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Individual and Social Network Factors Associated with High Self-efficacy of Communicating about Men's Health Issues with Peers among Black MSM in an Urban Setting

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Abstract Black men who have sex with men (BMSM) bear a disproportionate burden of HIV in the USA. BMSM face stigma, discrimination and barriers to health care access, and utilization. Peers (male or female) may assist BMSM in navigating their health issues by engaging in communication to support in their health care needs. Individuals with high self-efficacy of communicating about men's health issues with peers can be trained as community popular opinion leaders (CPOLs) to change peer behaviors by promoting risk reduction communication. We examined the characteristics associated with high self-efficacy of communicating with peers about men's health issues among 256 BMSM from a behavioral HIV intervention conducted in Baltimore, Maryland. In the multivariate logistic model, gay identity (AOR: 2.10, 95% CI: 1.15,3.83), involvement in the house and ballroom community (AOR: 2.50, 95% CI: 1.14,5.49), larger number of network members who are living with HIV (AOR: 6.34, 95% CI: 1.48,27.11), and larger number of network members who would loan them money (AOR: 1.46, 95% CI: 1.05,2.03) were statistically significantly associated with high self-efficacy of communicating with peers about men's health issues. We also found that having depressive symptoms (AOR: 0.43, 95% CI: 0.24, 0.77) was negatively associated with high self-efficacy of communicating with peers about men's health issues. Findings from the current study can inform future studies to identify better CPOLs who are able to communicate effectively with peers about men's health issues for BMSM.

Keywords Black men who have sex with men · Social networks · Communication · Self-efficacy · HIV · Urban health

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Introduction

Black men who have sex with men (BMSM), remain disproportionately impacted by HIV [1] and other sexually transmitted infections (STIs) [2] in the USA, particularly in the southern USA. [3]. BMSM are less likely to be aware of their HIV infection [4, 5], have lower pre-

exposure prophylaxis (PrEP) uptake [6], encounter structural barriers to sexual health services [7, 8], and lack culturally competent health care [9, 10] as compared with other racial/ethnic groups of MSM. Peers (male or female) may provide social support to BMSM in navigating their health issues by engaging in communication to support in their health needs (i.e., HIV, sexual health, mental health, men's health) [4, 11, 12]. Promoting peer communication among BMSM and their social networks may optimize the dissemination of HIV prevention messaging and harm reduction strategies. This is particularly important given that the majority of new HIV infections are transmitted from people living with HIV who either did not know they had HIV or have been diagnosed but not in HIV care [1]. High levels of sexual health communication have been associated with a lower odds of condomless sex and intercourse with partners of unknown HIV serostatus [13]. However, the stigma associated with many men's health issues, including HIV and STIs, can be barriers to communication [14, 15]. For example, BMSM have low rates of HIV disclosure with sexual partners and health care providers [16, 17]. In a multisite study, Rosser and colleagues reported lower levels of serodisclosure to secondary sexual partners among BMSM as compared with white MSM [18]. Interventions that promote communication of sexual health among BMSM may reduce HIV transmission and other sexual health disparities [19, 20].

The community popular opinion leader (CPOL) model is an evidence-based intervention designed to change peer behaviors by promoting risk reduction communication and modeling what is perceived to be normative [21–24]. Based on the theories of diffusion of innovations [25], social learning [26], and cognitive dissonance [27], the CPOL model identifies socially influential members of a target population and trains these individuals to increase communication skills and self-efficacy to engage in peer outreach [28]. Self-efficacy refers to an individual's belief in their capacity to execute behaviors necessary to produce specific performance outcomes [29]. Self-efficacy is a key concept in Bandura's social cognitive theory, and it has been considered as a foundation for adopting new behaviors [30]. With a high self-efficacy, CPOLs are more likely to have the skills to reach subpopulations who may be engaged in high risk behaviors or disengaged from health or social services and tailor messaging for these network members [31]. It is theorized that actively promoting risk reduction communication among network members will enhance health-promoting social norms, which can lead to sustainable behavioral change [32]. The CPOL intervention has been utilized with various populations at risk for HIV, including people who inject drugs [33] and MSM [23, 34, 35]. There is evidence suggesting that CPOL approaches can be effective in promoting sustainable behavioral change among BMSM [28, 36] and Latino MSM [37]. For example, the house and ballroom community has strong historical significance among BMSM [38] as it has been a primary meeting and social engagement space. One study has successfully tailored the CPOL model for BMSM involved in the house and ballroom community and found reductions in multiple partners, sexual stigma, and condomless anal intercourse [39].

While CPOLs often have common individual attributes such as demographic background or share lived experiences of the target population, different studies use various approaches or rationales to select CPOLs [40, 41]. Recent findings suggest that network characteristics of CPOLs can be more important than the specific messages they convey [42, 43]. Not all CPOL interventions for MSM have been successful in reducing risk [24, 34], and this may be in part due to the inappropriate selection of CPOLs [44]. CPOLs have conventionally been selected via ethnographic methods because they are well known and respected and within networks [45–47]. For example, CPOLs in a recent online HIV prevention study were identified and recruited as well-respected peer leaders by community-based organizations serving primarily BMSM and Latino MSM [48]. CPOLs have been found to cluster in online groups related to risk behaviors (e.g., condomless sex) [49] and are more likely to discuss sexual and health related information with other MSM [31, 48]. Another study found that MSM who are non-Hispanic Black and those with a history of a STI other than HIV were more likely to be CPOLs on immunization issues [47].

Few studies have examined the characteristics of potential CPOLs, particularly among BMSM, and there is even less information on the social networks of BMSM CPOLs. Social network analysis is important as it provides detailed information on individuals' sources of social support and the composition of networks. Social network composition has been linked to transmission of HIV [50] and other sexually transmitted infections [51]. Examining the social network composition of CPOLs is critical for assessing who they can

most easily reach or influence as well as the forms of the social and economic support available to those individuals. In impoverished communities, the material resources of network members and the ability to obtain resources from network members may also be important [52]. Identifying individual and social network characteristics of CPOLs can inform behavioral interventions and potentially enhance the reach of interventions to their social networks.

Given the persistent HIV and STI disparities as well as barriers to HIV prevention and care among BMSM, identifying CPOLs who are able to communicate effectively with peers about men's health issues is critical. The goal of the current study was to explore what are the individual and social network characteristics of BMSM associated with high self-efficacy in communicating with peers about men's health issues. While the study is primarily exploratory, we hypothesize that high self-efficacy of communicating with peers about men's health is associated with individual characteristics, such as gay or homosexual identity, involvement in the house and ballroom community, and social network factors, such as larger number of network members who are living with HIV and larger number of network members who may provide emotional or material support. Understanding and improving self-efficacy on communication has implications for public health practice and engagement of BMSM.

Methods

Participants and Setting

After the baseline visit, participants completed a 6-month follow-up survey assessment. The outcome variable was only assessed at the 6-month follow-up assessment. We analyzed 6-month follow-up survey data from a randomized pilot trial of a behavioral HIV intervention conducted in Baltimore, Maryland, between 2011 and 2017. Participants were recruited using street-based outreach, advertising in area newspapers, and word-of-mouth referrals. Two types of participants were enrolled: indexes and networks. *Index participants* were individuals aged 18 years and older who self-reported being African American or Black, biological sex at birth was male, and they had sex with a man in the past 90 days. *Network participants* were individuals aged 18 years and older who were referred by the index participant to the research center to receive HIV antibody testing. Network members were eligible for survey assessments if they had one of following sexual risks: (1) unprotected vaginal or anal sex in past 90 days; (2) diagnosed with a sexually transmitted infection in the past 90 days; or (3) had sex with 2 or more people in the past 90 days. Both index and network participants who met the inclusion criteria and provided written informed consent completed baseline, 6-month, and 12-month survey assessments. Index participants who completed a baseline visit and showed up for randomization within 90 days of their baseline were eligible to be randomized into intervention or comparison conditions. The behavioral intervention provided training to index participants on how to (1) conduct peer health education, (2) promote HIV risk reduction among their social network members, (3) promote HIV voluntary counseling and testing (VCT) among their social network members, and (4) recruit social network members for VCT. The comparison condition was focused on HIV education, nutrition, and healthy eating. This study was approved by the Institute's institutional review board.

The current analyses included all study participants (both index and network participants) who reported male sex at birth, African American or Black, sexually attracted to men or both men and women, and returned to complete the 6-month follow-up survey.

Measures

Dependent Variable

High self-efficacy in communicating with peers about men's health issues was assessed by the question, "How confident do you feel in having conversations with peers about men's health issues?" with response options from "very confident," "somewhat confident," "neither confident nor unconfident," "somewhat unconfident," and "very confident." High self-efficacy in communicating with peers about men's health issues was operationalized as a response of "very confident."

Independent Variable

Individual characteristics Age, highest education level (less than high school vs. high school or GED or higher), sexual identity (homosexual vs. others), employment status (full-/part-time employed vs. other), current health insurance status, and HIV status were

self-reported. Homelessness was assessed by asking participants if they have been homeless during the past 6 months. Drug use was assessed by self-report of marijuana, crack, cocaine, heroin, recreational or prescription drug, methamphetamine, ecstasy, poppers, or club drugs use in the past 6 months. A dichotomous variable of multiple sex partners was determined by asking participants to provide the number of sexual partners they had in the prior 90 days, regardless of their partners' gender or the type of sex had. Participants reported their frequency of condom use for anal and vaginal sex for all partners by choosing from the following categories: never, less than half the time, half the time, more than half the time, and always. A binary variable of condomless sex was created to indicate those who reported not always using condoms versus always using condoms with all partners for vaginal or anal sex.

Transactional sex was assessed by one question "Thinking of those people [you had sex within the past 90 days], have you had sex with any of them in the past 90 days to GET any of the following?" "Money ($25 or more)", "Drugs," "Food," "A place to stay," "Clothes or other gifts," "Cigarettes." A binary variable for transactional sex was created if participants chose at least one of the options (i.e., transactional sex vs. none).

Depressive symptoms were measured with the Center for Epidemiological Studies Depression (CES-D) scale, a 20-item survey with questions about symptoms, such as restless sleep, loneliness, or crying spells within the past week [53]. The CES-D was developed for use in the general population and has high validity and reliability [53]. In the current sample, the CES-D had a Cronbach's alpha of 0.90, indicating excellent reliability. Answer choices range from 0 (rarely or none of the time) to 3 (most or almost all of the time). Scores were summed, and a cut-off score of 16 was used to determine the presence of depressive symptoms. A binary variable of community involvement was created by assessing the frequency of "going to places where gay men hang out, meet, or socialize" as at least once a month vs. less than once a month. Involvement in the house and ballroom community was assessed by the question "How often do you attend a house ball?" A binary variable was created to assess ever attending a house ball event. Data on intervention assignment for index participants and network participants' indexes who recruited them to the study was also included in the model.

Social network characteristics Social network characteristics were assessed using name generator questions, which elicited different domains of social support participants would receive during the last 6 months. Questions included "If you needed someone to talk to, who are the people that you could talk to about things that were personal and private?" "If you wanted to talk about any of your sexual experiences – for example, if you had questions about different types of sex or other issues – who would you talk to?" "If you wanted to talk about relationship issues that you are having with your same sex partners, who would you talk to?" "If you wanted to talk about relationship issues that you are having with your opposite sex partners, who would you talk to?" "if you needed some money, who would loan or give you some money?" Once the network was elicited, participants were asked about a variety of characteristics of the listed network members. The HIV status of each network was assessed by asking, "who on this list has HIV or AIDS?" Drug use among network was assessed with questions "who on this list has used heroin/smoked crack/used cocaine in the past 6 months."

Data Analysis

Bivariate associations were examined using *t* test and chi-square statistics. To evaluate independent associations between individual and network characteristics and high self-efficacy of communicating about men's health issues, all variables with *p* value less than 0.10 in bivariate analyses were adjusted into a multivariate logistic regression model with generalized estimating equations (GEE) [54]. GEE was used to account for the fact that index participants had multiple network members that contributed to the analysis and account for clustering in networks. Given the potential overlap in social network variables, backward stepwise selection method was used to choose social network variables in the final model. All analyses were performed using Stata Version 15.0. Table 1 presents descriptive results, and Table 2 bivariate associations.

Results

The current analyses included 256 BMSM. Close to two thirds (64%) of the sample reported high confidence in communicating with peers about men's health issues. Socio-demographic and behavioral background

Table 1 Sample characteristics of 256 Black MSM (BMSM) and self-efficacy of communicating with peers about men's health issues (Baltimore, Maryland)

	N (%) 256	Low self-efficacy *N* = 92 (35.94)	High self-efficacy *N* = 164 (64.06)	*p* value
Age				
18–24	31 (12.11)	12 (113.04)	19 (11.6)	0.914
25–40	110 (42.97)	40 (43.48)	70 (42.68)	
> 40	115 (44.92)	40 (43.48)	75 (45.73)	
Sexual identity				
Bisexual, heterosexual, and other	149 (58.20)	67 (72.83)	82 (50.00)	<.001
Gay/homosexual	107 (41.48)	25 (27.17)	82 (50.00)	
Current employment status				
Not working	161 (62.89)	58 (63.04)	103 (62.80)	0.97
Employed full or part-time	95 (37.11)	34(36.96)	61 (37.20)	
Education level				
Less than high school	46 (17.97)	19 (20.65)	27 (16.46)	0.402
High school or GED or higher	210 (82.03)	73 (79.35)	137 (83.54)	
Insurance				
No	29 (11.33)	11 (11.96)	18 (10.98)	0.812
Yes	227 (88.67)	81 (88.04)	146 (89.02)	
Homeless in the past 6 months				
No	209 (81.64)	69 (75.00)	140 (85.37)	0.04
Yes	47 (18.36)	23 (25.00)	24 (14.63)	
Condomless sex in the past 90 days				
No	65(25.39)	21 (22.83)	44 (26.83)	0.48
Yes	191 (74.61)	71 (77.17)	120 (73.17)	
Transactional sex in the past 90 days				
No	190 (74.22)	62 (67.39)	128 (78.05)	0.061
Yes	54 (20.00)	26 (27.08)	28 (16.09)	
Used any drug to get high in the past 6 months				
No	100 (39.06)	31 (33.70)	69 (42.07)	0.187
Yes	156 (60.94)	61 (66.30)	95 (57.93	
HIV status				
Negative	128 (50.00)	56 (60.87)	72 (43.90)	0.009
Positive	128 (50.00)	36 (39.13)	92 (56.10)	
Depressive symptoms (CES-D > 16)				
No	160 (62.50)	44 (47.83)	116 (70.73)	<.001
Yes	96 (37.50)	48 (52.17)	48 (29.27)	
Participation in house or ballroom event				
No	208 (81.25)	81 (88.04)	127 (77.44)	0.037
Yes	48 (18.75)	11 (11.96)	37 (22.56)	
Frequency of socializing at places where gay men hangout				
Less than once a month	144 (56.25)	57 (61.96)	87 (53.05)	0.168
At least once a month	112 (43.75)	35 (38.04)	77 (46.95)	
Intervention assignment				
No randomization	68 (26.56)	28 (30.43)	40 (26.56)	0.548

Table 1 (continued)

	N (%) 256	Low self-efficacy *N* = 92 (35.94)	High self-efficacy *N* = 164 (64.06)	*p* value
Intervention	88 (34.38)	31 (33.70)	57 (34.76)	
Control	100 (39.06)	33 (35.87)	67 (40.85)	
Social network characteristics	Mean (SD)			
Number of networks client named	4.53 (2.90)	4.38 (2.56)	4.62 (3.08)	0.534
Number of networks who could talk to about private things	1.62 (1.31)	1.42 (.96)	1.73 (1.45)	0.076
Number of networks who could talk to about sexual experiences	.91 (1.09)	.82 (.78)	.96 (1.23)	0.297
Number of networks who would talk about opposite sex partner issues	.81 (1.09)	.77 (.95)	.84 (1.16)	0.655
Number of networks who would talk about same sex partner issues	.85 (1.02)	.74 (.86)	.91 (1.01)	0.201
Number of networks would loan money to client	1.29(1.04)	1.09(0.83)	1.40(1.13)	0.022
Number of networks who are HIV positive	.64 (1.09)	.35 (.64)	.80 (1.25)	0.001
Number of networks who have used heroin, cocaine, or crack cocaine in the past 6 months	.38 (.98)	.40 (.84)	.36 (1.05)	0.776
Number of networks who know client is MSM	2.45 (2.29)	2.12 (2.04)	2.64 (2.41)	0.081

information is provided in Table 1 (i.e., descriptive characteristics). The average age of this sample was 39 years (range: 18–68 years). More than half of the sample identified as bisexual, heterosexual, or other (58%) and 42% as gay or homosexual. Over half of the men were not working (63%) and half were living with HIV (50%). The mean size of the social network was 4.53 (SD = 2.90). Participants reported having an average number of 2.45 (SD = 2.29) network members who knew they were MSM; 1.62 (SD = 1.31) network members whom they could talk to about private things and 1.29 (SD = 1.04) network members who would loan them money.

Table 2 (i.e., bivariate analysis) presents the results of a multivariate logistic regression model that include independent variables with *p* value less than 0.10 in bivariate analyses with backward stepwise selection method for social network factors. Multivariate logistic regression showed that odds of high self-efficacy of communicating with peers about men's health issues were higher among BMSM who identified as gay or homosexual than BMSM who identified as bisexual,

Table 2 Multivariate logistic regression model of high self-efficacy in communicating with peers about men's health issues among BMSM (*n* = 256)

	Adjusted odds ratio	95% CI	*p* value
Sexual identity	2.1	1.15, 3.83	0.015
Homeless in the past 6 months	0.74	.36, 1.53	0.42
Transactional sex in the past 90 days	0.85	.56, 2.14	0.618
HIV status	1.09	.56, 2.13	0.794
Depressive symptoms (CES-D > 16)	0.43	.24, .77	0.005
Participation in house or ballroom event	2.5	1.14, 5.49	0.022
Social network characteristics			
Number of networks who are HIV positive	6.34	1.48, 27.11	0.013
Number of networks would loan money to client	1.46	1.05, 2.03	0.024

heterosexual, or other (adjusted odds ratio [AOR] : 2.10, 95% Confidence Interval [CI]: 1.15,3.83). A large number of networks involved in the house and ballroom community (AOR: 2.50, 95% CI: 1.14, 5.49) and a larger number of networks who are living with HIV (AOR: 6.34, 95% CI: 1.48, 27.11) were independently associated with high self-efficacy of communicating with peers about men's health issues. BMSM with a larger networks who would loan them money (AOR: 1.46, 95% CI: 1.05, 2.03) were statistically significantly associated with high self-efficacy of communicating with peers about men's health issues. Finally, we found that having depressive symptoms (AOR: 0.43, 95% CI: 0.24, 0.77) was negatively associated with high self-efficacy of communicating with peers about men's health issues.

Discussion

Our results suggest that gay or homosexual identity, involvement in the house and ballroom community, and those with larger numbers of individuals living with HIV or with larger numbers of individuals who can provide financial support in their social network were more likely to report high self-efficacy of communicating with peers about men's health issues among BMSM. We also found that having depressive symptoms was negatively associated with high self-efficacy of communicating with peers about men's health issues. These characteristics have important implications for better identification of CPOL and other types of peer educators for future programs to address health disparities among BMSM. The findings underscore the importance of recognizing the diversity of sexual identities of BMSM in developing culturally specific interventions. These results are in line with previous findings that indicate Black men who are sexual minorities may not be captured solely in sexual identity of MSM categories [55, 56]. Gay identity has been associated with lower HIV risk behavior [57] among BMSM. However, the persistently high HIV and STI rates among BMSM suggests a need for culturally specific and network-based communication strategies that incorporate multiple sexual identities. For example, BMSM who self-identify as gay or homosexual may have less self-stigma/internalized stigma than those with other sexual identities, so they may be more comfortable talking to their peers about men's health. Conversely, BMSM who do not identify as gay will not be reached through approaches or strategies that solely emphasize sexual or gender minority identities. This suggests that future research is needed on who non-gay-identified men interact with and are influenced by. Approaches encompassing other identities (e.g., gender, race) that resonate with BMSM are much needed as are programs that may promote new identities that encompass a range of sexual identities. Tapping into existing community networks with various intersectional identities to disseminate culturally specific messages to BMSM may enhance their reach and impact.

In the current study, BMSM with depressive symptoms were less likely to report high confidence in communicating with peers about men's health issues. This finding is in line with previous studies that reveal that communication processes are negatively impacted by mental health problems [58, 59]. Mental health problems, including depression, disproportionately impact BMSM [60] and can affect information or treatment seeking behavior [61, 62]. This has implications for HIV among BMSM as rates of HIV are higher among individuals with mental illness [63]. Furthermore, a recent study found that BMSM with depressive symptoms were less likely to have emotional, medical, and financial support [64]. This suggests that peer support or CPOL models could be utilized to enhance social support among BMSM. However, our finding suggests that BMSM with depressive symptoms may face challenges as CPOLs due to lower self-efficacy of communicating with peers about men's health issues.

Another finding from the current study is that BMSM who ever participated in a house or ballroom event were more likely to report high self-efficacy of communicating with peers about men's health issues. The house and ballroom communities are at increased risk for HIV and other STIs [65, 66]. Our finding corroborates existing literature on house and ball communities as a viable places to promote HIV risk reduction and a mechanism for fostering self-efficacy [67] [39]. Limited prior research on house and ballroom communities has documented the relationship between participation, communication, and protective traits derived for BMSM [68]. BMSM often engage in these networks as a means of social support [69], as naturally occurring "peer education" and social capital have long existed in the house and ballroom community. Our finding provides new evidence that individuals in networks with larger proportions of BMSM from house and ballroom communities could be leveraged for future interventions. Future

CPOL-based interventions for house and ballroom communities should incorporate other competing priorities, such as employment components to address high unemployment among BMSM. House leaders often place an emphasis on economic empowerment and leadership development due to the low socioeconomic status of many BMSM participants [70]. The peer mentorship and emotional and financial support that these networks provide may reduce negative outcomes related to transactional and or trade sex among BMSM due to limited employment opportunities. Therefore, financial issues should be addressed in developing HIV prevention and care programs in house and ballroom communities. For example, credible house leaders could have training on how to assist others with economic- and employment-related issues, so house members could potentially access tangible financial and workforce development resources.

Several social network factors were found to be associated with high self-efficacy of communicating with peers about men's health issues. BMSM with a larger number of network members who would loan them money were more likely to have high self-efficacy of communicating with peers about men's health issues. This result indicates that social capital, such as financial support from networks among BMSM, may have a positive influence on communication with peers and potentially sexual partners. These data elucidate a more nuanced context for understanding prevention communication and interventions for BMSM. Future research is needed to investigate the extent to which individual characteristics and interpersonal factors (e.g., social support, social capital, access to economic resources) within networks affect peer communication. These characteristics and factors may have important implications for addressing social and structural factors related to health disparities among BMSM.

Our evidence also suggests that BMSM who had a larger number of people living with HIV in their network were more likely to have greater self-efficacy in communicating with peers about men's health issues. The larger size of networks living with HIV may be the result of more HIV disclosure and acceptance of HIV positivity among networks, which can be an indicator of positive social norms associated with HIV or other men's health issues. HIV disclosure could lead to more discussions about HIV and other health issues [71–73]. Future HIV, STI, and other health promotion programs designed to reach BMSM should consider further leveraging network members living with HIV to disseminate health communication messages into these complex and high-risk networks.

The findings must be considered within the limitations of the study design. First, this was a convenience sample of BMSM and therefore not generalizable to all BMSM in Baltimore or other settings. Second, the use of self-report data could be subject to social desirability [74] and recall bias [75]. Third, the cross-sectional design of the study limits our ability to draw causal inferences about characteristics and communication. Fourth, the small sample size of members from the house and ball community in this analysis should be noted given the implications for HIV prevention in BMSM communities. Finally, positive attitudes about communication are not sufficient for actual conversations to occur. Designing interventions that increase communication with social networks is warranted [76].

Despite the limitations, results from the current study expand knowledge of the individual and social network characteristics of BMSM with high self-efficacy of communicating with peers about men's health issues. Communicating about health issues among BMSM may address norms around HIV and expand harm reduction strategies to subpopulations of BMSM. Interpersonal [20] and internet-based strategies [77–79] have been used to reach BMSM with health promotion messages, but there are scant analyses of the individual or social network characteristics of the BMSM CPOLs. Further research should investigate the effectiveness of intervention messages or delivery based on CPOLs with various individual and network characteristics.

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