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Asking only "Did you use a condom?" underestimates the prevalence of unprotected sex among perinatally HIV infected and perinatally exposed but uninfected youth

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Abstract

Among young adults who use condoms, incomplete condom use (putting a condom on after beginning or taking a condom off before finishing sex) and condom failure (condom breaking or slipping off during sex) are common. Therefore, sexual behavior surveys that only ask if a condom was used are likely to underestimate the actual prevalence of unprotected sex. This study examined data from 135 sexually active perinatally HIV-infected (PHIV+) youth and perinatally exposed but uninfected (PHIV-) youth, ages 13–24. Participants were asked whether they used a condom on their first and their most recent occasion of vaginal sex. Youth who reported using a condom were asked a follow-up question about whether there was any time during that occasion when sex was not protected by a condom. This follow-up question identified additional participants – almost double the proportions who initially said they did not use a condom – who had unprotected sex. Incomplete condom use was similar among PHIV+ and PHIV- youth, boys and girls, Latinos and African-Americans, and younger and older youth. These findings illustrate the importance of asking specifically about whether any unprotected behavior occurred from start to finish of sex to achieve more valid estimates of sexual risk behavior.

Keywords

Sexual Risk Behavior; Sex Surveys; PHIV+ Youth; Unprotected Sex

Introduction

Male condoms provide substantial protection against HIV and other sexually transmitted infections (STIs) and also are an important birth control method. Although a recent analysis of the biennial National Youth Risk Behavior Surveillance System (YRBSS) found that U.S. high school students increased their condom use at last sexual intercourse from 46% to 60% over the last 10 years, the question simply asked if the respondent or partner used a condom (Centers for Disease Control and Prevention [CDC], 2012a). However, several practices

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compromise condom effectiveness and place condom users – even those who report *consistent* condom use (i.e., use at every sexual intercourse occasion) – at risk for STIs including HIV. For instance, a respondent may affirm condom use, but sex might actually have begun unprotected and a condom applied only just prior to ejaculation. Or, sex might have begun with a condom that was then removed because of erection problems or a desire to increase pleasure. In addition, condoms can break, leak, or slip off during intercourse. Thus, studies that only ask if condoms were used may be under-reporting risk behaviors for STI/HIV transmission.

Several studies have demonstrated that such condom-use errors and problems are common among young adults who *report using condoms*. For instance, 44% of a sample of young U.S. women (18–24 years) in a managed care site who were at risk for STIs reported beginning condom use sometime after initial penetration in the past three months, and 19% reported condom slippage or breakage (Civic et al., 2002). In a sample of U.S. college men (mean age = 20.2 years) who reported using condoms in the prior three months, Crosby, DiClemente, Holtgave and Wingood (2002) found that 43% put the condom on after starting sex, 15% took the condom off before finishing sex, 29% reported condom breakage, and 13% reported the condom slipping off during sex. Even more striking, the mean percent of condom-use *occasions* in which men put a condom on after starting sex or took it off before finishing sex was 50% for *each* error. Thus, in one half of occasions characterized by self-reported condom use, unprotected – potentially risky – sex occurred.

Although less research has been reported on adolescents who are not in college, Paz-Bailey et al. (2005) found that, among African American adolescent girls (ages 15–18 years) recruited in a U.S. public adolescent healthcare clinic, 43% reported beginning sex without a condom and 22% reported that the condom was removed before sex finished. In adjudicated girls in the U.S. (mean age = 16.6 years), Crosby et al. (2005) found that 22% reported at least one occasion when a condom was applied after sex had begun, and 27% reported at least one occasion when the condom was removed before sex was over. Analysis of sex diary entries from young people (ages 16–18 years) in England revealed that 31% applied a condom late, and 9% removed a condom early at least once in the past six months (Hatherall, Ingham, Stone, & McEachran, 2007).

The role of undocumented condom-use problems in underestimating rates of unprotected sex is underscored by an analysis of Sanders, Graham, Yarber, and Crosby (2008) in a sample of American undergraduate students (ages 18–24 years). Similar to the studies above, among those reporting any condom use in the last three months, 46% reported not using a condom from start to finish of penetrative sex. But of note, of those reporting incomplete condom use, *almost 35% had reported using condoms “100% of the time for sex in the past three months.”* Clearly, if the questions on completeness of condom use were not taken into account, prevalence of unprotected sex would be underestimated.

Although our focus is on youth, incomplete condom use and condom-use errors have been reported among adults as well – both in the U.S. (e.g., Hensel et al., 2011; Hoff et al., 2004) and around the world (Sanders et al., 2012). For both youth and adults, incomplete condom use compromises the protection against HIV and STIs that condoms can provide. Because

many STIs can be transmitted in the absence of ejaculation, a condom that is applied late (after penetration but before ejaculation) or removed early does indeed pose a risk for transmission or acquisition of infection. For example, in the sample of U.S. adolescent girls described above, Paz-Bailey et al., (2005) reported that those who reported consistent condom use *but also reported incorrect condom use* (e.g., starting sex without a condom) had higher rates of infection with gonorrhea and chlamydia than did those reporting both consistent *and* correct condom use. In its fact sheet for public health personnel, the CDC (2013) states, “Condoms block transmission and acquisition of STDs by preventing contact between the condom wearer’s penis and a sex partner’s skin, mucosa, and genital secretions.” (p. 1). This report also cautions, “To achieve the maximum protective effect, condoms must be used both consistently and correctly... if condoms are not used correctly, the protective effect may be diminished even when they are used consistently” (p. 1).

Thus, the significant occurrence of incomplete condom use has important implications for meaningful assessment of sexual risk behavior, and questions must go beyond asking only whether or not a condom was used. We are unaware of any study that has examined such follow-up questions among youth as young as 13 years – especially those either infected with or at risk for HIV. As part of a secondary analysis of sexual data in a sample of sexually active perinatally HIV-infected (PHIV+) and perinatally HIV-exposed but uninfected (PHIV-) youth from mid-adolescence through young adulthood (ages 13 – 24 years), we examined the prevalence of incomplete condom use. We also explored whether incomplete condom use was more frequent among PHIV+ compared to PHIV- youth, boys compared to girls, Latino compared to African-American youth, and younger (<19 years old) compared to older youth. Since incomplete condom use has been reported among sexually active youth, we hypothesized that these analyses would reveal additional rates of unprotected behavior over and above that detected by only asking if a condom was used.

Method

Study Sample

Data came from the third wave of Project CASA, a longitudinal study of PHIV+ and PHIV- youth (Mellins et al., 2009) who were recruited from four New York City medical centers that provide care to HIV-affected families. Inclusion criteria at baseline were (1) youth ages 9–16 years with perinatal exposure to HIV, (2) cognitive capacity to complete interview, (3) English- or Spanish-speaking, and (4) caregiver with legal ability to sign consent for child participation. Of the 340 caregiver-child dyads enrolled at baseline, 260 had completed Follow-up 2 (i.e., their third interview, on average 4.4 years after baseline) at the time of these analyses. Of these, 135 youth reported engaging in vaginal sex, and analyses for this paper are limited to those sexually active youth.

Institutional Review Board approval was obtained from all sites. Caregivers provided written consent for themselves and youth, while youth provided written assent (or consent, if 18 years). Monetary compensation for time and transportation was provided.

Measures

Youth perinatal HIV status was provided by the caregiver at study enrollment and confirmed by the caregiver at each follow-up assessment. Youth completed a demographic questionnaire that included gender, age, and race/ethnicity.

Sexual behavior was measured using the Adolescent Sexual Behavior Assessment (Dolezal, Mellins, Brackis-Cott, & Meyer-Bahlburg, 2006; Dolezal et al., 2012), which was developed for this project and based, in part, on the Psychosexual Development Interview (PDI; Meyer-Bahlburg, Dugan, Mellins, Williams, & Ehrhardt, 1999). Assessments were self-administered via Audio Computer-Assisted Self-Interview (ACASI). Participants read survey questions on a computer screen while audio files read the questions to them. For this article, we examined responses to questions about a) the first time they had vaginal sex, and b) the most recent (i.e. "last") time they had vaginal sex. The terms "penis," "vagina," and "condom" were defined using technical as well as slang terms that might be more familiar to youth; after the participant confirmed that s/he understood these terms, "vaginal sex" was defined as when "a boy's penis is in a girl's vagina." If a participant reported engaging in vaginal sex, s/he was asked if the boy used a condom on that occasion. If the participant said a condom was used, a follow-up question was asked about that specific sexual occasion: "The first/last time you had vaginal sex, did you ever have your penis in the girl's vagina when you were NOT wearing a condom" (or a similarly worded question for female participants). Anal sex was not included in these analyses because parallel questions about condoms not being used were not asked regarding that behavior.

Data analysis

These analyses were limited to youth who reported engaging in vaginal sex. For each occasion (first vaginal sex and, if applicable, last vaginal sex), the prevalence of any unprotected vaginal sex was determined based first on only the condom-use question (was a condom used) and second, for those saying a condom was used, on the follow-up question asking if any sex occurred without a condom at that occasion. The number of additional youth reporting unprotected sex based on the follow-up question was calculated.

We compared responses from youth who were a) PHIV+ vs. PHIV-, b) male vs. female, c) Latino vs. African-American, and d) younger vs. older (dichotomized at the median age of 19). Chi-square tests were used to compare rates of condom use at first and most recent vaginal sex occasion. Additionally, binomial tests were used to see if the participants who reported using a condom but also engaging in some vaginal sex without a condom (incomplete condom use) were disproportionately of one demographic group compared to the other. For example, since 65% of the total sample was PHIV+, a binomial test was used to determine whether, among youth who reported incomplete condom use, the proportion that were PHIV+ differed significantly from .65.

Results

Among 135 youth who reported engaging in vaginal sex, 46% were female and 65% were PHIV+. The mean age was 18.7 ($SD = 2.2$, range = 13–24); 35% had completed high school,

and only 11% had any post-high school (i.e., college) education. The majority of youth were African-American (47%), Latino (38%), or mixed African-American and Latino (13%). This subsample was demographically similar to the total sample of 260 who completed Follow-up 2 by the time of these analyses, with the exception that they were on average older ($M = 18.7$, $SD = 2.2$ vs. $M = 15.6$, $SD = 2.3$).

Table 1 shows responses to condom-use questions for the total sample and separately for demographic groups. Among these 135 sexually active youth, 119 (88%) reported using a condom the first time they had vaginal sex. With only this information, one would estimate that 16 (12% of 135) engaged in sexual risk behavior (i.e., unprotected sex). However, when those who reported that a condom was used were asked a specific follow-up question about any incomplete condom use during that occasion, an additional 15 (11% of the 135) youth were identified who had not used a condom at some point when the boy's penis was in the girl's vagina. Thus, with the additional information from the follow-up question, 31 youth (23% of 135) were identified as engaging in some unprotected sex on their first vaginal sex occasion, nearly doubling the estimate based on only the first question (12% vs. 23%). Similar results were obtained for condom use at last occasion. Of the 125 reporting more than one vaginal sex occasion, 21 (17%) said they did not use a condom at last occasion. Of the 104 reporting using a condom, 16 (13% of the 125) reported incomplete condom use. Thus, inclusion of the follow-up question on incomplete condom use at last sexual intercourse again led to a nearly doubling of the proportion of youth identified as having some unprotected sex (17% vs. 30%). Furthermore, incomplete condom use was identified in every demographic subgroup examined in this analysis, indicating that improving survey design by adding follow-up questions will identify additional sexual risk behavior in many different groups of youth.

Condom use was also similar across demographic groups. When asked if a condom was used on first or last vaginal sex occasion, rates of condom use did not differ by PHIV status, race/ethnicity, or age. Boys and girls did not significantly differ on condom use at first vaginal sex occasion, but boys were more likely to report using a condom on their most recent occasion (91% vs. 74%, $\chi^2 = 6.4$, $df = 1$, $p = .012$).

Among those reporting incomplete condom use, binomial tests found no statistically significant differences between PHIV+ and PHIV-, male and female, Latino and African-American, or younger and older youth, for either the first or the most recent vaginal sex occasions. However, these analyses are somewhat limited due to small numbers.

Discussion

We found that asking about incomplete condom use almost doubled the proportion of respondents who had in fact engaged in unprotected sex over that identified by simply asking if a condom was used. These findings illustrate that unprotected sexual behavior can be underestimated among youth if surveys only ask whether a condom was used. Our data are consistent with studies that find relatively high rates of partial condom use and condom failures among both adolescents and adults who report using condoms (e.g., Civic et al.,

2002; Crosby et al., 2005; De Visser & Smith 2000; Hensel, Stupiansky, Herbenick, Dodge, & Reece 2011; Paz-Bailey et al., 2005; Sanders et al., 2008; Sanders et al., 2012).

We believe that ours is the first study to examine incomplete condom use among a sample that includes adolescents as young as 13 years of age. Furthermore, members of our inner-city, predominantly ethnic minority sample are for the most part, not college-educated and are either dealing with a sexually communicable disease (HIV) or living in communities at risk. Our findings were equally robust among our younger (13–19 years) and older participants, PHIV+ and PHIV– youth, boys and girls, and Latinos and African-American, and younger and older youth, indicating that this phenomenon was not isolated to a subsample of our participants.

Limitations

Although the current study demonstrates that incomplete condom use was significant among these youths, we did not assess the *type* of incomplete condom use that occurred (e.g., sex started without a condom, condom removed before ejaculation). Nor did we ask about other condom-use errors, such as putting the condom on incorrectly, or about condom failures, such as having the condom slip off or break during sex. A better understanding of specific condom-use errors and problems would be useful in designing interventions to improve correct condom use. In addition, we did not have data on factors that may have motivated or influenced condom-use behavior, including HIV status of the partners, or attitudes and beliefs about condoms, which would be helpful in future studies.

Finally, the sample size for our subgroup analyses was low, and, although we did not detect group differences associated with gender, HIV status, or other demographics, we also did not have sufficient power to adequately address those comparisons. Future studies should explore these comparisons among larger samples to inform development of appropriately tailored prevention messages.

Conclusions and Future Directions

A survey aiming to identify sexual risk behavior will have more measurement validity if the questions are designed to ask specifically about unprotected behavior rather than only asking if a condom was used. For example, it is common for even excellent surveys such as the National Youth Risk Behavior Survey (CDC, 2012b) and the National Survey of Adolescents and Young Adults (Kaiser Family Foundation, 2003) to ask "Did you use a condom the last time you had vaginal sex?" and it would be accurate to respond "Yes" to this question even if a condom was used only part of the time (i.e., *some* unprotected sex occurred on that occasion). Thus, if a participant says s/he engaged in vaginal (or anal) sex during which a condom was used, a follow-up question should determine whether there was also any time during that occasion when a condom was *not* used. This approach is more likely to identify whether potential exposure to STIs occurred, even if a condom was used at some point during the occasion. A similar approach could be used for condom-use frequency questions. For example, a female participant could be asked "In the past 3 months, how many times did a boy or man put his penis in your vagina?" An appropriate follow-up question would be "Of those times, how many times did a boy or man put his

penis in your vagina, *without* a condom, even for a little while?" Of course, simple questions about condom use are important and indicate whether participants have at least some experience with their use. But, for epidemiological purposes, more detailed questions about condom use during an event will provide more accurate estimates of the prevalence and level of sexual risk and identify important opportunities for prevention programs. With youth clearly engaging in unprotected sex, it is important to give clinicians and other providers the awareness and strategies that will enable them to ask specific questions about incomplete condom use in order to identify and intervene with those at risk.

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Table 1

Prevalence of unprotected sex based on 1 vs. 2 questions

	First Vaginal Sex Occasion								
	Total N=135	PHIV+ N=88	PHIV- N=47	Boys N=73	Girls N=62	Latino N=51 ^a	African- American N=64 ^a	Younger than 19 N=71	19 or older N=64
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Report unprotected sex based on first question only ^b	16 (12)	10 (11)	6 (13)	8 (11)	8 (13)	6 (12)	8 (13)	8 (11)	8 (13)
Report unprotected sex based on follow-up question only	15 (11)	7 (8)	8 (17)	9 (12)	6 (10)	6 (12)	4 (6)	7 (10)	8 (13)
Report at least partially unprotected sex based on both questions ^b	31 (23)	17 (19)	14 (30)	17 (23)	14 (23)	12 (24)	12 (19)	15 (21)	16 (25)
	Most Recent Vaginal Sex Occasion								
Total N=125	PHIV+ N=82	PHIV- N=43	Boys N=67	Girls N=58	Latino N=46	African- American N=59	Younger than 19 N=65	19 or older N=60	
N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Report unprotected sex based on first question only ^b	21 (17)	11 (13)	10 (23)	6 (9)	15 (26)	9 (20)	7 (12)	9 (14)	12 (20)
Report unprotected sex based on follow-up question only	16 (13)	10 (12)	6 (14)	6 (9)	10 (17)	9 (20)	4 (7)	8 (12)	8 (13)
Report at least partially unprotected sex based on both questions ^b	37 (30)	21 (26)	16 (37)	12 (18)	25 (43)	18 (39)	11 (19)	17 (26)	20 (33)

^a 18 mixed (African-American & Latino) and 2 "other" race/ethnicity youth excluded from these results.

^b Example from boys' version / first vaginal sex occasion: First question = "Did you wear a condom the first time you had vaginal sex?" Follow-up question = "The first time you had vaginal sex, did you ever have your penis in the girl's vagina when you were NOT wearing a condom?"