



Family-Related Factors and HIV-Related Outcomes Among Black Young Men Who Have Sex with Men in Mississippi

Andrew P. Barnett^{1,2} · Larry K. Brown^{1,2} · Richard Crosby³ · Lacey Craker^{1,5} · Rodney Washington⁴ · Paul A. Burns⁴ · Leandro A. Mena^{4,6}

Accepted: 1 October 2022 / Published online: 1 November 2022

© The Author(s), under exclusive licence to Springer Science+Business Media, LLC, part of Springer Nature 2022

Abstract

Given their disproportionate HIV incidence, there is a critical need to identify factors related to HIV risk among Black young men who have sex with men (YMSM) in the southeastern United States. This study investigated the association of family factors and HIV-related outcomes among Black YMSM in Mississippi ages 14–20 ($n = 72$). Multivariable regression models evaluated associations of family factors and outcomes. Greater parent/child communication about sex was associated with fewer lifetime male sex partners and lower odds of lifetime anal sex. Greater parental monitoring was associated with greater likelihood of future condom use. Sexual orientation disclosure was associated with more lifetime male sex partners. Parental monitoring and parent/child communication about sex were protective, suggesting that family-based interventions are promising for HIV prevention among Black YMSM in Mississippi. Results also indicated that YMSM who are “out” to family are important to reach, and families could be useful in encouraging healthy behaviors.

Keywords Black young men who have sex with men · Parent child communication about sex · Parental monitoring · HIV risk behavior · Sexual risk behavior

Portions of these findings were presented as a poster at the Society for Prevention Research 2022 annual meeting, 31 May to 3 June, 2022, Seattle, Washington, United States.

✉ Andrew P. Barnett
andrew_barnett@brown.edu

¹ Bradley/Hasbro Children’s Research Center, Rhode Island Hospital, 1 Hoppin Street, Suite 204, Providence, RI 02903, USA

² Department of Psychiatry and Human Behavior, Warren Alpert Medical School of Brown University, Providence, RI, USA

³ Department of Health, Behavior, and Society, University of Kentucky, Lexington, KY, USA

⁴ Department of Population Health Sciences, University of Mississippi Medical Center, Jackson, USA

⁵ Present Address: Division of Prevention Science and Community Health, Department of Public Health Sciences, University of Miami Miller School of Medicine, Miami, FL, USA

⁶ Present Address: Division of STD Prevention, Centers for Disease Control and Prevention, Atlanta, GA, USA

Introduction

Black or African American young men who have sex with men (hereafter referred to as “Black YMSM”) living in Mississippi are at particularly high risk for HIV infection. In 2019, sexual behavior between males accounted for 81% of new HIV infections among 13–24-year-olds nationally [1], and more than half of these cases were among Black YMSM. In Mississippi, the prevalence of HIV among MSM is twice the national rate (23% vs. 11%) [2], and Black MSM are five times as likely to be infected with HIV as their White counterparts [3]. Given their acute vulnerability, there is a critical need to identify the factors that predict HIV risk behavior among Black YMSM in Mississippi.

According to the social personal framework, parents are important influences on adolescents’ sexual risk behavior through parenting practices such as communicating with their child about sex and monitoring their child’s whereabouts, activities, and peers [4]. Previous studies have applied this framework to Black adolescents in observational [5] and intervention studies [6, 7]. Aligning with this theory, research with presumably majority heterosexual adolescents indicates that parent/child communication about sex [8] and

parental monitoring are protective [9]. Findings have also supported that parent/child communication about sex is associated with better sexual health outcomes among likely predominantly heterosexual samples of Black adolescents and emerging adults [10–12], and parent-based interventions targeting such communication have been effective in reducing sexual risk for Black and Hispanic or Latino/a/x adolescents [13].

Nonetheless, the relationship between parenting practices and adolescent sexual behavior may differ significantly for Black YMSM. The minority stress model for sexual minority populations [14] holds that sexual minority individuals experience additional stressors on the basis of their sexual minority status. For YMSM, such stressors can include their family rejecting them based on their sexual orientation, which may place a strain on the parent/child relationship in mild cases or lead to the son's separation from the family in more extreme ones (see [15] for a review). Whether a YMSM is "out" to his parents may shape whether he tells them about his social activities and how effectively parents monitor his behavior. At the same time, in many families, parents likely remain a significant influence on YMSM's behavior, particularly for those young men living at home.

The extant research on parent/child communication about sex and YMSM largely supports the premise that it is protective with respect to sexual health outcomes. YMSM in a qualitative study reported that conversations with their parents about topics such as condoms and HIV influenced their sexual behavior [16], and parent/child communication about sex has been associated with less condomless anal sex for YMSM [17]. There is also evidence that parent/child communication about sex is related to other HIV prevention behaviors, specifically that more frequent communication about sex with men is associated with HIV testing [18] and that greater comfort with parent/child communication about sex is associated with pre-exposure prophylaxis (PrEP) use [19]. However, one study found no association between parent/child communication about sex and sexual behavior among YMSM and that more communication was associated with greater likelihood of condomless anal sex among sexually active YMSM [20], indicating the need for more research on these links.

The growing body of literature on parental monitoring and YMSM's sexual behavior has produced somewhat inconsistent results. There is evidence that when parents are more knowledgeable about their son's activities and whereabouts, exercise greater control, enforce rules, and engage in more supervision, YMSM report better sexual health outcomes [21, 22]. Other findings suggest no relationship between parental knowledge and monitoring and sexual behavior [20, 21], and more parental inquiries about the son's free time has been associated with greater likelihood of sexual activity [22]. These findings do not follow a clear

pattern, which may be due to unique challenges parents of YMSM face in effective monitoring, such as being unsure about whether their child's same-sex peers are friends or dating partners [23] and not knowing how to set limits for common teenage activities [24]. As a whole, results from the extant literature suggest that parental monitoring is likely related to sexual behavior for YMSM and point to the need for more such investigations to establish more definitive conclusions about this relationship.

Understanding the relationship between parenting practices and HIV risk behavior among YMSM also requires accounting for the potential contribution of family-based stress related to sexual minority status [14]. For YMSM, concealing their sexual orientation from their parents and/or their parents' negative reaction to their "coming out" may be sources of sexual minority-based stress, which can lead to negative health outcomes, including HIV risk behavior [14]. There is evidence that parental rejection is associated with HIV risk behavior [25] and that maternal acceptance is protective with respect to sexual health outcomes [26]. Previous research also found that being out to one's parents is associated with recent sexual activity [22] and HIV risk behavior for YMSM [22, 26], which may indicate that YMSM who are more open about their sexual orientation in their family are also more open in other contexts and thus more likely to seek and find sexual partners.

Further research is needed to clarify the disparate findings on the association of family factors and HIV risk behavior among YMSM and to shed light on whether they extend to Black YMSM in the southeastern United States (hereafter referred to as "the South"). Although previous quantitative research on parenting factors and sexual behavior among YMSM has been conducted with racially and ethnically diverse samples [18, 20–22, 26], none have been conducted with samples consisting entirely of Black young men. Furthermore, no known previous studies have used samples exclusively recruited from the South, a region that is highly religious [27, 28], has relatively few legal protections for sexual and gender minority populations [29], and in which parenting styles differ from other areas of the U.S. [27, 30]. Previous research supports that religiosity can influence parent/child communication about sex for sexual minority adolescent males [31], and all of these cultural factors may shape how parenting practices relate to sexual health outcomes for Black YMSM. Given the high incidence of HIV infections among Black YMSM [1] and the high prevalence of HIV among MSM in the South [2], understanding the influence of parenting factors on HIV risk behavior among Black YMSM from the South in particular is critical to preventing new HIV infections among this vulnerable group.

In the present study, we seek to fill this gap in the literature by investigating the relationship of parenting factors and HIV risk and prevention behaviors among Black

YMSM in Mississippi. We hypothesize that more parent/child communication about sex and parental monitoring will be associated with less HIV risk behavior (lifetime anal sex and lifetime male sexual partners) and more HIV prevention behavior (greater likelihood of future condom use and lifetime HIV testing). We also investigate whether communication about specific topics relevant to Black YMSM's sexual health (HIV/AIDS, condoms, and HIV testing) are associated with HIV prevention and risk behaviors, when accounting for general communication with parents about sex.

In addition, we evaluate the contribution of disclosure of sexual orientation to family and family acceptance in predicting HIV risk and prevention behaviors among Black YMSM in Mississippi. We hypothesize that more parental acceptance will be associated with less HIV risk behavior and more prevention behaviors and that more disclosure will be associated with more HIV risk behavior. Our analyses on the relationship between disclosure and HIV prevention behaviors are exploratory. Finally, given that knowledge about HIV and prevention practices may be antecedents to HIV risk and prevention behaviors [32, 33], we examine the association of parenting factors and knowledge of HIV and PrEP among YMSM. We hypothesize more parent/child communication about sex and more parental monitoring will be associated with more knowledge about HIV and PrEP. Our analysis of the relationship between disclosure and family acceptance and HIV-related knowledge outcomes is exploratory.

Method

Eligibility

The present study was a secondary analysis of the baseline assessment for MyStyle (ClinicalTrials.gov ID: NCT03487796), a family-based HIV prevention intervention for non-heterosexual Black adolescent males ages 13 to 20. Study protocol was approved by the Institutional Review Boards of the hospitals.

Eligibility criteria were as follows: (1) be between the ages of 13 and 20; (2) have resided with the same adult caregiver for at least six months and plan to stay in the area and with this caregiver for the next six months; (3) be able to read and speak English; (4) identify as male; (5) identify as Black or African American; and (6) identify as non-heterosexual (respondents given options including gay, bisexual, exploring, questioning, other). All adolescents who enrolled stated interest in a program focused on healthy adolescent relationships and acceptance for heterosexual and sexual minority adolescents. Potential participants who were not able to provide assent or were living with HIV were

excluded from the study. Parental consent was waived for participants under the age of 18 for those who felt informing parents would be harmful; participants age 18 and older provided consent themselves. Data collection occurred from October 2019 to July 2020.

Recruitment

Recruitment methods were a blend of traditional and online strategies. Two community recruiters conducted venue-based outreach for the project through community-based organizations and health clinics serving adolescent and sexual and gender minority populations as well as schools in a medium-sized city in Mississippi. In addition, these venues also directly provided information about the project to potential participants, and the project's advisory board members, peer ambassadors, and current participants referred potential participants to the study via word of mouth. Participants were compensated \$10 for each potential participant referred to the study, up to five referrals. Online recruitment methods consisted of advertisements posted on social media platforms.

Procedure

The procedure was modified in April 2020 due to the COVID-19 outbreak in the U.S. and related precautions. Prior to April 2020, recruitment materials and referring individuals and organizations provided potential participants contact information for the study team. The study team determined potential participants' eligibility using a preliminary screener, described the study to them, and answered their questions about participation. If interested, potential participants then provided contact information for their parent or caregiver if it was safe to do so, and the study team contacted the parent or caregiver to obtain written informed consent for participants age 17 and younger, if applicable. Participants completed baseline measures in person on computers at the study site using REDCap, a secure data collection platform [34].

Beginning in April 2020, consent and enrollment was completed using HIPAA-compliant secure digital platforms. Recruitment materials referred potential participants to an online eligibility screener hosted on REDCap, and those meeting eligibility criteria were asked to provide their contact information. Study staff provided eligible potential participants with electronic informed consent forms and reviewed consent and study procedures with them via a secure videoconference platform. Participants electing to enroll in the study then electronically signed the consent form and received a link to the baseline assessment via email. The baseline assessment continued to be hosted on REDCap, and participants completed measures via personal

devices capable of accessing the internet. Of the total participants ($n=72$), 44 were enrolled prior to the implementation of COVID-related protocol changes, and 28 were enrolled after this event.

All participants who completed the baseline assessment received \$35 in compensation for their time and effort.

Measures

Cronbach's alpha was calculated as a measure of internal consistency for scales used to measure a unidimensional construct.

Demographic Characteristics

Participants self-reported their age, race, current school status, highest grade completed, and school lunch payment status. Participants also responded to items assessing sex assigned at birth, gender identity, and sexual identity. For sex assigned at birth, the item read "What sex were you assigned at birth, on your original birth certificate?" and response options were "male," "female," and "other." Gender identity was assessed with a separate item asking "What is your current gender identity?", and response options were "male," "female," "trans male/trans man," "trans female/trans woman," "genderqueer/gender non-conforming," and "other." For sexual identity, participants responded to the prompt "Which best describes your sexual orientation?" and could select one or multiple responses from the following options: "exploring," "undecided," "anonymous," "questioning," "otherwise," "gay," "bisexual," "queer," and "straight."

Parent/Child Communication About Sex

Parent/child communication about sex was measured using six items (e.g., "My parent/caregiver and I talk openly and freely about topics regarding sex") from the parent-adolescent sexual communication scale [35]. Response format was a seven-point semantic differential scale anchored with "not at all true" and "very true." Item scores were summed for the scale. One item, reverse-scored, "My parent/caregiver would think I'm doing these things if I talked to him/her about topics regarding sex" was negatively correlated with the mean of the remaining items ($r=-0.32$; $p=0.01$), and the Cronbach's alpha for the scale was low ($\alpha=0.66$) when it was included. For this reason, the item was dropped. The Cronbach's alpha for the scale for this sample with the remaining five items was 0.83, and this scale score was used in the analysis.

Perceived Parental Monitoring

Six items from Silverberg and Steinberg's parental monitoring measure [36, 37] were summed to assess participant's perception of their parent or guardian's knowledge of their whereabouts and activities (e.g., "When I go out at night, this person knows where I am"). Response options were either "never," "rarely," "sometimes," "very often," and "always" or "never," "hardly ever," "some days," "most days," and "almost every day"). Cronbach's alpha for this sample was 0.90.

Frequency of Discussing Specific Sex-Related Topics with Parent

Three items from the same parent-adolescent communication scale as above [35] assessed frequency participants had communicated with their parent or caregiver about HIV/AIDS, condoms, and HIV testing during the previous two months. Response options were "never," "once," "a few times (2–3 times)," and "a lot (more than 3 times)."

Disclosure of Sexual Orientation to Family

Three items adapted from a previous study [38] measured disclosure of sexual orientation to family. Items assessed participant's mother's, father's and sibling's knowledge of their sexual orientation, with response options: "definitely knows and we have talked about it," "definitely knows but we have never talked about it," "probably knows or suspects," "does not know or suspect, and "I do not have a [family member] in my home." Values were set to missing for participants who reported not having that particular person in their family, and the mean of the items was calculated for an overall measure of disclosure, with higher values indicating more disclosure.

Perceived Family Acceptance of Sexual Orientation

Three items from the same scale [38] assessed perceived family acceptance of sexual orientation. For each of the three family members, participants reporting having that person in their family responded to an item asking, "What was your [family member]'s reaction to your disclosure how would you expect your [family member] to react?" Response options were: "accepting," "tolerant," "intolerant," and "rejecting." The mean was calculated for these items, with higher values indicating more acceptance.

Family Social Support

The family subscale of the Multidimensional Scale of Perceived Social Support [39] measured family social support. The subscale consists of four items assessing participants' perception of family support (e.g., "I get the emotional help and support that I need from my family") with seven response options ranging from "very strongly disagree" to "very strongly agree." Responses were summed for the overall measure, with higher values indicating more perceived family support. Cronbach's alpha for this sample was 0.91.

HIV Knowledge

The HIV Knowledge Questionnaire [40] assessed HIV knowledge. Five items comprise the measure, with each focusing on a different aspect of knowledge about the virus and how it is transmitted (e.g., "oral sex is completely safe and you cannot get HIV from it"). Response options were "true," "false," and "I don't know." The number of correct responses was used for the overall measure, with higher scores indicating more HIV knowledge.

PrEP Knowledge

The PrEP knowledge scale was created for this study and consisted of five items measuring participants' knowledge concerning PrEP: "PrEP is very, very effective at preventing HIV;" "You need a doctor's prescription to get PrEP;" "PrEP is intended to be used by people infected with HIV;" "Most insurance plans, including Medicaid, cover PrEP;" and "Half of Black, gay men in Jackson, MS could get HIV if they don't protect themselves." The items were designed to assess a range of information about PrEP, including its efficacy, how to obtain it, and the need for prevention in this study's geographic area. Response options were "true," "false," and "I don't know." The total score was calculated in the same manner as for the HIV knowledge measure, with higher scores indicating more knowledge of PrEP.

Condom Likelihood

Participants responded to items assessing how often they will use a condom if they have sex in the next two months, how important it is to use condoms when having sex, and how confident they are that they will use condoms while having sex. For each item, response was a slider scale anchored with 0 at one end, 50 at the midpoint, and 100 at the other end (e.g., "0 = not important at all; 50 = about as important as the other things in my life; 100 = most important thing in

my life"). The mean of these three items was used for the measure. Cronbach's alpha for this sample was 0.80.

Lifetime Anal Sex

Lifetime anal sex was measured with a single, dichotomous item assessing whether participants had ever engaged in this behavior.

Lifetime HIV Testing

Lifetime HIV testing was measured with a single, dichotomous item measuring whether participants had ever accessed this service.

Lifetime Male Sex Partners

Participants responded to a single item assessing how many male sex partners they had in their lifetime.

Analytic Plan

We used SAS software v9.4 [41] to conduct the analyses. Bivariate associations were evaluated using Pearson correlation coefficients for continuous variable pairs and Spearman rank-order correlations for pairs including lifetime male sex partners, due to it being a count variable. Bivariate associations between sexual identity and the predictor and outcome variables were tested using one-way analyses of variance, Fisher's exact tests (due to high proportion of cells with counts less than 5), and negative binomial regression, based on the variable distribution. For hypotheses tests, multivariable analyses were conducted using linear regression for continuous outcomes (condom likelihood, HIV knowledge, PrEP knowledge), logistic regression for dichotomous outcomes (lifetime anal sex and lifetime HIV testing), and negative binomial regression for the count outcome (lifetime male sex partners) and included significant covariates identified in the bivariate analysis.

The treatment of missing data was as follows. For the disclosure of sexual orientation to family and perceived family acceptance of sexual orientation measures, means were calculated if participants responded to at least one of the items due to the possibility of different family constellations resulting in missing data (i.e., participants not having one or more than one type of family member in their home). For the condom likelihood measure, the mean was calculated if participants responded to at least two of the three items. No data were missing on the other scales in the analysis. Listwise deletion was performed for cases missing on any constructs assessed with a single item or missing on an entire scale according to the criteria above.

Table 1 Demographic characteristics, family relationship and behavior factors, and HIV risk and prevention behaviors and knowledge of black YMSM in Mississippi

Demographic variables	M	SD	
Age ^a	18.21	1.63	
	N	%	
Race			
Black/African American	67	93	
Multiracial	4	6	
American Indian or Alaskan Native	1	1	
Sexual identity			
Gay	32	44	
Multiple endorsements	20	28	
Bisexual	10	14	
Exploring	5	7	
Questioning	2	3	
Undecided	2	3	
Otherwise	1	1	
Sex assigned at birth			
Male	71	99	
Female	1	1	
Gender identity			
Male	69	96	
Female	1	1	
Trans male/trans man	1	1	
Genderqueer/gender non-conforming	1	1	
Hispanic or Latinx ethnicity ^b	1	1	
Currently in school ^b	64	89	
Dropped out of school ^b	2	3	
Highest grade completed in school			
8th	1	1	
9th	2	3	
10th	8	11	
11th	4	6	
12th	7	10	
Other	49	68	
Not reported	1	1	
School lunch status			
Full price	25	35	
Reduced price	13	18	
Free	34	47	
Study variables	Scale range	M	SD
Parent/child communication about sex	5–35	18.43	8.04
Perceived parental monitoring	6–30	24.24	5.59
Disclosure of sexual orientation to family	1–4	2.99	0.95
Perceived family acceptance of sexual orientation ^a	1–4	3.20	0.84
Family social support	4–28	19.76	6.21
Frequency of communication with parent/caregiver in past two months about			
HIV/AIDS	1–4	1.83	0.96
Condoms	1–4	2.35	1.20
HIV testing	1–4	1.49	0.98

Table 1 (continued)

Study variables	Scale range	M	SD
Condom likelihood	0–100	86.14	19.30
Lifetime male sexual partners ^c	0–14 ^d	3.31	3.45
HIV knowledge	0–5	3.26	1.20
PrEP knowledge	0–5	2.54	1.38
	N		%
Ever had anal sex ^b	47		65
Ever been tested for HIV ^b	38		53

N = 72 except as noted below due to missing data

^aN = 71

^bParticipants who endorsed the item

^cN = 70

^dRange of reported partners in sample

Results

Descriptive Statistics and Bivariate Analysis

The sample consisted of 72 participants. Descriptive statistics are presented in Table 1. The mean age was 18.21 years old. The great majority of the participants identified as Black in terms of their race (93%) and male (96%) in terms of their gender identity. All of the participants who endorsed more than one racial identity included Black as one of the identities they endorsed. One participant identified as American Indian or Alaska Native, and two participants endorsed gender identities other than male (female and genderqueer). Each of these participants identified as male, non-heterosexual, and Black or African American at the time of screening, so these cases were retained in the present analysis. One participant identified as a transgender man and assigned female at birth.

Regarding sexual identity, nearly half the sample (44%) identified as gay, and more than a quarter (28%) of participants endorsed multiple responses. The socioeconomic status composition of the sample was mixed, with nearly half (47%) of the sample reporting that they qualified to receive free school lunches. Regarding the family relationship and behavior variables, the means of the disclosure of sexual orientation to family members (M.: 2.99; range of scale: 1–4) and perceived family acceptance (M.: 3.20; range of scale: 1–4) variables indicated moderate levels of disclosure and acceptance. With respect to HIV prevention and risk behaviors, the sample was mixed in terms of sexual experience, with nearly two out of three (65%) of participants reporting ever having had anal sex. The mean of the condom likelihood scale was 86.14 (range of scale: 0–100), indicating high levels of self-reported likelihood to use condoms in future sexual encounters, and more than half of the sample

(53%) reported ever having been tested for HIV. The number of lifetime male sex partners in the sample ranged from zero to fourteen, with the mean being 3.31.

Bivariate correlations were calculated for the variables of interest and continuous demographic variables (see Table 2). More family acceptance was associated with fewer lifetime male sex partners, not having been tested for HIV, and less PrEP knowledge. More parental monitoring was associated with greater condom likelihood. More parent/child communication about sex was associated with not having had anal sex, fewer male sex partners, and less PrEP knowledge. More family social support not specific to sexual orientation was related to more parent/child communication about sex, but it was not related to any of the HIV prevention and risk behavior variables. For this reason, it was not retained in the multivariable analysis.

Age, racial identity, and sexual identity were evaluated as potential demographic covariates. At the bivariate level, age was related to the predictor variables frequency of communication about condoms and the outcome variables lifetime anal sex, lifetime HIV testing, lifetime male sexual partners, and HIV knowledge (see Table 2). Age was included as a covariate to control for potential confounding in the multivariate analysis.

Racial identity was significantly related to HIV knowledge ($F = 4.09$; $d.f. = 2, 69$; $p = 0.02$) and PrEP knowledge ($F = 3.46$; $d.f. = 2, 69$; $p = 0.04$). There was no evidence of an association between racial identity and parent/child communication about sex ($F = 1.67$; $d.f. = 2, 69$; $p = 0.20$), parental monitoring ($F = 0.09$; $d.f. = 2, 69$; $p = 0.91$), disclosure of sexual identity to family ($F = 0.51$; $d.f. = 2, 69$; $p = 0.60$), perceived family acceptance ($F = 0.12$; $d.f. = 2, 68$; $p = 0.88$), frequency of communication about HIV/AIDS ($F = 1.37$; $d.f. = 2, 69$; $p = 0.26$), frequency of communication about condoms ($F = 1.83$; $d.f. = 2, 69$; $p = 0.17$),

Table 2 Zero-order correlations among family relationship and behavior factors and HIV risk and prevention behavior and knowledge among black YMSM in Mississippi

Variables	n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Age	71	-														
2 Parent/child comm. about sex	72	-0.09	-													
3 Parental monitoring	72	-0.17	0.18	-												
4 Disclosure	72	-0.09	-0.07	0.17	-											
5 Acceptance	71	-0.12	0.28	0.11	0.33	-										
6 Family social support	72	0.03	0.28	0.00	-0.03	-0.02	-									
7 Freq. comm. about HIV/AIDS	72	0.19	0.37	0.01	0.10	0.13	0.14	-								
8 Freq. comm. about condoms	72	0.30	0.25	0.17	0.00	-0.09	-0.02	0.55	-							
9 Freq. comm. about HIV testing	72	0.21	0.27	0.08	0.19	0.04	-0.05	0.43	0.45	-						
10 Condom likelihood	72	-0.03	0.08	0.33	0.14	0.06	-0.21	0.14	0.27	0.12	-					
11 Lifetime anal sex	72	0.42	- 0.32	-0.07	0.06	-0.22	-0.04	0.03	0.07	0.09	0.03	-				
12 Lifetime HIV testing	72	0.42	-0.08	-0.17	-0.18	- 0.28	0.02	0.18	0.32	0.19	-0.03	0.19	-			
13 Lifetime male sex partners ^a	70	0.45	- 0.34	-0.22	0.08	- 0.27	0.06	0.02	0.14	0.09	-0.17	0.65	0.39	-		
14 HIV knowledge	72	0.28	-0.09	0.07	0.05	-0.21	0.04	0.14	0.19	0.03	0.10	0.36	0.19	0.23	-	
15 PrEP knowledge	72	0.06	- 0.27	-0.01	0.08	- 0.27	0.07	0.09	0.02	0.17	0.23	0.29	0.25	0.25	0.30	-
16 Recruitment period ^b	72	- 0.53	0.08	0.08	-0.05	0.06	-0.06	-0.19	-0.07	-0.11	-0.01	-0.14	-0.22	-0.03	- 0.27	-0.09

Boldface indicates $p \leq 0.05$

^aSpearman's rank correlation coefficient reported due to count nature of variable

^b0 = Recruited prior to changes in procedures due to COVID-19 outbreak; 1 = recruited after these changes

Comm. communication; freq. frequency

frequency of communication about HIV testing ($F = 1.41$, $d.f. = 2, 69$; $p = 0.25$), likelihood of future condom use ($F = 0.01$; $d.f. = 2, 69$; $p = 0.99$), lifetime anal sex (Fisher's exact test $p = 0.54$), and lifetime HIV testing (Fisher's exact test $p = 0.47$). Results from negative binomial regression also indicated no relationship between racial identity and lifetime male sex partners (reference group was Black/African American; $\chi^2 = 3.32$; $d.f. = 2$; $p = 0.19$).

A significant relationship was detected between sexual identity and HIV knowledge ($F = 3.20$; $d.f. = 6, 65$; $p = 0.01$). Sexual identity was not related to parent/child communication about sex ($F = 1.33$; $d.f. = 6, 65$; $p = 0.26$), parental monitoring ($F = 0.47$; $d.f. = 6, 65$; $p = 0.83$), disclosure of sexual identity to family ($F = 0.97$; $d.f. = 6, 65$; $p = 0.45$), perceived family acceptance ($F = 0.49$; $d.f. = 6, 64$; $p = 0.81$), frequency of communication about HIV/AIDS ($F = 0.66$, $d.f. = 6, 65$; $p = 0.68$), frequency of communication about condoms ($F = 1.01$; $d.f. = 6, 65$; $p = 0.42$), frequency of communication about HIV testing ($F = 0.58$, $d.f. = 6, 65$; $p = 0.75$), likelihood of future condom use ($F = 1.21$; $d.f. = 6, 65$; $p = 0.31$), lifetime anal sex (Fisher's exact test $p = 0.17$), lifetime HIV testing (Fisher's exact test $p = 0.30$), and PrEP knowledge ($F = 1.96$; $d.f. = 6, 65$; $p = 0.08$). Negative binomial regression indicated that sexual identity was related to lifetime male sexual partners ($\chi^2 = 14.80$; $d.f. = 6$; $p = 0.02$; reference group was participants who identified as gay), but there was no evidence of differences between the reference group and any of the other groups (for bisexual, $\chi^2 = 0.21$, $d.f. = 1$, $p = 0.65$; for exploring, $\chi^2 = 1.84$, $d.f. = 1$, $p = 0.17$; for questioning, $\chi^2 = 2.64$, $d.f. = 1$, $p = 0.10$; for undecided, $\chi^2 < 0.01$, $d.f. = 1$, $p > 0.99$; for otherwise, $\chi^2 = 0.21$, $d.f. = 1$, $p = 0.64$; for multiple endorsements, $\chi^2 = 1.69$, $d.f. = 1$, $p = 0.19$).

We also investigated differences in the study variables between the participants recruited in the period prior to protocol changes due to the COVID-19 outbreak and those recruited in the period after these changes (see Table 2). Participants recruited after implementation of COVID-19-related protocol changes were younger and less knowledgeable about HIV. Because racial identity, sexual identity, and recruitment period were unrelated to any of the predictors, these variables were not included in multivariable models.

Multivariable Analyses

HIV Prevention and Risk Behaviors

All continuous variables were standardized prior to multivariable analysis. The family relationship and behavior variables were entered together as predictors of each of the HIV prevention and risk behavior variables. Age was included as a covariate for all multivariable analyses. The results of these analyses are presented in Table 3.

At the multivariable level, parent/child communication about sex was related to lifetime male sexual partners such that reporting more communication about sex with the parent or caregiver was associated with fewer lifetime male sexual partners. More parent/child communication about sex was also associated with lower odds of ever having had anal sex. Perceived parental monitoring was related to condom likelihood such that more monitoring was associated with greater likelihood of condom use in future sexual encounters. Disclosure of sexual orientation to family was related to number of lifetime male sexual partners such that more disclosure was associated with a greater number of sexual partners. Perceived family acceptance was not related to any of the HIV prevention and risk behavior outcomes. None of the family relationship and behavior variables were related to lifetime HIV testing.

Next, the frequency of reported communication with parents/caregivers about each of the three sexual health topics (HIV/AIDS, condoms, and HIV testing) in the past two months were entered into the model together for each of the HIV prevention and risk behavior variables, as reported in Table 4. At the multivariable level, none of the sexual health topic variables were significantly associated with condom likelihood, lifetime anal sex, lifetime male sexual partners, or lifetime HIV testing.

HIV and PrEP Knowledge

Findings from the multivariate analysis for the HIV and PrEP knowledge outcomes are reported in Table 5. None of the family relationship and behavior variables were related to HIV knowledge or PrEP knowledge.

Discussion

Black YMSM living in the Southern United States are at particularly high risk for HIV infection due to their position at the intersection of multiple groups overburdened by the disease [1–3], pointing to an urgent need to identify factors that predict HIV risk for this group. The present study contributes to this understanding by investigating the associations among family factors and HIV risk and prevention behavior among Black YMSM in Mississippi. Consistent with our hypotheses, we found that both parent/child communication and parental monitoring were protective: YMSM who reported stronger communication also reported having fewer lifetime male sex partners and were less likely to have ever had anal sex, and those who reported stronger parental monitoring indicated greater likelihood to use condoms in the future. Results also indicated that disclosure of sexual orientation was associated with more lifetime male

Table 3 Associations of family relationship and behavior factors with HIV risk and prevention behaviors and knowledge among Black YMSM in Mississippi

	Condom Likelihood n=70			Lifetime Anal Sex n=70			Lifetime Male Sex Partners n=68			Lifetime HIV Testing n=70				
	β	SE (β)	95% CI	B	SE (B)	AOR (95% CI)	B	SE (B)	95% CI	B	SE (B)	AOR (95% CI)		
													LL	UL
Intercept	0.01	0.12	-0.22	0.24	0.81	0.31	-	0.91	0.12	0.68	1.14	-0.02	0.29	-
Age	0.04	0.12	-0.20	0.28	1.01	0.33	2.76 (1.44-5.28)	0.69	0.15	0.41	0.98	1.11	0.37	3.04 (1.46-6.33)
Parent/child comm. about sex	0.03	0.12	-0.22	0.28	-0.70	0.34	0.50 (0.25-0.96)	-0.33	0.12	-0.56	-0.10	0.06	0.30	1.06 (0.59-1.91)
Parental monitoring	0.30	0.12	0.06	0.55	0.07	0.32	1.08 (0.57-2.01)	-0.04	0.11	-0.26	0.18	-0.08	0.28	0.92 (0.53-1.61)
Disclosure to family	0.14	0.13	-0.12	0.41	0.31	0.35	1.36 (0.68-2.73)	0.27	0.12	0.04	0.51	-0.14	0.32	0.87 (0.46-1.63)
Perceived family acceptance	-0.03	0.13	-0.30	0.23	-0.44	0.36	0.64 (0.32-1.29)	-0.13	0.11	-0.36	0.09	-0.55	0.33	0.58 (0.30-1.10)
Dispersion	-	-	-	-	-	-	-	0.40	0.14	0.21	0.78	-	-	-

Boldface indicates $p \leq 0.05$

All continuous variables were standardized prior to multivariable analysis. Standardized beta estimates are presented for the continuous outcome (condom likelihood), and unstandardized beta estimates are presented for outcomes that are dichotomous (lifetime anal sex, lifetime HIV testing) and counts (lifetime male sex partners)

CI confidence interval; AOR adjusted odds ratio; LL lower limit; UL upper limit; comm. communication

Table 4 Associations of frequency of discussing topics related to sexual risk with HIV risk and prevention behaviors and knowledge among black YMSM in Mississippi

	Condom likelihood n = 70				Lifetime anal sex n = 70				Lifetime male sex partners n = 68				Lifetime HIV testing n = 70				
	β	SE (β)	95% CI		B	SE (B)	AOR	(95% CI)	B	SE (B)	95% CI	LL	UL	B	SE (B)	AOR	(95% CI)
			LL	UL													
Intercept	0.03	0.11	-0.20	0.26	0.84	0.31	-	-	0.91	0.12	0.67	1.14	0.03	0.30	-	-	
Age	-0.09	0.13	-0.36	0.17	0.98	0.36	2.68 (1.31–5.46)		0.70	0.15	0.41	1.00	0.91	0.40	2.49 (1.14–5.43)		
Parent/child comm. about sex	-0.11	0.14	-0.39	0.17	- 0.83	0.39	0.43 (0.20–0.92)		- 0.32	0.14	- 0.60	- 0.04	-0.23	0.36	0.79 (0.39–1.60)		
Parental monitoring	0.24	0.13	-0.01	0.49	0.11	0.34	1.11 (0.57–2.17)		-0.03	0.12	-0.26	0.20	-0.23	0.31	0.80 (0.43–1.46)		
Disclosure to family	0.09	0.13	-0.18	0.36	0.24	0.37	1.27 (0.62–2.62)		0.28	0.12	0.03	0.52	-0.30	0.35	0.74 (0.37–1.47)		
Family acceptance	0.02	0.13	-0.25	0.28	-0.48	0.37	0.62 (0.30–1.27)		-0.14	0.12	-0.38	0.09	-0.47	0.35	0.62 (0.32–1.24)		
Freq. of comm. about HIV/AIDS	0.09	0.15	-0.22	0.40	0.22	0.44	1.25 (0.53–2.96)		0.00	0.15	-0.28	0.29	0.10	0.38	1.10 (0.52–2.34)		
Freq. of comm. about condoms	0.25	0.16	-0.06	0.57	-0.18	0.41	0.83 (0.37–1.86)		-0.03	0.15	-0.33	0.26	0.52	0.38	1.68 (0.80–3.54)		
Freq. of comm. about HIV testing	0.05	0.14	-0.23	0.33	0.25	0.38	1.28 (0.60–2.71)		-0.01	0.13	-0.26	0.25	0.22	0.35	1.24 (0.63–2.47)		
Dispersion	-	-	-	-	-	-	-		0.40	0.14	0.21	0.78	-	-	-	-	

Boldface indicates $p \leq 0.05$

All continuous variables were standardized prior to multivariable analysis. Standardized beta estimates are presented for the continuous outcome (condom likelihood), and unstandardized beta estimates are presented for outcomes that are dichotomous (lifetime anal sex, lifetime HIV testing) and counts (lifetime male sex partners)

CI/confidence interval; AOR/adjusted odds ratio; LL/lower limit; UL/upper limit; comm. communication; freq. frequency

Table 5 Associations of family relationship and behavior factors on HIV and PrEP knowledge among black YMSM in Mississippi

	HIV Knowledge n = 70				PrEP Knowledge n = 70			
	β	SE (β)	95% CI		β	SE (β)	95% CI	
			LL	UL			LL	UL
Intercept	-0.03	0.11	-0.26	0.20	0.00	0.12	-0.23	0.23
Age	0.31	0.12	0.07	0.54	0.02	0.12	-0.22	0.26
Parent/child comm. about sex	-0.02	0.12	-0.26	0.23	-0.19	0.12	-0.44	0.06
Parental monitoring	0.16	0.12	-0.09	0.40	0.02	0.12	-0.22	0.27
Disclosure to family	0.16	0.13	-0.09	0.42	0.11	0.13	-0.15	0.38
Perceived family acceptance	-0.23	0.13	-0.49	0.03	-0.24	0.13	-0.51	0.02

Boldface indicates $p \leq 0.05$

Standardized beta estimates are presented

CI confidence interval; LL lower limit; UL upper limit

sex partners and that perceived family acceptance was not related to any of the behavioral outcomes when accounting for the other family factors. None of the family factors were associated with knowledge about HIV or PrEP. Taken together, findings suggest that parents play an important role in YMSM's sexual health outcomes and that parents can promote healthy sexual behaviors through talking to their sons about sex and monitoring their activities.

Parenting Practices

Parent/child communication about sex was protective for Black YMSM in Mississippi. The measure of parent/child communication assessed the quality of those discussions (e.g., whether sons believed their parents wanted to know their questions about sex and whether such discussions are "open and free"), and participants who reported better communication were less likely to report lifetime anal sex and reported fewer lifetime male sexual partners. This result aligns with evidence that parent/child communication is protective for heterosexual adolescents [8] and with previous studies conducted with YMSM that have found parental communication to influence sexual health decision-making [16] and behavior [17]. We did not find evidence that more frequent communication about the specific topics of HIV, condoms, and HIV testing were associated with behavioral outcomes when also accounting for communication about sex in general, suggesting that the quality of such communication may be the most predictive of sexual behavior.

The growing evidence that parent/child communication about sex is associated with favorable outcomes lends additional support to calls for family-based HIV prevention programs for YMSM [42], and findings from this study suggest Black YMSM in particular could benefit. Family-based interventions have been effective in promoting parent/child communication and improved sexual health outcomes for youth of color, and these programs frequently include

adaptation to cultural context [13]. Similarly, strategies to promote parent/child communication about sex for families of Black YMSM in the South should account for the unique cultural context in which racism, homophobia, and lack of access to economic resources all influence HIV risk at the individual and structural levels [43].

Contrary to our hypotheses, parent/child communication about sex was unrelated to HIV testing, nor was it associated with knowledge about HIV or PrEP among Black YMSM in Mississippi. This result contrasts with previous evidence that mother/child communication about sex predicted HIV testing among YMSM of color [18]. YMSM have reported that their parents do not discuss sexual health topics relevant to gay or bisexual men, potentially due to parents' lack of knowledge about the subject [23, 44, 45], and parents of YMSM have also reported such a gap in their knowledge [24]. The lack of association between parent/child communication about sex and accessing HIV testing and HIV and PrEP knowledge in this study may reflect that these discussions do not include enough information about HIV and prevention behaviors. It is also possible that the small sample size of the present study precluded detection of significant relationships. New guidelines recommend healthcare providers discuss PrEP with all sexually active adolescents [46], which may help fill the gap if parents are not initiating these discussions. However, involving parents in such conversations is optimal, given that YMSM may still use parents' health insurance and that parents are potential supports for adherence, which is a concern for YMSM on daily oral PrEP [47–49]. Building parents' knowledge about HIV, PrEP, and other critical sexual health topics is a critical target for family-based HIV prevention programs for Black YMSM in Mississippi.

Importantly, as is common in the extant literature on parent/child communication about sex among YMSM [17, 20], the data for this analysis were cross-sectional, and so

temporal order cannot be determined. Longitudinal studies assessing the relationship between parent/child communication and sexual behavior among YMSM are particularly needed given the potential for parents to change their approach to this type of discussion if they learn their son is sexually active. Future investigations should use prospective designs to evaluate these links over time and allow for stronger conclusions about the causal direction.

The present study also found evidence that increased parental monitoring was associated with increased likelihood for future condom use among Black YMSM in Mississippi. This result is consistent with existing evidence that it is protective for heterosexual adolescents [9] and YMSM [21, 22]. However, it is notable that while prior studies found that parental monitoring was associated with less HIV risk behavior [21, 22], in this analysis, parental monitoring was not related to behavior outcomes, but it was related to future condom likelihood. This result suggests that the mechanism through which monitoring confers protection is not purely through controlling opportunities for adolescents to engage in risky behavior.

In the present study, parental monitoring largely measured the parent or caregiver's knowledge of the YMSM son's behavior (e.g., knowing where he is after school or when he goes out at night). Previous research on parental knowledge and HIV risk behavior among YMSM broadly has produced equivocal results [20–22], which may indicate that multiple processes are at play. Giving credence to this possibility is evidence that the effect of parental monitoring differs based on the YMSM son's outness to his parents [20] and that parents of sexual and gender minority adolescents are at times unsure how to determine rules for their child [24], which may hinder their monitoring efforts. Although this analysis does not elucidate any such potential mechanisms, results do indicate that parental monitoring is protective for Black YMSM in Mississippi. Future investigations with larger samples should further evaluate potential interactions between parental monitoring and related constructs. In addition, as with parent/child communication, it is possible that parents may adjust their monitoring in response to their son engaging in risky behavior, so longitudinal studies are needed to establish causal relationships.

Disclosure to Families and Perceived Family Acceptance

Findings from the present study indicated that Black YMSM in Mississippi who have disclosed their sexual orientation to more family members reported more lifetime male sexual partners. This result is consistent with previous studies with YMSM [22, 26] and may reflect that YMSM who are out with their families are also more likely to be out in other domains of their life. While a young man need not openly

identify as a sexual minority to engage in sex with other men, doing so would likely facilitate meeting other MSM and thus potential partners. YMSM have reported discussions with their parents about sex become less frequent after they come out [23]. Our results suggest that parent/child communication about sex is particularly critical for Black YMSM in Mississippi after they come out to their parents, as they may be more sexually active, and thus provide further evidence of the need for family-based HIV prevention programs. More broadly, this finding indicates that YMSM who are more “out” may be at greater risk for HIV and are therefore an important group for prevention programs to target.

At the bivariate level, participants who perceived more family acceptance of their sexual orientation reported fewer lifetime male sexual partners, indicating that acceptance is protective for Black YMSM in Mississippi. This result is in line with previous research suggesting that acceptance is protective for sexual health outcomes [26] and family rejection is harmful [25]. More acceptance was also associated with more parent/child communication at the bivariate level, and acceptance was not related to lifetime male sexual partners when accounting for the other family factors. The lack of association between acceptance and lifetime male sex partners at the multivariable level may be due to the limitations presented by the sample size. Some YMSM have reported a desire to talk to their parents about sex and relationships [23], and so the observed relationship between parent/child communication and perceived acceptance may reflect that YMSM view having these discussions with their parents as a form of acceptance and support. As a whole, these findings indicate that how parents talk about to their sons about sex and how their sons perceive their acceptance are related to each other and to sexual behavior among Black YMSM in Mississippi. Future studies with larger samples should further investigate these links and potential interactions.

Strengths and Limitations

Findings from this study should be interpreted in the context of several limitations. The data were cross-sectional and so cannot be used to establish causal relationships. As previously noted, longitudinal designs are particularly necessary for future investigations on family factors and HIV risk behavior given potential bidirectional relationships. Data for this study were drawn from the baseline assessment for a pilot intervention trial, and so the sample size was small. Statistical power may therefore have prevented the detection of significant relationships, particularly in the multivariable models. We recruited participants from a single metropolitan area in Mississippi, and so findings may not generalize to Black YMSM in other areas of the southeastern United States.

Although all participants identified as Black non-heterosexual males at the time of enrollment, there was some variability in how participants responded to demographic questions concerning race (one identified as American Indian/Alaska Native) and gender (three did not identify as cisgender men). Small sample size precluded analyses by these groups. We measured family factors through sons' report only, and parents' perspectives on family communication and their own level of PrEP and HIV knowledge may be informative. Finally, our measures of sexual behavior were limited to lifetime anal sex engagement and number of male sex partners, and so there may be substantial variability in HIV risk behaviors not captured, including engagement in anal sex not protected by condoms or PrEP. Future investigations should collect data from both parents and sons on family factors and include more precise measures of HIV risk behavior, such as total counts of anal sex encounters and unprotected anal sex encounters.

This analysis also evidenced several methodological strengths. Family factors were measured through multiple measures, allowing for differentiation of parent behaviors as well as disclosure and perceived family acceptance in multivariable analysis. Similarly, the study measured and reported on multiple HIV risk and prevention behaviors. Furthermore, HIV incidence among MSM in Mississippi is high [2], and so the present study contributes to understanding the determinants of HIV risk in an overburdened population.

Conclusion

Black YMSM living in the southeastern United States face particularly high risk for HIV infection [1–3]. Preventing new HIV infections for Black YMSM in Mississippi and across the South will likely require leveraging all potential sources of support and influence, particularly given that myriad forms of marginalization including poverty [50], lack of access to health care [50], and other manifestations of structural racism [51] are implicated in this marked disparity. Findings from this analysis suggest that families can play an important role in promoting positive sexual health outcomes for these young men through discussing sex with their son and staying aware of where he is and how he spends his time. However, for parents, initiating and sustaining these conversations and effectively monitoring their sons' behavior may be daunting tasks, particularly if they feel ill-informed about HIV and other sexual health topics relevant to MSM and are unsure about how to supervise their son and set and enforce appropriate rules. Culturally-appropriate family-based HIV prevention programs tailored to the unique needs and experiences of Black YMSM are urgently

needed to support parents in initiating and sustaining these practices over time, and, ultimately, to reduce HIV incidence among Black YMSM in the southeastern United States.

Acknowledgements Disclaimer: The findings and conclusions in this manuscript are those of the authors and do not necessarily represent the official position of the United States Centers for Disease Control and Prevention (CDC). Mention of company names or products does not imply endorsement by CDC.

Author Contributions AB conceived of the study, participated in the development of the analytic plan, performed the statistical analysis, participated in the interpretation of the data, and drafted the manuscript. LB conceived of the study, participated in the development of the analytic plan, and participated in the interpretation of the data. RC participated in the interpretation of the data. LC participated in the data collection, interpretation of the data, and revision of the manuscript. RW, PB, and LM participated in the interpretation of the data and revision of the manuscript. All authors read and approved the final manuscript.

Funding This research was supported by the NIMH (R34MH113384, MPIS: Brown and Crosby; and T32-MH078788, PI: Brown) and was facilitated by the Providence/Boston Center for AIDS Research (P30AI042853).

Data Availability The data will not be uploaded to a public repository.

Code Availability Analyses were performed using SAS v9.4.

Declarations

Conflict of interest In the previous 12 months, Dr. Mena received honoraria for advisory board participation from Gilead Science, GSK/ViiV Healthcare and Merck and grant funding through his former institution, the University of Mississippi Medical Center, from: Gilead Science, GSK/ViiV Healthcare, Merck, Janssen, Evofem, Click Diagnostics, Thai Med, Visby Health, and Westat. These relationships have all concluded, and he currently has no conflicts of interest. None of the other authors have any conflicts of interest to report.

Ethical Approval All study protocols and procedures were approved by the institutional review boards of the affiliated hospitals.

Consent to Participate All participants provided assent (if age 17 or younger) or consent (if age 18 or older) to participate at time of enrollment. Parental consent was waived for participants under the age of 18 for those who felt informing parents would be harmful.

Consent for Publication Not applicable.

References

- Centers for Disease Control and Prevention (CDC). Diagnoses of HIV infection and AIDS in the United States and dependent areas, 2019 [Internet]. Vol. 32. 2021. <http://www.cdc.gov/hiv/library/reports/hiv-surveillance.html>
- Rosenberg ES, Grey JA, Sanchez TH, Sullivan PS. Rates of prevalent HIV infection, prevalent diagnoses, and new diagnoses among men who have sex with men in US states, metropolitan statistical areas, and counties, 2012–2013. *JMIR Public Heal Surveill*. 2016;2(1): e22.

3. Lieb S, Prejean J, Thompson DR, Fallon SJ, Cooper H, Gates GJ, et al. HIV prevalence rates among men who have sex with men in the Southern United States: Population-based estimates by race/ethnicity. *AIDS Behav.* 2011;15(3):596–606.
4. Donenberg GR, Pao M. Youths and HIV/AIDS: Psychiatry's role in a changing epidemic. *J Am Acad Child Adolesc Psychiatry.* 2005;44(8):728–47. <https://doi.org/10.1097/01.chi.0000166381.68392.02>.
5. Donenberg G, Emerson E, Mackesy-Amiti ME, Fletcher F. Sexual risk among African American girls seeking psychiatric care: A social-personal framework. *J Consult Clin Psychol.* 2018;86(1):24.
6. Donenberg GR, Kendall AD, Emerson E, Fletcher FE, Bray BC, McCabe K. IMARA: a mother-daughter group randomized controlled trial to reduce sexually transmitted infections in Black/African-American adolescents. *PLoS ONE.* 2020;15(11):e0239650. <https://doi.org/10.1371/journal.pone.0239650>.
7. Hadley W, Brown LK, Barker D, Warren J, Weddington P, Fortune T, et al. Work it out together: preliminary efficacy of a parent and adolescent DVD and workbook intervention on adolescent sexual and substance use attitudes and parenting behaviors. *AIDS Behav.* 2016;20(9):1961–72.
8. Widman L, Choukas-Bradley S, Noar SM, Nesi J, Garrett K. Parent-adolescent sexual communication and adolescent safer sex behavior: a meta-analysis. *JAMA Pediatr.* 2016;170(1):52–61.
9. Dittus PJ, Michael SL, Becasen JS, Gloppen KM, McCarthy K, Guilamo-Ramos V. Parental monitoring and its associations with adolescent sexual risk behavior: a meta-analysis. *Pediatrics.* 2015;136(6):e1587–99.
10. Kapungu CT, Baptiste D, Holmbeck G, McBride C, Robinson-Brown M, Sturdivant A, et al. Beyond the “birds and the bees”: gender differences in sex-related communication among urban African-American adolescents. *Fam Process.* 2010;49(2):251–64. <https://doi.org/10.1111/j.1545-5300.2010.01321.x>.
11. Harris AL, Sutherland MA, Hutchinson MK. Parental influences of sexual risk among urban African American adolescent males. *J Nurs Scholarsh.* 2013;45(2):141–50. <https://doi.org/10.1111/jnu.12016>.
12. Hutchinson MK, Montgomery AJ. Parent communication and sexual risk among African Americans. *West J Nurs Res.* 2007;29(6):691–707.
13. Sutton MY, Lasswell SM, Lanier Y, Miller KS. Impact of parent-child communication interventions on sex behaviors and cognitive outcomes for Black/African-American and Hispanic/Latino youth: a systematic review, 1988–2012. *J Adolesc Health.* 2014;54(4):369–84. <https://doi.org/10.1016/j.jadohealth.2013.11.004>.
14. Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: conceptual issues and research evidence. *Psychol Bull.* 2003;129(5):674–97.
15. McGeough BL, Sterzing PR. A systematic review of family victimization experiences among sexual minority youth. *J Prim Prev.* 2018;39(5):491–528. <https://doi.org/10.1007/s10935-018-0523-x>.
16. LaSala MC. Condoms and connection: parents, gay and bisexual youth, and HIV risk. *J Marital Fam Ther.* 2015;41(4):451–64.
17. Thoma BC, Huebner DM. Parent-adolescent communication about sex and condom use among young men who have sex with men: an examination of the theory of planned behavior. *Ann Behav Med.* 2018;52(11):973–87.
18. Bouris A, Hill BJ, Fisher K, Erickson G, Schneider JA. Mother-son communication about sex and routine human immunodeficiency virus testing among younger men of color who have sex with men. *J Adolesc Health.* 2015;57(5):515–22. <https://doi.org/10.1016/j.jadohealth.2015.07.007>.
19. Flores DD, Meanley SP, Wood SM, Bauermeister JA. Family characteristics in sex communication and social support: implications for emerging adult men who have sex with men's PrEP engagement. *Arch Sex Behav.* 2020;49(6):2145–53. <https://doi.org/10.1007/s10508-020-01648-4>.
20. Thoma BC, Huebner DM. Parental monitoring, parent-adolescent communication about sex, and sexual risk among young men who have sex with men. *AIDS Behav.* 2014;18(8):1604–14.
21. Mustanski B, Swann G, Newcomb ME, Prachand N. Effects of parental monitoring and knowledge on substance use and HIV risk behaviors among young men who have sex with men: results from three studies. *AIDS Behav.* 2017;21(7):2046–58.
22. Thoma BC. Parental monitoring among young men who have sex with men: Associations with sexual activity and HIV-related sexual risk behaviors. *J Adolesc Health.* 2017;61(3):348–54. <https://doi.org/10.1016/j.jadohealth.2017.03.004>.
23. Feinstein BA, Thomann M, Coventry R, Macapagal K, Mustanski B, Newcomb ME. Gay and bisexual adolescent boys' perspectives on parent-adolescent relationships and parenting practices related to teen sex and dating. *Arch Sex Behav.* 2018;47(6):1825–37. <https://doi.org/10.1007/s10508-017-1057-7>.
24. Newcomb ME, Feinstein BA, Matson M, Macapagal K, Mustanski B. “I have no idea what's going on out there:” parents' perspectives on promoting sexual health in lesbian, gay, bisexual, and transgender adolescents. *Sex Res Soc Policy.* 2018;15(2):111–22.
25. Ryan C, Huebner D, Diaz RM, Sanchez J. Family rejection as a predictor of negative health outcomes in white and Latino lesbian, gay, and bisexual young adults. *Pediatrics.* 2009;123(1):346–52.
26. Morris E, Balaji AB, Trujillo L, Rasberry CN, Mustanski B, Newcomb ME, et al. Family factors and HIV-related risk behaviors among adolescent sexual minority males in three United States Cities, 2015. *LGBT Health.* 2020;7(7):367–74.
27. Stearns M, Szkody E, McKinney C. Perceived Mother–Father Dyad Parenting Typologies Across Four Regions in the United States. *J Fam Issues.* 2021;0192513X211055114.
28. Norman J. The Religious Regions of the U.S.. 2018. <https://news.gallup.com/poll/232223/religious-regions.aspx>
29. Human Rights Campaign Foundation. 2021 State Equality Index. 2022. <https://www.hrc.org/resources/state-equality-index>
30. McKinney C, Brown KR. Parenting and Emerging Adult Internalizing Problems: Regional Differences Suggest Southern Parenting Factor. *J Child Fam Stud.* 2017;26(11):3156–66. <https://doi.org/10.1007/s10826-017-0749-x>.
31. Flores D, Abboud S, Barroso J. Hegemonic masculinity during parent-child sex communication with sexual minority male adolescents. *Am J Sex Educ.* 2019;14(4):417–39. <https://doi.org/10.1080/15546128.2019.1626312>.
32. Fisher JD, Fisher WA, Williams SS, Malloy TE. Empirical tests of an information-motivation-behavioral skills model of AIDS-preventive behavior with gay men and heterosexual university students. *Health Psychol.* 1994;13(3):238–50.
33. Dubov A, Altice FL, Fraenkel L. An information-motivation-behavioral skills model of PrEP uptake. *AIDS Behav.* 2018;22(11):3603–16. <https://doi.org/10.1007/s10461-018-2095-4>.
34. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform.* 2009;42(2):377–81.
35. Dutra R, Miller KS, Forehand R. The process and content of sexual communication with adolescents in two-parent families: associations with sexual risk-taking behavior. *AIDS Behav.* 1999;3(1):59–66.
36. Li X, Stanton B, Feigelman S. Impact of perceived parental monitoring on adolescent risk behavior over 4 years. *J Adolesc Health.* 2000;27(1):49–56.

37. Silverberg SB, Steinberg L. Adolescent autonomy, parent-adolescent conflict, and parental well-being. *J Youth Adolesc.* 1987;16(3):293–312.
38. D’Augelli AR, Hershberger SL, Pilkington NW. Lesbian, gay, and bisexual youth and their families: disclosure of sexual orientation and its consequences. *Am J Orthopsychiatry.* 1998;68(3):361–71.
39. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. *J Pers Assess.* 1988;52(1):30–41.
40. Brown LK, DiClemente RJ, Beausoleil NI. Comparison of human immunodeficiency virus related knowledge, attitudes, intentions, and behaviors among sexually active and abstinent young adolescents. *J Adolesc Health.* 1992;13(2):140–5.
41. SAS Institute Inc. SAS® 9.4 Statements: Reference. Cary, NC: SAS Institute Inc.; 2013.
42. Newcomb ME, Lasala MC, Bouris A, Mustanski B, Prado G, Schrager SM, et al. The influence of families on LGBTQ youth health: a call to action for innovation in research and intervention development. *LGBT Health.* 2019;6(4):139–45.
43. Burns PA, Williams MS, Mena LA, Bruce MA, Bender M, Burton ET, et al. Leveraging community engagement: the role of community-based organizations in reducing new HIV infections among black men who have sex with men. *J Racial Ethn Health Disparities.* 2020;7(2):193–201.
44. Flores DD, Meanley SP, Bond KT, Agenor M, Relf MV, Barroso JV. Topics for inclusive parent-child sex communication by gay, bisexual, queer youth. *Behav Med.* 2021;47(3):175–84. <https://doi.org/10.1080/08964289.2019.1700481>.
45. Flores DD, Docherty SL, Relf MV, McKinney RE, Barroso JV. “It’s almost like gay sex doesn’t exist”: parent-child sex communication according to gay, bisexual, and queer male adolescents. *J Adolesc Res.* 2019;34(5):528–62.
46. Centers for Disease Control and Prevention (CDC). Preexposure prophylaxis for the prevention of HIV infection in the United States – 2021 update. 2021. <https://www.cdc.gov/hiv/pdf/risk/prep/cdc-hiv-prep-guidelines-2021.pdf>
47. Hosek SG, Landovitz RJ, Kapogiannis B, Siberry GK, Rudy B, Rutledge B, et al. Safety and feasibility of antiretroviral pre-exposure prophylaxis for adolescent men who have sex with men aged 15 to 17 years in the United States. *JAMA Pediatr.* 2017;171(11):1063–71.
48. Hosek SG, Rudy B, Landovitz RJ, Kapogiannis BG, Siberry G, Rutledge B, et al. An HIV pre-exposure prophylaxis (PrEP) demonstration project and safety study for young MSM. *J Acquir Immune Defic Syndr.* 2017;74(1):21–9.
49. Wood S, Gross R, Shea JA, Bauermeister JA, Franklin J, Patsis D, et al. Barriers and facilitators of PrEP adherence for young men and transgender women of color. *AIDS Behav.* 2019;23(10):2719–29. <https://doi.org/10.1007/s10461-019-02502-y>.
50. Burns PA, Hall CDX, Poteat T, Mena LA, Wong FY. Living while Black, gay, and poor: the association of race, neighborhood structural disadvantage, and PrEP utilization among a sample of Black men who have sex with men in the Deep South. *AIDS Educ Prev.* 2021;33(5):395–410.
51. Bowleg L, Malekzadeh AN, Mbaba M, Boone CA. Ending the HIV epidemic for all, not just some: structural racism as a fundamental but overlooked social-structural determinant of the US HIV epidemic. *Curr Opin HIV AIDS.* 2022;17(2):40–5.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.