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## Condom Breakage Among Young Black Men Who Have Sex With Men: An In-Depth Investigation Including Men Living With HIV/AIDS

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### Abstract

Correlates of condom breakage (reported by 19% of 398 young black who have sex with men) for anal insertive sex included the following: condoms drying out ( $P=0.018$ ), erection loss during application ( $P=0.03$ ), and using erection-enhancing drugs ( $P=0.003$ ). Breakage was 2.7 times greater for HIV-positive men ( $P=0.001$ ). Breakage was associated with testing positive for urethral infections ( $P=0.012$ ).

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Biological synergy between sexually transmitted infections (STIs) and HIV acquisition<sup>1–3</sup> warrants the primary prevention of these infections to reduce HIV transmission. Moreover, gonorrhea resistance to treatment remains problematic.<sup>4</sup>

Male condoms remain as the single best method of preventing the acquisition and transmission of STIs.<sup>5,6</sup> However, at least among heterosexuals, condom effectiveness may be poor unless several forms of user error are avoided.<sup>7</sup> A primary user error is condom breakage.<sup>7–12</sup> During anal sex, breakage poses some risk to the insertive partner; however, the receptive partner becomes completely exposed to potentially infected ejaculate (unprotected receptive anal sex is the leading sexual risk factor for HIV infection—the risk is 18 times greater than that experienced by females having unprotected penile-vaginal sex<sup>13</sup>). Unfortunately, only 2 studies have investigated condom breakage among who have sex with men (MSM) having anal sex<sup>11,12</sup> and neither of these occurred in the population of MSM experiencing the greatest burden of HIV in the United States: young black MSM (YBMSM), residing in the southern United States. In the United States, YBMSM are the nation's leading priority for HIV prevention.<sup>14</sup> This population accounts for a proportion of infections among all MSM that is 100 times larger than their relative population size.<sup>15</sup> Young black MSM in the United States have a 1-in-4 chance of becoming infected by age 25 years.<sup>16</sup> These odds are far worse in the south, where most of the epidemic is occurring.<sup>16</sup>

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The purpose of this study was to investigate the causes of breakage during anal sex as a top (insertive) partner and the characteristics (including HIV serostatus) of YBMSM most likely to experience breakage when wearing condoms for anal sex with males. To provide optimal rigor, an event-level analysis was used.<sup>17,18</sup> Whether breakage during the last time a condom was used for insertive anal sex was associated with urethrally acquired *Neisseria gonorrhoeae* (*NG*) and *Chlamydia trachomatis* (*CT*) was also assessed. Finally, the possible interaction of HIV serostatus and breakage with urethral *NG/CT* was tested.

A convenience sample of 398 YBMSM were recruited for participation in a National Institutes of Health–funded randomized controlled trial of a safer sex intervention program. Only baseline data were used. Recruitment occurred in a federally supported clinic designated specifically for the diagnosis and treatment of HIV and other STIs. Inclusion criteria were as follows: (1) self-identification as black/African American, (2) ages 18 to 29 years, (3) attending the clinic to be tested for HIV or other STIs; (4) engaging in penile-anal sex, as a top with a male partner, at least once in the past 6 months; and (4) the ability to speak and comprehend English.

A total of 733 men were screened for eligibility; of these 485 were eligible. After being offered, the opportunity to enroll, 85 YBMSM declined, yielding a participation rate of 82.5%. All study procedures were approved by the institutional review board at the University of Mississippi Medical Center and the Office of Research Integrity at the University of Kentucky.

After providing written informed consent, men completed a computer-assisted online questionnaire in private. The questionnaire included an item asking, “The last time that you used a condom for anal sex with another male did the condom you were using break during sex?” Other items assessed various possible causes and characteristics (see Table 1) of breakage, including a 7-item scale measure of internalized homophobia (Cronbach  $\alpha = 0.81$ ). The questionnaire also asked men to self-report their HIV status. This self-report was subsequently verified by either the clinic record or the administration of an OraSure test. Finally, men were evaluated for urethrally acquired *CT* and *NG* through nucleic acid amplification testing performed on urine specimens.

Bivariate associations between breakage and selected characteristics/causes were assessed by  $\chi^2$  tests. Characteristics/causes achieving screening significant ( $P < 0.20$ ) at the bivariate level were entered into forward stepwise logistic regression models (one for the characteristics and another for causes). Multivariate significance was defined by 95% confidence intervals and  $P$  values of 0.05 or less. Finally, the association between breakage and *CT/NG* (combined) was assessed by  $\chi^2$  and the interaction effect with HIV serostatus was assessed with a layered  $\chi^2$  test.

Average (SD) age was 22.58 (3.13) years. Men's average monthly income ranged from less than \$500 per month (19.6%), to greater than \$2000 (16.8%). Just under one-third (29.1%) reported having received food stamps in the past 12 months. Sixty percent reported current employment, and 47.0% reported current enrollment in school/college. Scores on the measure of internalized homophobia ranged from 1.4 (low) to 7.0 (high). Twenty-six men

tested positive for *CT* and 20 tested positive for *NG*. Eight men had both *CT* and *NG*. More than one-quarter (107/384; 27.8%) were HIV positive.

Fourteen men opted not to answer the question on breakage, leaving 384 for the analyses. Of these, 73 men (19.0%) indicated that breakage occurred the last time they had sex as a top.

Table 1 displays the bivariate associations pertaining to the dichotomous correlates. As shown, 4 of the 5 possible causes were significant and 1 of the 4 characteristics was significant. Three other characteristics (not shown in Table 1) were assessed by continuous measures. Age did not differ between those reporting and not reporting breakage ( $M = 22.0$  years with breakage vs. 22.7 without breakage,  $t = 1.74$  [367],  $P = 0.08$ ). Frequency of condom use as a top in the past 90 days did not differ between groups ( $M = 7.59$  times with breakage vs. 4.43 without breakage,  $t = 1.41$  [355],  $P = 0.16$ ). Also, a scale measure of internalized homophobia did yield differences ( $M = 4.03$  with breakage vs. 3.48 without breakage,  $t = 3.10$  [382],  $P = 0.002$ ).

Table 2 displays the results of the logistic regression models relative to causes and characteristics associated with breakage. The model for causes was significant ( $\chi^2$  with 4  $df = 25.0$ ,  $P < 0.0001$ ) and achieved a satisfactory fit with the data (goodness-of-fit  $\chi^2$  with 3  $df = 4.56$ ,  $P = 0.21$ ). Three of the 4 correlates entered retained significance. Having condoms dry out during sex increased the odds of breakage by 2-fold, as did having issues with erection loss during condom application. Using an erection-enhancing drug increased the odds of breakage by more than 4-fold.

The model for characteristics was significant ( $\chi^2$  with 4  $df = 24.9$ ,  $P < 0.0001$ ) and achieved a satisfactory fit with the data (goodness-of-fit  $\chi^2$  with 8  $df = 8.6$ ,  $P = 0.38$ ). Three of the 4 correlates entered retained significance. For every added time men had sex as a top, the odds of breakage during last sex significantly increased by 2%. For every 1-unit increase of internalized homophobia, the odds of breakage increased by 40%. In addition, the odds of breakage were 2.7 times greater for men living with HIV/AIDS.

Finally, the event of breakage was significantly associated with a positive test result for urethraly acquired *CT/NG*. Among those reporting breakage, prevalence was 17.8% versus 8.0% among those without breakage ( $P = 0.012$ ). This association was moderated by HIV status, with significance applying to those living with HIV/AIDS ( $P = 0.05$ ) rather than those who were HIV negative ( $P = 0.10$ ).

This is the first in-depth study of condom breakage specifically among YBMSM. Breakage was extremely common. The most critical findings concern the elevated prevalence of *CT/NG* among those experiencing breakage the last time a condom was used, as a top, with male partners. This was especially true for men living with HIV/AIDS. These urethral infections in HIV-positive men may, in turn, facilitate the transmission of HIV to sex partners during condomless sex or when breakage occurs.

A primary cause of breakage may be the use of erection-enhancing drugs<sup>19</sup>; thus, caution should be exercised in making these prescriptions without teaching YBMSM how to avoid other causes of breakage (letting condom dry out during sex and having issues during

condom application). Breakage is not a function of age or having multiple partners as a top; however, it may be a function of having more frequent anal sex as a top, greater levels of internalized homophobia, and living with HIV/AIDS. Possible mediating variables for these last 2 study findings warrant further investigation. For instance, an investigation could determine whether internalized homophobia may lead to rushed condom application, thereby potentially leading to breakage. For YBMSM living with HIV/AIDS, it may be that several psychological factors (e.g., fear of disclosing their status and worry about whether condom use will raise suspicions of being HIV-infected) may plausibly lead to rushed/poor condom application that may, in turn, cause breakage. Although other significant factors such as condoms drying out (with the added friction causing breakage) may be evident in their association with breakage, 2 other factors require further investigation: erection loss during application (possibly leading to rushed application) and use of erection-enhancing drugs (possibly causing breakage as a consequence of prolonged sex without added lubrication).

Findings are limited by the validity of men's self-reported data and by the use of a convenience sample. The convenience sample, however, may be representative of relatively higher-risk YBMSM, given that all men were recruited from a publicly funded sexually transmitted disease clinic. Although this representativeness may extend to YBMSM residing in other midsize southern cities, it is not known whether similar findings would occur in other populations of MSM. This may be especially true for older black MSM who are perhaps more experienced with condom use.

To better achieve the Centers of Disease Control and Prevention vision of “high-impact prevention,” the findings suggest that clinics diagnosing and treating STIs among YBMSM may benefit this population by including teaching as part of routine clinical care. This teaching may take the form of brief, clinic-based one-to-one counseling programs that provide men with requisite information, motivation, and skills to use condoms effectively and to avoid breakage. Several such programs have been tested and shown to be efficacious.<sup>20–24</sup> In addition to reducing HIV transmission risk, teaching YBMSM how to avoid condom breakage may also reduce STI burden. One possible strategy for this education involves nurse educators or health educators taking as little as 30 minutes of time in a postexamination room to privately interact with the patient about his past negative experiences with condom use, his current reasons for nonuse, and his “issues” with comfort and sensation when using condoms (or when a partner does so). This type of education is now Medicaid reimbursable for sexually transmitted disease clinics; reimbursement can be provided for up to two 30-minute sessions annually.<sup>25</sup>

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TABLE 1

## Bivariate Associations Between Selected Correlates and Condom Breakage

	%Reporting Breakage	Prevalence Ratio	<i>P</i>
<i>Correlates pertaining to causes</i>			
Condom became dry during sex			
Yes (81)	30.9	1.96	0.002
No (n = 303)	15.8		
Used a new condom			
No (51)	25.5	1.42	0.20
Yes (333)	18.0		
Condom fit correctly			
No (125)	25.6	1.62	0.02
Yes (259)	15.8		
Used an erection-enhancing drug			
Yes (18)	50.0	2.86	0.001
No (366)	17.5		
Erection loss during condom application			
Yes (68)	33.8	2.14	0.001
No (316)	15.8		
<i>Correlates pertaining to characteristics</i>			
Circumcised			
No (105)	21.0	1.15	0.55
Yes (279)	18.3		
Multiple sex partners as a top (past 90 d)			
Yes (163)	20.9	1.21	0.37
No (221)	17.2		
Currently enrolled in school or college			
No (204)	19.2	1.02	0.91
Yes (181)	18.8		
HIV positive			
No (277)	15.2	1.92	0.002
Yes (107)	29.2		

**TABLE 2**

Multivariate Findings Relative to Causes and Characteristics Pertaining to Breakage During the Last Time Condoms Were Used

	<b>AOR</b>	<b>95% CI</b>	<b>P</b>
Correlates pertaining to causes			
Condom became dry during sex	2.05	1.13–3.71	0.018
Condom did not fit	1.20	0.71–2.31	0.41
Used an erection-enhancing drug	4.43	1.64–11.94	0.003
Erection loss during condom application	2.03	1.06–3.09	0.03
Correlates pertaining to characteristics			
Age	0.93	0.84–1.02	0.12
Frequency of sex as a top, past 90 d	1.02	1.01–1.04	0.04
Internalized homophobia	1.40	1.13–1.74	0.002
Living with HIV/AIDS	2.70	1.50–4.86	0.001

AOR indicates adjusted odds ratio, adjusted for the influence of all other variables in the model; CI, confidence interval.

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