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Psychosocial predictors of engagement in sexual risk behavior among trans*female youth ages 16 – 24 years in San Francisco

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Abstract

Background—Trans*female youth (TFY) carry a disproportionate burden of HIV. Few longitudinal studies have analyzed both proximal and upstream predictors of changes in HIV-related risk behaviors for TFY. The present analysis aims to identify psychosocial predictors of changes in sexual risk behavior over time for TFY in the San Francisco Bay area.

Methods—Data come from the SHINE cohort study conducted at the San Francisco Department of Public Health from 2012–2014 (n=263). The relationship between hypothesized psychosocial factors and changes in engagement in condomless receptive anal intercourse over 12-month follow-up was modeled using generalized estimating equations, after adjusting for participant age, race/ethnicity, and education level.

Results—TFY who were ever in a serious relationship since identifying as trans* (aOR=1.89, 95% CI=1.16–3.08), those who reported recent crack or cocaine use (aOR=2.01, 95% CI=1.05–3.85), and those with a monthly income of over \$500 (aOR=0.55, 95% CI=0.35–0.85) had significantly higher odds of condomless receptive anal intercourse over the 12-month study period compared to TFY without these exposures. Those who reported high exposure to gender-based discrimination had significantly increased odds of engagement in condomless receptive anal intercourse compared to those who had low exposure over the study period (aOR=1.70, 95% CI=1.10–2.63).

Conclusion—Both proximal and structural factors predicted increased engagement in sexual risk behavior among TFY. Results demonstrate the need for a multilevel approach to HIV prevention strategies for this population.

1. Background

“Trans*female” is an overarching term for an individual assigned a male sex at birth who identifies differently from the gender typically associated with their sex. The asterisk in “trans*” denotes how this term encompasses a spectrum of gender identities. Although trans*female youth (TFY) comprise a small percentage of the population,¹ the HIV prevalence among TFY in the United States is estimated to be as high as 19% or 22%.^{2,3}

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Conflicts of Interest: none.

The HIV prevalence among adult trans*females in the U.S. is about 28%,⁴ and is estimated to be almost 40% in San Francisco.⁵ There is substantial increase in HIV prevalence for trans*females between youth and adulthood, highlighting the critical need for HIV interventions among TFY.

Structural, social, and individual level factors underlying HIV/AIDS incidence have been identified as important targets of intervention efforts.⁶ For trans*females, HIV risk is associated with a host of co-occurring adverse experiences related to discrimination, violence/victimization, and mental health.⁷ Qualitative research has suggested a link between psychosocial hardship and HIV risk among adult trans*females.⁸ Quantitative studies of sexual and gender minority groups showed associations between relationship status,⁹ substance use,¹⁰ depression,¹¹ discrimination,^{10,12} unstable housing,¹³ parent/caregiver rejection¹⁴ and engagement in risk behavior. To our knowledge, there are no longitudinal analyses specific to TFY that establish temporality between psychosocial factors and changes in sexual risk outcomes.^{15,16} The aim of the present study is to assess the psychological and social predictors of changes in sexual risk behavior over a 12-month period for trans*female youth in the San Francisco Bay area.

2. Methods

Data for this project come from the SHINE study, conducted at San Francisco Department of Public Health from 2012–2014. SHINE is the first longitudinal study of TFY living in the San Francisco Bay Area. The aim of the study was to characterize HIV risk and resilience behaviors within this community. Face-to-face surveys, administered by a research assistant fluent in Spanish and English, captured information on demographics, the social environment, substance use, and sexual behaviors at baseline and 12-month follow-up for each participant. Informed consent, available in Spanish and in English, was obtained by all participants. The Institutional Review Board at University of California, San Francisco provided approval for study procedures (IRB # 12-08875).

Eligibility criteria for participants included: self-identifying as a gender different from that typically associated with the male sex assigned at birth, having 16–24 years of age, living in the San Francisco Bay Area, and speaking English or Spanish. Recruitment methods for this study are described in detail elsewhere.¹⁷ In total, 300 participants were enrolled in the study.

The present analyses were restricted to TFY who completed both their baseline assessment and 12-month follow-up assessment. Of the 300 total participants in the sample, 263 TFY (88%) remained once this exclusion was made. Possible bias due to excluding these participants was examined by checking for similarity of exposure distributions by outcome for the entire cohort compared to the sample used in this analysis.

In the interviewer-conducted surveys, each participant reported on the number of times they engaged in various sexual behaviors for up to six sexual partnerships in the previous 6 months. We examined condomless receptive anal intercourse specifically because it has been identified as an HIV-related risk behavior for trans*females^{7,18} and has high HIV

transmission risk.¹⁹ Condomless receptive anal intercourse was coded as a binary variable (any report versus no report in the past 6 months) since the distribution of the number of times that participants engaged in this behavior was heavily skewed and contained outliers.

Age was a continuous variable, defined as participants' year of age at the time of taking the surveys. Participants also provided their annual income. We adjusted self-reported annual income by number of dependents reported, and coded it as below the poverty line, at or above the poverty line, and unknown based on the extremely low income limit for San Francisco.²⁰ Monthly income, education, and working status were also included in the analysis; variable categories are in Table 1. TFY who reported owning their own house, renting a house or an apartment, or living with partners, friends, family, or guardians were considered as having stable housing, while those in transitional housing and homeless individuals were considered as having unstable housing. Race/ethnicity was an indicator variable of participants' self-reported racial/ethnic identities. Categories were defined according to Office of Management and Budget (OMB) standards.²¹ Due to sample size constraints, race/ethnicity was coded into the following categories: Black or African American (non-Hispanic or Latino/a), Latino/a or Hispanic, Other (non-Hispanic or Latino/a Asian, American Indian/Alaska Native, Native Hawaiian or other Pacific Islander, Other, or multiracial), and White (non-Hispanic or Latino/a).

Relationship status since identifying as trans*, probable depression status (based on the Center for Epidemiologic Studies Depression Scale using a cut point recommend for youth),²² and history of sex work were binary variables, with positive responses in the survey coded as 1 and negative responses as 0. TFY also reported the extent to which they felt as though they passed as the gender with they identified. We categorized responses as not at all/not very much, somewhat, and very much in our analysis. Parent/caregiver acceptance of gender identity and closeness with parents/caregivers were assessed by scales designed to capture the extent to which participant's felt accepted by and close to their parents/caregivers. Ten parent/caregiver acceptance items were adapted from a family acceptance scale developed by Ryan and colleagues.²³ The adapted items included: "Do any of your parents/caregivers ever talk about your trans or gender non-conforming identity with you?"; "Do any of your parents/caregivers support your gender expression?"; and "Have any of your parents/caregivers ever advocated for you when you were mistreated because of your identity?". Participants could respond with "Yes" or "No" to these questions. "Yes" responses were coded as 1; "No" responses were coded as 0. Responses to the ten items were summed to create a composite score for parent/caregiver acceptance that ranged from 0 to 10. Participants were asked four parent/caregiver closeness items including: "When growing up, most of the time my mother, father, or caregiver was warm and loving toward me"; and "When I did something wrong that was important, my mother, father, or caregiver talked about it with me and helped me understand why it was wrong." Participants could respond to these items along a 4-point Likert scale from "Strongly disagree" (coded as 0) to "Strongly agree" (coded as 3), with responses to all four items summed to create a composite score ranging from 0 to 12. Higher scores on both the parent/caregiver acceptance and closeness scales denoted a higher degree of these constructs. Experiences of transgender- and racial-based discrimination, adapted from a measure of homophobia²⁴ and the "Experiences of Discrimination" instrument,²⁵ respectively, comprised participant

responses to items asking about discrimination in work and school, in attaining housing, and in access to health services. TFY who responded “Yes” to 2 or more items for each type of discrimination were categorized as having high exposure to transgender or racial discrimination.¹² Finally, runaway status (ever ran away vs. never ran away) and housing status (stable vs. unstable) were combined to create a runaway/housing status variable, defined as never ran away, ran away and currently stably housed, and ran away and currently unstably housed.

Alcohol and substance use were binary variables that captured behaviors in the past 6 months. TFY were asked if they self-identified with having a drinking or drug problem. Responses were coded as 1 for “Yes” or “Maybe” and 0 for “No.” Participants were also asked whether they consumed at least one drink of alcohol, had at least one instance of binge drinking, used methamphetamine, poppers, or crack/cocaine, or smoked cigarettes in the past 6 months. Positive responses were coded as 1, while responses indicating no use were coded as 0.

Each participant’s exposure and outcome information were analyzed for two time points: baseline and 12-month follow-up. Data were modeled using generalized estimating equations with an exchangeable correlation structure to account for within-subject clustering for repeated measures data and to assess changes in sexual risk behavior over the 12-month study period. Variables of interest were first examined with univariate analyses to determine their prevalence, perform range checks, and explore missing data. We then conducted bivariable analyses of hypothesized predictors of changes in sexual risk behavior among TFY. Hypothesized confounders and variables at a 0.05 alpha level of significance in bivariable analyses were included in the final model. All analyses were conducted in Stata 13 software.²⁶

3. Results

Descriptive statistics, overall and by outcome status, are presented in Table 1. Eighty-four participants (32%) reported engaging in condomless receptive anal intercourse at least once in the 6 months prior to their baseline visit. The average age of TFY was 21 years. Participants reported a variety of gender identities and sexual orientations. Most identified as female (47%) and reported being straight or heterosexual (31%). A majority of TFY lived below the poverty line in San Francisco (65%) and reported their previous month’s income to be \$500 or less (52%). Almost half (48%) of participants completed at least some college. TFY also came from racially and ethnically diverse backgrounds: about 40% self-identified as White, 32% as Hispanic or Latino/a, 12% as Black/African-American, and 16% as “Other” race/ethnicity. Eight participants (3%) were living with HIV at baseline and 2 participants sero-converted by 12-month follow-up (12-month incidence proportion = 0.8%).

About two in three TFY had ever been in a serious relationship since identifying as trans*. Fifty-six (21%) of participants reported feeling depressed. While most participants (72%) reported experiencing low exposure to racial discrimination, 41% of the sample experienced high exposure to gender-based discrimination. About half (53%) of the sample ever ran away from home. Of those who reported ever running away from home, a majority reported

their current living situation was stable. Forty-six participants (17%) reported having or “maybe” having a drinking/drug problem. A majority of TFY reported consuming at least one drink of alcohol (82%). Twenty-six TFY (10%) used methamphetamine, 42 (16%) used crack/cocaine, and about half of the sample (118, 45%) reported cigarette use in the past 6 months.

In assessing possible bias from excluding participants who did not complete both baseline and 12-month follow-up assessments (n=37), we found that there were no qualitative differences in the crude relationships between exposures and condomless receptive anal intercourse for the full cohort (n=300) versus the restricted sample (n=263). Based on a 0.05 significance cut-off, monthly income, gender-based discrimination, housing/run-away status, ever being in a relationship since identifying as trans*, self-reported drinking/drug problem, methamphetamine use, crack/cocaine use, and cigarette use were included in final models. We also adjusted for baseline demographics hypothesized to be confounders, including age, race/ethnicity, and education level (Table 1).

Results from the final multivariable model are in Table 1. Over the 12-month study period, TFY who reported a monthly income of less than \$500 had significantly lower adjusted odds of condomless receptive anal intercourse (aOR=0.55, 95%CI=0.35–0.85, p<0.01). TFY with high exposure to gender-based discrimination had significantly higher adjusted odds of engaging in condomless receptive anal intercourse (aOR=1.70, 95%CI=1.10–2.63, p=0.02) over the study period. Those who had ever been in a serious relationship since identifying as trans* also had significantly higher adjusted odds of engagement in condomless receptive anal intercourse (aOR=1.89, 95%CI=1.16–3.08, p=0.01) over 12-month follow-up. Finally, crack/cocaine use was significantly associated with increased engagement in condomless receptive anal intercourse (aOR=2.01, 95%CI=1.05–3.85, p=0.04) over the study period. Runaway/stable housing status (p=0.65), runaway/unstable housing status (p=0.11), self-reported drinking/drug problem (p=0.20), methamphetamine use (p=0.29), and smoking cigarettes at least once (p=0.28) were not statistically associated with changes in condomless receptive anal intercourse over the study period compared to TFY without these exposures.

4. Discussion

Overall, structural factors such as higher monthly income and high exposure to gender-based discrimination predicted increased odds of engagement in sexual risk behavior among TFY over the 12-month study period. Proximal factors such as crack/cocaine use and being in a relationship since identifying as trans* also predicted higher odds of engagement in condomless receptive anal intercourse over the study period.

The findings that high exposure to gender-based discrimination and crack/cocaine use predicted increased odds of engagement in sexual risk behavior add longitudinal evidence to other studies that have revealed such disparities in HIV-related risk among transgender women.^{5,7,10,16} Minority stress theory posits that chronic stressors (such as gender-based discrimination) shape coping mechanisms (such as substance use) and lead to adverse health outcomes.²⁷ However, few studies have explored this theoretical model as it applies to gender-minority groups.^{28–30} Although there were statistically significant increased odds of

sexual risk behavior for TFY with high exposure to gender-based discrimination over the study period, racial discrimination was not associated with changes in sexual risk behavior. It could be that racial discrimination, a more explicit form of racism measured in this analysis, failed to capture pervasive experiences of structural racism and racial microaggressions (subtle, seemingly innocent messages that are actually negatively intended and contain racist undertones³¹). These implicit forms of racism are also implicated in health outcomes. In a recent study of young adults of color, O'Keefe and colleagues found an association between racial microaggressions and suicide-related outcomes mediated by depressive symptoms.³² To our knowledge, the mechanism by which racial microaggressions and gender minority status interact to produce changes in sexual risk behavior is unclear for trans*female youth. Although the present study attempts to analyze the role of racial discrimination in risk behavior, there is a need for using measures that are sensitive and relevant to the discrimination experiences of diverse populations, such as racial/ethnic minority trans*female youth, to rigorously inform targeted HIV intervention efforts.

The relationship between higher monthly income and changes in sexual risk behavior that we found may be explained by participant engagement in sex work. We conducted an ad hoc analysis and discovered that among those who engaged in sex work, there was a significantly higher proportion of TFY who made more than \$500 per month compared to those who made less than that amount ($\chi^2=11.5$, $p<0.01$).

Finally, the association between relationship status since identifying as trans* and sexual risk behavior is corroborated by other studies of trans*females showing that condomless intercourse likely occurs within primary partnerships.^{9,33} In one of these studies, Wilson and colleagues showed that TFY were more likely to talk about their HIV status with primary partners, possibly due to lessened stigma in this context.³³ These findings suggest that serosorting behaviors may be occurring among TFY and that risk networks in the context of primary partnerships are important when exploring HIV incidence in vulnerable subgroups, such as trans*females.

Overall, this study adds key strengths to existing research of TFY. To current knowledge, this is the first study to longitudinally analyze psychosocial predictors of changes in sexual risk behavior in a diverse and relatively large sample of TFY. Subsequently, we established temporality between exposures and changes in sexual risk behavior and also had more power to detect hypothesized associations. In addition, the analysis included both proximal and structural predictors.

Despite these strengths, the results of this study should be interpreted with some limitations in mind. Although the SHINE study comprised a large sample of trans*females relative to other studies with similar samples, we were still restricted in our ability to detect statistically meaningful associations. Since the participants in the study were drawn from convenience and respondent-driven sampling, they may be more alike in certain aspects. Convenience sampling may have led to an over-representation of sexual risk behavior and other adverse outcomes.¹ If these sampling strategies resulted in choosing participants with similar psychosocial characteristics as well, selection bias would have occurred. In any case,

samples of TFY from San Francisco may not be representative of the overall TFY population. Operationalizing sexual risk behavior as a binary outcome was another limitation. For example, someone who reported engaging in condomless receptive anal intercourse only once with one sexual partner would have been classified in the same risk category as someone engaging in that behavior multiple times. However, the vast majority of participants in this sample (70%) reported no engagement in condomless receptive anal intercourse or only one instance of this behavior. Thus, we did not have the power to analyze counts of this condomless receptive anal intercourse. Moreover, participants were only asked questions for up to six sexual partners. This placed an upper limit on the frequency with which sexual behaviors could have occurred. Finally, analyzing data at two time points (baseline and 12-month follow-up) restricted our ability to characterize nuanced trajectories of sexual risk behavior for TFY or changes over a longer period of time.

In light of these limitations, this study serves as a building block for subsequent research and intervention efforts among TFY. Future research can delve deeper into the causal pathways by which structural and proximal factors interact to produce engagement in sexual risk behavior and subsequent HIV infection and transmission. After these pathways are elucidated, public health practitioners can design HIV prevention programs that intervene on various components of the causal pathway. Intervention on proximal determinants of HIV risk such as substance use and primary partnerships could prove more feasible in the short-term while working toward larger-scale societal changes in gender acceptance. Overall, this study spells out the need for exploring the complex interplay of social- and individual-level factors in predicting HIV risk behavior in order to design relevant, multi-level interventions for trans*female youth.

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Table 1

Baseline characteristics of trans*female youth and adjusted odds ratios (aOR) for the relationship between demographic and psychosocial characteristics and changes in condomless receptive anal intercourse over a 12-month study period, SHINE Study, San Francisco, CA, 2012–2014

	Overall [§]	Any condomless receptive anal intercourse [§]	No condomless receptive anal intercourse [§]	Adjusted odds of condomless receptive anal intercourse
	N (%) [‡] or M (SD)	N (%) ^{‡‡} or M (SD)	N (%) ^{‡‡} or M (SD)	aOR (95% CI)
Total	263 (100.0)	84 (31.9) [‡]	169 (64.3) [‡]	
Demographic characteristics				
Age	21.2 (2.2)	21.4 (2.2)	21.0 (2.3)	0.97 (0.86–1.09)
Gender identity				
Female	123 (46.8)	44 (52.4)	74 (43.8)	
Transgender female or transwoman	83 (31.6)	25 (29.8)	55 (32.5)	
Genderqueer or gender fluid	41 (15.6)	13 (15.5)	28 (16.6)	
Other	16 (6.1)	2 (2.4)	12 (7.1)	
Sexual orientation				
Straight	82 (31.2)	36 (42.9)	44 (26.0)	
Gay/lesbian	45 (17.1)	14 (16.7)	30 (17.8)	
Bisexual	19 (7.2)	4 (4.8)	14 (8.3)	
Queer	41 (15.6)	13 (15.5)	26 (15.4)	
Pansexual	38 (14.5)	9 (10.7)	28 (16.6)	
Other	38 (14.5)	8 (9.5)	27 (16.0)	
Adjusted annual income				
At/above poverty line	64 (24.3)	19 (22.6)	44 (26.0)	
Below poverty line	170 (64.6)	57 (67.9)	105 (62.1)	
Unknown	29 (11.0)	8 (9.5)	20 (11.8)	
Income in the last month [‡]				
\$501 or more	122 (46.4)	50 (59.5)	69 (40.8)	1
\$0 – 500	138 (52.5)	32 (38.1)	99 (58.6)	0.55 (0.35–0.85)**
Education level attained				
Some college or beyond	125 (47.5)	33 (39.3)	86 (50.9)	1
High school graduate/GED	87 (33.1)	34 (40.5)	50 (29.6)	1.25 (0.75–2.06)
Less than high school	51 (19.4)	17 (20.2)	33 (19.5)	1.03 (0.49–2.16)
Current living situation				
Stable	205 (78.0)	60 (71.4)	138 (81.7)	
Unstable	58 (22.1)	24 (28.6)	31 (18.3)	
Ever worked				
No	61 (23.2)	15 (17.9)	44 (26.0)	

	Overall [§]	Any condomless receptive anal intercourse [§]	No condomless receptive anal intercourse [§]	Adjusted odds of condomless receptive anal intercourse
	N (%) [†] or M (SD)	N (%) ^{††} or M (SD)	N (%) ^{††} or M (SD)	aOR (95% CI)
Yes	202 (76.8)	69 (82.1)	125 (74.0)	
Race/ethnicity				
White	105 (39.9)	23 (27.4)	76 (45.0)	1
Hispanic or Latino/a	83 (31.6)	27 (32.1)	53 (31.4)	1.94 (1.03–3.65)*
Black/African American	32 (12.2)	13 (15.5)	19 (11.2)	2.36 (1.04–5.36)*
Other	43 (16.4)	21 (25.0)	21 (12.4)	2.56 (1.28–5.13)**
Psychosocial characteristics				
Ever in a serious relationship since identifying as transgender [‡]				
No	98 (37.3)	23 (27.4)	73 (43.2)	1
Yes	162 (61.6)	60 (71.4)	94 (55.6)	1.89 (1.16–3.08)*
Depressed				
No	206 (78.3)	66 (78.6)	133 (78.7)	
Yes	56 (21.3)	18 (21.4)	35 (20.7)	
Passing as gender with which identified				
Not at all/not very much	49 (18.6)	11 (13.1)	37 (21.9)	
Somewhat	95 (36.1)	27 (32.1)	63 (37.3)	
Very much	101 (38.4)	39 (46.4)	58 (34.3)	
Gender-based discrimination [‡]				
Low exposure	147 (55.9)	36 (42.9)	107 (63.3)	1
High exposure	108 (41.1)	47 (56.0)	55 (32.5)	1.70 (1.10–2.63)*
Racial discrimination				
Low exposure	189 (71.9)	57 (67.9)	124 (73.4)	
High exposure	66 (25.1)	27 (32.1)	37 (21.9)	
Parent/caregiver acceptance of gender identity	4.8 (3.0)	4.6 (3.1)	4.9 (3.0)	
Closeness with parents/caregivers	7.2 (3.4)	6.8 (3.4)	7.4 (3.5)	
Ever run away/current living situation [‡]				
Never ran away	123 (46.8)	29 (34.5)	91 (53.9)	1
Ran away, currently stably housed	92 (35.0)	33 (39.3)	55 (32.5)	1.13 (0.66–1.93)
Ran away, currently unstably housed	47 (17.9)	22 (26.2)	23 (13.6)	1.77 (0.88–3.56)
Ever engaged in sex work				
No	175 (66.5)	35 (41.7)	135 (79.9)	
Yes	59 (22.4)	32 (38.1)	24 (14.2)	
Self-reported drinking/drug problem [‡]				
No	213 (81.0)	60 (71.4)	145 (85.8)	1
Maybe or Yes	46 (17.5)	23 (27.4)	21 (12.4)	1.45 (0.82–2.57)

	Overall[§]	Any condomless receptive anal intercourse[§]	No condomless receptive anal intercourse[§]	Adjusted odds of condomless receptive anal intercourse
	N (%)[†] or M (SD)	N (%)^{††} or M (SD)	N (%)^{††} or M (SD)	aOR (95% CI)
At least one drink of alcohol, past 6 months				
No	47 (17.9)	13 (15.5)	34 (20.1)	
Yes	216 (82.1)	71 (84.5)	135 (79.9)	
Used methamphetamine, past 6 months [‡]				
No	235 (89.4)	70 (83.3)	158 (93.5)	1
Yes	26 (9.9)	14 (16.7)	9 (5.3)	1.46 (0.73–2.90)
Used poppers, past 6 months				
No	236 (89.7)	72 (85.7)	155 (91.7)	
Yes	25 (9.5)	12 (14.3)	12 (7.1)	
Used crack or cocaine, past 6 months [‡]				
No	219 (83.3)	64 (76.2)	149 (88.2)	1
Yes	42 (16.0)	20 (23.8)	18 (10.7)	2.01 (1.05–3.85) [*]
Frequency of smoking cigarettes, past 6 months [‡]				
Never	145 (55.1)	39 (46.4)	103 (61.0)	1
At least once	118 (44.9)	45 (53.6)	66 (39.1)	1.29 (0.82–2.03)

[§]Baseline characteristics

[†]Percentages calculated out of a total of 263 trans^{*} female youth and may not add to 100% due to missing data

^{††}Unless otherwise specified, percentages calculated out of the total number of trans^{*} female youth in that outcome category; these may not add to 100% due to missing data

[‡]p<0.05 in the bivariable model

^{*}p<0.05 in the multivariable model

^{**}p<0.01 in the multivariable model

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