HIV Testing Behaviors among Black Rural Women: The Moderating Role of Conspiracy Beliefs and Partner Status Disclosure

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Objective: This study investigated whether HIV testing attitudes, HIV conspiracy beliefs, and reported sexual partner disclosure of HIV/STI status related to one-month self-report HIV testing outcomes following a brief intervention among Black women aged 18-25 years residing in rural Mississippi.

Participants: Black women (N=119; M_{age}=19.90, SD=1.81) recruited in rural Mississippi completed an online assessment before a brief HIV prevention intervention and a one month follow-up assessment during January to November 2016.

Main Outcome Measures: Self-reported HIV testing 30-days following the intervention, partner HIV/STI status disclosure, beliefs in HIV conspiracy theory, and HIV testing attitudes in pre- and post-intervention assessments. Bivariate and multivariate analyses tested associations with HIV testing behaviors following the intervention.

Results: Moderated moderation was used to examine whether HIV conspiracy beliefs and partner disclosure status both moderated the relationship between pre-intervention attitudes toward HIV testing and HIV testing at 1-month follow-up. It was found that both HIV conspiracy beliefs and partner disclosure moderated the relationship between attitudes and HIV testing at one-month follow-up. When partner disclosure was low, women with more negative attitudes toward testing and higher conspiracy beliefs were less likely to get tested than those with negative attitudes and lower conspiracy beliefs; conspiracy beliefs did not relate to testing outcomes when testing attitudes were positive.

Conclusion: Findings suggest that interventions may benefit from accounting for conspiracy beliefs and the dyadic status disclosure when encouraging young rural women to test for HIV. *Ethn Dis*. 2020;30(2):251-260; doi:10.18865/ed.30.2.251

Keywords: HIV Testing; Testing Attitudes; Black Women; Rural South; Partner Status Disclosure; HIV Conspiracy Beliefs

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Introduction

Despite CDC recommendations that all individuals aged ≥13 years be routinely screened for HIV, less than one-third of young adults who have had unprotected sex report never testing for HIV.[1] Widespread HIV testing is critical for HIV prevention, particularly in the rural, Southern United States. The South is now the epicenter of the HIV epidemic and experiences the greatest burden of HIV diagnoses.[2] Although the South constitutes only 37% of the US population, the region accounts for 52% of new HIV diagnoses, 48% of new AIDS diagnoses, and 43% of all HIV positive persons in the country.[2,3] These rates are particularly high among Southern, rural, Black women, who have the highest rate of new HIV diagnoses compared with other ethnic and racial minority women.[3] In line with this disparity, findings suggest that approximately 17% of Black youth are unaware of their HIV status. As a result, research is needed to address the public health concern of HIV testing among Southern, rural Black women.

Some research suggests concerns regarding HIV testing behaviors may be addressed, in part, by examination of HIV testing attitudes in this population,[4] as well as factors that might interact with HIV testing attitudes to produce engagement in HIV testing. Existing findings highlight a significant relationship between HIV testing and disclosure of HIV status to sexual partners[5]; this is particularly important for women, who tend to disclose their HIV status more than men.[6] Lastly, some inquiry has demonstrated connections between HIV testing attitudes and HIV conspiracy beliefs of Black Americans.[7] These important factors, to our knowledge, have never been explored in conjunction. Thus, our current study examined whether partner disclosure status and HIV conspiracy beliefs conjointly moderated the re-

lationship between HIV testing attitudes and HIV testing behaviors.

Attitudes toward HIV Testing

Previous research highlights that, although Black emerging adults, aged 18-25 years, are more likely to get tested for STIs than any other racial group,[8] a majority of Black individuals are unaware of their HIV status.[1]

Our study examined whether partner disclosure status and HIV conspiracy beliefs conjointly moderated the relationship between HIV testing attitudes and HIV testing behaviors.

These results suggest a need for increased HIV testing among Black people, necessitating the examination of factors that might impact testing behaviors. One prominent factor is HIV testing attitudes, any positive and negative beliefs about being tested.[9,10] Previous research suggests that testing attitudes significantly influence HIV testing behaviors. These findings demonstrate that individuals with more positive testing attitudes are more likely to be tested for HIV in their lifetimes, while those with negative attitudes are less likely to have ever been tested.[11,12] Moreover, knowing the results of an HIV test were significantly connected to HIV testing attitudes. Those who learned the results of their test, regardless of whether the test was positive or negative, held more positive testing attitudes than those who do not know the results of their test.[11] These extant findings point to significant relationships between HIV testing attitudes and testing behaviors and demonstrate the importance of learning one's results. Additionally, learning one's HIV status is imperative, as having this knowledge is a necessary part of HIV status disclosure to one's sexual partners.

HIV Status Disclosure

HIV status disclosure, discussing one's STI/HIV status prior to engaging in sex, is an important aspect of partner communication leading to informed decisions about condom use and other preventative strategies. Much research has focused on disclosure by people living with HIV[13,14] or those living in African countries.[15] Research focused on partner communication has found that HIV/STI disclosure is related to protective sexual behaviors, including HIV/STI testing,[16,17] PrEP use among people living with HIV,[18] and condom use.[19–22] Despite the breadth of the existing literature, more research is needed to examine the relationship between status disclosure and HIV testing attitudes and behaviors in a rural, Southern, Black population. Additionally, in order to capture unique factors that may affect this relationship, research on cultural norms and beliefs about HIV must be assessed, such as HIV conspiracy theory beliefs.

HIV Conspiracy Theory Beliefs

HIV conspiracy beliefs refer to ideas about the etiology, spread, and treatment of HIV, including ideas that HIV was created to exterminate Black individuals and that HIV testing and treatment are two modes by which HIV is spread to Black communities.[23,24] They are related to medical inequalities, stemming from a history of discrimination and exploitation of communities of color by medical researchers and subsequent health care distrust experienced by Black Americans.[23] Previous research has found that high endorsement of conspiracy beliefs is associated with negative outcomes, such as less condom usage.[7] While some studies have linked increased endorsement of HIV conspiracy beliefs to more negative HIV testing attitudes,[25] fewer have examined how these beliefs can influence actual testing behaviors. The limited extant work has demonstrated significant connections between conspiracy belief endorsement and HIV testing behaviors for Black individuals, such that those scoring higher in these beliefs were less likely to have been tested for HIV.[26,27] However, despite increased HIV conspiracy belief endorsement among Black individuals,[23,24] limited research has examined conspiracy beliefs among rural, Southern, Black women.

Existing work has demonstrated independent connections between factors significantly related to HIV testing behaviors, including HIV testing attitudes,[11,12] HIV status disclosure,[16,17] and HIV conspiracy beliefs.[26,27] However, limited study has examined how these variables interact to facilitate or impede individuals' engagement in HIV testing. Less work still has examined these relationships among Southern, rural, Black women, who have the highest rates of new HIV diagnoses among women.[3] To fill gaps in our knowledge, our current study investigated whether attitudes toward HIV testing, HIV conspiracy beliefs, and reported sexual partner HIV/STI status disclosure influenced HIV testing outcomes following a brief intervention among rural, Black women, aged 18-25 years, residing in Mississippi.

Purpose and Hypotheses

Our current study adapted a CDC-endorsed evidenced-based intervention titled "Video Opportunities for Innovative Condom Education and Safer Sex" (VOICES/VOCES).[28,29] VOICES is an evidenced-based, single session group-level intervention designed to increase HIV knowledge, enhance partner communication around condom use, and increase consistent condom use among Black and Latino men and women.[30–33] The adaptation involved disseminating the intervention using primarily a web-based model, providing online resources for HIV and STI testing and counseling, and offering HIV self-testing kits.

In order to increase HIV preventive behaviors and HIV testing, it is imperative to examine factors influencing HIV testing attitudes and testing behaviors. As past research shows that HIV testing attitudes influence HIV testing behaviors, we predicted that HIV testing attitudes would be significantly related to participants' self-reported HIV testing behaviors at one-month post intervention assessment. Further, partner HIV/STI status disclosure is also related to HIV testing behaviors. People who disclose their status and ask about their partner's status are more likely to test for HIV. Conversely, those with conspiracy beliefs generally believe that catching HIV is unavoidable, as belief in conspiracy theories would also be related to participants' self-reported HIV testing behaviors at one-month post-intervention assessment. Finally, as partner disclosure status and conspiracy beliefs have been linked to both testing attitudes and testing behaviors, we predicted that both partner status and HIV conspiracy theory beliefs would facilitate the link between HIV testing attitudes and reported HIV testing behaviors at one-month post intervention assessment. Women who reported lower HIV testing attitudes, those who reported lower partner disclosure and higher conspiracy beliefs would be less likely to report post intervention HIV testing at one-month follow-up.

Method

Participants

A community-based study group was recruited from social media, flyers posted in town, newspaper ads, or word-of-mouth targeted to heterosexual Black women residing in three rural counties in Mississippi. Eligible participants were then directed to the online survey if inclusion criteria were met; criteria included: self-identification as being a woman, Black, and between the ages 18 and 25. Additionally, participants had to report heterosexual sexual activity since this was one of the primary modes of HIV/STI transmission among Black emerging adult women. Black women who reported never having voluntary vaginal sexual intercourse (n= 8), and not having access to the internet using a personal computer or mobile device (n=1), were excluded from the study. Of 133 eligible individuals invited to participate, 124 (93%) indicated interest in participating. A total of 124 Black women completed pre-intervention assessment and participated in the VOICES intervention session. Five women did not complete the one-month post-intervention assessment; thus the final study group included 119 Black women.

Measures

Self-reported HIV Testing at 1-Month Follow-Up

One question was used to assess whether participants had been tested for HIV in the past month. Response options were 1 (Yes) and 2 (No).

Partner Disclosure of STI and HIV Status

One question assessed whether an individual's sexual partners had revealed their HIV/STI status to them. Response options were on a four-

point Likert scale that included: 1 (All of them); 2 (Most of them); 3 (Some of them); and 4 (None of them). Higher scores indicate less disclosure.

HIV Testing Attitudes

The HIV Attitudes Scale[12] is a 22-item measure assessing an individual's HIV testing attitudes. Items include questions about attitudes toward HIV tests in general, attitudes toward those who get tested, and perceptions of others' testing attitudes. This measure uses a five-point Likert-type scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). An example item is, "HIV antibody testing is not really confidential." Higher scores indicate more positive HIV testing attitudes, while lower scores indicate more negative attitudes.

HIV/AIDS Conspiracy Theory Beliefs

The HIV Conspiracy Theory Scale[23] was used. This scale included 21 items and evaluated the HIV conspiracy theory beliefs individuals hold. The items use a seven-point Likert-type scale ranging from 1 (Strongly Disagree) to 7 (Strongly Agree). Example item: "HIV was created and spread by the CIA." Higher scores on this measure indicate a greater belief in HIV/AIDS conspiracy theories.

Demographics

The study contained demographic questions that assessed biological sex, race/ethnicity, age, sexual orientation, gender identity, relationship status, and pregnancy history. Participants also reported ever having an STI and if they had ever been tested for HIV prior to participating in the study.

Procedure

This study was approved by the university's institutional review board (IRB) and all procedures followed were in accordance with the ethical standards of the IRB and the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants included in the study. Each participant read and signed an electronic informed consent document prior to engaging in study activities. Interested individuals were screened online or by program staff. Those who met the criteria were given a brief description of the study and asked if they were interested in participating. Interested women were then asked to complete a consent form and a brief recruitment survey, demographic information, and a participant contact form. After completing the consent form and contact form, further information was given about how to complete the pre-test assessment, incentives, and intervention scheduling. All surveys were completed online via the website Qualtrics.

Once the screening and consenting process was complete, all participants were then asked to complete an online pre-intervention assessment of their sexual risk behaviors and were scheduled to participate in the intervention in small groups, no larger than 8 participants. The intervention sessions were conducted within two weeks of completing the pre-test assessment. One month after completing the intervention session, participants were asked to complete follow-up assessments. Participants were provided a total of $75 for their participation.

Statistical Analysis

The associations between HIV testing behaviors, HIV testing attitudes, partner disclosure of HIV/STI status and HIV conspiracy beliefs were tested via SPSS v.25. (Table 1). Preliminary analyses were conducted to screen data for outliers and violations of assumptions of logistic regression all were met. Logistic regressions tested associations between testing attitudes and behaviors and partner disclosure and testing behaviors. The moderation model and the moderated moderation were assessed using PROCESS macro v3.3.[34] Each logis-

Table 1. Bivariate correlations of variables of interest

	M (SD)	α	1	2	3	4	5
1. HIV testing at 1-month	1.51(.50)	--	1				
2. HIV testing attitudes	3.87(.51)	.83	-.26[b]	1			
3. HIV conspiracy beliefs	3.40(1.07)	.93	-.07	-.23[a]	1		
4. Partner disclosure	2.38 (1.31)	--	.29[b]	-.24[b]	.16	1	
5. Lifetime HIV testing	1.82(.39)	--	.48[b]	-.28[b]	-.02	.36[b]	1

a. P<.05.
b. P<.01.

tic regression and moderation controlled for HIV testing history. HIV testing history was controlled for because individuals who have been tested in the past, regardless of results, are more likely to test for HIV in the future. Thus, HIV testing history may have had an impact on our findings.

Results

A total of 124 Black women (M_{age}= 19.90, SD=1.81) completed pre-intervention assessment and participated in the VOICES intervention session. Five women did not complete the one-month post-intervention assessment; thus, the final sample included 119 Black women. More than half of the participants (56%) reported being in a committed relationship, (31%) reported being in a casual relationship, and (13%) reported being single. The majority of participants (n=103; 85%) reported planning to use a condom the next time they had sex, and (73; 60%) of women reported using condoms consistently. Twenty-four women (20%) reported contracting an STI in their lifetime, and 38 women (31%) had been tested for HIV. Twelve women reported ever being pregnant, two reported having at least one child, and none of the women reported being pregnant or were trying to conceive a child at the time of the study. Approximately 30 (25%) had completed some college, 13 (19%) had an associate's degree or technical degree, and nine (13%) had a bachelor's degree. The majority of the women (n=92; 76%) were employed.

Logistic regression controlling for HIV testing history, found that HIV testing attitudes were significantly related to self-reported HIV testing behavior. In the sample, the overall model was statistically significant, $\chi^2(2)=24.74$, P<.001. The Nagelkerke pseudo R^2 suggested that the model accounted for approximately 30.3% of the total variance in HIV testing behavior. In the model, lifetime HIV testing was significantly related to post-intervention HIV testing behavior, such that those who had tested before were 10.05 times more likely to have reported testing after the intervention (P<.001; b=2.31; OR=10.05, 95%CI=3.06, 32.99). Beyond HIV testing history, a one-point decrease in HIV testing attitudes scores was associated with .13 times less likelihood of reporting HIV testing at 1-month follow-up (P=.002; b=-2.07; OR=.13, 95%CI=.03, .48).

We also found that partner HIV/STI status disclosure was significantly related to self-reported HIV testing behavior at one-month follow-up, χ^2 (2) = 24.41, P<.001. The Nagelkerke pseudo R^2 suggested that the model accounted for approximately 30.1% of the total variance in HIV testing behavior. In the model, lifetime HIV testing was significantly related to post-intervention HIV testing behavior, such that those who had tested before were 8.12 times more likely have reported testing after the intervention (P<.001; b=2.09; OR=8.12, 95%CI=2.58, 25.52). Beyond HIV testing history, a one-point increase in partner disclosure status scores (higher scores mean less disclosure) was associated with 2.22 times less likelihood of reporting HIV testing at 1-month follow-up (P=.003; b=.80; OR=2.22, 95%CI=1.31, 3.77).

Controlling for HIV testing history, results revealed that partner disclosure of HIV/STI status moderated the link between HIV testing attitudes and self-reported HIV testing at one-month follow-up (B[SE]=-2.52(.96), Nagelkerke pseudo R^2=.49, z=-2.61, P=.009). To interpret the statistically significant moderation effect, we used Hayes's PROCESS v3.3[34] Johnson-Neyman and bootstrap analysis (Figure 1). This procedure used 5,000 bootstrapped samples, drawn with replacement, from our sample. For Black women with lower partner HIV/STI status disclosure (1 SD above the mean of partner disclosure), HIV testing attitudes was significantly and negatively associated with HIV testing behaviors (b=-7.43, 95%CI [-12.29, -2.57], z=-3.00, P=.003). For Black women with higher partner HIV/STI status disclosure (1 SD below the mean of partner disclosure), HIV testing attitudes was not significantly associated with self-reported HIV testing at one-month follow-up (b=-.84, 95%CI [-2.32, .64], z=-1.11, p=.27). Results also revealed that, after controlling for HIV testing history, both HIV testing attitudes (B[SE]= -4.14(1.33), P=.002) and partner disclosure of HIV/STI status (B[SE]=1.72(.61), P=.005) were significantly related to self-reported HIV testing at one-month follow-up.

Controlling for HIV testing history, results revealed that HIV conspiracy beliefs and partner disclosure of HIV/STI status conjointly moderated the relation between HIV testing attitudes and self-reported HIV testing at one-month follow-up (B[SE]=-3.15(1.44), Nagelkerke pseudo

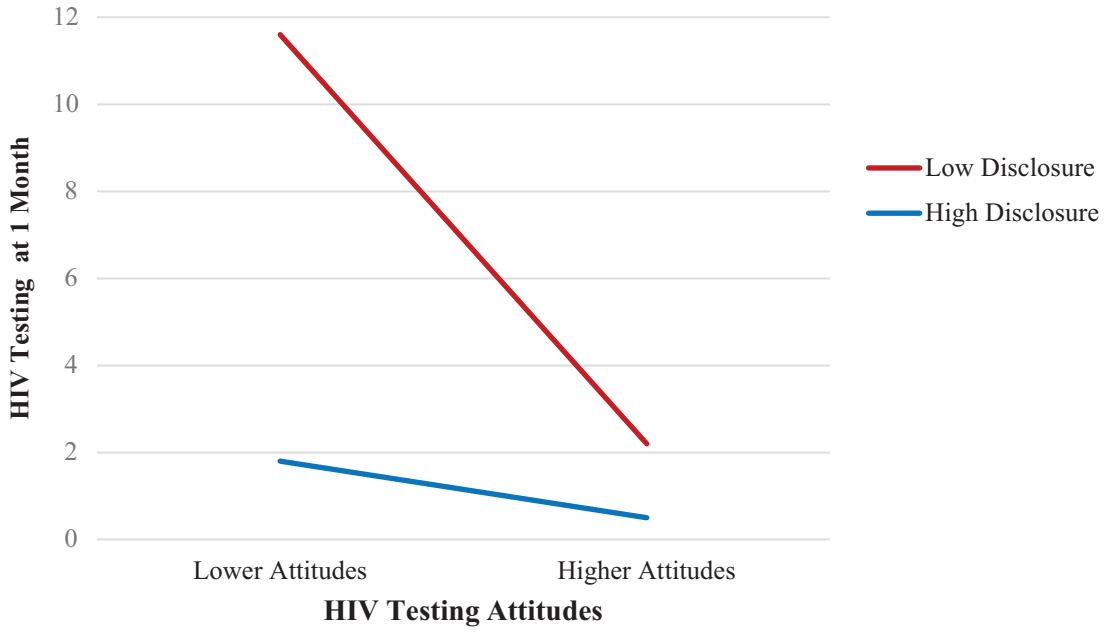

Figure 1. HIV/STI partner status disclosure on HIV attitudes and HIV testing relationship
Lower scores = self-reported HIV testing at 1 month follow-up.

R^2=.59, z=-2.19, P=.03). To interpret the statistically significant moderated moderation effect, we used Hayes' PROCESS v3.3[34] Johnson-Neyman and bootstrap analysis (Table 2 and Figure 2). This procedure used 5,000 bootstrapped samples, drawn with replacement, from our sample. For Black women with lower partner HIV/STI status disclosure and higher HIV conspiracy beliefs, HIV testing attitudes were significantly and negatively associated with HIV testing behaviors (b=-16.70, 95%CI [-29.04, -4.36], z=-2.65, P=.008). For Black women with lower partner HIV/STI status disclosure and lower HIV conspiracy beliefs, HIV testing attitudes were not significantly associated with self-reported HIV testing at one-month follow-up (b=-2.13, 95%CI [-7.66, 3.40], z=-.75, P=.45). For Black women with higher partner HIV/STI status disclosure and both higher and lower conspiracy beliefs, HIV testing attitudes were not significantly associated with self-reported HIV testing at one-month follow-up (b=.13, 95%CI[-2.30, 2.57], z=.11, P=.91) and (b=-3.08, 95%CI [-6.93, .77], z=-1.57, P=.12) respectively.

Discussion

This study investigated whether attitudes toward HIV testing, HIV conspiracy beliefs, and reported sexual partner disclosure of HIV/STI status were related to one-month self-report HIV testing outcomes following a brief intervention among rural 18-25-year-old Black women, residing in Mississippi. Results revealed that when partner disclosure was low, women with more negative testing attitudes and higher conspiracy beliefs were less likely to have tested at the one-month follow-up than those with negative attitudes and lower conspiracy beliefs. Additionally, when partner disclosure was high, HIV conspiracy beliefs did not influence testing outcomes, regardless of HIV testing attitudes. The influence of conspiracy beliefs on testing outcomes at different levels of partner status disclose may be attributed to a partner-driven testing motivation. That is, partner status disclosure may serve as high motivation for women to get tested regardless of their beliefs or attitudes toward testing. When Black women endorse HIV conspiracy beliefs and have negative attitudes but engage with partners that disclose their status, they may be more likely to get tested in order to be able to disclose their status as well or appease their partner's de-

sire to know. In contrast, women who do not have partners who frequently disclose their status and have high beliefs in HIV conspiracy theories and negative attitudes, may be less motivated to get tested given their partner has not shared their status.

Our current study builds on previous research that connects HIV conspiracy theory beliefs to both HIV testing attitudes and HIV testing behaviors. First, our results confirm previous research showing how a significant relationship between HIV conspiracy beliefs plays an important role in relationship between attitudes related to testing behaviors.[25] Moreover, these findings build on previous research that demonstrated connections between HIV conspiracy theory beliefs and HIV testing behaviors.[26,27] Our findings show that HIV conspiracy beliefs are particularly influential on HIV testing behaviors when Black women have low partner status disclosure, especially when they also have more negative HIV testing attitudes. These results indicate the importance of HIV conspiracy beliefs when considering the HIV testing behaviors for women who may already be at risk due to negative testing attitudes and less HIV-related disclosure from their sexual partners.

These findings suggest the importance of addressing HIV disclosure and HIV conspiracy beliefs in prevention interventions, as few HIV interventions account for conspiracy beliefs or the importance of dyadic status disclosure on testing outcomes. Many interventions focus on partner communication regarding prevention,[28,29,35] namely addressing partner condom refusal

Table 2. Moderated moderation analysis assessing HIV conspiracy beliefs and partner disclosure on attitudes and testing relationship

	B	SE	z	P
HIV testing attitudes	-5.44	1.79	-3.04	.00[a]
HIV conspiracy beliefs	1.02	.77	1.32	.19
Partner status disclosure	2.20	.77	2.86	.00[a]
Attitudes X conspiracy beliefs	-2.63	1.70	-1.55	.12
Attitudes X partner disclosure	-3.03	1.22	-2.48	.01[b]
Conspiracy beliefs X partner disclosure	1.80	.71	2.55	.01[b]
Attitudes X conspiracy beliefs X partner disclosure	-3.15	1.44	-2.19	.03[c]
Lifetime HIV testing history	3.42	.96	-3.59	.00[b]

χ^2=6.23; *P*=.01 Nagelkerke pseudo R^2=.59.
a. P<.001.
b. P<.05.
c. P<.01.

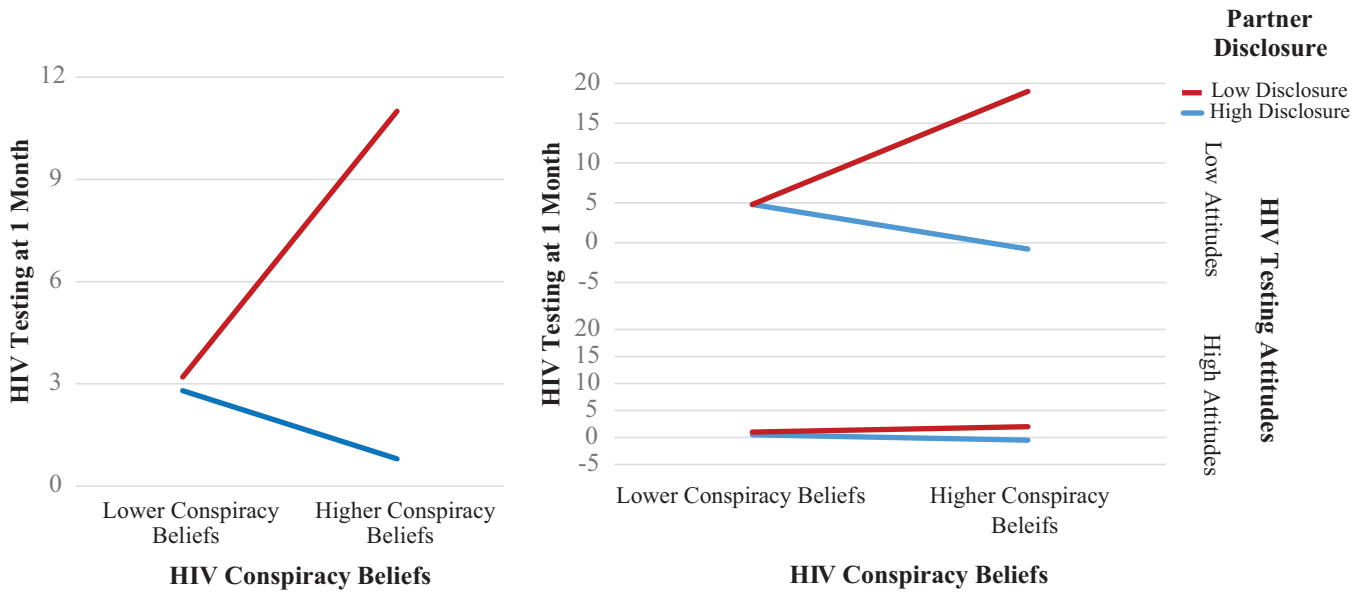

Figure 2. HIV conspiracy beliefs and partner disclosure on attitudes and testing relationship
Lower scores = self reported HIV testing at 1 month follow-up

through role-playing and efficacy building. Women have mentioned that partners use similar strategies for HIV/STI testing and disclosure refusal as condom refusal. These include statements such as "You must be doing something if you are so worried about HIV" or changing the subject by stating "If you loved me, you would not worry." Thus, similar communication techniques could be used to build efficacy surrounding routine testing and status disclosure.

Results revealed that when partner disclosure was low, women with more negative testing attitudes and higher conspiracy beliefs were less likely to have tested at the one-month follow-up than those with negative attitudes and lower conspiracy beliefs.

In addition to integrating communication techniques to promote testing and HIV/STI status disclosure, interventions should focus on debunking HIV conspiracy beliefs as a means of increasing testing motivation and subsequently result in increased testing. With a more nuanced understanding of the roles of conspiracy beliefs and partner HIV/STI status disclosure, intervention programs can better impact rural emerging adult Black women's testing behaviors. Specifically, decreasing conspiracy beliefs may serve as one way to improve attitudes toward HIV testing, which scholars[25] identify as being instrumental testing behaviors within this population.

Study Limitations

The study findings provide insight into factors influential in testing behaviors among young adult Black women and should be considered with some limitations. First, more than half of our sample (56%) reported being in a committed relationship and 31% reported being in a casual relationship. The variation in relationship status among our sample may influence status disclosure. It is possible that women in relationships that they believe to be mutually committed or sexually monogamous may not place high value in status disclosure after being in a relationship for an extended period of time. Future research should expand our current study by examining differences in testing behaviors between Black women in various relationship statuses, namely people who are in a committed sexually monogamous relationship and those in casual non-monogamous relationships. It would be important to further assess whether attitudes and testing relation differs based on relationship type and length. Additional insight into these differences will provide further information on ways to target prevention intervention methods that consider the influence of relationship dynamics, given heterosexual sexual activity is one of the primary methods of HIV/STI transmission among Black emerging adult women.[1]

Additionally, the single-item status disclosure question assessed if a participant's partners disclosed their status to them, implying that status disclosure could have been at any point in their relationship. While this provides important information about general disclosure patterns, it does not capture possible distinctions of long-term sexual relationships, like decreased condom use. Future research should examine how often, and at which points in women's sexual relationships, their partners disclosed their status. This will provide a better understanding of which disclosure moments/points are most influential in testing behaviors.

Conclusions

Our current research suggests that HIV conspiracy beliefs are impactful on HIV testing behaviors particularly when rural, heterosexual, young adult Black women have more negative attitudes and less frequent partner status disclosures. By debunking conspiracy beliefs and incorporating partner disclosure communication techniques in prevention and intervention programs, testing behaviors may improve, which is pivotal in early detection and treatment.

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Conflict of Interest

No conflicts of interest to report.

Author Contributions

Research concept and design: Hood, Belgrave; Acquisition of data: Hood, Hall, Owens, Patev; Data analysis and interpretation: Hood; Manuscript draft: Hood, Hall, Owens, Belgrave; Statistical expertise: Hood; Acquisition of funding: Hood; Administrative: Hall, Owens, Patev, Belgrave

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