The Relationship Between Discrimination and High-Risk Social Ties by Race/Ethnicity: Examining Social Pathways of HIV Risk

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ABSTRACT *High-risk social ties portend differences in opportunity for HIV exposures and may contribute to racial/ethnic disparities in HIV transmission. Discrimination may affect the formation of high-risk social ties and has not been explored as a possible explanation for these persistent disparities. Using data from injection and non-injection drug users, we examined the association between the number of high-risk sex and drug ties with discrimination due to race, drug use, and incarceration stratified by race/ethnicity. Negative binomial regression models were used. While blacks had significantly fewer injecting ties than Latinos and whites, blacks who reported racial discrimination compared to blacks who did not, had more sex and injecting ties. Latinos who reported drug use discrimination compared to Latinos who did not also had more sex ties. Latinos and whites who reported drug use discrimination had more injecting ties than Latinos and whites who did not. Discrimination is associated with high-risk social ties among all racial/ethnic groups. But, these data highlight different forms of discrimination within racial/ethnic group are associated with risky social ties. More research is needed to confirm these findings and further explore the association between various forms of discrimination and social ties that may help explain racial/ethnic disparities in HIV.*

KEYWORDS *Social networks, HIV risk, Discrimination, Race/ethnicity*

Higher prevalence and rates of transmission of human immunodeficiency virus (HIV) among black and Hispanic drug users compared to white drug users¹⁻³ are not fully explained by higher drug use and sexual risk behaviors. Studies show blacks (and to a lesser extent Hispanics), are less likely than whites to use drugs,^{4,5} initiate injection drug use,^{6,7} and engage in high-risk drug use¹ and sexual behaviors.⁸⁻¹⁰ Friedman and colleagues argue that racial disparities in HIV persist because of racialized social processes that influence high-risk social network relationships. Indeed, empirical evidence has shown that those who report discrimination because of their race/ethnicity or because they are a drug user have

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increased high-risk sex and drug ties even after accounting for individual-level sex and drug use behaviors.¹¹ But, whether differences exist by race/ethnicity is unclear.¹² While minorities in the general population report more experiences of racial discrimination than whites,¹³ less is known about discrimination among drug users and non-race-related experiences of discrimination such as drug use discrimination.^{14–16} Furthermore, as perceptions of discrimination vary by race/ethnicity, it is possible that distinct differences in social relationships are present by racial group among those who report discrimination compared to those who do not.

In this paper, we propose one central conceptual model to explain how various forms of discrimination may influence exposure to high-risk social ties. However, as some forms of discrimination are more salient in some racial/ethnic groups, we would expect the mechanism leading to high-risk social ties to vary by race/ethnicity. For example, an experience of discrimination because of one's race/ethnicity, use of drugs or prior incarceration status, can limit access to social and health services, health information, housing, and employment opportunities. And these limitations in access to critical resources can result in social isolation whereby individuals who are isolated because of discrimination form relationships with others who have faced similar patterns of discrimination.^{12, 17} The resulting relationship network is a more vulnerable, high-risk network characterized by a heightened opportunity for HIV transmission. As another example, poor individual and network resources due to experiences of discrimination could lead to increased sexual ties because of survival sex and the internalization of disadvantage.^{18–20}

Given that the magnitude of racial/ethnic disparities in HIV prevalence and transmission cannot be completely explained by individual level factors (e.g., HIV testing, sex and drug behaviors, depression),^{21–24} it is possible that discrimination not only shapes the level of risk within one's social network,^{12,25–27} but certain forms of discrimination (e.g., racial, incarceration, and drug use) filter individuals into different types of risk networks; and it is one's risk network that drives racial disparities as opposed to individual risk behaviors. Therefore, even if someone engages in fewer HIV risk behaviors, their probability of exposure could be high if they have more high-risk social ties with higher levels of disease within the social network.¹² In an extreme example, consider an individual who refrains from any high-risk sex or drug use behaviors but associates exclusively with people who trade sex for money (a highly HIV prevalent population). In such a circumstance, a single unprotected sexual encounter with someone in their network would greatly increase their risk of HIV exposure.

Isolation of individuals who experience discrimination into high-risk networks could influence racial/ethnic disparities in HIV transmission if certain forms of discrimination only act to filter individuals into specific risk networks. So, either form of discrimination due to race, drug use or previous incarceration can lead to higher-risk networks, but the mechanism through which this occurs may be different within each racial/ethnic group. For example, an effect between racial discrimination and high-risk networks may be seen among racial/ethnic minorities given that minorities have historically been prepared to expect and combat racial discrimination in the USA. However, a similar effect between drug use discrimination and high-risk networks may not be seen among racial/ethnic minorities since the salience of racial discrimination is more apparent. On the other hand, racial/ethnic groups who are not primed to handle experiences of discrimination may be unable to cope effectively with an experience of any type of discrimination when one is encountered. Thus, nonracial forms of discrimination may be particularly detrimen-

tal among nonminorities and a relationship between drug use discrimination and high-risk networks is likely to be seen. Therefore, it may not necessarily be “what one does”, but “with whom it is done”, and in “what social contexts” that is driving disparities in HIV transmission by race/ethnicity.^{12,24}

Herein, this study examines the relationship between discrimination and high-risk social ties within racial/ethnic group. This paper contributes to the current discrimination literature in two important ways. First, through an examination of an additional and unexplored pathway—specifically, social networks—through which discrimination may influence health. Second, through an examination of discrimination not only based on race, but also based on drug use and prior incarceration which are rarely examined in the literature and may also impact social opportunities and influence health.

METHODS

Population and Setting

This study used data from 652 injection drug users (IDUs) and non-IDUs enrolled in the Social Ties Associated with Risk of Transition into Injection Drug Use (START) study from August 2005 to January 2009 in New York City. Two recruitment strategies were used: (1) targeted sampling strategies (TSS), and (2) respondent driven sampling (RDS). Detailed methods on recruitment have been published elsewhere.²⁸ In brief, neighborhoods that were ethnographically mapped as high drug active areas in New York City were targeted and RDS, a chain sampling referral strategy, was employed to reach drug users who were harder to reach.^{29,30}

Study Design

START employed two study designs: (1) a prospective study design among heavy non-IDUs who never injected and used heroin, crack, or cocaine (i.e., used ≥ 1 year and currently used ≥ 2 –3 times per week in the past 3 months) and (2) a cross-sectional study design among recently initiated IDUs (i.e., injected for ≤ 4 years and currently injected ≥ 1 in the past 6 months). Drug use was verified with a rapid drug test that detected opiate and cocaine metabolites in the urine. Additionally, visible track marks (i.e., stigmata) were verified among those who reported injecting.

Data Collection

For this analysis, baseline data from non-IDUs and cross-sectional data from IDUs were used. The baseline visit included informed consent for participation and completion of a 90-min face-to-face interviewer-administered survey. This study was approved by the Institutional Review Boards of Columbia University and the New York Academy of Medicine.

Outcome Variable

Participants were asked to provide the names and behaviors of key people in their egocentric social networks, year-by-year, for 5 years prior to study entry. Recalling behavioral histories has been shown to yield valid responses (using construct validity techniques) among drug users using a 10-year reconstruction of behavioral history.^{31,32} To assist with recall, participants' memory of behavioral events was anchored by important biographical landmarks (e.g., child birth, famous event,

change in residence, etc.) and they were asked to recount the most significant personal acquaintances in their network for each year. Then, demographic and behavioral characteristics of each social tie listed were collected.

For this analysis, information on each unique individual in the entire social network over the past 5 years was pooled to proxy an individuals' lifetime social network. From the complete social network, high-risk social ties in the network were operationalized as a social tie that could pose some HIV risk through sexual or drug transmission. Four outcomes were created by tallying the total number of social ties that held each type (sex, drug, injecting) of risk: (1) sex ties (male and female sexual ties and ties who participate in transactional sex); (2) drug using ties (ties that use crack, heroin, inject, and ties that the participant used drugs with); (3) injecting ties (ties that use heroin and inject drugs); and (4) a total social ties variable was created which included all sex and drug ties (identified above) plus ties that had ever spent time in jail to understand how many sex and drug risks individuals were aware that they could be exposed to.

Explanatory Variables and Covariates

Self-reported experience of discrimination was the main independent variable of interest. It was assessed using one stem question modified from previous discrimination studies^{33,34} for drug using populations:¹⁵ "In your lifetime, have you ever been discriminated against, prevented from doing something, or been hassled or made to feel inferior because of any of the following?" Available response categories included, age, race, sex (gender), sexual orientation, poverty, drug use, having been in jail or prison, religion, mental illness, physical illness, other, and I have never been discriminated against. Participants could respond yes or no to each type of discrimination. For this analysis, discrimination due to race, drug use, and having been in jail or prison (hereafter referred to as incarceration) were examined. These forms of discrimination have been identified as the most prevalent forms of lifetime discrimination in drug using populations.³⁵ Only those who reported spending time in jail or prison in their lifetime were included in the analyses assessing discrimination due to incarceration ($n=468$).

To ascertain race/ethnicity, participants were asked, "How do you describe your racial/ethnic background?" Racial/ethnic groups were categorized as Hispanic/Latino, non-Hispanic black and all other racial/ethnic groups. Whites ($n=64$) were combined with Asians/Pacific Islanders ($n=2$), Native Americans/Eskimos/Aleutians ($n=1$), mixed ($n=18$), and other race ($n=7$) persons, due to their small sample sizes. Reports of discrimination among Hispanics/Latinos who identified as black were more similar to those of Hispanics/Latinos compared to reports of discrimination among non-Hispanic blacks. Therefore, we combined Hispanics/Latinos who identified as black ($n=5$) with Hispanics/Latinos rather than non-Hispanic blacks, because being Hispanic/Latino may confer different interpretations, meanings and experiences of discrimination.³⁶ Hereafter, Hispanics/Latinos, non-Hispanic blacks, and all other racial/ethnic groups will be referred to as Latinos, blacks, and whites, respectively.

Variables previously identified in the literature as potential confounders to social network characteristics were assessed^{27,28,37,38} and accounted for when appropriate as the aim of this analysis was to isolate the effect of discrimination on high-risk social ties regardless of individual-level demographics and behaviors. We assessed age (continuous), gender (male/female), education (<high school education, high school or general equivalency degree, and some college or more), legal income (no

income, <\$5,000, and $\geq$ \$5,000), age at sexual debut (continuous), number of female and male sex partners (continuous), female and male condom use in the past 2 months (always/infrequently), HIV testing frequency (≤ 3 vs. ≥ 4 times), self-reported HIV sero-status (yes/no), injection status (yes/no), primary type of drug used (cocaine, crack cocaine, heroin, or polytomous drug use of all three types of drugs equally), and sample strategy (RDS/TSS). Lifetime depressive symptom (yes/no) was assessed using a question from the Composite International Diagnostic Interview which asked “In your lifetime, have you ever had a period of at least two weeks when nearly every day you felt, sad, depressed, or empty most of the time”.³⁹ Transgendered persons were excluded due to small sample sizes ($n=5$).

Analytic Plan

Descriptive statistics of the sample are presented by race/ethnicity. First, we calculated measures of location (median) and measures of spread (interquartile range) for continuous variables and frequencies were calculated for categorical variables by race/ethnicity. Unadjusted negative binomial regression models were used to determine the relationship between each form of discrimination with high-risk social ties. Mann–Whitney tests determined whether significant differences (p value < 0.05) were present between potential confounders and each high-risk social tie. Significant variables were included in the adjusted models. Adjusted negative binomial regression models stratified by race/ethnicity are presented to show the relationship between high-risk social ties and each form of discrimination within each racial/ethnic group. Interactions between race/ethnicity and each form of discrimination were also assessed in unstratified models. Analyses were performed using SAS version 9.2.⁴⁰

RESULTS

Descriptive characteristics of the population by race/ethnicity are described in Table 1. There were significant differences in the median number of sex and injecting ties by race/ethnicity. More blacks than Latinos or whites reported discrimination due to drug use. The unadjusted relationship between each form of discrimination and high-risk social ties are shown in Table 2. Those who reported experiencing discrimination due to race or drug use had significantly more total social ties. When sex and drug using ties were separated, only those who reported racial discrimination had more sex ties; however, a borderline relationship between drug use discrimination and sex ties existed. Participants who reported racial and drug use discrimination had more drug using ties. Significantly more injecting ties were reported among those who experienced discrimination due to race, drug use, and incarceration.

Important relationships were observed within racial/ethnic group in the stratified analysis (Table 3). Specifically, blacks who experienced racial discrimination compared to blacks who did not reported increased sex ties (PR, 1.41; 95 %CI, 1.09–1.84) and increased injecting ties (PR, 2.05; 95 %CI, 1.28–3.28) after adjusting for important sociodemographic characteristics. There was no association between racial discrimination and sex or injecting ties among Latinos and whites in the adjusted analysis. Latinos who reported drug use discrimination compared to those who did not had significantly more sex ties (PR, 1.51; 95 %CI, 1.17–1.95). Neither blacks nor whites who experienced drug use discrimination had more sex ties. But, Latinos (PR, 1.53; 95 %CI, 1.09–2.15) and whites (PR, 2.10; 95 %CI,

TABLE 1 Distribution of selected population characteristics by race/ethnicity, START 2006–2009

Demographics	Total (n=647)	Latino (n=240)	Black (n=316)	White (n=91)	<i>p</i> value
Median (IQR)					
Age	33 (28 – 37)	31 (27 – 36)	36 (31 – 39)	28 (23 – 34)	<0.001
Age at sexual debut	14 (12 – 16)	14 (13 – 15)	13 (12 – 15)	14 (13 – 16)	0.0048
Female sex partners	1.0 (0 – 2)	1.0 (0 – 2)	1.0 (0 – 2)	0 (0 – 1)	0.0072
Male sex partners	0 (0 – 1)	0 (0 – 0)	0 (0 – 1)	0 (0 – 1)	<0.001
Number of total social ties	7 (4 – 13)	7 (4 – 12)	8 (4 – 14)	9 (5 – 14)	0.0924
Number of sex ties	2 (1 – 4)	2 (1 – 3)	2 (1 – 6)	2 (1 – 4)	0.0018
Number of drug using ties	4 (2 – 7)	4 (2 – 8)	3.5 (2 – 7)	5 (3 – 8)	0.0534
Number of injecting ties	0 (0 – 2)	1 (0 – 3)	0 (0 – 1)	1 (0 – 3)	<0.001
%					
Female	29.52	17.92	35.13	40.66	<0.001
< High school	49.54	55.65	49.68	32.97	0.0011
≤\$5,000	82.71	80.80	84.90	80.22	0.3748
Married	15.24	15.42	14.70	16.67	0.8962
Primary Drug used					
Powder cocaine	10.20	11.79	9.86	7.06	<0.001
Crack cocaine	51.81	33.62	72.11	30.59	
Heroin	27.30	39.74	10.20	52.94	
Poly drug use	10.69	14.85	7.82	9.41	
Injector	21.89	35.42	2.87	52.22	<0.001
Infrequent Female Condom use	71.89	75.32	69.71	68.29	
Infrequent Male Condom use	68.57	66.67	64.75	83.78	
Lifetime depression	57.96	65.42	53.80	52.75	0.0127
≤3 HIV tests (lifetime)	45.32	42.73	44.78	54.32	0.1940
HIV status	8.92	5.96	12.84	2.50	0.0022*
RDS Sampling strategy	65.07	67.08	68.67	47.25	0.0006
Forms of Discrimination					
Racial	25.94	22.03	27.42	31.11	0.1755
Drug use	32.86	41.10	25.16	37.78	0.0003
Incarceration [‡]	33.97	37.63	29.91	37.93	0.2055

[‡]Only includes those that reported spending time in jail or prison in their lifetime (n=468)

*Fishers exact test

1.43–3.09) who reported drug use discrimination did have significantly more injecting ties. Increases in injecting ties were not seen among blacks who reported drug use discrimination. After adjustment for sociodemographic characteristics, no relationship between discrimination due to incarceration and injecting ties was observed among any racial/ethnic group. Interactions between racial discrimination and race/ethnicity with respect to injection ties were marginally increased among blacks compared to whites ($p=0.0705$), but no other differences by race/ethnicity were seen.

DISCUSSION

These data highlight that the influence of self-reports of various forms of discrimination on risky social ties differs within racial/ethnic group. For instance, blacks who experienced racial discrimination compared to those who did not had

TABLE 2 Unadjusted prevalence ratios (PR) and 95 % confidence interval (CI) between various forms of discrimination with total, sex, drug, and injecting social ties, START 2000–2009

	Total social ties	Sex ties	Drug using ties	Injecting ties
PR (95 % CI)				
Racial discrimination	1.37 (1.18–1.60)	1.29 (1.08–1.54)	1.42 (1.19–1.70)	1.38 (1.04–1.83)
Drug discrimination	1.35 (1.17–1.57)	1.17 (0.99–1.38)	1.43 (1.22–1.69)	1.97 (1.53–2.55)
Incarceration discrimination ^a	1.14 (0.96–1.36)	1.11 (0.91–1.34)	1.12 (0.92–1.37)	1.50 (1.11–2.02)

^aOnly includes those who reported spending time in jail or prison in their lifetime ($n=468$)

more sex ties and more injecting ties, even though, blacks had significantly fewer injecting ties than whites and Latinos. Moreover, Latinos who reported drug use discrimination compared to those who did not, had more sex ties; and Latinos and whites who reported drug use discrimination compared to Latinos and whites who did not, respectively, tended to have more injecting ties.

Higher injection drug use ties among Latinos and whites that experience discrimination may be a function of increased heroin and injection drug use among Latinos and whites.^{4,7} In attempts to remove this possibility, we adjusted for type of drug used and injection status and the association between drug use discrimination and injecting ties persisted. Another highly plausible explanation for these findings is that Latinos and whites who use drugs are more perceptive of drug use discrimination and therefore develop relationships with other drug users to avoid judgment and negative treatment because of their drug use. On the other hand, blacks who likely have a historical context of racism, perceive racial discrimination and therefore develop relationships with other blacks who understand the experience of racial discrimination. In our sample, blacks had 2.7 more black social ties compared to whites ($p<0.001$, data not shown); and having more black social ties was significantly associated with racial discrimination ($p=0.0214$, data not shown). These assortative racial mixing patterns are argued to be a driving force of disparities in HIV transmission by race/ethnicity.^{41,42} Experiences of discrimination, particularly racial discrimination, may facilitate racial mixing patterns and further

TABLE 3 Adjusted prevalence ratios (PR) and 95 % confidence intervals (CI) between various forms of discrimination with sex and injecting social ties stratified by race/ethnicity, START 2006–2009

	Latino	Black	White
Sex ties ^a			
Racial discrimination	1.19 (0.88–1.61)	1.41 (1.09–1.84)*	1.01 (0.70–1.48)
Drug use discrimination	1.51 (1.17–1.95)*	1.23 (0.94–1.62)	0.91 (0.64–1.30)
Injecting ties ^b			
Racial discrimination	1.10 (0.73–1.67)	2.05 (1.28–3.28)*	1.28 (0.84–1.96)
Drug use discrimination	1.53 (1.09–2.15)*	1.53 (0.93–2.52)	2.10 (1.43–3.09)*
Incarceration discrimination ^c	1.37 (0.94–1.99)	1.33 (0.75–2.36)	1.27 (0.74–2.18)

^aAdjusted for marital status, main drug used, injection status, HIV status and recruitment strategy

^bAdjusted for age, age at sexual debut, main drug used, injection status and recruitment strategy

^cOnly includes those who reported spending time in jail or prison in their lifetime ($n=468$)

* $p<0.01$

concentrate disease risk. Thus examining discrimination as a factor influencing social tie formation could highlight a subset (e.g., those who experience discrimination) within high-risk drug users to target with prevention and intervention programs.

While Latinos and white had larger injecting networks, it is important to note that having increased injecting ties may add little, if any, HIV risk to one's network given the success of harm reduction programs reducing transmission of HIV through injection.⁴³ In this sample, only 2.4 % of IDUs reported being HIV positive compared to 10.7 % of non-IDUs ($p=0.0012$, data not shown). Therefore, the consequences of experiencing discrimination may not translate into substantial increases in HIV risk through injecting ties since disease prevalence is low among injectors. On the other hand, for blacks who report racial discrimination and Latinos who report drug use discrimination, the risk of HIV risk through sexual ties may be more imminent since most recent HIV infections are occurring through sexual transmission.⁴⁴

Establishing relationships with other racial minorities has been described as a mechanism for coping with negative racial stereotypes and treatment by race.⁴⁵ While buffering against mental health consequences of racism, these relationships may unintentionally contribute to HIV risk in the sexual relationships that blacks and Latinos encounter with their social ties because data¹ consistently show that blacks (12.84 %) and Latinos (5.96 %) are more likely to have HIV than whites (2.50 %). While collinearity issues with sexual ties would not allow us to examine whether having more racial minority ties explained the relationship between discrimination and increased sex ties, these data indicate a high possibility that discrimination is important for understanding plausible mechanisms of high-risk sex relationship formation.⁸

When interactions between discrimination and race/ethnicity were performed, we found that experiences of racial discrimination and injection ties were marginally increased among blacks compared to whites. While, no other differences by race/ethnicity were seen, replication of this analysis is warranted in a larger study with greater power to detect differences across racial/ethnic groups.

Several other limitations are noted in this study. First, measurement biases through self-report and data collection measures may have influenced the results of the study. Specifically, social desirability and acquiesce biases may have influenced social network and discrimination reporting leading to our results possibly being over or underestimated. The one-item measure of discrimination also may have limited our ability to suitably capture the construct of discrimination. Moreover, this measure only captures individual level, perceived discrimination which does not account for institutional experiences of discrimination or discrimination experiences that individuals were unaware of.¹⁶ The measurement of social ties may also be a limitation since ties with overlapping sex and drug risks were not accounted for. Since HIV can be transmitted through sexual and drug use practices, this study quantified how the level of risk could increase due to each possible transmission route regardless of whether a social tie held both risks.

Categorization of racial/ethnic groups may also be a limitation since Latinos who identified as black were combined with all Latinos.³⁶ However, given that reports of discrimination among Latinos who identified as black were more similar to Latinos than blacks, we do not expect this would affect the results. Finally, since this analysis utilizes cross-sectional data, we are unable to establish temporality, which could be achieved if at the onset of drug use, drug users were prospectively followed to

determine risk of developing a high-risk social tie after a discriminatory experience. It is also possible that network factors lead to an increased chance of discrimination. However, since discrimination has been shown to influence health outcomes and behaviors,¹³ we believe the reverse association is also important for ultimately understanding disparities in disease transmission.

In light of our results and the acknowledged limitations, our paper underscores the need to study multiple sources of discrimination and the effect these experiences have on the context within which behaviors occur. Moreover, we have highlighted that social network relationships may form as a result of common social experiences of discrimination that aggregate high-risk social ties in a network. This process should be further explored as a potential mechanism for racial/ethnic disparities, particularly with respect to HIV, which has not been explained by high-risk behaviors. Additional research to further explain the direction of these relationships and a more nuanced discussion of the relations between social disadvantage, discrimination, and risk for disease are needed.

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