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ORIGINAL PAPER

The HIV Environmental Riskscape: The Roles of HIV Sexual Risk and Resilience Factors among Black Men Who Have Sex with Men: Findings from the Real Talk Project

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Abstract
Black and African American men who have sex with men (Black MSM) experience the greatest proportion of new HIV infections in the United States. To address this challenge, a better understanding of the HIV environment riskscape including both risk and resilience factors is warranted among Black MSM. Research indicates that stress is associated with increased HIV sexual risk behaviors. Further, behavioral factors such as serosorting and community level factors including social support and community connection are resilience factors that protect against risk behaviors. The present study examines whether everyday stress is associated with HIV sexual risk behavior, as well as the role of risk and resilience factors among 125 Black MSM recruited in the Real Talk study. The Real Talk project examined the relationships between resilience, HIV risk behaviors, and HIV prevention strategy among a sample of Black MSM. Using generalized estimating equations, our results indicate a positive association between everyday stress and engaging in condomless anal intercourse only after adjusting for risk, resilience, and correlate variables. Similarly, having multiple sex partners and using substances during sex also show positive associations with condomless anal intercourse. Resilience factors of engaging in serosorting and being connected to both the Black and gay communities were negatively associated with condomless anal intercourse. Future prevention research and programming should focus on both risk and resilience factors to mitigate new HIV infections among Black MSM.

Keywords Black MSM · HIV · Sexual risk · Resilience · Stress

Introduction

Despite the overall decline in new cases of HIV over the past decade [1], Black and African American men who have sex with men (Black MSM) in the United States (U.S.) continue to experience a disproportionate burden of HIV [2, 3]. Black MSM represented 25% of all new infections in the U.S. [3], accounted for 32% of all new cases among MSM in 2021 [4], and continue to be diagnosed with HIV at younger ages (13–24 years old) than their counterparts with 51% of new cases in 2019 [3] and 55% of new cases in 2021 [4]. Further, the Southern region of the U.S. continues to have the highest proportion of new HIV cases among MSM, with 47% of cases among Black MSM [3]. Despite the recent and modest epidemiological successes in annual cases, infection rates among Black MSM in the U.S. rival those among the general population in lower income countries [5].

The response to this public health challenge demands a full understanding of what Hickson and colleagues [6] refer to as the "HIV environmental riskscape," a multilevel set of risk and resilience factors known to be associated with HIV risk behavior and outcomes. The research examining ongoing disparities in HIV risk behavior among Black MSM identifies a myriad of risk factors at the individual, behavioral, social, and structural levels. One factor known to contribute to HIV risk behavior at various levels is stress, specifically the stress processes [7, 8] associated with increases in HIV risk behavior. Though often measured as minority stress [9], the overall level of distress for Black

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MSM includes but is not limited to minority stress associated with racism and or homophobia [10]. Moreover, this literature indicates that Black MSM experience greater rates of health and social disparities than other MSM, including HIV incidence, substance use, mental health, and victimization [11–14]. The focus on measuring stress and risks within the HIV environmental landscape contributes to the risk-reduction literature, a deficit-driven approach [15] that indicates behavior or decisions to be thwarted or discontinued due to their known associated risk. Though a vital component toward ending the epidemic, very little attention has been paid to the vitality of resilience or protective factors included in strengths-based or asset-driven approaches that honor and celebrate where people and communities are exercising their autonomy to mitigate risk and avoid disease.

Recently, MSM generally, and Black MSM specifically, have received much attention with regard to resilience in the context of HIV prevention [15–18]. The MSM literature conceptualizes resilience as a process of positive adaptation, or positive growth, in the face of adversity [18–22]. A more nuanced conceptualization draws on both the protective influences of internal assets (individual-level resilience) and external resources (supportive social environments) [23]. Internal assets focus on individual agency and adjustments to psychological, social, and behavioral characteristics of the individual to adapt to personal and social losses. Internal assets include hardiness [22], self-efficacy [22], and grit [24]. External resources consider not only the quality of resources within one's social environment [23], but also how one interacts and utilizes those resources within their social environment [25]. Taken together, resilience exists at multiple levels of influence with reciprocal associations among these levels. In the context of HIV risk behavior, resilience refers to positive adaptation relating to avoiding contracting and transmitting [15].

A growing strengths-based literature within the HIV environmental riskscape suggests resilience across multiple levels may promote a reduction in sexual risk behaviors or buffer the effects of social stressors on HIV risk among MSM populations overall [15, 18, 21, 26] and among Black MSM populations specifically [10, 27–30]. The literature suggests resilience may contribute to decreased HIV risk through behavioral, psychological, and physiological mechanisms [15, 20, 22, 28, 31]. Additionally, resilience mechanisms related to social networks, including social support and community connection, have a protective effect. Sources of resilience in the form of social support have been specifically linked to reduced HIV sexual risk behavior [10, 22, 28]. Similarly, resilience in the form of connection to the Black community [29] and gay community [32, 33] have been associated with decreased HIV sexual risk behavior. It is important to note, these mechanisms are dependent on the social environment of Black MSM. Further, research has also documented serosorting and conversations about HIV status are common strategies employed by MSM populations to reduce sexual risks [18]. HIV prevention researchers posit these and other sources of resilience are largely underutilized resources in behavioral interventions as they are associated with reductions in HIV-related risk behaviors [15, 21, 34].

Goals of the Current Study

Theory and research provide evidence for multiple dimensions of risk and resilience within the context of the HIV environmental riskscape. However, studies often focus on risk and resilience separately. This strategy limits the ability to investigate how people may experience risk and resilience factors simultaneously, thereby perpetuating dichotomous labels used to describe people or populations such as "high- or low-risk" and or "resilient or not" [22]. Analyses that allow for a side-by-side comparison of both risk and resilience factors at various levels will be useful in creating a more realistic model of the realities and lived experiences of populations generally, and Black MSM specifically. A side-by-side approach describes how various risk and resilience factors may co-occur, whilst extending our knowledge of these complex phenomena as part of the lived experiences of Black MSM within the HIV environmental riskscape.

This study's primary focus is to examine both risk and resilience factors associated with HIV sexual risk behavior assessed as condomless sex. The goals of this study are (a) to describe the HIV environmental riskscape for Black MSM; (b) to explore the association of everyday stress and HIV sexual risk; and (c) explore a side-by-side analysis of risk and resilience factors at individual and social levels among Black MSM. Consistent with existing research, we hypothesize that the risk factors will be associated with elevated reports of condomless sex, whereas resilience factors will buffer the effect of stress and protect against condomless sex.

Methods

Participants and Procedures

This study is a secondary analysis using a sample from Real Talk project, an intervention aimed at HIV prevention adapted from the Afrocentric grouping of evidence-based interventions including SISTA/SiHLE/Willow for Black MSM [35, 36]. Real Talk was designed from a sexual harm reduction framework to examine the relationship between Black MSM resilience and HIV prevention strategies [35]. Real Talk used a combination of recruitment methods including site specific client recruitment, venue-based outreach, a social media campaign, and snowball sampling.

Between June and October of 2015, participation in Real Talk was opened to individuals who (a) self-identified as men; (b) self-identified Black and or African American; (c) between the ages of 18 and 49 years; (d) reported having had sex with a man; and (e) spoke English. Real Talk, a computer delivered program, was delivered in partnership with agencies with a history of providing services for Black MSM in the U.S. metropolitan areas in California, Florida, Georgia, and New Jersey [36]. Using a quasi-experimental design, Real Talk recruited 226 participants. All 226 participants were given a baseline assessment using SurveyMonkey, a third party online survey platform. The baseline assessment collected information on mental health, HIV and STI prevention knowledge, HIV and STI history, social identities, substance use, sexual risk behaviors, and sexual risk reduction strategies [36]. Participants received $50.00 for completing the baseline survey. Real Talk also collected follow up assessments at six months, which were not utilized for the present study. The Real Talk project and this secondary analysis were approved by Portland State University's Institutional Review Board; protocol numbers #153352 and #227560-18, respectively. The sample for this analysis was generated from the baseline assessments of Real Talk and included participants who (a) met the Real Talk inclusion criteria (b) self-reported at least one sexual partner in the last six months and (c) completed the baseline survey (n = 125).

Measures

Psychological Distress

Mean Stress: The Real Talk project collected information about the levels of stress in Black MSM participants. The Real Talk project used a five-level Likert scale (ranging from 1 = "none" to 5 = "a great deal of stress") to determine the level of stress participants had experienced in the last 30 days. Through a total of thirteen questions, participants were asked how much stress was caused by a variety of factors including: discrimination, relationships, family, work, finances, health, and housing. Mean stress, a continuous variable ranging from 0 to 4, consisted of a composite measure of all stress related questions, where higher mean scores correspond to increased levels of stress and 0 corresponds to no stress experienced at all.

Sexual Risk and Risk Reduction Behaviors

HIV Sexual Risk Behavior: The Real Talk project collected information on sexual behavior and HIV risk within the past 6 months from the date of the survey. From these data, we assessed three variables. Our outcome variable is condomless anal intercourse (CAI) measured as a binary variable (yes = 1) for engaging at least once in condomless anal intercourse in the last 6 months. Our other two sexual risk behaviors included a binary variable for those with multiple sexual partners in the last 6 months (1 = two or more partners, 0 = one partner), as well as a binary variable for if the participants used alcohol, poppers, painkillers, and/or downers (1 = yes) right before or during sexual intercourse in the last 30 days.

Sexual Risk Reduction Behavior: Participants reported the HIV status of their sexual partners in the last 6 months along with their own HIV status. A binary variable for serosorting (1 = yes) was used to represent participants who engaged in serosorting with all reported sexual partners in the last 6 months.

Resilience

Mean Social Support: The Real Talk project collected information on social support in participants' lives. Participants were asked whether they had someone in their life who could help with: (a) getting a job; (b) advice with relationships; (c) being down or upset; (d) health issues; and (e) emergencies. Mean social support is a continuous variable consisting of a composite measure of those 5 questions ranging from 0 to 5, where higher values indicate more social support. It should be noted participants with all 5 types of social support could be receiving that support from the same person, thus this variable does not determine how many people are included in that support network.

Connection to Community: Real Talk collected data from participants regarding connection to various communities. Items were assessed on a binary (1 = yes, connected) to capture self-reported connection. For the Black MSM population, two specific communities were of interest for our study: the Black community and the gay community. Binary variables were used to represent participants' connection to the Black community (1 = yes) and the gay community (1 = yes).

Correlates: Real Talk collected known correlates of sexual risk behavior including age (years old at time of interview) and self-reported HIV status (positive = 1). Socioeconomic status variables included education (no formal schooling, less than high school, high school or GED, some college or vocational training, and college degree or more), individual annual income, and current employment status (1 = working or 0 = not working). To increase parsimony, education and income variables included binary variables, respectively: those who attended college (1) or those who never attend (0); self-reported annual income at least $24,000 (1 = yes).

Statistical Analysis

All variables were descriptively analyzed for differences by CAI status using Pearson Chi-square tests for categorical

variables, and Welch's two sample t-tests for continuous variables. In cases of sparse data, Fisher's exact test was used. Using logistic generalized estimating equations (GEEs) from r-package "geepack" [37, 38], a series of marginal models were used to account for correlation due to geographic similarities by site location [39]. The first model includes the univariate association between mean everyday stress and CAI, with subsequent models iteratively adding more covariates including demographics and other related correlates (age, education, income, current work, HIV status); sexual risk and reduction behaviors (multiple sex partners, substances, serosorting); and resiliency factors (social supports and connection to Black or gay community). Due to the intersectional nature of Black MSM belonging to both the Black and gay communities, the fifth model includes the interaction between connections to both those communities. For all stages of model building, odds ratios (OR) including 95% confidence intervals (CI) were calculated for all covariates. Overall model fit was assessed using Tjur's R^2, known also as the coefficient of discrimination [40]; presence of multicollinearity was assessed using Variance Inflation Factors (VIF). All data preparation and analyses were conducted using [R studio] (R version 4.1.2).

Results

Exploratory Analysis

The final analysis included n = 125 Black MSM with complete data from the baseline survey. Mean age for participants at baseline was 32.3 years old (sd 9.62). Participants self-reported income, employment status, and education: 35% reported an annual income of at least $24,000; 64% reported current employment; and 61% had at least some college experience at the time of the survey. All baseline covariates by CAI status can be seen in Table 1; only sexual risk and reduction behaviors were found to be significantly different by CAI status.

Regression Analysis

Table 2 presents all odds ratios and corresponding confidence intervals for the outcome of condomless anal intercourse (CAI) with mean everyday stress and other correlates across each stage of model building. Univariately [model 1 (M1)], mean stress was not associated with CAI [M1 OR (95% CI): 1.27 (0.88–1.83)], nor when adjusted for age, income, education status, work status, and HIV status [M2 OR (95% CI): 1.23 (0.84–1.82)]. For Black MSM with annual income greater than $24,000, the odds of CAI were significantly higher compared to those with annual income less than $24,000 [M2 OR (95% CI): 1.60 (1.13–2.27). Neither age, education status, work status, or HIV status was associated with CAI at this stage of model building.

When accounting for sexual risk behaviors [model 3 (M3)] along with individual sources of resiliency [model 4 (M4)], mean stress continued to not be associated with CAI. Annual incomes greater than $24,000 were found to be a consistent risk factor for CAI [M3 OR (95% CI): 2.25 (1.83–2.76)] and [M4 OR (95% CI): 2.04 (1.40–2.98)]. Current employment was found to be a significant protective factor for CAI [M3 OR (95% CI): 0.45 (0.33–0.61)] and [M4 OR (95% CI): 0.34 (0.18–0.62)]. Sexual risk behaviors including multiple sex partners [M3 OR (95%): 3.68 (1.42–9.57)] and [M4 OR (95% CI): 3.78 (1.16–12.32)] and sex-substance linked behavior [M3 OR (95% CI): 5.11 (2.08–12.54)] and [M4 OR (95% CI): 5.20 (1.88–14.41)] were found to be significant risk factors for CAI. On the other hand, the practice of serosorting was found to be a highly protective factor [M3 OR (95% CI): 0.11 (0.02–0.49)] and [M4 OR (95% CI): 0.10 (0.02–0.50)]. When accounting for sources of resiliency, Black MSM with connection to the Black community had significantly lower odds of engaging in CAI compared to those without connection to the Black community [M4 OR (95% CI): 0.41 (0.18–0.96)]. Those with increased levels of mean social support had slightly higher odds of engaging in CAI [M4 OR (95% CI): 1.40 (95% CI 1.03–1.91)]. Connection to the gay community was not found to be associated with CAI [M4 OR (95% CI): 1.36 (0.54–3.44)].

Due to the intersectional nature of race and sexuality, accounting for the interaction between connections to the Black and gay communities, model #5 revealed that every increased unit in mean stress was significantly associated with higher odds of engaging in CAI [M5 OR (95% CI): 1.36 (1.01–1.84)]. Further, serosorting remained a highly protective factor towards CAI; the odds of CAI were significantly lower [M5 OR (95% CI): 0.10 (0.02–0.46)] among those engaged in serosorting behavior compared to participants who did not engage in serosorting behavior. In addition to serosorting, simultaneous connection to both the Black and the gay community served as a protective factor towards HIV risk behavior as those self-reporting a connection to both communities the odds of CAI were significantly lower [M5 OR (95% CI): 0.39 (0.26–0.58) compared to those who self-reported no connection to either the Black or gay communities. It should be noted, that group effects for connection to the gay community or Black community were not found to be associated with increased odds of CAI at this stage in the analysis.

Discussion

Our findings indicate that increased stress is associated with condomless sex. These results are consistent with previous studies among Black MSM, reinforcing that stress is a

Table 1 Demographic Characteristics and HIV Environmental Riskscape Factors of n = 125 Black MSM by Self-Reported Condomless Anal Intercourse (CAI) in the last 6 months

	No CAI (N = 47)	Yes CAI (N = 78)	Overall (N = 125)	Test statistic	P-value
Mean stress					
Mean (SD)	1.26 (0.830)	1.45 (0.943)	1.38 (0.903)	t = − 1.0, df = 107	0.2
Median [Min, Max]	1.08 [0, 3.15]	1.35 [0, 4.00]	1.31 [0, 4.00]		
Approximate age					
Mean (SD)	32.6 (9.76)	32.1 (9.60)	32.3 (9.62)	t = 0.3, df = 96	0.8
Median [Min, Max]	33.0 [20.0, 54.0]	29.0 [18.0, 51.0]	30.0 [18.0, 54.0]		
Income ($24,000 +)					
Yes	14 (29.8%)	30 (38.5%)	44 (35.2%)	$\chi^2 = 1$, df = 1	0.3
Attended college					
Yes	27 (57.4%)	49 (62.8%)	76 (60.8%)	$\chi^2 = 0.4$, df = 1	0.6
Currently working					
Yes	30 (63.8%)	50 (64.1%)	80 (64.0%)	$\chi^2 = 0$, df = 1	1.0
Multiple sexual partners					
One only	34 (72.3%)	27 (34.6%)	61 (48.8%)	$\chi^2 = 17$, df = 1	< 0.001***
2 +	13 (27.7%)	51 (65.4%)	64 (51.2%)		
HIV Status					
Negative	25 (53.2%)	41 (52.6%)	66 (52.8%)	$\chi^2 = 0.005$,df = 1	1
Positive	22 (46.8%)	37 (47.4%)	59 (47.2%)		
Serosorting					
Yes	38 (80.9%)	34 (43.6%)	72 (57.6%)	$\chi^2 = 17$, df = 1	< 0.001***
Substances during sex					
Yes	15 (31.9%)	50 (64.1%)	65 (52.0%)	$\chi^2 = 12$, df = 1	0.001**
Connection to black community					
Yes	30 (63.8%)	40 (51.3%)	70 (56.0%)	$\chi^2 = 2$, df = 1	0.2
Connection to gay community					
Yes	28 (59.6%)	47 (60.3%)	75 (60.0%)	$\chi^2 = 0.006$,df = 1	0.9
Mean total social supports					
Mean (SD)	3.79 (1.63)	4.01 (1.50)	3.93 (1.55)	t = − 0.8, df = 91	0.4
Median [Min, Max]	5.00 [0, 5.00]	5.00 [0, 5.00]	5.00 [0, 5.00]		
Study site					
1	17 (36.2%)	24 (30.8%)	41 (32.8%)	$\chi^2 = 5$, df = 3	0.2
2	5 (10.6%)	18 (23.1%)	23 (18.4%)		
3	9 (19.1%)	19 (24.4%)	28 (22.4%)		
4	16 (34.0%)	17 (21.8%)	33 (26.4%)		
PrEP					
No	20 (42.6%)	35 (44.9%)	55 (44.0%)	OR[a] = 0.58	0.6
Yes	2 (4.3%)	2 (2.6%)	4 (3.2%)		
Missing	25 (53.2%)	41 (52.6%)	66 (52.8%)		

[a]Odds Ratio (OR) reported for Fisher's exact test in cases of sparse data

*p < 0.05 **p < 0.01 ***p < 0.001 (Two-Sided Test)

pervasive factor in HIV risk [10, 27]. After accounting for known correlates of risk behavior, the association became stronger; meaning accounting for individual, behavioral, and social factors allows for a more nuanced and contextualized understanding of this association. In addition to stress, we found higher income, more sexual partners, and sex-substance linked behavior to be risk factors for engaging in condomless sex. These findings are consistent with previous studies [12, 30, 41] indicating individual and behavioral risks for acquiring HIV. Our results in the fourth model indicate social support is a significant risk factor, as those with high levels of social support were 40% more likely to engage in condomless sex, which goes against our hypothesis. However, our final model produced the same finding,

Table 2 Generalized Estimating Equations (GEE) Model Results of Odds Ratios and 95% Confidence Intervals for Association of Mean Stress and Individual Factors in HIV Environmental Riskscape on Condomless Anal Intercourse for Black Men who have sex With Men (n = 125)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Mean stress	OR = 1.27 (0.88–1.83)	OR = 1.23 (0.84–1.82)	OR = 1.08 (0.81–1.43)	OR = 1.28 (0.95–1.72)	OR = 1.36* (1.01–1.84)
Approximate age		OR = 0.98 (0.95–1.02)	OR = 0.94* (0.89–0.99)	OR = 0.94* (0.88–0.99)	OR = 0.93* (0.88–0.99)
Income (ref ≤ $24 k)		OR = 1.60** (1.13–2.27)	OR = 2.25*** (1.83–2.76)	OR = 2.04*** (1.40–2.98)	OR = 1.97** (1.29–3.02)
Attended College (ref = none)		OR = 1.26 (0.93–1.72)	OR = 0.89 (0.50–1.58)	OR = 0.79 (0.41–1.52)	OR = 0.74 (0.37–1.49)
Currently Employed (ref = no)		OR = 0.80 (0.41–1.55)	OR = 0.45*** (0.33–0.61)	OR = 0.34*** (0.18–0.62)	OR = 0.36** (0.19–0.70)
HIV Status (ref = negative)		OR = 1.19 (0.44–3.17)	OR = 0.78 (0.15–4.12)	OR = 0.85 (0.15–4.66)	OR = 0.88 (0.15–5.17)
Multiple Sexual Partners (ref = 1 partner)			OR = 3.68** (1.42–9.57)	OR = 3.78* (1.16–12.32)	OR = 3.98* (1.13–13.93)
Serosorting (ref = No)			OR = 0.11** (0.02–0.49)	OR = 0.10** (0.02–0.50)	OR = 0.10** (0.02–0.46)
Substances before/during sex in last 30 days (ref = No)			OR = 5.11*** (2.08–12.54)	OR = 5.20** (1.88–14.41)	OR = 5.03** (1.79–14.14)
Connection with Black Community (ref = No)				OR = 0.41* (0.18–0.96)	OR = 0.66 (0.35–1.26)
Connection with Gay Community (ref = No)				OR = 1.36 (0.54–3.44)	OR = 2.34 (0.84–6.55)
Mean Social Supports				OR = 1.40* (1.03–1.91)	OR = 1.40† (1.00–1.97)
Connect w/ Black Comm * Connect w/ Gay Comm					OR = 0.39*** (0.26-0.58)
Constant	OR = 1.71	OR = 2.82	OR = 22.79	OR = 11.80	OR = 10.30
# of Cases	125	125	125	125	125
Tjur's R^2	0.009	0.022	0.335	0.357	0.358

Source: Real Talk Project Data; Includes cases with complete data

*p < 0.05 **p < 0.01 ***p < 0.001 (Two-Sided Test)

though no longer significant. Social support, in this study, should be interpreted with caution, given it is teetering on significance.

We found the effects of age, current employment, and serosorting to be protective of engaging in condomless sex and consider them resilience factors. These findings are consistent with the literature suggesting Black MSM experience resilience factors at multiple levels. Serosorting behavior has been known to be protective of HIV transmission among MSM [42–44] and specifically among Black MSM [18]. However, this study finds engaging in serosorting to not only be highly protective but also the most protective factor. Though not directly assessed as part of serosorting behavior in the Real Talk study, the findings of serosorting in this study allude to the idea of community/collective resilience behavior. Given serosorting requires communication among sexual partners, it is often understood as an individual behavior. However, when conducted in mass, an entire community can prevent the spread of HIV and lower the community incidence. By communicating with partners, entire communities of sexual networks can positively adapt to the adversity of contracting HIV [15]. At a group-level, this behavior begins to act as a form of collective resilience.

Lastly, our data expands the literature by documenting the association between connection to the Black and gay communities and HIV sexual risk reduction among Black MSM. Our initial findings (model #4) assess community connection in the Black and gay communities separately, resulting in a protective effect for those connected to the Black community, but not those connected to the gay community. These findings are consistent with the literature [28, 29, 45] indicating that safe spaces within the Black

community are integral to the promotion of safer sexual health practices for all Black men. These designated spaces are often cultural spaces for the Black community include barbershops and churches [29]. Our findings suggest HIV prevention programming continue to partner with known Black cultural spaces and expand to additional spaces Black MSM frequent. Our findings do not support connection to the gay community alone being associated with condomless sex. Other studies have reported this being both a risk and resilience factor. Future research should continue to investigate this association given the mixed results of the literature.

Given our results on Black and gay community connection, we created an interaction term allowing us to examine the effect of being connected in both the Black and gay communities. The results indicate being connected to both Black and gay communities is protective of engaging in condomless sex while also explaining away the association between Black community connection and condomless sex. These results are consistent with the literature [27, 45] and support building and maintaining community relationships and community spaces that cater to the Black MSM communities as a means of preventing HIV.

Limitations

Despite the significance of these findings, several study limitations warrant mentioning. Overall, these findings may not be generalizable to all Black MSM, particularly those from other geographic locations or socioeconomic groups. Despite Real Talk using a wide array of recruitment strategies, the sample size is relatively small and could be increased in future studies as well as broadening the locations of recruitment to other places Black MSM live, work, and socialize. The true prevalence of respondents' risk and resilience behaviors may be underestimated because of self-disclosing bias on the part of participants. Given participant responses cannot be verified, our findings are likely conservative estimates of both risk and resilience factors. Due to the secondary analysis design of our study, we used only baseline data collected cross-sectionally. As a result, the directional relationship between risk and resilience factors with condomless sex cannot be confirmed. Though our findings indicate a strong protective effect for Black MSM who are connected to both the Black and gay communities, a nuanced understanding of these connections is needed. For instance, our findings do not distinguish between being connected to the Black and gay communities, the Black gay community, or a combination of all three.

Additional research is warranted to examine the nuances of how various types, sources, frequency, and duration of risk and resilience factors influence HIV risk behavior. For a more complete examination of substance use during sex, future studies should examine the use of stimulants during sex [10, 46] as our analysis only included alcohol, poppers, and downers based on the limitations of the Real Talk data. Additionally, a more comprehensive understanding of variables regarding social support, community, and other external resilience factors is warranted extending beyond the mere presence of these factors and towards the mechanisms within these factors that influence the outcome as either a risk or resilience factor [28, 47, 48]. For instance, social support in our study assesses whether a participant had someone to contact without assessing the quality of that relationship. Future research should examine who would be called upon and why. Research examining this level of nuance will further contextualize and support not only whether these factors and supporting mechanisms are important, but more precisely, explain how they can be implemented in HIV prevention work. Lastly, the continued practices of HIV reduction communication strategies, like serosorting and use of Pre-Exposure Prophylaxis (PrEP), and connection with the Black and gay communities and their intersection should be further explored. Though serosorting as a risk reduction strategy may be less relevant in the era of PrEP, this behavior is intriguing within the riskscape as serosorting is reflective of the relational decision-making practices that Black MSM have relied upon in the past and is similar to those they may engage in and rely upon today within the context of PrEP access and utilization as a means of mitigating their risk of acquiring HIV. Despite its efficacy, PrEP use among Black MSM was considerably low in 2015 when Real Talk was recruiting, [49, 50] as indicated in our data (our study had only 4 participants reporting use of PrEP). Since then, HIV campaigns in the United States have advocated for the initiation and sustained use of PrEP whilst addressing the various barriers to PrEP for Black MSM. Future research studies should account for PrEP initiation, sustained use, and conversations about PrEP use in relation to HIV risk and resilience factors. Further, the use of PrEP should be explored in relation to community connection and how PrEP has been incorporated into these communities. Exploring PrEP use and communication as a community level, harm reduction approach will further explore collective/community resilience among this population.

Conclusion

Despite these limitations, several implications for future research, policy, and practice arise from our findings. A more nuanced and focused examination of the risk and resilience factors in the HIV environmental riskscape is needed to address the ongoing and disproportionate burden of HIV incidence among Black MSM. It is important to examine both risk and resilience side-by-side, as they are experienced this way. Stress, higher income, having multiple sex partners, and

using substances right before and or during sex were all risk factors for engaging in condomless sex. On the other hand, being employed, serosorting, and connection to both the Black and gay communities were protective of condomless sex and served as indicators of resilience. Our findings indicate that risk and resilience co-occur and are navigated together by Black MSM exercising agency in their risk mitigation practices for HIV infection. Our findings allude to a collective or community level resilience practice that should be explored in further research, especially in relationship to serosorting, the use of PrEP, and connection to community. HIV prevention providers could also play a role by promoting HIV sexual risk reduction strategies including community connection as means of reducing not only the risk at an individual-level, but also reducing community-level risk. A more nuanced understanding of how risk and resilience factors influence HIV sexual risk behavior will aid in developing prevention and intervention programming for Black MSM and provide important direction to ending the HIV epidemic by providing context to a population disproportionately affected by HIV.

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Data Availability Data are available upon request.

Code Availability Code is available upon request.

Declarations

Conflict of Interest The authors declare that there are no conflicts of interests (or competing interests).

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References

1. Sullivan PS, et al. Epidemiology of HIV in the USA: epidemic burden, inequities, contexts, and responses. The Lancet. 2021;397(10279):1095–106. https://doi.org/10.1016/S0140-6736(21)00395-0.
2. Centers for Disease Control and Prevention, "HIV Surveillance Report, 2021," vol. 34, 2023, Accessed: Oct. 30, 2023. [Online]. Available: https://www.cdc.gov/hiv/library/reports/hiv-surveillance/vol-34/index.html.
3. Centers for Disease Control and Prevention, "HIV Surveillance Report, 2019," vol. 32, May 2021, Accessed: Sep. 26, 2023. [Online]. Available: http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html.
4. Centers for Disease Control and Prevention, "Estimated HIV incidence and prevalence in the United States 2017–2021. HIV Surveillance Supplemental Report. 28(3), 2023.
5. Peterson JL, Jones KT. HIV prevention for black men who have sex with men in the United States. Am J Public Health. 2009;99(6):976–80. https://doi.org/10.2105/AJPH.2008.143214.
6. Hickson DA, et al. Rationale, design and methods of the ecological study of sexual behaviors and HIV/STI among African American men who have sex with men in the Southeastern United States (The MARI Study). PLoS ONE. 2015;10(12): e0143823. https://doi.org/10.1371/journal.pone.0143823.
7. Town MA, Walters KL, Orellana ER. Discriminatory distress, HIV risk behavior, and community participation among American Indian/Alaska Native men who have sex with men. Ethn Health. 2021;26(5):646–58. https://doi.org/10.1080/13557858.2018.1557115.
8. Turan JM, et al. Challenges and opportunities in examining and addressing intersectional stigma and health. BMC Med. 2019;17(1):7. https://doi.org/10.1186/s12916-018-1246-9.
9. Meyer IH. Minority stress and mental health in gay men. J Health Soc Behav. 1995;36(1):38–56. https://doi.org/10.2307/2137286.
10. Storholm ED, et al. Sources of resilience as mediators of the effect of minority stress on stimulant use and sexual risk behavior among young black men who have sex with men. AIDS Behav. 2019;23(12):3384–95. https://doi.org/10.1007/s10461-019-02572-y.
11. Garofalo R, Mustanski B, Johnson A, Emerson E. Exploring factors that underlie racial/ethnic disparities in HIV Risk among young men who have sex with men. J Urban Health. 2010;87(2):318–23. https://doi.org/10.1007/s11524-009-9430-z.
12. Harawa NT, Williams JK, Ramamurthi HC, Manago C, Avina S, Jones M. Sexual behavior, sexual identity, and substance abuse among low-income bisexual and non-gay-identifying African American men who have sex with men. Arch Sex Behav. 2008;37(5):748–62. https://doi.org/10.1007/s10508-008-9361-x.
13. Mays VM, Cochran SD, Zamudio A. HIV prevention research: are we meeting the needs of African American men who have sex with men? J Black Psychol. 2004;30(1):78–105. https://doi.org/10.1177/0095798403260265.
14. Tobin KE, German D, Spikes P, Patterson J, Latkin C. A comparison of the social and sexual networks of crack-using and non-crack using African American men who have sex with men. J Urban Health. 2011;88(6):1052–62. https://doi.org/10.1007/s11524-011-9611-4.
15. Herrick AL, Stall R, Goldhammer H, Egan JE, Mayer KH. Resilience as a research framework and as a cornerstone of prevention research for gay and bisexual men: theory and evidence. AIDS Behav. 2014;18(1):1–9. https://doi.org/10.1007/s10461-012-0384-x.
16. Kubicek K, McDavitt B, Carpineto J, Weiss G, Iverson EF, Kipke MD. 'God Made Me Gay for a Reason': young men who have sex

with men's resiliency in resolving internalized homophobia from religious sources. J Adolesc Res. 2009;24(5):601–33. https://doi.org/10.1177/0743558409341078.
17. Kubicek K, McNeeley M, Holloway IW, Weiss G, Kipke MD. 'It's Like Our Own Little World': resilience as a factor in participating in the ballroom community subculture. AIDS Behav. 2013;17(4):1524–39. https://doi.org/10.1007/s10461-012-0205-2.
18. Kurtz SP, Buttram ME, Surratt HL, Stall RD. Resilience, syndemic factors, and serosorting behaviors among HIV-positive and HIV-negative substance-using MSM. AIDS Educ Prev. 2012;24(3):193–205. https://doi.org/10.1521/aeap.2012.24.3.193.
19. Rabkin JG, Remien R, Williams JBW, Katoff L. Resilience in adversity among long-term survivors of AIDS. Psychiatr Serv. 1993;44(2):162–7. https://doi.org/10.1176/ps.44.2.162.
20. Fergus S, Zimmerman MA. ADOLESCENT RESILIENCE: a framework for understanding healthy development in the face of risk. Annu Rev Public Health. 2005;26(1):399–419. https://doi.org/10.1146/annurev.publhealth.26.021304.144357.
21. Herrick AL, et al. Resilience as an untapped resource in behavioral intervention design for gay men. AIDS Behav. 2011;15(1):25–9. https://doi.org/10.1007/s10461-011-9895-0.
22. Wilson PA, Meyer IH, Antebi-Gruszka N, Boone MR, Cook SH, Cherenack EM. Profiles of resilience and psychosocial outcomes among young Black gay and bisexual men. Am J Community Psychol. 2016;57(1–2):144–57. https://doi.org/10.1002/ajcp.12018.
23. Liebenberg L, Ungar M. Intorduction: the challenges in research resilience. in Researching Resilience, Toronto: University of Toronto Press, 2009, pp. 3–25.
24. Duckworth AL, Peterson C, Matthews MD, Kelly DR. Grit: perseverance and passion for long-term goals. J Pers Soc Psychol. 2007;92(6):1087–101. https://doi.org/10.1037/0022-3514.92.6.1087.
25. Southwick SM, Bonanno GA, Masten AS, Panter-Brick C, Yehuda R. Resilience definitions, theory, and challenges: interdisciplinary perspectives. Eur J Psychotraumatology. 2014;5(1):25338. https://doi.org/10.3402/ejpt.v5.25338.
26. Mustanski B, Garofalo R, Herrick A, Donenberg G. 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(1):37–45. https://doi.org/10.1007/BF02879919.
27. Quinn KG, Dickson-Gomez J, Craig A, John SA, Walsh JL. Intersectional discrimination and PrEP use Among Young Black Sexual Minority Individuals: the Importance of Black LGBTQ Communities and Social Support. AIDS Behav. 2023;27(1):290–302. https://doi.org/10.1007/s10461-022-03763-w.
28. Buttram ME. The social environmental elements of resilience among vulnerable African American/black men who have sex with men. J Hum Behav Soc Environ. 2015;25(8):923–33. https://doi.org/10.1080/10911359.2015.1040908.
29. Hotton AL, Keene L, Corbin DE, Schneider J, Voisin DR. The relationship between Black and gay community involvement and HIV-related risk behaviors among Black men who have sex with men. J Gay Lesbian Soc Serv. 2018;30(1):64–81. https://doi.org/10.1080/10538720.2017.1408518.
30. McNair OS, Gipson JA, Denson D, Thompson DV, Sutton MY, Hickson DA. The associations of resilience and HIV Risk behaviors among black gay, bisexual, other men who have sex with men (MSM) in the deep South: the MARI study. AIDS Behav. 2018;22(5):1679–87. https://doi.org/10.1007/s10461-017-1881-8.
31. Mustanski B, Lyons T, Garcia SC. Internet use and sexual health of young men who have sex with men: a mixed-methods study. Arch Sex Behav. 2011;40(2):289–300. https://doi.org/10.1007/s10508-009-9596-1.
32. McConnell EA, Janulis P, Phillips G, Truong R, Birkett M. Multiple minority stress and LGBT community resilience among sexual minority men. Psychol Sex Orientat Gend Divers. 2018;5(1):1–12. https://doi.org/10.1037/sgd0000265.
33. Meanley S, Connochie D, Choi SK, Bonett S, Flores DD, Bauermeister JA. Assessing the role of gay community attachment, stigma, and PrEP stereotypes on young men who have sex with men's PrEP uptake. AIDS Behav. 2021;25(6):1761–76. https://doi.org/10.1007/s10461-020-03106-7.
34. Reed SJ, Miller RL. Thriving and adapting: resilience, sense of community, and syndemics among young black gay and bisexual men. Am J Community Psychol. 2016;57(1–2):129–43. https://doi.org/10.1002/ajcp.12028.
35. Klein C, Lomonaco C. Real talk: developing a computer-delivered sexual health program for black men who have sex with men. AIDS Educ Prev. 2016;28(6):455–71. https://doi.org/10.1521/aeap.2016.28.6.455.
36. Klein CH, Kuhn T, Huxley D, Kennel J, Withers E, Lomonaco CG. Preliminary findings of a technology-delivered sexual health promotion program for black men who have sex with men: quasi-experimental outcome study. JMIR Public Health Surveill. 2017;3(4): e78. https://doi.org/10.2196/publichealth.7933.
37. Halekoh U, Højsgaard S, Yan J. The *R* Package geepack for Generalized Estimating Equations. J Stat Softw. 2006. https://doi.org/10.18637/jss.v015.i02.
38. Yan J, Fine J. Estimating equations for association structures. Stat Med. 2004;23(6):859–74. https://doi.org/10.1002/sim.1650.
39. Pekár S, Brabec M. Generalized estimating equations: a pragmatic and flexible approach to the marginal GLM modelling of correlated data in the behavioural sciences. Ethology. 2018;124(2):86–93. https://doi.org/10.1111/eth.12713.
40. Tjur T. Coefficients of determination in logistic regression models—a new proposal: the coefficient of discrimination. Am Stat. 2009;63(4):366–72. https://doi.org/10.1198/tast.2009.08210.
41. Mimiaga MJ, et al. Walking the line: stimulant use during sex and HIV risk behavior among Black urban MSM. Drug Alcohol Depend. 2010;110(1–2):30–7. https://doi.org/10.1016/j.drugalcdep.2010.01.017.
42. Eaton LA, et al. Serosorting sexual partners and risk for HIV among men who have sex with men. Am J Prev Med. 2007;33(6):479–85. https://doi.org/10.1016/j.amepre.2007.08.004.
43. Golden MR, Stekler J, Hughes JP, Wood RW. HIV serosorting in men who have sex with men: is it safe? JAIDS J Acquir Immune Defic Syndr. 2008;49(2):212–8. https://doi.org/10.1097/QAI.0b013e31818455e8.
44. McConnell JJ, Bragg L, Shiboski S, Grant RM. Sexual seroadaptation: lessons for prevention and sex research from a cohort of HIV-positive men who have sex with men. PLoS ONE. 2010;5(1):e8831. https://doi.org/10.1371/journal.pone.0008831.
45. Burns PA, et al. Leveraging community engagement: the role of community-based organizations in reducing new HIV infections among black men who have sex with men. J Racial Ethn Health Disparities. 2020;7(2):193–201. https://doi.org/10.1007/s40615-019-00691-9.
46. Dangerfield Ii DT, Heidari O, Cooper J, Allen S, Lucas GM. Motivations for opioid and stimulant use among drug using black sexual minority men: a life course perspective. Drug Alcohol Depend. 2020;215:108224. https://doi.org/10.1016/j.drugalcdep.2020.108224.
47. Buttram ME. The Social Environmental Context of Resilience Among Substance-Using African American/Black Men Who Have Sex With Men. J Homosex. 2020;67(6):816–32. https://doi.org/10.1080/00918369.2018.1557952.
48. Chen Y-T, et al. Social-Environmental Resilience, PrEP Uptake, and Viral Suppression among Young Black Men Who Have Sex with Men and Young Black Transgender Women:

the Neighborhoods and Networks (N2) Study in Chicago. J Urban Health. 2020;97(5):728–38. https://doi.org/10.1007/s11524-020-00425-x.

49. Eaton LA, Driffin DD, Bauermeister J, Smith H, Conway-Washington C. Minimal awareness and stalled uptake of pre-exposure prophylaxis (PrEP) among at risk, HIV-negative, black men who have sex with men. AIDS Patient Care STDs. 2015;29(8):423–9. https://doi.org/10.1089/apc.2014.0303.
50. Rolle C-P, et al. Challenges in translating PrEP interest into uptake in an observational study of young black MSM. JAIDS J Acquir Immune Defic Syndr. 2017;76(3):250–8. https://doi.org/10.1097/QAI.0000000000001497.