.71, p<.02) were both associated with an increase in casual male CAI partners in unadjusted analysis. After adding control variables, heavy drinking retained significance and increased in magnitude (b=3.47, p<.01), whereas homophobic discrimination was no longer significant.

Non-syndemic models indicate that there is specificity with regard to the psychosocial conditions that influence certain sexual risk behaviors. In addition, these models explained more variation in total number of male partners over the past 12 months (adjusted R^2 of .08 and .10 in unadjusted and adjusted models, compared with .05 and .08). However, the non-syndemic approaches explained less variation for main male CAI partners (adjusted R^2 of .08 and .25 in unadjusted and adjusted models, compared with .09 and .26) and casual male CAI partners in this period (adjusted R^2 of .10 and .11 in unadjusted and adjusted models, compared with .12 and .14). See Table 3 for the complete analyses.

4. DISCUSSION

Our results demonstrate that Latinx MSM continue to be highly vulnerable to HIV infection, and the synergistic interaction of risk factors impact sexual HIV risk behaviors. Our study also highlights the importance of including factors beyond only psychosocial in syndemic research. We demonstrate that environmental and behavioral factors such as homelessness, incarceration, and engagement in sex exchange can and should be included when investigating HIV behavioral risk factors through syndemic theory. In addition, we demonstrate that both syndemic and non-syndemic analyses provide information about the impact of risk factors on HIV risk behavior.

Our syndemics framework analysis provided evidence that the presence of at least two of the five risk factors we examined was associated with more male partners and more casual male CAI partners. This model also explained the variance in acts of CAI with a main male partner and CAI with casual male partners, but did not perform as well with regard to the total number of male partners. In contrast, our non-syndemic models showed the association between experiencing homophobia and homelessness and the number of male partners, as well as the impact of heavy drinking on the number of casual male CAI partners. This approach also better explained variability in the total number of male partners, but did not show any significant impact of sex exchange and incarceration on our outcome variables.

Through both approaches, this analysis demonstrated that the individual impacts of psychosocial conditions are not necessarily equivalent to the cumulative impact of those conditions. While consistent with the logic of syndemic theory, this suggests that syndemic and non-syndemic approaches vary in their relative capacity to account for sexual risk among Latinx MSM. As we move forward in an era of biomedical prevention tools, including PrEP and U=U, these syndemic conditions should be further addressed. For example, the presence of syndemics, including lager structural conditions such as discrimination and stigma, might impact viral load suppression and adherence to medications. Study findings underscore the importance of social and structural determinants in HIV prevention and care. Future studies should explore the impact of racism and ethnic discrimination; housing insecurity; anti-immigration policies and laws; unemployment; and

lack of health insurance on HIV prevention and care continua outcomes, including PrEP continuum of care.

To address growing HIV prevention and care challenges among Latinx MSM and implementation gaps, we urge researchers, clinicians, health and social service providers, policy makers, and multi-sectoral community stakeholders to adopt an implementation science framework, which will increase the uptake of effective HIV programs and interventions. Implementation science is an integrated concept that links research and practice to accelerate the development and delivery of public health approaches. Implementation science focuses on practical approaches to improve implementation and to enhance equity, efficiency, scale-up, and sustainability of programs, policies and practices (Waltz, Powell, Fernández, Abadie, & Damschroder, 2019).

Several programs and interventions have been shown to be feasible and acceptable, efficacious and/or effective among sexual and gender minority Latinxs. For example, Connecting Latinos en Parejas is a couple-based HIV biobehavioral HIV prevention and treatment intervention for Latino men and their same-sex partners (O. Martinez et al., 2018). Tal Como Somos is an educational film to reduce stigma toward gay and bisexual men, transgender individuals, and persons living with HIV/AIDS (Ramirez-Valles, Kuhns, & Manjarrez, 2014). Trans Equity Project is a homegrown community-level HIV prevention and treatment intervention for transgender men and women (O. o. m. t. e. Martinez, Lopez, Woodard, Rodriguez-Madera, & Icard, 2019). HOLA en Grupo is a group-level HIV prevention intervention for recently-arrived sexual and gender minority Latinxs (Scott D. Rhodes et al., 2017).

Despite its significance, this study has several limitations. First, a tri-city analysis using NHBS data from Baltimore, Philadelphia, and Washington, DC was pursued, however there were prohibitively few Latinx MSM participants from Baltimore and Washington, DC. Consequently, we could not determine the extent to which the documented patterns are unique to Philadelphia. Therefore, moving forward, increased efforts to collect data from Latinx MSM in Washington D.C. and Baltimore are needed. Second, due to skip patterns in prior cycles of NHBS data, it was not possible to include transgender participants in assessments of sexual risk behavior. Third, the study relied upon self-reported socio-behavioral data. NHBS includes extensive staff training and survey methods to build participant rapport and enhance validity of self-reported data, but social desirability bias may have affected study findings. Fourth, there may be limitations connected with venue-based sampling for MSM and other populations that face an elevated risk of HIV infection and transmission. Finally, it is somewhat difficult to gauge the relative effectiveness of syndemic and non-syndemic approaches with these data. In some models, participants who reported two or more factors differed significantly from those reporting no factors, however without a larger scale and sample, we do not have the data to determine whether a further increase in syndemic conditions would have been associated with a further increase in HIV risk.

5. CONCLUSION

To our knowledge, this is the first paper that looks at syndemics among Latinx MSM in the Philadelphia Metropolitan Area, one of the epicenters of the HIV epidemic in the U.S. Our analysis provides a description of the characteristics of Latinx MSM in Philadelphia, highlighting socioeconomic vulnerability and the high burden of syndemic conditions. Through syndemic models, we showed that the presence of particular syndemic conditions – including sex exchange– increased the number of male partners and proportion of CAI more than those with none. Future studies should further explore the impact of structural factors, including racial and ethnic discrimination; housing instability; lack of insurance; and anti-immigration rhetoric on HIV prevention and care. In addition, HIV prevention and care interventions for Latino MSM should be responsive to psychosocial and structural conditions impacting this group.

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Table 1.

Descriptive Characteristics

	N (%) or M (SD)
NHBS Round	
Round 2	104 (22%)
Round 3	134 (29%)
Round 4	226 (49%)
Hispanic Ancestry (n=464)	
Mexican	42 (9%)
Puerto Rican	310 (70%)
Cuban	26 (6%)
Dominican	42 (9%)
Other	34 (8%)
Racial Identity (n=376)	
White	130 (35%)
Black	196 (52%)
American Indian or Alaska Native	14 (4%)
Asian	4(1%)
Native Hawaiian or other Pacific Islander	24(6%)
Born in the United States	378 (81%)
Age	30.62 (9.01)
Sexuality	
Gay/Homosexual	342 (74%)
Bisexual	122 (26%)
Employment Status	
Full-time work	250 (54%)
Part-time work	78 (17%)
Full-time student	26(6%)
Unemployed	86 (19%)
Other	24 (5%)
Education	
Less than High School	52(11%)
High School or GED	168 (36%)
Some College	140 (30%)
Bachelor's or Higher	104 (22%)
Annual income (n=458)	
Less than $10,000	116 (25%)
$10,000–19,999	96 (21%)
$20,000–29,999	64 (14%)
$30,000–39,999	72 (16%)
$40,000–49,000	18 (4%)
$50,000–74,999	60 (13%)

	N (%) or M (SD)
$75,000 or higher	32 (7%)
Health Insurance (currently insured)	302 (65%)
Syndemic Factors	
Arrest/Detention in Past 12 Months	30 (6%)
Sex Work in Past 12 Months (worker or client)	36 (8%)
Homelessness in Past 12 Months	72 (16%)
Heavy Drinking in Past Month	212 (46%)
Homophobic Discrimination	166 (36%)
Syndemic Scale, for Sexual Behaviors	
0 Factors	160 (34%)
1 Factor	210 (45%)
2+ Factors	94 (20%)
Outcomes: Full Sample[*]	
Male Partners in Past 12mths (n=462)	4.09 (6.17)
Main Male Partners, CAI (n=96)	1.38 (1.22)
Casual Male Partners, CAI (n=162)	2.23 (4.49)

N=(464) unless otherwise specified.

[*]CAI refers to condomless anal intercourse in the past 12 months.

Syndemic factors for sexual behaviors include heavy drinking; sex work, end homophobic discrimination (reference group; 0 factors); syndemic factors for testing include homelessness, criminal justice involvement, and homophobic discrimination.

Data: non-heterosexual end non-female Latinos from HET 3, IDU 3–4, and MSM 2–4

Table 2.

Linear and Logistic: Regressions of Sexual Behavior by Cumulative syndemic Conditions.

	b	SE	p Value	F (df)	Adjusted R^2	Adjusted b**	SE	p Value	F (df)	Adjusted R^2
*Number of Syndemic Factors**	*Male Partners in the Past 12 Months (n=462)*					*Male Partners in the Past 12 Months (n=456)*				
One	0.77	0.63	0.22	14.29 (2, 459)	0.05	0.72	0.67	0.28	3.06 (18, 437)	0.08
Two or More	4.08	0.79	<.01			3.96	0.84	<.01		
*Number of Syndemic Factors**	*Main Male Partners with Whom Participant Reported CAI (n=96)*					*Main Male Partners with Whom Participant Reported CAI (n=96)*				
One	0.20	0.29	0.49	5.92 (2, 93)	0.09	0.13	0.31	0.67	2.83 (18, 77)	0.26
Two or More	1.00	−.31	<.01			0.69	0.39	0.08		
*Number of Syndemic Factors**	*Casual Male Partners with Whom Participant Reported CAI (n=162)*					*Casual Male Partners with Whom Participant Reported CAI (n=160)*				
One	−0.10	0.82	0.91	12.38 (2, 159)	0.12	0.05	0.88	0.96	2.40 (18, 141)	0.14
Two or More	3.43	0.84	<.01			4.73	1.06	<.01		

*Syndemic factors for sexual behaviors include heavy drinking, sex work, and homophobic discrimination (reference group: 0 factors.).

**b coefficients are adjusted for the following controls: NHSS round, race (White, Black, Other), employment status, education, household income, sexuality, age, current health insurance status, and whether participants were born in the U.S.

Table 3.

Linear and Logistic: Regressions of Sexual Behavior and Testing outcomes, Non-Syndemic Approach.

	b	SE	p Value	F (df)	Adjusted R^2	Adjusted b*	SE	p Value	F (df)	Adjusted R^2
Psychosacial Predictors	*Male Partners in the Past 12 Months (n=462)*					*Male Partners in the Past 12 Months (n=456)*				
Heavy Drinking	0.67	0.56	0.23	13.71 (3, 458)	0.08	0.58	0.58	0.32	3.64 (19, 436)	0.10
Homophobic Discrimnation	2.44	0.59	<.01			2.52	0.67	<.01		
Sex Work	3.82	1.06	<.01			4.40	1.18	<.01		
Psychosacial Predictors	*Main Male Partners with Whom Participant Reported UAI (n=96)*					*Main Male Partners with Whom Participant Reported UAI (n=96)*				
Heavy Drinking	0.35	0.24	0.16	3.83 (3, 92)	0.08	0.17	0.30	0.57	2.68 (19, 76)	0.25
Homophobic Discrim nation	0.55	0.26	0.04			0.53	0.32	0.10		
Sex Work	0.41	0 38	0.28			0.13	0.61	0.83		
Psychosocial Predictors	*Casual Male Partners with Whom Participant Reported UAI (n=162)*					*Casual Male Partners with Whom Participant Reported UAI (n=160)*				
Heavy Drinking	2.55	0.68	<.01	7.13 (3, 158)	0.10	3.47	0.77	<.01	2.00 (19, 140)	0.11
Homophobic Discrimnation	1.71	0.69	0.02			1.58	0.85	0.06		
Sex Work	−0.45	0.84	0.60			−1.37	1.19	0.25		

*b coefficients are adjusted for the following controls: NHBS round, race (White, Black, Other), employment status, education, household income, sexuality, age current health insurance status, and whether participants were born in the U.S.