

Circumcision Status and HIV Infection Among Black and Latino Men Who Have Sex With Men in 3 US Cities

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Objective: To examine characteristics of circumcised and uncircumcised Latino and black men who have sex with men (MSM) in the United States and assess the association between circumcision and HIV infection.

Methods: Using respondent-driven sampling, 1154 black MSM and 1091 Latino MSM were recruited from New York City, Philadelphia, and Los Angeles. A 45-minute computer-assisted interview and a rapid oral fluid HIV antibody test (OraSure Technologies, Bethlehem, PA) were administered to participants.

Results: Circumcision prevalence was higher among black MSM than among Latino MSM (74% vs. 33%; $P < 0.0001$). Circumcised MSM in both racial/ethnic groups were more likely than uncircumcised MSM to be born in the United States or to have a US-born parent. Circumcision status was not associated with prevalent HIV infection among Latino MSM, black MSM, black bisexual men, or black or Latino men who reported being HIV-negative based on their last HIV test. Further, circumcision was not associated with a reduced likelihood of HIV infection among men who had engaged in unprotected insertive and not unprotected receptive anal sex.

Conclusions: In these cross-sectional data, there was no evidence that being circumcised was protective against HIV infection among black MSM or Latino MSM.

Key Words: black, circumcision, HIV/AIDS, homosexual, Latino, men who have sex with men

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Three recent randomized controlled trials (RCTs) conducted in Africa found that circumcision conferred a strong protective effect (55% to 60%) against acquisition of HIV infection among heterosexual men.^{1–3} Since the publication of the results of these trials, health professionals from Western and non-Western nations have been considering the utility of male circumcision as an HIV prevention strategy with populations at risk for HIV infection.^{4,5} Most adult men in the United States are circumcised.⁶ Population-based studies have found that white men are more likely to be circumcised (81% to 88%) than black men (65% to 73%) and that black men and white men are more likely to be circumcised than Latino men (42% to 54%).^{6,7} The results from the African trials may be applicable to heterosexual men in the United States.⁸ Whether the results from the African trials apply to men who have sex with men (MSM) in the United States is unknown.

Several issues complicate the application of the African trials to MSM. First, the HIV epidemic in Africa occurs largely among heterosexuals, whereas MSM remain the most affected risk group in the United States.⁹ Second, the African data might be most relevant to MSM who only take the insertive role during anal sex, because being the receptive partner during anal sex would involve an HIV transmission route that is likely to be unaffected by circumcision.⁴ Third, the concentration of HIV in rectal secretions may be greater than in vaginal secretions, which may increase HIV transmission risk per act of unprotected insertive anal sex compared with unprotected vaginal sex.⁴

Only 3 published studies have examined the association between circumcision status and HIV infection among Western MSM populations.^{10–12} Two of the 3 studies were conducted in the United States, and both found a protective effect associated with circumcision.^{11,12} Neither study recruited sufficient numbers of black or Latino MSM to examine the association between circumcision and HIV infection adequately by race/ethnicity, however. Because black MSM and Latino MSM are disproportionately affected by HIV in the United States compared with white MSM,^{13,14} it is imperative to explore the possibility of an association between circumcision and HIV infection by race/ethnicity. The purpose of this study is to examine the following:

1. Demographic and behavioral differences between circumcised and uncircumcised black MSM and Latino MSM

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The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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2. Associations between circumcision and HIV status in adjusted analyses among black MSM and Latino MSM
3. Associations between circumcision and HIV status in adjusted analyses among black men who reported recent sex with men and women and among black men who only reported recent sex with men
4. Associations between circumcision and a new HIV diagnosis among black MSM and Latino MSM who reported an HIV-negative result on their last test
5. Associations between circumcision and prevalent HIV infection among men who reported only engaging in unprotected insertive anal sex with male partners

METHODS

Data were collected as part of a study funded by the Centers for Disease Control and Prevention (CDC). The Brothers y Hermanos study recruited black MSM and Latino MSM to examine factors associated with HIV risk behavior and HIV infection. To be eligible, participants had to (1) be male (and identify as such); (2) identify as black or Latino; (3) be 18 years of age or older; (4) report sex (oral sex, anal sex, or mutual masturbation) with another man in the past 12 months; and (5) be a resident of New York City, Philadelphia, or Los Angeles. Men who were HIV-positive, HIV-negative, or of unknown serostatus were eligible for participation in the study. A total of 2235 MSM were recruited and interviewed between May 2005 and April 2006: 614 black MSM and 516 Latino MSM in New York City, 540 black MSM in Philadelphia, and 565 Latino MSM in Los Angeles County.

Recruitment

Respondent-driven sampling (RDS),¹⁵ a form of chain-referral sampling, was used to recruit participants at each site. RDS has been used in past studies to reach persons from hidden or hard-to-reach populations such as injection drug users,¹⁶ Ecstasy users,¹⁷ and Latino gay men.¹⁸

As part of the RDS sampling procedure, an initial set of target population members (called “seeds”) who met study eligibility criteria were recruited and interviewed. Seeds were then encouraged to recruit other eligible individuals from their social networks to participate in the study. Men recruited by the seeds were then asked to recruit the next wave of persons, with the process continuing until the target sample size was achieved. Each participant who agreed to become a study recruiter was given referral coupons to distribute to others. Referral coupons provided basic information about the study, including the study telephone number and the project office location(s). In addition, each study coupon contained a unique serial number (used to link the recruiter to his recruit). Recruiters were given a maximum of 3 coupons to prevent any single individual from dominating the recruitment process.

Procedures

Study enrollment took place in project offices located in office buildings, community-based organizations, community health centers, or neighborhood storefront offices. All the study sites offered weekend and/or evening hours to

accommodate men who were unable to participate during weekday hours.

After screening for eligibility and obtaining written informed consent, participants completed an audio computer-assisted self-interview (ACASI). The ACASI was available in English and Spanish versions and took approximately 45 minutes to complete. A unique numeric identification code that did not contain any personal identifiers was generated for each participant.

Next, all participants, except those who disclosed during screening that they had been previously diagnosed as HIV-positive, were tested for HIV antibodies using a rapid oral fluid HIV antibody test (OraQuick Advance; OraSure Technologies, Bethlehem, PA). All participants received pre- and posttest counseling. Men who tested preliminarily positive on the rapid test and men who disclosed that they were HIV-positive provided a blood specimen for confirmatory testing through Western blot assay and were asked to return in 1 to 2 weeks for the confirmatory results. Those with confirmed HIV infection received additional counseling and information on obtaining medical care and other services.

At the end of the study session, each participant was offered an opportunity to recruit others into the study. Those who agreed to recruit other men were given a brief training session on ways to approach and describe the study to prospective participants. Recruiters earned an additional \$15 to \$20 for each eligible person (up to 3) who they recruited into the study. All participants, regardless of whether they agreed to be recruiters, were paid \$50 for their participation in the study.

The protocol was approved by the Institutional Review Board at the CDC and at each of the local study sites.

Measures

Participants were asked “Is your penis circumcised or cut?” Of the 2245 men who completed the survey, 2106 answered this question. An additional 70 men who indicated that they spoke and read primarily in Spanish but took the English survey were excluded from the analysis. Our final sample for the analyses in this report included 1079 black MSM and 957 Latino MSM. HIV status was determined by the study’s HIV testing procedures as described previously.

Men were asked to indicate the highest level of education that they completed, their total income before taxes in the past 12 months, their sexual identity (ie, gay, bisexual, heterosexual, other), and the kind of health insurance they currently had. Participants were asked if they had been born in the United States and if their parents had been born in the United States. Those who indicated that they were not born in the United States were asked how many years they had lived in this country. Participants were asked if they had ever taken an HIV test, the number of times in their lives they had been tested, and the date of their most recent test. They were also asked if they had ever been diagnosed with a sexually transmitted disease (STD) by a health care provider.

To assess recent (past 3 months) sexual and substance use behaviors, participants were asked about insertive and receptive protected anal sex; insertive and receptive unprotected anal intercourse (UAI); protected and unprotected vaginal sex; number of male and female sex partners; and use

of alcohol, crystal methamphetamine, crack, cocaine, heroin, amyl nitrites, and “club drugs” (ie, ketamine, Ecstasy, γ -hydroxybutyrate). Additionally, to capture relevant transmission risk for this analysis, a variable reflecting sexual position was created. For this variable, a value of 1 corresponded to engaging in unprotected insertive anal sex (ie, being a “top”) but not unprotected receptive anal sex (ie, being a “bottom”) with male partners; a value of 0 corresponded to all other combinations of unprotected or protected insertive and receptive anal sex, including not engaging in any anal sex with a male partner.

Statistical Analysis

Survey data and HIV test results were analyzed using SAS 9.1 (SAS Institute, Cary, NC). Statistical significance was designated at $P < 0.05$. In descriptive analyses, we compared men who reported being circumcised with those who reported being uncircumcised on demographic characteristics, sexual risks, substance use behaviors, and health status using χ^2 tests for categorical variables and t tests for continuous variables. Multivariable logistic regression was used to assess factors associated with HIV-positive status, controlling for demographic and sexual risk covariates. Separate regression analyses were performed for black MSM and Latino MSM. Among black MSM, parallel analyses examined the factors associated with HIV-positive status for men who had reported recent sex with men and women (MSM/W) and for men who only had male partners (MSM/only). A final regression analysis examined the factors associated with an HIV diagnosis (based on testing done in the study) among MSM who reported an HIV-negative result on their last HIV test. All regression analyses were adjusted for factors associated with HIV infection among black and Latino MSM. Predictor variables were tested for evidence of collinearity, and interaction between sexual position and circumcision was evaluated.

RESULTS

Univariate Analyses

Black MSM had a higher prevalence of circumcision compared with Latino MSM (74% vs. 33%; $P < 0.0001$; Table 1). Among black MSM, circumcision was associated with being older, a higher level of education, higher income, being born in the United States, having at least 1 US-born parent, or identifying as gay. Among Latino MSM, there were fewer demographic differences by circumcision status, but circumcised Latino MSM were significantly more likely than uncircumcised Latino MSM to be born in the United States, to be living in the United States for a greater number of years, or to have 1 or 2 parents born in the United States. There were no differences in health insurance coverage by circumcision status for either racial/ethnic group.

Use of certain substances varied by circumcision status. Circumcised black MSM were more likely than uncircumcised black MSM to report using marijuana or amyl nitrites in the past 3 months. There were no other differences between circumcised and uncircumcised black MSM for the remaining drugs. Among Latino MSM, circumcised men were more

likely than uncircumcised men to report using cocaine, heroin, or crystal methamphetamine in the past 3 months.

HIV testing and sexual risk also differed between circumcised and uncircumcised men. Circumcised Latino MSM were more likely than uncircumcised Latino MSM to report a greater number of previous HIV tests and to be tested in the past year, but there were no differences by circumcision status among Latino MSM in ever being tested for HIV, number of receptive or insertive partners in the past 3 months, or recent UAI. In contrast, none of the HIV testing measures differed significantly between circumcised and uncircumcised black MSM. There were also no differences by circumcision status in the number of recent anal sex partners among black participants who reported the insertive role, but circumcised black MSM reported being the receptive partner during anal sex with a greater number of male partners than uncircumcised black MSM. Circumcised black MSM also reported greater rates of recent UAI than uncircumcised black MSM.

Circumcision status was not associated with ever being diagnosed with an STD or HIV infection in the Latino MSM or the black MSM sample.

Multivariable Analyses

We conducted separate logistic regression analyses to assess the association between circumcision and HIV infection among black MSM and Latino MSM, controlling for demographic characteristics and sexual risks (Table 2). There was no statistically significant association between circumcision and HIV status among Latino MSM (adjusted odds ratio [AOR] = 1.10, 95% confidence interval [CI]: 0.73 to 1.67) or black MSM (AOR = 1.23, 95% CI: 0.87 to 1.74). Among Latino MSM, older age, low income, being foreign born, being a Los Angeles resident, gay identification (vs. bisexual), or having ever been diagnosed with an STD was associated with an HIV-seropositive test result. Older age, low income, gay identification (vs. bisexual or heterosexual), being a resident of New York City, or ever having had an STD diagnosis was associated with an HIV-seropositive test result among black MSM. For each racial/ethnic group, men who reported being an exclusive top (ie, the insertive partner) during recent unprotected anal sex had a reduced odds of being HIV-positive compared with men who had not, but the reduced odds were only statistically significant among Latino MSM.

Next, we ran separate models for men who only reported recent male sex partners (MSM/only) and men who reported recent male and female sex partners (MSM/W; Table 3). These analyses were restricted to black men because a small number of Latino men reported sex with female partners in the past 3 months. Circumcision was not significantly associated with HIV infection (AOR = 0.99, 95% CI: 0.41 to 2.37) among black MSM/W or among black MSM/only (AOR = 1.45, 95% CI: 0.85 to 2.44). Lower education, previous STD diagnosis, or being recruited from the New York City site was associated with HIV infection among black MSM/W. Being older, low income, from the New York City site, gay-identified (vs. bisexual or heterosexual), or ever being diagnosed with an STD was associated with HIV infection among black MSM/only. Being the insertive partner during recent unprotected anal sex was associated with reduced odds of being

TABLE 1. Demographics of Circumcised and Uncircumcised Black and Latino MSM Recruited from New York City, Los Angeles, and Philadelphia, Brothers y Hermanos Study—Univariate Analyses

	Black MSM (n = 1079)			Latino MSM (n = 957)		
	Circumcised	Uncircumcised	P	Circumcised	Uncircumcised	P
	N (%)	N (%)		N (%)	N (%)	
Total	794 (73.6)	285 (26.4)		317 (33.1)	640 (66.9)	
Demographics						
Age, median	43.7	41.1	<0.01	33.1	33.1	0.95
Education						
<High school diploma	162 (20.4)	85 (29.8)		64 (20.2)	137 (21.4)	
High school or equivalent	439 (55.4)	146 (51.2)		164 (51.7)	335 (52.4)	
College and above	192 (24.2)	54 (19.0)	<0.01	89 (28.1)	167 (26.1)	0.79
Annual income						
<\$5000	257 (33.0)	113 (40.8)		85 (27.9)	194 (31.1)	
\$5000 to 9999	191 (24.6)	62 (22.4)		68 (22.3)	131 (21.0)	
\$10,000 to \$19,999	155 (19.9)	62 (22.4)		58 (19.0)	136 (21.8)	
\$20,000 and above	175 (22.5)	40 (14.4)	0.01	94 (38.8)	163 (26.1)	0.35
Born in US	747 (94.1)	243 (85.3)	<0.01	191 (60.3)	231 (36.2)	<0.01
Years in US, mean	39.8	41.1	0.12	23.8	18.4	<0.01
Any parent born in US	756 (95.5)	246 (86.3)	<0.01	169 (53.3)	165 (25.8)	<0.01
Sexual identity						
Gay	399 (50.5)	109 (38.3)		229 (72.2)	483 (75.7)	
Bisexual	277 (35.1)	120 (42.1)		71 (22.4)	109 (17.1)	
Heterosexual	78 (9.9)	39 (13.7)		7 (2.2)	13 (2.0)	
Other	36 (4.6)	17 (6.0)	<0.005	10 (3.2)	33 (5.2)	0.14
Health insurance coverage						
No medical coverage	126 (15.9)	41 (14.5)		127 (40.3)	293 (46.3)	
Medicaid or Medicare	536 (67.5)	207 (73.1)		104 (33.0)	195 (30.8)	
Private, Tricare, or VA coverage	132 (16.6)	35 (12.4)	0.46	84 (26.7)	145 (22.9)	0.08
Substance use (past 3 mo)						
Alcohol use	522 (65.9)	175 (61.6)	0.19	201 (63.4)	435 (68.0)	0.16
Frequency of alcohol use						
Daily	42 (8.0)	17 (9.7)		6 (3.0)	5 (1.2)	
A few times a week	117 (22.4)	41 (23.4)		24 (11.9)	52 (12.0)	
About once a week	85 (16.3)	30 (17.1)		39 (19.4)	56 (12.9)	
2 to 3 times a month	71 (13.6)	28 (16.0)		37 (18.4)	69 (15.9)	
About once a month	69 (13.2)	15 (8.6)		28 (13.9)	71 (16.3)	
Less than once a month	47 (9.0)	15 (8.6)		30 (14.9)	65 (14.9)	
Not at all	91 (17.4)	29 (16.6)	0.74	37 (18.4)	117 (26.9)	0.07
Crystal methamphetamine use	28 (3.5)	7 (2.5)	0.38	51 (16.1)	74 (11.6)	0.05
Cocaine use	249 (31.4)	103 (36.3)	0.14	46 (14.5)	58 (9.1)	0.01
Crack use	266 (33.6)	102 (35.8)	0.50	23 (7.3)	31 (4.9)	0.13
Marijuana use	386 (48.7)	113 (39.7)	<0.01	115 (36.3)	209 (32.7)	0.27
Heroin use	27 (3.4)	12 (4.2)	0.53	11 (3.5)	9 (1.4)	0.04
"Club" drug use*	28 (3.5)	5 (1.8)	0.13	41 (12.9)	76 (11.9)	0.64
Amyl nitrites use	100 (12.6)	18 (6.3)	<0.01	60 (18.9)	120 (18.8)	0.96
Sexual behavior (past 3 mo)						
No. partners: insertive UAI						
0	583 (74.8)	218 (79.6)		255 (81.0)	525 (83.2)	
1	72 (9.4)	21 (7.7)		20 (6.4)	34 (5.4)	
≥2	124 (15.9)	35 (12.8)	0.29	40 (12.7)	72 (11.4)	0.68
No. partners: receptive UAI						
0	651 (83.1)	255 (91.7)		268 (85.6)	547 (86.7)	
1	62 (5.8)	12 (4.3)		21 (6.7)	43 (6.8)	
≥2	70 (8.9)	11 (4.0)	<0.01	24 (7.7)	42 (6.7)	0.85

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TABLE 1. (continued) Demographics of Circumcised and Uncircumcised Black and Latino MSM Recruited from New York City, Los Angeles, and Philadelphia, Brothers y Hermanos Study—Univariate Analyses

	Black MSM (n = 1079)			Latino MSM (n = 957)		
	Circumcised	Uncircumcised	P	Circumcised	Uncircumcised	P
	N (%)	N (%)		N (%)	N (%)	
Any UAI	296 (37.3)	87 (30.5)	0.04	103 (32.5)	209 (32.7)	0.95
Insertive UAI only	138 (17.4)	52 (18.3)	0.74	43 (13.56)	87 (13.6)	0.99
HIV/STD history						
Ever diagnosed with STD	525 (66.1)	177 (62.1)	0.22	131 (41.5)	261 (40.9)	0.87
Ever tested for HIV	727 (91.7)	256 (89.8)	0.34	279 (88.0)	539 (84.4)	0.13
Total no. HIV tests	5.7	5.5	0.76	6.7	5.1	0.01
Tested for HIV in the past 12 mo	342 (47.6)	123 (49.2)	0.67	164 (59.0)	255 (47.4)	<0.01
HIV-positive test result†	425 (53.7)	138 (48.8)	0.16	116 (36.6)	232 (36.4)	0.94

*“Club” drugs include ketamine, Ecstasy, and γ -hydroxybutyrate.

†Based on the project’s rapid and confirmatory tests.

US indicates United States; VA, Veterans Affairs.

HIV-positive among black MSM/only, but the association was not statistically significant for black MSM/W.

To examine whether circumcision was related to recent HIV seroconversion, we combined the black and Latino MSM samples and selected the subset of men who reported being HIV-negative on their last HIV test (Table 4). Using circumcision as the exposure variable, we ran the regression

model and found no association between circumcision and a new HIV-positive diagnosis (AOR = 1.61, 95% CI: 0.84 to 3.07). Having a low income and being gay-identified (vs. bisexual) were associated with a new HIV diagnosis. Older age and being born in the United States approached significance with having a new HIV diagnosis. There were no differences in new HIV diagnoses among men who reported being the

TABLE 2. Factors Associated With HIV-Positive Status Among the Total Sample of Black MSM and Latino MSM Recruited From New York City, Los Angeles, and Philadelphia, Brothers y Hermanos Study—Multivariate Logistic Regression

Covariates	Black MSM (n = 1044)*		Latino MSM (n = 923)*	
	AOR	(95% CI)	AOR	(95% CI)
Circumcised (yes vs. no)	1.23	(0.87 to 1.74)	1.10	(0.73 to 1.66)
Age (1 y)	1.05	(1.04 to 1.07)	1.10	(1.08 to 1.12)
Education				
College and above	1.00	—	1.00	—
High school or equivalent	1.26	(0.85 to 1.85)	0.71	(0.44 to 1.15)
<High school	1.20	(0.75 to 1.93)	0.78	(0.43 to 1.41)
Annual income				
≥\$20,000	1.00	—	1.00	—
\$10,000 to \$19,999	2.27	(1.42 to 3.64)	2.50	(1.38 to 4.52)
\$5000 to \$9999	2.08	(1.32 to 3.28)	5.51	(3.02 to 10.05)
<\$5000	1.15	(0.74 to 1.77)	5.92	(3.30 to 10.64)
Sexual identity				
Gay	1.00	—	1.00	—
Bisexual	0.24	(0.17 to 0.34)	0.43	(0.27 to 0.71)
Heterosexual	0.09	(0.05 to 0.16)	0.31	(0.09 to 1.03)
Other	0.52	(0.27 to 1.00)	0.32	(0.10 to 1.05)
Black sites† (New York vs. Philadelphia)	3.67	(2.71 to 4.98)	—	—
Latino sites† (New York vs. Los Angeles)	—	—	0.74	(0.64 to 0.85)
Born in US (yes vs. no)	0.87	(0.51 to 1.47)	0.52	(0.29 to 0.95)
Any recent UAI (yes vs. no)	1.14	(0.81 to 1.60)	1.14	(0.76 to 1.73)
Sexual position (top vs. other)	0.75	(0.49 to 1.15)	0.52	(0.29 to 0.95)
Previous STD diagnosis	3.64	(2.64 to 5.02)	4.29	(2.92 to 6.30)

Sexual position compares men who reported being the insertive partner during unprotected anal sex with a man in the past 3 months relative to men who had not engaged in that activity.

*Of the 1044 black MSM, 546 were HIV-positive; of the 923 Latino MSM, 330 were HIV-positive.

†Two research sites recruited only black MSM, and an additional 2 sites recruited only Latino MSM.

US indicates United States.

TABLE 3. Factors Associated With HIV-Positive Status Among Black MSM/W and Black Men Who Only Reported Male Sex Partners in New York City and Philadelphia, Brothers y Hermanos Study—Multivariate Logistic Regression

Covariates	Black MSM/W (n = 170)*		Black MSM/Only (n = 551)*	
	AOR	(95% CI)	AOR	95% CI
Circumcised (yes vs. no)	0.99	(0.41 to 2.37)	1.44	(0.85 to 2.44)
Age (1 y)	1.01	(0.96 to 1.06)	1.08	(1.06 to 1.11)
Education				
College and above	1.00	—	1.00	—
High school or equivalent	4.18	(1.07 to 16.37)	1.58	(0.93 to 2.69)
<High school	7.85	(1.63 to 37.89)	1.25	(0.64 to 2.44)
Annual income				
≥\$20,000	1.00	—	1.00	—
\$10,000 to \$19,999	2.32	(0.59 to 9.15)	2.07	(1.06 to 4.06)
\$5000 to \$9999	3.34	(0.82 to 13.68)	1.89	(1.01 to 3.55)
<\$5000	1.56	(0.43 to 5.64)	0.84	(0.46 to 1.52)
Sexual identity				
Gay	1.00	—	1.00	—
Bisexual	2.18	(0.52 to 9.16)	0.30	(0.18 to 0.50)
Heterosexual	1.80	(0.31 to 10.61)	0.17	(0.05 to 0.66)
Other	0.50	(0.04 to 7.21)	0.84	(0.29 to 2.40)
Project site† (New York vs. Philadelphia)	5.97	(2.64 to 13.50)	4.37	(2.76 to 6.92)
Born in US (yes vs. no)	0.12	(0.01 to 1.48)	1.12	(0.51 to 2.44)
Any recent UAI (yes vs. no)	0.92	(0.33 to 2.53)	1.14	(0.71 to 1.83)
Sexual position (top vs. other)	0.79	(0.28 to 2.24)	0.54	(0.30 to 0.95)
Previous STD diagnosis	5.58	(2.10 to 14.83)	3.93	(2.49 to 6.20)

Sexual position compares men who reported being the insertive partner during unprotected anal sex with a man in the past 3 months relative to men who had not engaged in that activity.

*Of the 170 black MSM/W, 63 were HIV-positive; of the 551 black MSM only, 342 were HIV-positive.

†Research sites that recruited only black MSM.

US indicates United States.

insertive partner during recent unprotected anal sex and men who had not.

In each regression model, we added an interaction term reflecting the combination of circumcision status and sexual position (unprotected insertive role during anal sex vs. other). None of the interaction terms was statistically significant in any model; that is, among those who engaged in unprotected insertive but not unprotected receptive anal sex in the prior 3 months, HIV prevalence was not lower among circumcised than uncircumcised black MSM (AOR = 0.69; $P = 0.42$), Latino MSM (AOR = 2.64; $P = 0.12$), black MSM/W (AOR = 1.29; $P = 0.78$), black MSM/only (OR = 1.00; $P = 0.95$), or black or Latino MSM newly diagnosed with HIV (AOR = 0.70; $P = 0.63$). We further explored the association between circumcision status and HIV infection among the 190 black and 130 Latino MSM who reported recent insertive UAI exclusively. No association was found for black (odds ratio [OR] = 1.47; $P = 0.25$) or Latino (OR = 1.59; $P = 0.28$) MSM who only engaged in unprotected anal sex as the insertive partner.

DISCUSSION

We found no statistically significant evidence of a protective effect from prevalent HIV infection among circumcised black or Latino MSM. If the results from the

African circumcision trials were directly applicable to the MSM in our study, we would have expected to observe a significantly higher prevalence of HIV infection among uncircumcised men. Circumcision conferred neither risk nor protection among black men or Latino men in our study, however, and was unrelated to seroconversion among MSM who reported that their last HIV test was negative. Further, there was no evidence that circumcision was protective among men who had only engaged in unprotected insertive anal sex in any of the models.

Previous research has found that black MSM and Latino MSM are more likely to engage in bisexual activity than men of other races and ethnicities.^{19–21} Studies have also found that MSM/W, irrespective of race/ethnicity, are less likely than MSM/only to engage in receptive anal sex with male partners.^{22,23} Because evidence suggests that male circumcision provides a protective effect for men who only have sex with women,^{1–3,8} it has fueled speculation that circumcision might confer some protective effect among MSM/W²⁴ because MSM/W are more likely to engage in sex as the insertive partner with men than MSM/only.²⁵ Yet, the association between circumcision status and HIV infection was not statistically significant for black MSM/W or black MSM/only in our data set.

The results from our study stand in contrast to those of 2 other US-based studies of MSM in which circumcision

TABLE 4. Factors Associated With New HIV Diagnoses Among Black MSM and Latino MSM Who Self-Reported Being HIV-Negative on Their Last HIV Test in New York City, Los Angeles, and Philadelphia, Brothers y Hermanos Study—Multivariate Logistic Regression

Covariates	AOR	(n = 925)*
		95% CI
Circumcised (yes vs. no)	1.61	(0.84 to 3.07)
Age (1 y)	1.01	(0.99 to 1.05)
Education		
College and above	1.00	—
High school or equivalent	1.06	(0.50 to 2.25)
<High school	1.46	(0.59 to 3.60)
Annual income		
≥\$20,000	1.00	—
\$10,000 to \$19,999	4.31	(1.76 to 10.57)
\$5000 to \$9999	4.20	(1.69 to 10.42)
<\$5000	1.59	(0.60 to 4.22)
Sexual identity		
Gay	1.00	—
Bisexual	0.46	(0.23 to 0.93)
Heterosexual	0.53	(0.19 to 1.43)
Other	0.31	(0.04 to 2.43)
Latino vs. Black	0.79	(0.57 to 1.09)
Born in US (yes vs. no)	2.25	(0.94 to 5.42)
Any recent UAI (yes vs. no)	1.36	(0.72 to 2.56)
Sexual Position (top vs. other)	1.15	(0.54 to 2.45)
Previous STD diagnosis	1.47	(0.82 to 2.62)

Sexual position compares men who reported being the insertive partner during unprotected anal sex with a man in the past 3 months relative to men who had not engaged in that activity.

*Of these 925 men, 61 tested HIV-positive on study enrollment.
US indicates United States.

conferred a protective effect from HIV infection.^{11,12} Notably, these previous studies enrolled primarily white MSM. Because HIV infection is disproportionately higher among black and Latino MSM than among white MSM in the United States, perhaps the greater background prevalence of HIV infection in black and Latino MSM communities diminishes any protective effect afforded by circumcision. This is partially supported by one of the previous US-based studies of MSM, which found that although uncircumcised men were at greater risk for HIV infection, this effect was modest compared with other factors that contributed to HIV seroconversion.¹¹

Our null results are comparable to those of 2 recent studies that examined circumcision and HIV infection among MSM in Peru and Australia. Findings from a large cross-sectional survey of Latino MSM in 3 Peruvian cities found no association between circumcision status and HIV infection, but the authors reported evidence of a protective trend among circumcised men who had only engaged in insertive anal sex.²⁶ These data are similar to the null results among Latino MSM in our sample, except that we did not find evidence of a protective trend among circumcised Latino MSM who only reported insertive anal sex. Likewise, a prospective study of

MSM in Australia found no association between circumcision status and HIV incidence among all MSM who seroconverted or among the subset of newly infected men who had engaged exclusively in insertive anal sex.²⁷

Our study is not without its limitations. First, we relied on self-report of participants' true circumcision status, although there is evidence of high concordance between self-reported and actual circumcision status among MSM.²⁷ Moreover, because of nondifferential misclassification, any reporting bias in circumcision status would have been toward the null. Second, we used a network-based approach for recruiting MSM, and the composition of our final sample may have been substantially different if other probability-based data collection methods (eg, time-space sampling) were used. Third, our data only capture sexual and substance use risk behaviors that took place relatively recently (in the past 3 months) and may not reflect long-term behavioral risk patterns. Nevertheless, we attempted to address this limitation by restricting one of our analyses to men who tested HIV-negative in their last test before enrolling in the study and then examining whether circumcision was associated with seroconversion. Research shows that HIV-positive individuals who are aware of their serostatus alter their sexual behavior after diagnosis.²⁸ It is possible that the 3-month behavioral recall period represents behavior patterns over a longer period of time for men who were unaware of their HIV-positive status, and thus might overlap with seroconversion. A fourth limitation is that our regression analyses modeled associations between circumcision status and chronic rather than incident HIV infection. Fifth, we do not control for sexual partner's serostatus, which may be a confounder in our regression analyses. Finally, our data are cross-sectional and do not permit causal inferences. A prospective cohort design might have yielded an association between circumcision status and HIV infection,¹¹ although a recent prospective study of MSM found no such association.²⁷

There are concerns over the ethics and feasibility of a US-based male circumcision RCT.⁴ Participants at a recent CDC consultation on circumcision agreed that instead of an RCT, more evidence from observational studies of MSM is needed before drawing any conclusions about the merit of circumcision as an HIV prevention tool.²⁹ Moreover, others have suggested that a cautionary approach may be especially prudent before promoting circumcision as a viable strategy among black or Latino populations, given historical abuses against people of color in the United States (eg, Eugenics movement, Jim Crow era castration campaigns).²⁴

Disproportionately high infection rates among black and Latino MSM necessitate the investigation, refinement, and dissemination of effective behavioral and biomedical HIV prevention interventions that are capable of stemming the epidemic in both populations of men. The promotion of circumcision has been suggested as one such intervention for men who have sex with women. Additional observational studies need to be conducted before any definitive conclusions can be drawn about the association between circumcision status and HIV infection among black MSM and Latino MSM in the United States.

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