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# Social Network Characteristics Associated with More Frequent HIV and STI Prevention Conversations: The N2 Cohort Study in Chicago

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## Abstract

Black cisgender sexually minoritized men (SMM) and transgender women (TW) are subgroups at highest risk of HIV and sexually transmitted infections (STIs) in the US. We sought to identify factors facilitating continued conversations – social reinforcement – surrounding HIV/STI prevention among this subgroup. Participants were recruited in Chicago from 2018 to 2019 from community health spaces. Participants provided information about themselves (level 2) and

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⩽5 confidants (level 1). We used multinomial multilevel modeling to identify associations with HIV/STI prevention conversation frequency. A total of 370 participants provided information on 987 confidants (mean = 2.6). We found significantly positive associations between having biweekly or more often HIV/STI prevention conversations and a confidant being a kin family member, older by 15 years or more, racially homophilous, and emotionally close. Future interventions should harness social networks by including components that consider racial homophily, respect for elders, and strong ties, in addition to applying kin family systems interventions approaches and decreasing stigma surrounding HIV/STIs.

### Keywords

HIV; Social reinforcement; Social network analysis; Sexual and gender minorities; African American

## Introduction

Black cisgender sexually minoritized men (SMM) and transgender women (TW) experience disproportionate vulnerability to HIV, relative to other racially/ethnically, sexually, and gender minoritized subgroups [1]. One in every 2 Black SMM are estimated to be diagnosed with HIV by the age of 49 years [2] and approximately 64% of Black TW are estimated to be living with HIV [3]. Although biobehavioral strategies for HIV prevention such as pre-exposure prophylaxis (PrEP) or antiretroviral treatment (ART) have been available since 2012 and 1987, respectively, Black SMM and TW continue to experience elevated rates of HIV incidence and have low biomedical equity [4]. The initial uptake of biomedical prevention strategies may have been slow among Black SMM and TW [5], partially due to delays in information about biomedical prevention reaching this community [6] as well as minimal uptake of services [7]. Structural barriers such as racism and stigma/discrimination may further exacerbate lack of access and adherence to biomedical HIV prevention strategies [8–11].

### Role of Social Networks in HIV Prevention Communication

To overcome structural barriers in the reception of sexual health care, social networks can be examined. An individual's social network plays a significant role in a person's engagement with HIV care as they can support or discourage a prevention or treatment plan that matches the individual's HIV-related health goals [12]. Research indicates that social networks not only facilitate PrEP/ART awareness [7], but also promote PrEP/ART uptake [13]. A peer network intervention in Chicago (*PrEP Chicago*) trained opinion leaders to refer and link their social networks to PrEP and found that individuals who received a referral or linkage to PrEP were more likely to be connected to opinion leaders in the intervention, suggesting that network interventions including conversations about PrEP (i.e., social reinforcement) can diffuse PrEP uptake behaviors [14]. In addition, prevention interventions have found that social networks can be leveraged to support HIV-related status neutral care plan adherence among other minoritized groups [15]. These interventions have shown that discussions about PrEP and ART with network confidants have the capacity to increase uptake and adherence to these strategies. However, it is unknown what factors are associated with individuals

having social reinforcement in the form of continued conversations about the prevention of HIV or sexually-transmitted infections (STIs).

Research and interventions surrounding interpersonal conversations surrounding HIV prevention has focused on the disclosure of HIV among family members [16], disclosure of HIV [17] and PrEP use [18] to sexual partners, negotiation of behaviors with sexual vulnerability to HIV between sexual partners [19, 20], and discussions of HIV prevention messaging with providers [21]. Although the presence of support systems has been identified as a potentially important factor related to overall HIV and sexual health, there is scant information surrounding how attributes of social relationships, such as relationship factors including relationship type and strength and conversation topics, may directly contribute to conversations surrounding HIV and STI prevention within social networks. For example, Bond et al. found that there was rare communication about HIV among peers due to HIV-related stigma in the Black community [22]. Discussions about PrEP and ART with peers such as network confidants may have the capacity to increase uptake and adherence to these strategies, and may be an important first step in the PrEP care cascade [23].

Kincaid's metatheory of health communication has been posited to identify the range of communication theories, social/behavioral health theories, and the interweaving of these two types of theories which can result in behavioral change [24, 25]. Kincaid emphasizes the importance of moving away from once-off communication into an iterative practice [25]. Within the metatheory of health communication, there are components such as communication, ideational factors, skills and knowledge, behaviors, and the health outcome, within the context of the environment, including supports and constraints. Within the ideational factors component of the model, there are three psychosocial domains which can influence health behavioral change, such as PrEP/ART use within the context of the present study. These include cognitive determinants (i.e., attitudes, norms, and perceived risk surrounding behavior), emotional determinants (i.e., feelings of fear and trust surrounding the behavior), and social determinants (i.e., mutual understanding of the behavior, social support of behavior, and interpersonal communication about the behavior) [25, 26]. Previous studies suggest that ideation can play a role in socially reinforcing behaviors [27], such as HIV protective behaviors [28].

Despite the Strength of Weak Ties theory suggesting that weak relationships (i.e., people who are not close to an individual) can facilitate the transmission of novel information or "simple" behaviors more easily and broadly across a network, it is unknown what interpersonal attributes are associated with social reinforcement of that behavior, such as continued conversations surrounding HIV/STI prevention [29, 30]. In accordance with the theory of homophily, people are more likely to share information with others based on similar attributes such as race, gender, age, and even drug use [31–33]. Black SMM and TW living in high HIV incidence and prevalence areas such as Chicago, Illinois, may be even more vulnerable to care disengagement and require additional support in the uptake of and adherence to PrEP and ART [34]. Additionally, despite one study finding that 85% of Black SMM participants believed that it was important/very important to talk about HIV, only a small proportion (14%) had discussions about HIV testing [35]. Thus, we sought to examine associations of social network characteristics, including measures of homophily, among

social confidant network members with the outcome of the frequency of conversations about HIV/STI prevention among Black SMM and TW living in Chicago. We hypothesize that tie strength (measured by emotional closeness), relationship type (i.e., best friend or chosen family), and homophily (on race, age, and HIV status) are associated with ongoing conversations about HIV/STI prevention, which can socially reinforce complex behaviors such as PrEP or ART initiation or adherence.

## Methods

### Setting and Sample

We use data from the Neighborhoods and Network (N2) Cohort Study, a study which sought to investigate relationships between geospatial activity space neighborhoods, confidant and sexual networks, and status neutral biomedical uptake and adherence among Black SMM and TW in the Chicago, Illinois, area [10]. The present study includes baseline data collected from January 2018 to December 2019. Participants were actively recruited from a community health space, a federally-qualified health center, and passively through peer referral. Trained study staff first obtained participants' written informed consent in a private room and then collected study data using interviewer-administered computer-assisted software. Participants were then asked to return within two weeks to provide network-related information. Additional study information can be found elsewhere [10]. Study staff provided participants with $150 for participation in the study and $20 for each peer referral who enrolled in the study. The University of Chicago and the Columbia University IRB provided ethical review and clearance of the study.

### Levels, Measures, and Analysis

Participants were asked to name up to 5 confidants, or people with whom they frequently talk to about things that are most important to them. Because confidants were named by a participant, confidants are nested within participants.

**Level 1 Outcome—**To measure frequency of HIV prevention communication, our outcome variable, participants were asked, "*How often does [CONFIDANT] talk with you about avoiding getting infected with HIV or some other sexually transmitted disease?"* Responses were collected as a 9-level ordinal variable (0 = never or less than once a year, 1 = once a year, 2 = couple times a year, 3 = once a month, 4 = once every two weeks, 5 = once a week, 6 = several times a week, 7 = every day, 8 = several times a day) and then coded as a 3-level ordinal variable (never or less than once a year = reference, once a year to monthly, biweekly to several times a day).

**Level 1 Confidant Information—**Participants provided additional information for up to the first five confidants that participants named, including confidant's race (Black = reference or not Black), ethnicity (Latine = reference or not Latine), age (years), gender (cisgender man = reference, cisgender woman, or transgender woman or nonbinary), and HIV serostatus (positive, negative, participant doesn't know). We calculated measures of homophily including homophily on race (classified as both participant and confidant identifying as Black = reference, participant and confidant are different races), homophily on

age (participant and confidant are the same age ± 3 years = reference, the participant is older than their confidant by 4 years or more, the participant is younger than the confidant by 4–14 years, and the participant is younger than the confidant by 15 years or more), homophily on gender (classified as both participant and confidant identify as cisgender men = reference, both participant and confidant identify as being of transgender experience, and participant and confidant are not the same gender), homophily or concordance on HIV serostatus (both participant and confidant are HIV negative = reference, both participant and confidant are living with HIV, and both participant and confidant have different HIV status or participant does not know confidant's HIV status).

Participants also provided additional relationship-level characteristics (level 1) with each confidant, including relationship type (friend/close friend = reference, best friend, family, sexual partner, another relationship type), closeness (1 = not close, 2 = somewhat close, 3 = very close), frequency of communication (never or less than once a year = referent, once a year to monthly, biweekly to several times a day), frequency of the participant talking about their sex life with the confidant (never or less than once a year = referent, once a year to monthly, biweekly to several times a day), and if the participant had sex with the confidant in the past 6 months.

### Level 2 Participant's Sociodemographic and Background Information—

Participants provided sociodemographic information about their age (years), sexual identity (gay/homosexual = reference, bisexual, straight, other), housing stability (stable housing in past year = reference, unstable housing), employment status (employed = reference, not employed), education status (high school degree = reference, no high school degree), and yearly income (over $20,000 = reference, below $20,000).

## Analysis

We described participant (level 2) and confidant (level 1) data using descriptive statistics (Tables 1 and 2). We then conducted a series of unadjusted and adjusted multilevel multinomial regression models to assess associations between level 1 and level 2 factors with the outcome of interest, frequency of HIV prevention conversations. First, we conducted an adjusted multilevel multinomial regression model with the outcome referent group as never having had a conversation about HIV prevention, and the comparison groups being having conversations every 2 weeks or more frequently and having conversations monthly to yearly (Table 3: Model 1). Then, we conducted an adjusted multilevel multinomial regression model with the outcome referent group as having conversations monthly to yearly, and the comparison groups being never having had a conversation about HIV prevention and having conversations every 2 weeks or more frequently. We then conducted a post-hoc chi-squared analyses to identify associations between confidant relationship type and homophily on age. Using the R environment [36] we used the *nnet* package to conduct multilevel analyses and we visualized the egocentric social networks of participants using Cytoscape [37].

## Results

A total of 412 participants were enrolled in the parent study; however, only 380 participants provided information on 1,031 confidant network members. Complete data were included for 370 participants and their 987 confidants (missingness of participant = 2.6%; missingness of confidants = 4.3%). Participants were on average 26 years old and identified primarily as cisgender men (87%), and were majority gay/homosexual-identified (61%), stably housed in the past year (70%), and high school educated (87%). Most participants reported making an income of less than $20,000 in the past year (66%). Additional information about participants can be found in Table 1.

### Description of the Confidant Networks

Participants reported a mean of 2.7 confidants in their confidant networks. Confidants were mean age 31 years old with the majority being within 3 years of age of the participant (56%), Black (94%), non-Latine (94%), and either cisgender men (53%) or cisgender women (40%). Participants reported confidants as being a kin family member (33%), best friend (29%), friend or close friend (16%), chosen family (7%), partner or sexual partner (11%), or another relationship type [4%; acquaintance ($n = 3$), boss ($n = 2$), co-worker ($n = 5$), counselor ($n = 3$), ex-romantic partner ($n = 15$), former colleague ($n = 1$), neighbor ($n = 1$), roommate/housemate ($n = 5$), and STI/HIV tester ($n = 1$)]. Participants reported having sex with 13% of their confidant network members in the last 6 months [partner or sexual partner ($n = 101$); friend ($n = 20$), ex-romantic partner ($n = 9$), and missing relationship type ($n = 1$)]. Slightly over half of the confidants shared the same HIV status with participants (both are HIV negative = 46%; both are living with HIV = 10%). Participants reported that they were “very close” to most of their confidants (82%) which we operationalize as a strong tie [38]. Most participants reported speaking to their confidants at least weekly (92%). Participants also reported talking about their sex lives with confidants at least every two weeks or more (64%). Additional information about confidants can be found in Table 2. There were statistically significant differences between HIV/STI prevention conversation frequency and relationship type ($\chi^2 = 39.305$; $p < 0.001$), if the confidant was a sexual partner ($\chi^2 = 8.575$; $p = 0.014$), HIV status homophily ($\chi^2 = 36.943$; $p < 0.001$), emotional closeness ($\chi^2 = 42.017$; $p < 0.001$), communication frequency ($\chi^2 = 47.335$; $p < 0.001$), and frequency of conversations about the participant’s sex life ($\chi^2 = 230.014$; $p < 0.001$).

### Visualization of the Egocentric Networks

Figure 1 visualizes the egocentric confidant networks of our participants. The color of the node indicates where the node is a participant or a confidant. The shape of the node indicates the type of node: participant; a kin family member confidant; best friend, chosen family, or partner; or another type of confidant (friend or another relationship type). The size of the node indicates the age of the confidant relative to the participant. The thickness of tie indicates the frequency of HIV/STI conversations.

### Results of the Multilevel Multinomial Model Examining Biweekly or More Often and Monthly to Yearly, Relative to Never Having HIV/STI Prevention Conversations Among Black SMM and TW and Their Confidant Networks (Model 1)

We found that there were significant and positive associations with having HIV/STI prevention conversations every two weeks or more frequently with a confidant if the participant identified as bisexual (OR = 1.58; 95% CI = 1.01,2.49; $p = 0.046$), and if the participant felt closer to a confidant (OR = 1.74; 95% CI = 1.15,2.63; $p = 0.008$), had monthly to less than yearly conversations about the participants sex life with the confidant relative to never having a conversation about the participant's sex life (OR = 3.94; 95% CI = 2.08,7.47; $p < 0.001$), and had conversations about the participant's sex life every two weeks or more often with the confidant relative to never having a conversation about the participant's sex life (OR = 19.98; 95% CI = 11.16,35.80; $p < 0.001$), reported the confidant being a family member relative to a friend or close friend (OR = 2.15; 95%CI = 1.12,4.13; $p = 0.021$), reported that they were younger than the confidant by 15 years or more relative to being within 3 years of age (OR = 1.87; 95% CI = 1.02,3.43; $p = 0.043$), reported that the confidant was racially homophilous (both participant and confidant are Black; OR = 2.59; 95% CI = 1.29,5.21; $p = 0.008$). We found that there were significant and negative associations with having HIV/STI prevention conversations every two weeks or more frequently with a confidant if the participant was not employed (OR = 0.62; 95% CI = 0.42,0.93; $p = 0.020$) and did not know the confidant's HIV status relative to them both being HIV negative (OR = 0.42; 95% CI = 0.22,0.82; $p = 0.011$).

We found that there were significant and positive associations with participants having HIV/STI prevention conversations monthly to less than yearly relative to never having HIV/STI prevention conversations with a confidant if the participant felt closer to a confidant (OR = 1.65; 95% CI = 1.10,2.48; $p = 0.017$), had monthly to less than yearly conversations about the participant's sex life with the confidant relative to never having a conversation about the participant's sex life (OR = 5.00; 95% CI = 2.87,8.70; $p < 0.001$), and had conversations about the participant's sex life every two weeks or more often with the confidant relative to never having a conversation about the participant's sex life (OR = 2.95; 95%CI = 1.73,5.05; $p < 0.001$).

We found that there were significant and negative associations with monthly to less than yearly relative to never having HIV/STI prevention conversations with a confidant if the confidant was a best friend relative to a friend or close friend (OR = 0.48; 95% CI = 0.27,0.85; $p = 0.012$), a partner or spouse relative to friend or close friend (OR = 0.30; 95% CI = 0.09,0.96; $p = 0.042$), another relationship type relative to a friend or close friend (OR = 0.19; 95% CI = 0.06,0.61; $p = 0.006$), and if the participant did not know the HIV status of the confidant (OR = 0.26; 95% CI = 0.12,0.57; $p = 0.001$).

### Results of the Multilevel Multinomial Model Examining Biweekly or More Often Relative to Monthly to Yearly Frequency of Having HIV/STI Prevention Conversations Among Black SMM and TW and Their Confidant Networks (Model 2)

We found that there were significant and positive associations with having HIV/STI prevention conversations every two weeks or more frequently with a confidant relative to

monthly or less than yearly if the participant reported the confidant being a best friend relative to a friend or close friend (OR = 2.97; 95% CI = 1.76,5.01; $p < 0.001$), reported the confidant being a chosen family member relative to a friend or close friend (OR = 2.47; 95% CI = 1.13,5.38; $p = 0.023$), reported the confidant being a chosen family member relative to a friend or close friend (OR = 2.91; 95% CI = 1.62,5.22; $p < 0.001$), reported the confidant being a partner or spouse relative to a friend or close friend (OR = 3.32; 95% CI = 1.07,10.36 $p = 0.038$), reported the confidant being another relationship type relative to a friend or close friend (OR = 2.96; 95% CI = 1.06,8.24 $p = 0.037$), and reported that they were younger than the confidant by 15 years or more relative to being within 3 years of age (OR = 2.04; 95% CI = 1.14,3.65; $p = 0.016$).

We found that there were significant and negative associations with having HIV/STI prevention conversations every two weeks or more frequently with a confidant relative to monthly or less than yearly if the participant reported that they had conversations about their sex with the confidant life every two weeks or more often relative to never having a conversation about their sex life (OR = 0.34; 95% CI = 0.20–0.58; $p < 0.001$), reported that they had conversations about their sex with the confidant life monthly or less than yearly relative to never having a conversation about their sex life (OR = 0.20; 95% CI = 0.11,0.35; $p < 0.001$), identified as another sexual identity (OR = 0.43; 95% CI = 0.21,0.87; $p = 0.019$), and if the participant was older than the confidant by 4 years or more (OR = 0.49; 95% CI = 0.26,0.93; $p = 0.030$).

We do not present the findings of the outcome of never having HIV/STI prevention conversations relative to monthly to less than yearly HIV/STI prevention conversations as these findings can be inferred from Model 1.

### Results of the Chi-Squared Analysis Examining Confidant Relationship Type and Homophily on Age Among Black SMM and TW

There was a positive and statistically significant association between relationship type and homophily on age ($\chi^2 = 324.508$; Fisher's $p = 0.000$). For example, although overall, 32.9% of participants' confidants were a family member, 84.5% of participants' confidants who were older than the participant by 15 years or more were a family member. Overall, participants' best friends composed 29.7% of the sample, but composed 42.4% of confidants who were the same age within 3 years. Additional information of these findings can be found in the Supplementary Information section.

## Discussion

This study sought to identify relationship factors associated with the social reinforcement of HIV/STI prevention, operationalized as conversations about HIV/STI prevention, among a group of Black SMM and TW living in Chicago and their confidant network members. Slightly less than half of participants (48%) reported engaging in HIV/STI prevention-related conversations with confidants frequently. This is more often than what has been found in the prior literature with rates as low as 14% for monthly conversations among SMM living in Baltimore, MD in 2014 (of our sample, 60% monthly or more frequent conversations) [35]. Our findings somewhat supported our hypothesis- tie strength

(operationalized as closeness), relationship type (family members), homophily (on race and HIV negative serostatus) was positively associated with more frequent conversations about HIV/STI prevention across Black SMM and TW participants. However, we found that Black SMM and TW were more likely to have conversations surrounding HIV and STI prevention with confidant network members who were 15 years or more older than them, suggesting that instead of homophily on age, heterophily on age was associated with these conversations. Participants who were bisexual were more likely to have HIV/STI prevention conversations every two weeks or more, relative to gay/homosexual participants.

We found that racial homophily played an important role in HIV/STI conversation frequency, similar to what other studies have found regarding a preference for racial homophily [31–33]. Of confidants, 94% identified as Black, suggesting strength of racial homophily on egocentric network configuration. Previous studies have found that racial identity (or socialization based on race) is a salient social identity group across all races; however, Black American graduate students had a stronger preference for other Black American graduate students relative to White American graduate students [39]. Relationships based on homophily are not always a conscious decision- instead, homophily may be facilitated by social environments. For example, in our study almost 1/3rd of confidants were family members, which could begin to explain the high racial homophily as they may genetically related. In addition, previous scholars have that identified residential racial segregation could limit interactions with other races and contribute to the high racial homophily seen in our sample [39–41]. Racial homophily may be protective for Black Americans, and by Black Americans limiting their networks to other people who have experienced the same socialization as them, this could decrease their exposure to racism at the interpersonal level resulting in a preferred relationship. Racial homophily could also begin to explain racialized HIV disparities as it could restrict minority groups' ability to access novel information through majority groups [42]. In the context of PrEP, White Americans were the first group to receive PrEP information and engage in PrEP utilization in 2012 when it was approved by the Federal Drug Administration [43]; however, 10 years later, Black Americans continue to experience a stark PrEP disparity [44]. While there were 26 PrEP users for each new HIV diagnoses among White Americans, there were only 3.3 PrEP users for each new HIV diagnosis among Black Americans [4, 45]. As the majority of Black Americans are now aware of PrEP, social reinforcement, including continued conversations about HIV/STI prevention, may be an important next step to increase uptake of biomedical strategies, such as PrEP. Thus, public health information dissemination interventions can encourage individuals to share information with others who are not homophilous with them on race. Further, our study focuses on the status homophily of Black race; however, value homophily may also be worth considering in future studies. Black Americans are not a homogenous group and instead are a diaspora and researchers should consider the complexities of intersecting and heterogenous identities within Black SMM and TW.

Prior studies have focused on the negative influences of family members on HIV outcomes, such as kin family members not being regarded as the primary social support system of SMM living with HIV [46, 47]: this study highlights the potential benefits of including family members in HIV prevention related interventions. Black SMM who had higher

proportions of their confidant network that were family members engaged in fewer sexual behaviors with enhanced vulnerability to HIV [48]. SMM with a higher proportion of their confidant network that were family members were also in turn more likely to discourage sex-drug use and group sex within their own friendship networks with other SMM [48]. Having a family member in the confidant network has also been positively associated with PrEP uptake among Black SMM [49]. Among Black adolescents, those who have more frequent communication with their fathers were more likely to test for HIV [50]. Not only can positive parent communication and support increase HIV testing likelihood, but also stronger parent/child communication can delay sexual debut and parental monitoring can increase greater condom use likelihood [51]. For example, in one qualitative study, the majority of young Black SMM disclosed their sexual identity to at least one family member and they received family acceptance [52]. If parents are present in the confidant networks of Black SMM and TW, this could suggest that participants may be “out” and accepted by family members; thus, supporting the importance of the supportive family unit for HIV prevention. Our findings support research that because Black Americans have higher endorsement of cultural values such as communalism (values on social ties relative to individual achievements), familism (values on obeying, honoring, and caring for parents and other family members), and filial piety (attitude for respect for parents), relative to White and Hispanic counterparts [53], Black SMM and TW view their health through a collectivist (i.e., family) lens instead of an individual lens.

We found that participants had more frequent discussions about HIV/STI prevention with network members who were 15 years or older than them, relative to members who were within 3 years of age. This may be due to several reasons. First, Black SMM and TW may be less likely to discuss HIV/STI prevention with confidants who are their same age due to stigma; however, confidants who were 15 years or older may be in a role which commands or infers respect. Although across the United States and Europe, there appears to be an ageist cultural norm surrounding the idea that discussions about sex and sexual health are inappropriate and or unnecessary to have with older adults [54], this norm may not extend to conversations that older individuals may have with individuals who are 15 years or younger than them. Therefore, it is entirely possible that HIV/STI prevention conversations between Black SMM and TW may be centered on the younger person’s health. Although historical cultural values like communalism and filial piety may serve as barrier to conversations about HIV/STI prevention [55], Black SMM and TW may be willing to discuss these topics with older confidants as they practice respect for members of their confidant networks who are considerably (15 years or more) older than them. Further, as other studies suggest that social network norms may influence individual-level sexual behaviors, it is important to understand the nuances of these conversations as they may socially reinforce PrEP/ART behaviors, including both decisions for uptake/adherence or non-use [56]. Additionally, previous studies suggest that social media interactions have the potential of encouraging homeless youth to engage in HIV protective behaviors, necessitating the exploration of the mode of communication [57]. Future qualitative research is needed to explore the dynamics of HIV/STI prevention conversations among Black SMM and TW to understand the nuances of these conversations- areas can include specific topics, setting of conversation (e.g., in person, virtual, one-on-one, group setting), duration, who initiated the conversation,

information seeking, intentions of the conversation, and emotional/visceral responses to the conversation (e.g., comfort/discomfort, anxiety, relief).

Although this is one of the first studies among Black SMM and TW to explore the relationship between HIV/STI conversations and tie strength [32], there is evidence suggesting that conversations promoting HIV prevention methods (i.e., PrEP) occurred more frequently among SMM who were more closely and actively engaged with their contacts. Black SMM who reported relationships that were more emotional close had a greater likelihood of discussions of HIV testing within their social networks [35]. Similarly, a previous intervention study found that facilitating closeness and communication within networks resulted in better HIV outcomes for SMM, relative to networks that did not facilitate conversations about HIV prevention [58]. The intervention *Project nGage* found that among young Black SMM diagnosed with HIV, those who had a close confidant who supported their HIV care were 3 times more likely to have at least 3 HIV-care provider visits in a 12-month timeframe [15]. The intervention found that among social confidants, mothers were the most likely to be responsive to intervention-related calls regarding young Black SMM's HIV care, followed by female family members, and friends. Consistent with our study's findings that tie strength, age heterophily, and family members are associated with more frequent HIV/STI prevention conversations, future network interventions to increase conversations around HIV/STI prevention should consider leveraging these relationships. Additionally, interventions can also consider utilizing community advisory boards across age groups to better understand how social network interventions could be best applied to Black SMM and TW and their families [59].

Despite this study's strengths, there were several limitations. First, the use of cross-sectional data did not allow for authors to assess for causality. Second, it is possible that participants experienced recall and or social desirability bias due to the nature of self-reported data of up to one year before. Third, although authors utilized multilevel modelling, a complex statistical approach to identify associations with conversations about HIV/STI prevention, it is possible that that the second and third conditions stating that observations at the egocentric level must be independent of each other and egocentric confidant networks cannot overlap, may have been violated. There may have been overlapping networks due to our utility of peer referral sampling. In addition, because this is a social network study, and there are dependencies within our data, our findings may not be generalizable to other settings. Further, we were unable to ascertain the context and the topics of HIV/STI prevention conversations; thus, although we could identify that these conversations were occurring, we do not have any additional detail or context of these conversations. A qualitative study could explore the context of these conversations. Finally, there may be residual confounding.

## Conclusion

We found that family members, racial homophily, and strong relationships have the potential to socially reinforce HIV/STI prevention. As we focused on relationship characteristics, future research can explore how social network structural configurations are associated with the uptake and adherence of HIV/STI prevention strategies through the examination of peer

influence of HIV/STI prevention using sociocentric methods. There are few interventions for Black SMM and TW that capitalize on the potential of including family members in discussions surrounding HIV/STI prevention or confidants who are 15 years or older, as most interventions focus on peers. Therefore, future interventions should explore how family systems can be used as an opportunity for network-level intervening.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## Data Availability

The data that support the findings of this study are available from either DD or JS upon reasonable request. The code can be requested from CS and provided upon reasonable request.

## References

1. Centers for Disease Control and Prevention. HIV Surveillance Report. 2019; vol 32 2021.
2. Hess KL, Hu X, Lansky A, Mermin J, Hall HI. Lifetime risk of a diagnosis of HIV infection in the United States. Ann Epidemiol. 2017;27(4):238–43. [PubMed: 28325538]
3. Centers for Disease Control Prevention. HIV infection, risk, prevention and testing behaviors among transgender women–National HIV behavioral surveillance, 7 US cities, 2019–2020. HIV Surveill Special Rep. 2021;27:15.
4. Sullivan P, Whitby S, Hipp P, Juhasz M, DuBose S, McGuinness P, et al. editors. Trends in PrEP inequity by race and census region, United States, 2012–2021. AIDS 2022; 2022; Montreal, Canada.
5. Finlayson T, Cha S, Xia M, Trujillo L, Denson D, Prejean J, et al. Changes in HIV preexposure prophylaxis awareness and use among men who have sex with men—20 urban areas, 2014 and 2017. Morb Mortal Wkly Rep. 2019;68(27):597.
6. Kanny D, Jeffries IVWL, Chapin-Bardales J, Denning P, Cha S, Finlayson T, et al. Racial/ethnic disparities in HIV preexposure prophylaxis among men who have sex with men—23 urban areas, 2017. Morb Mortal Wkly Rep. 2019;68(37):801.
7. Ezennia O, Geter A, Smith DK. The PrEP care continuum and Black men who have sex with men: a scoping review of published data on awareness, uptake, adherence, and retention in PrEP care. AIDS Behav. 2019;23(10):2654–73. [PubMed: 31463711]

8. Bailey ZD, Feldman JM, Bassett MT. How structural racism works — racist policies as a root cause of U.S. Racial Health Inequities. NEJM. 2020;384(8):768–73. [PubMed: 33326717]
9. Duncan DT, Callander D, Bowleg L, Park SH, Brinkley-Rubinstein L, Theall KP, et al. Intersectional analysis of life stress, incarceration and sexual health risk practices among cisgender black gay, bisexual and other men who have sex with men in the deep South of the US: the MARI Study. Sex Health. 2020;17(1):38–44. [PubMed: 31972125]
10. Duncan DT, Hickson DA, Goedel WC, Callander D, Brooks B, Chen Y-T, et al. The social context of HIV prevention and care among black men who have sex with men in three US cities: the neighborhoods and networks (N2) cohort study. Int J Environ Res Public Health. 2019;16(11):1922. [PubMed: 31151275]
11. Goedel WC, Nunn AS, Chan PA, Duncan DT, Biello KB, Safren SA, et al. A shot at equity? Addressing disparities among Black MSM in the coming era of long-acting injectable preexposure prophylaxis. AIDS. 2019;33(13):2110–2. [PubMed: 31577579]
12. Huang W, Lockard A, Kelley CF, Serota DP, Rolle C-PM, Sullivan PS, et al. From declining PrEP to PrEP initiation as first nature–what changes PrEP initiation decisions among young, Black MSM. AIDS Care. 2022;34(3):284–93. [PubMed: 34369230]
13. Jaramillo J, Pagkas-Bather J, Waters K, Shackelford LB, Campbell RD, Henry J, et al. Perceptions of sexual risk, PrEP services, and peer navigation support among HIV-negative latinx and black men who have sex with men (MSM) residing in western Washington. Sex Res Soc Policy. 2022;19(3):1058–68.
14. Schneider JA, Young L, Ramachandran A, Michaels S, Cohen H, Robinson I, et al. A pragmatic randomized controlled trial to increase PrEP uptake for HIV prevention: 55-week results from PrEPChicago. J Acquir Immune Defic Syndr. 2021;86(1):31–7. [PubMed: 33306562]
15. Bouris A, Jaffe K, Eavou R, Liao C, Kuhns L, Voisin D, et al. Project nGage: results of a randomized controlled trial of a dyadic network support intervention to retain young black men who have sex with men in HIV care. AIDS Behav. 2017;21(12):3618–29. [PubMed: 29079949]
16. Edwards LL, Donovan-Kicken E, Reis JS. Communicating in complex situations: a normative approach to HIV-related talk among parents who are HIV+. Health Commun. 2014;29(4):364–74. [PubMed: 23799804]
17. Latkin C, Yang C, Tobin K, Roebuck G, Spikes P, Patterson J. Social network predictors of disclosure of MSM behavior and HIV-positive serostatus among African American MSM in Baltimore, Maryland. AIDS Behav. 2012;16:535–42. [PubMed: 21811844]
18. Shrader C-H, Arroyo-Flores J, Skvoretz J, Fallon S, Gonzalez V, Safren S, et al. PrEP use and PrEP use disclosure are associated with condom use during sex: a multilevel analysis of latino MSM egocentric sexual networks. AIDS Behav. 2021;25(5):1636–45. [PubMed: 33387134]
19. Morrill AC, Noland C. Interpersonal issues surrounding HIV counseling and testing, and the phenomenon of testing by proxy. J Health Communication. 2006;11(2):183–98. [PubMed: 16537287]
20. Aholou TM, Nanin J, Drumhiller K, Sutton MY. Opportunities for HIV prevention communication during sexual encounters with black men who have sex with men. AIDS Patient Care STDs. 2017;31(1):33–40. [PubMed: 27893276]
21. Wilkinson JD, Zhao W, Santibanez S, Arnsten J, Knowlton A, Gómez CA, et al. Providers' HIV prevention discussions with HIV-seropositive injection drug users. AIDS Behav. 2006;10(6):699–705. [PubMed: 16639542]
22. Bond KT, Frye V, Cupid M, Lucy D, Koblin BA. HIV-related communication and safe sex practices among heterosexual Black men: a qualitative report. J Black Sex Relatsh. 2018;4(3).
23. Liu A, Colfax G, Cohen S, Bacon O, Kolber M, Amico K, et al. editors. The spectrum of engagement in HIV prevention: proposal for a PrEP cascade. 7th International conference on HIV treatment and prevention adherence; 2012.
24. Kincaid DL. Mass media, ideation, and behavior: a longitudinal analysis of contraceptive change in the Philippines. Communication Res. 2000;27(6):723–63.
25. Kincaid DL, Delate R, Storey D, Figueroa ME. Closing the gaps in practice and in theory. Public Communication Campaigns. 2012;305:305–19.

26. Figueroa ME. A theory-based socioecological model of communication and behavior for the containment of the Ebola epidemic in Liberia. Health Commun. 2017;22(sup1):5–9.
27. Ricotta EE, Boulay M, Ainslie R, Babalola S, Fotheringham M, Koenker H, et al. The use of mediation analysis to assess the effects of a behaviour change communication strategy on bed net ideation and household universal coverage in Tanzania. Malar J. 2015;14:1–8. [PubMed: 25557741]
28. Babalola S Readiness for HIV testing among young people in northern Nigeria: the roles of social norm and perceived stigma. AIDS Behav. 2007;11(5):759–69. [PubMed: 17191141]
29. Granovetter MS. The strength of weak ties. Am J Soc. 1973;78(6):1360–80.
30. Centola D, Macy M. Complex contagions and the weakness of long ties. Am J Soc. 2007;113(3):702–34.
31. McPherson M, Smith-Lovin L, Cook JM. Birds of a feather: homophily in social networks. Ann Rev Sociol. 2001;27(1):415–44.
32. Shrader C-H, Arroyo-Flores J, Stoler J, Skvoretz J, Carrico A, Doblecki-Lewis S, et al. The association between social and spatial closeness with PrEP conversations among latino men who have sex with men. JAIDS. 2021;88(4):366–75. [PubMed: 34342298]
33. Kanamori M, Shrader C-H, Johnson A, Arroyo-Flores J, Rodriguez E, Skvoretz J et al. The association between homophily on illicit drug use and PrEP conversations among latino men who have sex with men friends: a dyadic network and spatially explicit study. Arch Sex Behav. 2021:1–11. [PubMed: 33507424]
34. HIV.gov. What is 'Ending the HIV epidemic: a plan for America'? 2019 [https://www.hiv.gov/federal-response/ending-the-hiv-epidemic/overview]
35. Tobin KE, Yang C, Sun C, Spikes P, Latkin CA. Discrepancies between hiv prevention communication attitudes and actual conversations about HIV testing within social and sexual networks of African American men who have sex with men. Sex Transm Dis. 2014;41(4):221–6. [PubMed: 24622631]
36. R Core Team. R: A language and environment for statistical computing. 2013.
37. Shannon P, Markiel A, Ozier O, Baliga NS, Wang JT, Ramage D, et al. Cytoscape: a software environment for integrated models of biomolecular interaction networks. Genome Res. 2003;13(11):2498–504. [PubMed: 14597658]
38. Burt RS, Knez M. Trust and third-party gossip. Trust Organizations: Front Theory Res. 1996;68:89.
39. Mollica KA, Gray B, Trevino LK. Racial homophily and its persistence in newcomers' social networks. Organ Sci. 2003;14(2):123–36.
40. Friedman SR, Cooper HL, Osborne AH. Structural and social contexts of HIV risk among African americans. Am J Public Health. 2009;99(6):1002–8. [PubMed: 19372519]
41. Charles CZ. The dynamics of racial residential segregation. Ann Rev Sociol. 2003;29(1):167–207.
42. Karimi F, Génois M, Wagner C, Singer P, Strohmaier M. Homophily influences ranking of minorities in social networks. Sci Rep. 2018;8(1):11077. [PubMed: 30038426]
43. US Department of Health & Human Services. US food & drug administration. Truvada for PrEP Fact Sheet: Ensuring Safe and Proper Use. 2012.
44. Sullivan PS, Rosenberg ES, Sanchez TH, Kelley CF, Luisi N, Cooper HL, et al. Explaining racial disparities in HIV incidence in black and white men who have sex with men in Atlanta, GA: a prospective observational cohort study. Ann Epidem. 2015;25(6):445–54.
45. Sullivan PS, Giler RM, Mouhanna F, Pembleton ES, Guest JL, Jones J, et al. Trends in the use of oral emtricitabine/tenofovir disoproxil fumarate for pre-exposure prophylaxis against HIV infection, United States, 2012–2017. Ann Epidem. 2018;28(12):833–40.
46. Bor R, Du Plessis P, Russell M. The impact of disclosure of HIV on the index patient's self-defined family. J Family Therapy. 2004;26(2):167–92.
47. Bor R, Miller R, Goldman E, Kernoff P. The impact of AIDS/HIV on the family: themes emerging from family interviews. Practice. 1989;3(1):42–8.
48. Schneider J, Michaels S, Bouris A. Family network proportion and HIV risk among black men who have sex with men. JAIDS (1999). 2012;61(5):627.

49. Chen Y-T, Duncan DT, Issema R, Goedel WC, Callander D, Bernard-Herman B, 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 Urb Health. 2020;97(5):728–38.
50. Boyd DT, Threats M, Winifred O, Nelson LE. The association between African American father–child relationships and HIV testing. Am J Mens Health. 2020;14(6):1557988320982702. [PubMed: 33356797]
51. Barnett AP, Brown LK, Crosby R, Craker L, Washington R, Burns PA et al. Family-related factors and HIV-related outcomes among Black Young men who have sex with men in Mississippi. AIDS Behav. 2022:1–16.
52. Quinn K, Dickson-Gomez J, Homonegativity. Religiosity, and the Intersecting Identities of Young Black Men Who Have Sex with men. AIDS Behav. 2016;20(1).
53. Schwartz SJ, Weisskirch RS, Hurley EA, Zamboanga BL, Park IJK, Kim SY, et al. Communalism, familism, and filial piety: are they birds of a collectivist feather? Cultur Divers Ethnic Minor Psychol. 2010;16(4):548–60. [PubMed: 21058818]
54. Dickerson BJ, Rousseau N. Ageism through omission: the obsolescence of black women's sexuality. J Afr Am Stud. 2009;13:307–24.
55. Schwartz SJ, Weisskirch RS, Hurley EA, Zamboanga BL, Park IJ, Kim SY, et al. Communalism, familism, and filial piety: are they birds of a collectivist feather? Cult Divers Ethnic Minor Psychol. 2010;16(4):548.
56. Shrader C-H, Duncan DT, Chen Y-T, Driver R, Russell J, Moody R, et al. Latent profile patterns of network-level norms and associations with individual-level sexual behaviors among black sexual and gender minorities assigned male at birth: the N2 cohort study in Chicago. Arch Sex Behav. 2023;1–18. [PubMed: 36344787]
57. Barman-Adhikari A, Rice E, Bender K, Lengnick-Hall R, Yoshioka-Maxwell A, Rhoades H. Social networking technology use and engagement in HIV-related risk and protective behaviors among homeless youth. Health Commun. 2016;21(7):809–17.
58. Kanamori M, De La Rosa M, Shrader C-H, Munayco C, Doblecki-Lewis S, Prado G, et al. Progreso en Salud: findings from two adapted social network HIV risk reduction interventions for latina seasonal workers. Int J Environ Res Public Health. 2019;16(22):4530. [PubMed: 31731821]
59. Weinstein ER, Herrera CM, Pla Serrano L, Martí Kring E, Harkness A. Promoting health equity in HIV prevention and treatment research: a practical guide to establishing, implementing, and sustaining community advisory boards. Therapeutic Adv Infect Disease. 2023;10:20499361231151508.

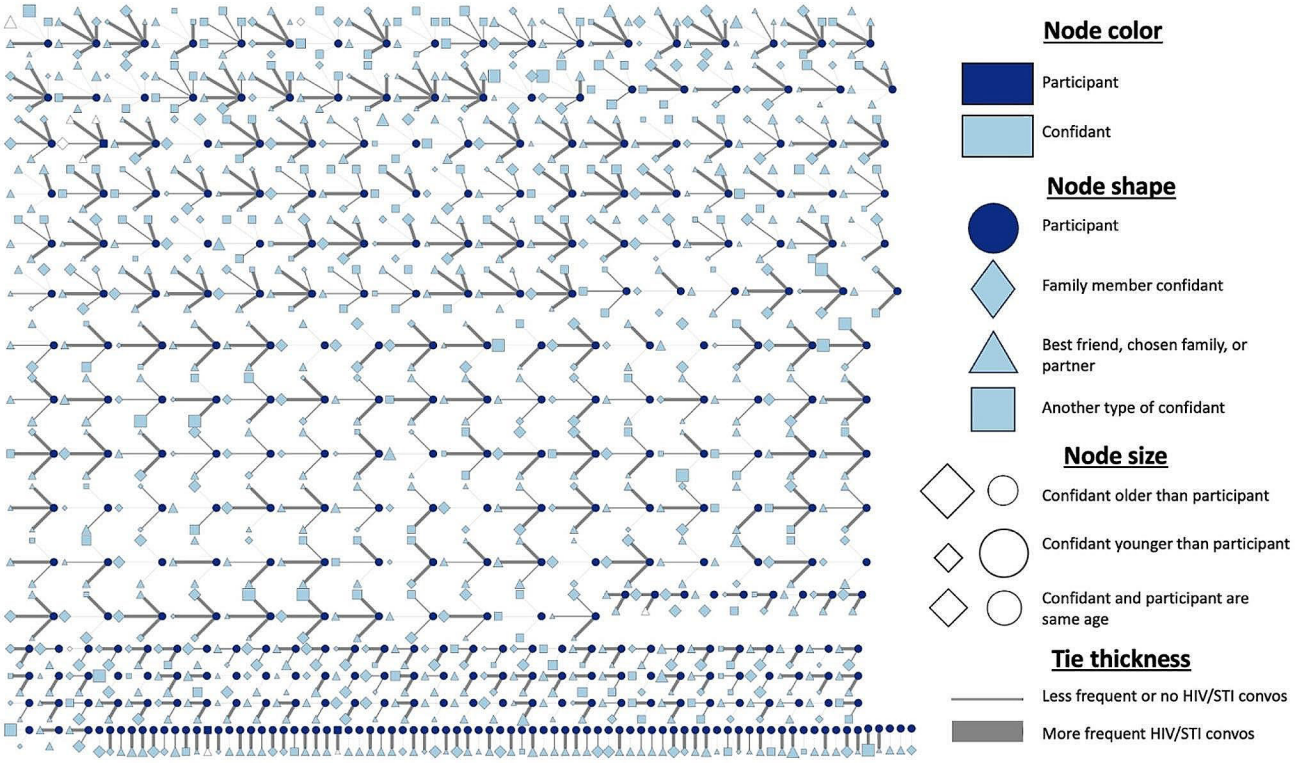


**Fig. 1.**

Egocentric confidant networks of Black SMM and TW in the N2 cohort study, $n = 370$ participants and 987 confidants

**Table 1**

Sociodemographic and background information of Black SMM and TW in the N2 cohort study, $n = 370$

| | **Overall (*N*=370)** |
|---|---|
| Mean age (SD) | 25.8 (4.02) |
| Gender | |
| Cisgender man | 322 (87.0%) |
| Transgender woman | 33 (8.9%) |
| Another gender identity | 15 (4.0%) |
| Sexual identity | |
| Gay/homosexual | 224 (60.5%) |
| Bisexual | 95 (25.7%) |
| Other | 27 (7.3%) |
| Straight or heterosexual | 24 (6.5%) |
| Experienced housing instability | 112 (30.3%) |
| Has high school degree | 320 (86.5%) |
| Employed full time | 185 (50.0%) |
| Income below $20,000 | 243 (65.7%) |

**Table 2**

Confidant information of Black SMM and TW in the N2 cohort study, $n = 987$

| | HIV/STI prevention conversation frequency | | | | | |
|---|---|---|---|---|---|---|
| | **Never (*N*=253)** | **Monthly to less than yearly (*N*=262)** | **Every 2 weeks or more (*N*=472)** | **Overall (*N* = 987)** | **Test statistic** | ***p*-value** |
| **Mean age (SD)** | 25.8 (3.71) | 26.1 (4.39) | 25.6 (3.95) | 25.8 (4.01) | *F = 1.398* | $p = 0.248$ |
| **Age homophily** | | | | | $\chi^2 = 7.347$ | $p = 0.290$ |
| Same age within 3 years | 140 (55.3%) | 144 (55.0%) | 272 (57.6%) | 556 (56.3%) | | |
| Participant is older than alter | 19 (7.5%) | 28 (10.7%) | 31 (6.6%) | 78 (7.9%) | | |
| Participant is younger than alter by 4–14 years | 43 (17.0%) | 46 (17.6%) | 96 (20.3%) | 185 (18.7%) | | |
| Participant is younger than alter by 15 years or more | 51 (20.2%) | 44 (16.8%) | 73 (15.5%) | 168 (17.0%) | | |
| **Black racial identity** | 232 (91.7%) | 244 (93.1%) | 449 (95.1%) | 925 (93.7%) | $\chi^2 = 3.497$ | $p = 0.174$ |
| **Latine ethnic identity** | 17 (6.7%) | 19 (7.3%) | 19 (4.0%) | 55 (5.6%) | $\chi^2 = 6.952$ | Fisher's $p = 0.106$ |
| **Gender** | | | | | $\chi^2 = 9.326$ | $p = 0.053$ |
| Cisgender man | 130 (51.4%) | 127 (48.5%) | 267 (56.6%) | 524 (53.1%) | | |
| Cisgender woman | 106 (41.9%) | 121 (46.2%) | 167 (35.4%) | 394 (39.9%) | | |
| Transgender woman or nonbinary | 17 (6.7%) | 14 (5.3%) | 38 (8.1%) | 69 (7.0%) | | |
| **Relationship type** | | | | | ***$\chi^2 = 39.305$*** | $p < 0.001$ |
| Friend or close friend | 42 (16.6%) | 63 (24.0%) | 53 (11.2%) | 158 (16.0%) | | |
| Best friend | 66 (26.1%) | 66 (25.2%) | 161 (34.1%) | 293 (29.7%) | | |
| Chosen family | 15 (5.9%) | 16 (6.1%) | 36 (7.6%) | 67 (6.8%) | | |
| Family | 89 (35.0%) | 92 (35.1%) | 140 (29.6%) | 321 (32.9%) | | |
| Partner or spouse | 26 (10.3%) | 19 (7.3%) | 67 (14.2%) | 112 (11.3%) | | |
| Other * | 15 (6.1%) | 6 (2.3%) | 15 (3.2%) | 36 (3.3%) | | |
| **Participant and alter had sex** | 28 (11.1%) | 25 (9.5%) | 78 (16.5%) | 131 (13.3%) | ***$\chi^2 = 8.575$*** | $p = 0.014$ |
| **HIV status homophily** | | | | | ***$\chi^2 = 36.943$*** | $p < 0.001$ |
| Both are living with HIV | 19 (7.5%) | 25 (9.5%) | 59 (12.5%) | 103 (10.4%) | | |
| Both are HIV negative | 112 (44.3%) | 137 (52.3%) | 205 (43.4%) | 454 (46.0%) | | |
| Participant and alter have different HIV status | 83 (32.8%) | 89 (34.0%) | 183 (38.8%) | 355 (36.0%) | | |

| | HIV/STI prevention conversation frequency | | | | | |
|---|---|---|---|---|---|---|
| | **Never (*N*=253)** | **Monthly to less than yearly (*N*=262)** | **Every 2 weeks or more (*N*=472)** | **Overall (*N* = 987)** | **Test statistic** | ***p*-value** |
| Participant doesn't know confidant's HIV status | 39 (15.4%) | 11 (4.2%) | 25 (5.3%) | 75 (7.6%) | | |
| **Closeness** | | | | | $\chi^2 = 42.017$ | $p < 0.001$ |
| Not close at all | 4 (1.6%) | 0 (0%) | 0 (0%) | 4 (0.4%) | | |
| Not very close | 8 (3.2%) | 3 (1.1%) | 1 (0.2%) | 12 (1.2%) | | |
| Somewhat close | 60 (23.7%) | 49 (18.7%) | 58 (12.3%) | 167 (16.9%) | | |
| Very close | 181 (71.5%) | 210 (80.2%) | 413 (87.5%) | 804 (81.5%) | | |
| **Communication frequency** | | | | | $\chi^2 = 47.335$ | $p < 0.001$ |
| Daily or more frequently | 119 (47.0%) | 134 (51.1%) | 342 (72.5%) | 595 (60.3%) | | |
| Weekly or several times a week | 100 (39.5%) | 93 (35.5%) | 120 (25.4%) | 313 (31.7%) | | |
| Less frequently than weekly | 34 (13.4%) | 35 (13.4%) | 10 (2.1%) | 79 (8.0%) | | |
| **Frequency of conversations about participant's sex life** | | | | | $\chi^2 = 230.014$ | $p < 0.001$ |
| Never | 98 (38.7%) | 40 (15.3%) | 28 (5.9%) | 166 (16.8%) | | |
| Every 2 weeks or more | 108 (42.7%) | 127 (48.5%) | 400 (84.7%) | 635 (64.3%) | | |
| Monthly to less than yearly | 47 (18.6%) | 95 (36.3%) | 44 (9.3%) | 186 (18.8%) | | |

* other confidant included acquaintance ($n = 3$), boss ($n = 2$), co-worker ($n = 5$), counselor ($n = 3$), ex-romantic partner ($n = 15$), former colleague ($n = 1$), neighbor ($n = 1$), roommate/housemate ($n = 5$), and STI/HIV tester ($n = 1$)

**Table 3**

Multilevel associations of frequency of HIV and STI prevention conversations among Black SMM and TW and their confidant networks

| | Model 1: Outcome referent group = Never | | | | | | Model 2: Outcome referent group = monthly to less than yearly | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Level: Every 2 weeks or more | | | Level: Monthly to less than yearly | | | Level: Every two weeks or more | | | |
| **Characteristic** | **OR[1]** | **95% CI[1]** | ***p*-value** | **OR[1]** | **95% CI[1]** | ***p*-value** | **OR[1]** | **95% CI[1]** | ***p*-value** | **Global p-value** |
| ***Level 2: Participant-level*** | | | | | | | | | | |
| **Age** | 0.98 | 0.93, 1.03 | 0.393 | 1.01 | 0.96–1.07 | 0.594 | 0.96 | 0.92–1.01 | 0.139 | 0.3 |
| **Sexual identity** | | | | | | | | | | 0.056 |
| Gay or homosexual | — | — | | — | — | | — | — | | |
| Bisexual | **1.58** | **1.01, 2.49** | **0.046** | 1.37 | 0.85–2.21 | 0.190 | 1.15 | 0.76–1.76 | 0.508 | |
| Other | 0.54 | 0.26, 1.15 | 0.110 | 1.26 | 0.60–2.64 | 0.534 | 0.43 | 0.21–0.87 | **0.019** | |
| Straight or heterosexual | 1.33 | 0.61, 2.91 | 0.468 | 0.92 | 0.40–2.15 | 0.854 | 1.44 | 0.65–3.21 | 0.368 | |
| **Housing stability** | | | | | | | | | | 0.8 |
| No | — | — | | — | — | | — | — | | |
| Yes | 1.06 | 0.70–1.60 | 0.781 | 0.91 | 0.59–1.42 | 0.692 | 1.09 | 0.70–1.70 | 0.693 | |
| **Employed** | | | | | | | | | | 0.057 |
| Yes | — | — | | — | — | | — | — | | |
| No | 0.62 | 0.42–0.93 | **0.020** | 0.81 | 0.53–1.23 | 0.325 | 1.24 | 0.81–1.88 | 0.325 | |
| **Education** | | | | | | | | | | 0.8 |
| High school or higher | — | — | | — | — | | — | — | | |
| No high school | 0.82 | 0.47–1.42 | 0.479 | 0.90 | 0.50–1.59 | 0.709 | 0.92 | 0.54, 1.58 | 0.8 | |
| **Income** | | | | | | | | | | 0.6 |
| $20,000 or above | — | — | | — | — | | — | — | | |
| Below $20,000 | 1.19 | 0.77–1.83 | 0.433 | 1.25 | 0.79–1.97 | 0.334 | 1.12 | 0.63–1.98 | 0.708 | |
| ***Level 1: Confidant level*** | | | | | | | | | | |
| **Closeness (numerical)** | 1.74 | 1.15–2.63 | **0.008** | 1.65 | 1.10–2.48 | **0.017** | 0.61 | 0.40–0.91 | **0.017** | 0.012 |
| **Sex with alter** | | | | | | | | | | 0.02 |
| No | — | — | | — | — | | — | — | | |
| Yes | 2.35 | 0.90–6.13 | 0.080 | 1.85 | 0.65–5.27 | 0.251 | 0.54 | 0.19–1.54 | 0.251 | |

| Characteristic | Model 1: Outcome referent group = Never | | | | | | Model 2: Outcome referent group = monthly to less than yearly | | | Global p-value |
|---|---|---|---|---|---|---|---|---|---|---|
| | Level: Every 2 weeks or more | | | Level: Monthly to less than yearly | | | Level: Every two weeks or more | | | |
| | OR[1] | 95% CI[1] | *p*-value | OR[1] | 95% CI[1] | *p*-value | OR[1] | 95% CI[1] | *p*-value | |
| **Conversation frequency of sex life** | | | | | | | | | | < 0.001 |
| Never | — | — | | — | — | | — | — | | |
| Monthly to less than yearly | 3.94 | 2.08–7.47 | **< 0.001** | 5.00 | 2.87–8.70 | **< 0.001** | 0.20 | 0.11–0.35 | **< 0.001** | |
| Every 2 weeks or more | 19.98 | 11.16–35.80 | **< 0.001** | 2.95 | 1.73–5.05 | **< 0.001** | 0.34 | 0.20–0.58 | **< 0.001** | |
| **Relationship type of alter** | | | | | | | | | | 0.002 |
| Friend or close friend | — | — | | — | — | | — | — | | |
| Best friend | 1.42 | 0.80–2.53 | 0.230 | 0.48 | 0.27–0.85 | **0.012** | 2.97 | 1.76–5.01 | **< 0.001** | |
| Chosen family | 1.47 | 0.63–3.44 | 0.372 | 0.60 | 0.25–1.45 | 0.253 | 2.47 | 1.13–5.38 | **0.023** | |
| Family | 2.15 | 1.12–4.13 | **0.021** | 0.74 | 0.39–1.40 | 0.353 | 2.91 | 1.62–5.22 | **< 0.001** | |
| Partner or spouse | 0.57 | 0.20–1.64 | 0.297 | 0.30 | 0.09–0.96 | **0.042** | 3.32 | 1.07–10.36 | **0.038** | |
| Another relationship type | 0.99 | 0.36–2.74 | 0.986 | 0.19 | 0.06–0.61 | **0.005** | 2.96 | 1.06–8.24 | **0.037** | |
| ***Level 1: Measures of homophily between confidant and participant*** | | | | | | | | | | |
| **Age homophily with alter** | | | | | | | | | | 0.021 |
| Same age within 3 years | — | — | | — | — | | — | — | | |
| Participant is older than alter by 4 years or more | 0.72 | 0.35–1.47 | 0.364 | 1.45 | 0.71–2.96 | 0.309 | 0.49 | 0.26–0.93 | **0.030** | |
| Participant is younger than alter by 15 years or more | 1.87 | 1.02–3.43 | **0.043** | 0.92 | 0.50–1.69 | 0.783 | 2.04 | 1.14–3.65 | **0.016** | |
| Participant is younger than alter by 4–14 years | 1.38 | 0.84–2.25 | 0.203 | 1.07 | 0.63–1.80 | 0.805 | 1.29 | 0.80–2.06 | 0.291 | |
| **Racial homophily with alter** | | | | | | | | | | 0.021 |
| Alter is not Black | — | — | | — | — | | — | — | | |
| Alter is Black | 2.59 | 1.29–5.21 | **0.008** | 1.47 | 0.72–2.99 | 0.292 | 1.77 | 0.87–3.58 | 0.113 | |
| **Gender homophily with alter** | | | | | | | | | | 0.5 |
| Both cisgender men | — | — | | — | — | | — | — | | |
| Both of trans experience | 1.75 | 0.48–6.38 | 0.397 | 1.01 | 0.23–4.42 | 0.993 | 1.74 | 0.47–6.43 | 0.408 | |
| Not same gender | 0.83 | 0.56–1.23 | 0.361 | 1.07 | 0.71–1.61 | 0.751 | 0.78 | 0.54–1.13 | 0.192 | |
| **HIV status concordance** | | | | | | | | | | 0.001 |
| Both HIV negative | — | — | | — | — | | — | — | | |
| Both living with HIV | 1.70 | 0.87–3.33 | 0.120 | 1.06 | 0.51–2.20 | 0.878 | 1.61 | 0.87–2.97 | 0.130 | |

| Characteristic | Model 1: Outcome referent group = Never | | | | | | Model 2: Outcome referent group = monthly to less than yearly | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Level: Every 2 weeks or more | | | Level: Monthly to less than yearly | | | Level: Every two weeks or more | | | |
| | OR[1] | 95% CI[1] | *p*-value | OR[1] | 95% CI[1] | *p*-value | OR[1] | 95% CI[1] | *p*-value | Global p-value |
| Ego doesn't know HIV status | 0.42 | 0.22–0.82 | **0.011** | 0.26 | 0.12–0.57 | **0.001** | 1.60 | 0.71–3.60 | 0.260 | |
| HIV status discordant | 1.30 | 0.86–1.96 | 0.220 | 0.94 | 0.60–1.46 | 0.775 | 1.38 | 0.93–2.05 | 0.106 | |

[1]OR = Odds Ratio, CI = Confidence Interval