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## Prevalence, Correlates, and Sexually Transmitted Infection Risk Related to Coitus Interruptus Among African-American Adolescents

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“COITUS INTERRUPTUS” OR WITHDRAWAL THAT involves the male partner “pulling out” before ejaculation, has received relatively little research attention, particularly in adolescents. The limited data that exist suggest that it is practiced among adolescents, yet its prevalence remains unclear. Depending on how withdrawal is measured (used at last sex occasion or regular use) prevalence rates vary from 9% to 48%.<sup>1-3</sup> Furthermore, in certain groups (e.g., college students), the combined use of withdrawal and condoms appears to be common. For example, in 1 study with male college students,<sup>4</sup> 43% reported this practice, suggesting that withdrawal may be practiced in 2 ways: (1) throughout intercourse with withdrawal just before extravaginal ejaculation, or (2) initially during intercourse before applying a condom for intravaginal ejaculation.

Researchers have suggested that withdrawal may provide some protection for male-to-female human immunodeficiency virus (HIV) transmission<sup>5-8</sup>; however, STIs contracted through lesions and ulcers may be transmitted by withdrawal, regardless of whether condoms are used.<sup>9</sup>

In a research trial developed to test the efficacy of a sexually transmitted infection (STI)/HIV prevention program among black adolescents,<sup>10</sup> we were surprised to see extensive use of withdrawal (60% prevalence). Because black adolescents are disproportionately affected by the intersecting epidemics of HIV and other STIs,<sup>11</sup> the practice of withdrawal may pose a particular risk practice for this population. Therefore, we examined 3 questions: (1) what are the correlates of withdrawal use among black adolescents, (2) how widespread is the combined use of withdrawal and condoms, and (3) what is the contribution of withdrawal to STI acquisition.

Details about the research trial are described elsewhere.<sup>10</sup> In brief, 1794 low-income black youth (age range, 14–18 years) were recruited from 4 medium-sized US cities with sizable black communities, above average levels of poverty, and high STI/HIV prevalence rates. The study was approved by the Institutional Review Boards of the participating universities.

Baseline assessments of participants (N = 585, average age = 16.6, SD = 1.1, 48% men) who reported having engaged in vaginal sex within the last 3 months were selected for analyses. Participants completed a baseline assessment, using audio and computer-assisted self-interview and provided urine specimens to assess the presence of 3 STIs: gonorrhea, *Chlamydia* infections, and trichomoniasis. *Chlamydia* and gonorrhea were tested using strand displacement amplification technique,<sup>12</sup> whereas *Trichomonas* was tested using a real-time polymerase chain reaction (PCR) assay.<sup>13</sup> Urine collection occurred in a private room. Specimens were stored in refrigerators until packed in approved biospecimen boxes and shipped via overnight courier to the Emory University Microbiology Laboratory for assay. Youth who tested positive for any STI were treated by a medical care provider. Youth received \$30 in exchange for completing the baseline assessment.

Respondents were categorized as having used withdrawal (or not) in the past 3 months. Further data on sexual behavior included the following: (a) number of lifetime sexual partners (1, 2–4, or  $\geq 5$  partners) and for the last 3 months; (b) number of sex occasions (1, 2–4, or  $\geq 5$  times); (c) experience of condom breakage (yes vs. no); and (d) consistency of condom use for vaginal sex (always vs. not always having used a condom on every sex occasion). Based on the STI urine screening, respondents were categorized into those with a positive test for one or more STIs and those with a negative test for all STIs.

Data were analyzed using SPSS 15.0.<sup>14</sup> Table 1 shows bivariate associations between withdrawal use and various demographic and behavioral characteristics. Use of withdrawal was quite common (60%), especially among participants reporting one or more episodes of sex without a condom (71%). However, withdrawal was also reported by youth who claimed to have used condoms on every sexual occasion (47%). Gender and age were not related to withdrawal use.

To assess which factors were independently associated with withdrawal, background and sexual behavioral variables were entered simultaneously in a binary logistic regression model. Because STI/HIV prevention messages were placed on commercial radio and television in 2 of the cities throughout the baseline assessment period, we controlled for city differences and the amount of time elapsed between the interview and the start of the media campaign.

Results showed that increased sex occasions (5 or more times vs. 1 time, OR = 1.97,  $P = 0.010$ ), condom breakage (OR = 1.76,  $P = 0.017$ ), and instances of condom non-use in the past 3 months (OR = 2.75,  $P = 0.000$ ) increased the odds of withdrawal use.

In the final step, we tested the combined and separate effects of withdrawal and condom non-use on STI diagnosis in a stepwise logistic regression model, including the following categories: (A) always using a condom and no withdrawal; (B) some sex without a condom and no withdrawal; (C) some sex without a condom and withdrawal; and (D) always using a condom and reports of withdrawal. The 4 categories had the following unadjusted STI rates: (A): 7.9%, (B): 17.6%, (C): 18.4%, and (D): 7.6%.

As shown in Table 2, male gender was associated with a decreased likelihood of testing positive for an STI, whereas having 5 or more sexual partners significantly increased the chance of STI diagnosis. Additionally, the combination of reporting one or more instances of sex without a condom and withdrawal (category C) significantly increased the odds of being diagnosed with an STI in comparison with those reporting completely protected occasions.

Findings from this study indicate that withdrawal is a frequently used practice (~60%) among sexually active black adolescents living in low-income urban areas. Another study that was based on a predominantly white male college student sample<sup>4</sup> also found high rates of withdrawal (43%). Thus, it appears that widespread use of withdrawal is not limited to black adolescents.

Withdrawal may be perceived as having several advantages over other forms of contraception, such as being free, always available, and requiring no medical supervision. These characteristics could make the method appealing to teens who engage in sex but who do not always have condoms available. Furthermore, the finding that experiencing condom breaks is associated with use of withdrawal may indicate that, on those occasions of condom breakage, adolescents resort to the next best thing available for protection, namely, withdrawal.

Perhaps most important, this study reveals that withdrawal is used by youth who report that they always used a condom during episodes of vaginal sex. About half of youth who reported that they always used condoms also reported using withdrawal at some time during those occasions. Previous research points to some reasons for this seemingly paradoxical report. Some young people find condoms uncomfortable and experience difficulties using them.<sup>15, 16</sup> This might lead them to remove them and continue sex without them,<sup>16</sup> or to begin sex without a condom and later apply a condom before ejaculation. From this perspective, withdrawal may sometimes be analogous to condom use “for ejaculation only”<sup>17</sup> in that unprotected penetration occurs, but intravaginal ejaculation is avoided.

Another possibility is that withdrawal occurs during (as opposed to after or before) condom use. Nevertheless, based on previous research, we believe that withdrawal is most often used when a condom is not worn. In-depth interviews conducted with 124 low-income black adolescents before this trial showed that 78 informants had used withdrawal instead of condoms, but no one ever mentioned using withdrawal, while wearing a condom.<sup>3</sup> Furthermore, a study among male college students reported that 43% started sex and then withdrew before putting on a condom and continuing sex.<sup>4</sup> Nevertheless, the potential use of withdrawal during condom use cannot be ruled out, making this an issue that ought to be explored in future research.

The results indicate that individuals who use withdrawal as well as failing to use condoms consistently are most likely to acquire STIs. This finding is consistent with the expectations that STI transmission may occur when using withdrawal as a result of exposure to ulcers or semen.<sup>18-21</sup> Nevertheless, since the STI prevalence in the 2 inconsistent condom use groups (with and without withdrawal) were similar, evidence of STI risk associated with withdrawal needs to be replicated and explored further in future research. Furthermore, it is somewhat surprising that youth who report using withdrawal with consistent condom use exhibit no greater STI acquisition than those who report no unprotected sex. Research could explore whether this reflects safer partner selection or using withdrawal in a limited way.

Two limitations should be acknowledged. First, we relied upon self-report, which can be influenced by memory or motivational biases; however, the use of computer-assisted self-interview should reduce self-report bias. Second, we sampled only disadvantaged black adolescents; consequently, results should not be generalized to other populations. Replication is needed, as is research with samples representing other socioeconomic groups, and gay and bisexual youth.

As with any study, the findings raise additional questions that need to be addressed in future research. For example, the practice (and determinants) of withdrawal may change as individuals (and relationships) mature. Indeed, type of relationship may be a critical factor in

estimating the risk of STI diagnosis related to the use of withdrawal. In addition, it would be helpful to use mixed methods, and ask respondents detailed questions about the event-specific circumstances in which withdrawal occurs (e.g., before or after condom use) and the intended purpose of withdrawal (birth control and/or STI prevention). To obtain better estimates of protected sexual practices, it is also important to allow for coding of multiple prevention methods during the same intercourse occasion to identify practices, which may either augment or undermine putatively safe practices (such as the combination of withdrawal and consistent use of condoms for the same sexual events). The Youth Risk Behavior Survey,<sup>22</sup> which measures priority health risk behaviors among high school students, is 1 example of current research practices where respondents are asked about withdrawal in the context of the single pregnancy prevention method used at last intercourse. This kind of coding may lead to underestimation of the practice of withdrawal.

Because withdrawal is used widely, it is appropriate that sexual educators address its use in prevention programs. On one hand, sexual educators need to honestly acknowledge that withdrawal can prevent pregnancy. On the other hand, adolescents need to be aware of the fact that withdrawal does not protect against some STIs, and that the best method to ensure safe sexual intercourse is to use condoms for the full duration of sexual intercourse.

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**TABLE 1**

Descriptive Statistics of Background and Sexual Practice Variables and Their Relations With Use of Withdrawal (n = 585)\*

Characteristics	Withdrawal N (%)	N (Total Row)	P <sup>†</sup>
Total	348 (59.5)	583	
Gender			0.333
Male	169 (58.8)	278	
Female	179 (60.8)	305	
Age			0.712
13-14	76 (56.7)	134	
15-16	196 (60.9)	322	
17-18	76 (59.8)	127	
Lifetime sexual partners			0.016
1	64 (48.9)	131	
2-4	137 (62.8)	218	
≥5	147 (62.8)	234	
No. sex occasions in last month			0.000
1 time	55 (15.8)	120	
2-3 times	125 (35.9)	220	
≥4 times	168 (48.3)	243	
Inconsistent condom use			0.000
No	123 (46.6)	264	
Yes	225 (70.5)	319	
Condom breakage			0.000
No	257 (56.1)	458	
Yes	91 (72.8)	125	
STI			0.206
Not infected	273 (58.0)	471	
Infected	46 (63.9)	72	
City			0.079
Columbia	85 (59.9)	142	
Syracuse	88 (59.1)	149	
Macon	96 (67.6)	142	
Providence	79 (52.7)	150	

\* n may vary according to random missing data patterns.

<sup>†</sup> P value for association with withdrawal use calculated with chisquare tests for equal distributions.

**TABLE 2**

Stepwise Multiple Logistic Regression for Factors Associated With STIs (n = 543)

Predictors	OR	95% CI	P
Consistent condom use and no withdrawal	1.00		
Inconsistent condom use and no withdrawal	2.12	0.89-5.05	0.089
Inconsistent condom use and withdrawal	2.22	1.06-4.66	0.035
Consistent condom use and withdrawal	1.02	0.39-2.65	0.966
Male	0.13	0.06-0.25	0.000
1 sex occasion in last 3 mo	1.00		
5 or more sex occasions in last 3 mo	3.50	1.97-6.24	0.000