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Condom Misuse Among Adjudicated Girls: Associations with Laboratory - Confirmed Chlamydia and Gonorrhea

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Abstract

Objectives—To identify the prevalence of condom use errors among detained female teens and to test two inter-related hypotheses concerning condom failure.

Methods—A cross-sectional survey of 134 female teens recruited within eight detention facilities. Measures were collected using audio-computer assisted self-interviewing. Assessment for the presence of *C. trachomatis* and *N. gonorrhoeae* was also conducted.

Results—Five forms of condom use errors/problems were common: not discussing condom use with the partner (34.3%), not having a condom when one was desired (48.5%), starting sex before application (21.6%), removing condoms before sex concludes (26.9%), and breakage (32.8%). Significant associations were found between condom errors/problems and drug/alcohol use. Errors/problems with condom use were significantly higher among teens diagnosed with an STD ($P=.039$ for an index measure; $P=.022$ for a single-item measure).

Conclusions—Findings suggest that detained female teens may have experienced multiple condom use error and problems thereby increasing their vulnerability to STD acquisition.

Keywords

STDs; Female Teens; Condoms; Adjudication

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Introduction

The acquisition of sexually transmitted diseases (STDs) is a substantial form of morbidity for U.S. teenagers.¹⁻³ Female teens are especially likely to acquire STDs such as chlamydia and gonorrhea because of a biological vulnerability.³ As receptive partners in penile-vaginal sex, female teens may be particularly susceptible to STD-pathogen exposure when condoms break, slip off, or leak upon removal. Evidence from studies of young adult women suggests that these (and other) forms of condom failure may be common occurrences.⁴⁻⁶ For example, in a study of university women who applied condoms to their partners, the following errors were reported as occurring at least once during the 3 month recall period: 51% put the condom on after starting sex; 15% took the condom off before ending sex; 48% wanted a condom but didn't have one; and 28% reported condom breakage, slippage, or both.⁴ Beyond studies of demonstrated skill in application,⁷ similar investigations have not been conducted among female teens. This is unfortunate because such studies could guide improved efforts to promote safer sex for this population.

Accordingly, the purpose of this study was twofold. First, we identified the prevalence of 10 condom use errors and problems among a sample of female teens. Subsequently we tested 2 inter-related research hypotheses: 1) alcohol and drug use during sex would co-occur with index measures of condom use errors and problems; and 2) An index measure of errors and problems would be significantly associated with biologically-confirmed STDs (chlamydia and gonorrhea). To ensure that our sample of female teens was likely to be at-risk of STD acquisition, we chose to conduct the study among adjudicated girls sentenced to short-term detention facilities (located in the Southern U.S). Evidence suggests that this population experiences substantial risk for STD infection.^{9,10}

Methods

Study Sample

Eight detention facilities located in Georgia formed the basis for a cross-sectional survey of adolescents. Georgia detention facilities house adolescents convicted of offenses ranging from truancy to homicide. Between October of 2001 and July of 2003, research assistants recruited 283 female teens for participation in the study. The study achieved an 85% participation rate. Teens were eligible if they were 14 to 18 years old, expressed willingness to participate, and (if < 18 years old) had a parent who provided informed consent. The Institutional Review Boards at Emory University and the State of Georgia's Department of Juvenile Justice approved all study procedures. The IRB-approved protocol precluded any preliminary assessments of adolescents prior to enrollment.

Data Collection

Self-reported measures—Based on formative research with this population of detained adolescents, the research team developed an assessment instrument appropriate to the study. Based on evidence from previous research¹¹⁻¹³ we used audio-computer assisted self-interviewing (A-CASI) to deliver the survey as this mode has been shown to decrease self-report bias. To help facilitate accurate recall yet provide a window of time long enough to be representative of true health risk behavior, a 2-month recall period was used when asking adolescents about their engagement in past behaviors (unless the question specifically asked, "have you ever..."). Specifically, the recall period was set up by the following phrase that prefaced each question, "In the 2 months prior to coming to this detention center..." To comply with the State Juvenile Justice Department's request, compensation to study participants was not provided; however, educational materials (e.g., books, brochures, videos) were provided to each detention center.

Laboratory measures—Teens provided a first-catch urine specimen for STD testing. Specimens were initially tested for *C. trachomatis* and *N. gonorrhoeae* DNA by ligase chain reaction using the Abbott LCx Probe System¹⁴⁻¹⁶ (Abbott Laboratories, Abbot Park, IL). In 2003, this Abbot assay was discontinued and we began using the BDProbeTec ET Chlamydia trachomatis and Neisseria gonorrhoeae Amplified DNA assay (Becton Dickinson and Company, Sparks, MD).¹⁷

Assessment of Condom Use Errors and Problems

By necessity, only data from teens recently using condoms could be analyzed for this study. Thus, those who reported having penile-vaginal sex in the past 2 months and using condoms at least once in this time period (n = 134) were eligible to complete questions assessing condom use errors and problems. Evidence suggests that females are indeed aware of events related to condom failure even though the act of condom use may be primarily controlled by the male partner.^{4,5} Ten items were selected (Table 1) from an instrument previously used to assess condom use errors and problems among young women.^{4,5} Because simplicity was critical to the assessment, 9 items were framed using a “yes” versus “no” response format. The final item, however, asked teens how often (in the past 2 months) they had a condom break, leak, or slip off the penis.

Assessment of Drug and Alcohol Use During Sex

Teens were asked, “In the 2 months before coming to this detention center, how many times did you have sex while high on alcohol or drugs?” To account for the drug and alcohol use of the sex partner, the question was rephrased slightly: “In the 2 months before coming to this detention center, how many times did you have sex while your sex partner was high on alcohol or drugs?”

Assessment of Unprotected Vaginal Sex (UVS)

Teens were asked how many times they had engaged in vaginal sex (again, the recall period was the 2 months before detention) and how many of these times a condom was used. The reported frequency for the latter measure was subtracted from the former. The value of using this measure as opposed to the percent of intercourse occasions that are condom-protected has been well established.¹⁸⁻²⁰

Data Analysis

Of the 9 dichotomously assessed condom use errors and problems, 6 were identified as items that could be summed to create an index. Three items were ruled out either because they did not have a direct bearing on condom failure (see first 2 entries in Table 1) or because of possibly redundancy (the eliminated item was “Had a problem with a condom and needed another one”). Affirmative answers to items were scored as “1” indicating a condom use error/problem had occurred while negative answers were scored as “0” indicating a lack of any errors or problems. Thus, the index had a potential range of 0 to 6. In addition to this index measure, we asked teens, “In the 2 months before coming to this center, how many times did you have a problem with a condom breaking, leaking, or falling off?” This single-item measure therefore represented teens' self-reported account of condom failure events.

Pearson Product Moment Correlation was used to test the first hypothesis. The index measure and the single-item measure were each correlated with a) female teens' use of alcohol or drugs before/during sex; and b) female teen's sex partners' use of alcohol or drugs before/during sex. To test the second hypothesis, we compared teens testing positive for chlamydia or gonorrhea to those testing negative for both diseases by using t-tests. The first t-test compared the 6-item index measure between the groups and the second compared the single-item measure.

Results

Characteristics of the Sample

Average age of the adolescents was 15.3 years ($SD = .93$). Nearly 40% identified as White and non-Hispanic, with 41.0% identifying as African American and non-Hispanic, 5.2% as White and Hispanic, 10.4% as African American and Hispanic, and the remainder identifying as members of other races. The mean number of previous detention sentences served by teens was 2.46 ($SD = 3.7$).

Condom Use Errors and Problems

Table 1 displays the prevalence of 9 dichotomously assessed condom use errors and problems. As shown, prevalence for 5 items was substantial. For example, nearly one-half of the teens reported at least one occasion when they wanted a condom but did not have one available. Nearly 22% reported at least one occasion when a condom was applied after sex had begun and about 27% reported at least one occasion when the condom was removed before sex was over. At least one occasion of condom breakage was reported by nearly one-third of the teens. The summative measure of errors and problems produced a range of 0 to 8. About 15% of the teens reported 2 or more problematic events.

Associations with Drug and Alcohol Use

The mean number of times teens reported having sex while high on drugs or alcohol was 2.78 ($SD = 5.5$). A modest, but significant relationship was found between this variable and the 6-item index ($r = .25$; $P < .01$) as well as the summative measure ($r = .35$; $P < .01$). The mean number of teens reported having sex with a partner who was high on drugs or alcohol was 2.47 ($SD = 3.7$). Again, a modest, but significant relationship was found between this variable and the 6-item index ($r = .32$; $P < .01$) as well as the summative measure ($r = .37$; $P < .01$). Thus, the first hypothesis was supported.

Associations With Biologically-Confirmed STDs

Valid specimens were not provided by 9 of the 134 teens. Thus, all subsequent analyses were based on $n = 125$. Of these 21 tested positive for chlamydia and 4 tested positive for gonorrhea. Two teens tested positive for both STDs. Thus, 23 teens (18.4%) testing positive for one or both pathogens and were compared to those testing negative for both.

The mean score on the 6-item index measure was significantly higher ($t = 2.1$, $df = 123$, $P = .039$) for teens testing positive for an STD (mean = 1.35) than those testing negative (mean = .84). Similarly, the mean score on the single-item, summative, measure was significantly higher ($t = 3.1$, $df = 123$, $P = .002$) for teens testing positive for an STD (mean = 1.96) than those testing negative (mean = .82). For contrast, we also compared the 2 groups with respect to frequency of UVS; differences were not observed ($t = .41$, $df = 123$, $P = .68$). Thus, the second hypothesis was supported.

Comment

To the best of our knowledge, this is the first study to show a relationship between the incorrect use of condoms and biologically-confirmed prevalence of STDs. The relationship is important for several reasons. First, this evidence suggests that safer sex program could benefit female teens by emphasizing skill development that fosters correct as well as consistent use of condoms. Although avoiding the specific errors and problems assessed in this exploratory study (see Table 1) may not be a novel component in safer sex programs, the observed relationship with STD prevalence justifies more intensive education efforts designed to promote correct condom use. Such programs may also benefit female teens by noting the potential for drug and

alcohol use to interfere with their ability (or their partners' ability) to ensure that condoms are used correctly.

Among high-risk teens one could speculate that errors and problems with condom use are especially problematic because teens may accurately perceive risk and only use condoms when the level of risk is perceived to be high. Thus, condom failure with an accurately perceived risky partner carries a much higher “cost” than it would if failure occurred in the context of sex with a low-risk partner. Viewed differently, condom failure may be an especially important risk factor for teens who use condoms on a situational basis rather than consistently.

Finally, the findings also suggest that female teens are well aware of condom-associated problems despite the observation that males actually wear the condoms. Indeed, Female teens in this sample reported a number of condom use errors and problems that meets or even exceeds that reported by samples of women in their twenties.⁴⁻⁶ Thus, female teens may be able to have a positive influence on the improved quality of condom use. However, this influence is probably contingent on establishing an egalitarian relationship with male sex partners (a task that may be problematic, especially with older sex partners).²¹⁻²³ Because transcending power differentials may not be possible for many female teens, future studies may need to focus on the sex partners of female teens to determine effective methods for improving their quality of condom use.

Limitations

Findings are limited by several factors. First, the validity of the self-reported data cannot be established. Second, the use of a convenience sample precludes generalization to other populations of female teens. Third, it should be noted that the findings pertaining to drug and alcohol use are merely correlational; an event-specific analysis is needed to determine whether being high impairs ability or desire to use condoms correctly. Finally, the small sample size may have limited the available statistical power. However, given that each of the hypotheses was supported, it is clear that statistical power was not a handicap to the study.

Conclusions

Findings from this exploratory study of female teens suggest that they may commonly experience various forms of condom use errors and problems. Further, our findings suggests that these errors and problems may be likely among those alcohol or drugs in conjunction with sex and that errors and problems may substantially increase risk of STD acquisition. Subsequent studies should investigate effective strategies that will help teen females better navigate the often complex negotiations that must occur (in the context of sex and --perhaps-- passion) in order to achieve the optimal level of protection afforded by the *correct* use of condoms.

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References

1. Eng, TR.; Butler, WT., editors. The hidden epidemic: Confronting sexually transmitted diseases. Washington, DC: National Academy Press; 1997.
2. DiClemente, R.J.; Crosby, RA. Sexually transmitted diseases among adolescents: Risk factors, antecedents, and prevention strategies. In: Adams, GR.; Berzonsky, M., editors. Blackwell Handbook of Adolescence. Oxford, UK: Blackwell Publishers Ltd; 2003. p. 573-605.

3. Berman, SM.; Hein, K. Adolescents and STDs. In: Holmes, KK.; Sparling, PF.; Mardh, P., et al., editors. Sexually Transmitted Diseases. New York, NY: McGraw Hill; 1999. p. 129-142.
4. Sanders SA, Graham CA, Yarber WL, Crosby RA. Condom use errors and problems among young women who apply put condoms on their male partners. JAMWA 2003;58:95–98. [PubMed: 12744422]
5. Crosby RA, Sanders SA, Yarber WL, Graham CA. Condom use errors and problems: A neglected aspect of studies assessing condom effectiveness. Am J Prev Med 2003;24:367–370. [PubMed: 12726876]
6. Civic D, Scholes D, Ichikawa L, et al. Ineffective use of condoms among young women in managed care. AIDS Care 2002;14:779–788. [PubMed: 12511211]
7. Crosby RA, DiClemente RJ, Wingood GM, et al. Correct condom application among African American adolescent females: The relationship to perceived self efficacy and the association to confirmed STDs. J Adolesc Health 2001;29:194–199. [PubMed: 11524218]
8. Centers for Disease Control and Prevention. HIV/AIDS education and prevention programs for adults in prisons and jails and juveniles in confinement facilities--United States, 1994. Morb Mortal Wkly Rep 1996;45:268–271.
9. Crosby, RA.; DiClemente, RJ.; Staples-Horne, M. Health issues of juvenile offenders. In: Moore, J., editor. Management and Administration of Correctional Healthcare. Kingston, NJ: Civic Research Institute; 2003. p. 11-1-11-12.
10. Teplin LA, Mericle AA, McClelland GM, et al. HIV and AIDS risk behaviors in juvenile detainees: Implications for public health policy. Am J Public Health 2003;93:906–912. [PubMed: 12773351]
11. Turner CF, Ku L, Rogers SM, et al. Adolescent sexual behavior, drug use, and violence: Increased reporting with computer survey technology. Science 1998;280:867–871. [PubMed: 9572724]
12. Kissinger P, Rice J, Farley T, et al. Application of computer-assisted interviews to sexual behavior research. Am J Epi 1999;149:950–954.
13. Michaud P, Narring F, Ferron C. Alternative methods in the investigation of adolescents' sexual life. J Adolesc Health 1999;25:84–90. [PubMed: 10418890]
14. Carrol KC, Aldeen WE, Morrison M, et al. Evaluation of the Abbott LCx chain reaction assay for detection of Chlamydia trachomatis and Neisseria gonorrhoeae in urine and genital swab specimens from a sexually transmitted disease clinic population. J Clin Micro 1998;36:1630–1603.
15. Lee HH, et al. Diagnosis of Chlamydia trachomatis genitourinary infection in women by ligase chain reaction assay of urine. Lancet 1995;345:213–216. [PubMed: 7823713]
16. Smith KR, et al. Evaluation of ligase chain reaction for use with urine for identification of Neisseria gonorrhoeae in females attending a sexually transmitted disease clinic. J Clin Micro 1995;33:455–457.
17. Van der Pol BD, Ferrero L, Buck-Barrington E, Hook E, et al. Multicenter evaluation of the BDProbeTec ET system for detection of Chlamydia trachomatis and Neisseria gonorrhoeae in urine specimens, female endocervical swabs, and male urethral swabs. J Clin Micro 2001;39:1008–1016.
18. Crosby RA, DiClemente RJ, Holtgrave DR, Wingood GM. Design, measurement, and analytic considerations for testing hypotheses relative to condom effectiveness against non-viral STIs. Sex Transm Inf 2002;78:228–31.
19. Fishbein M, Peguegnat W. Evaluating AIDS prevention interventions using behavioral and biological outcome measures. Sex Transm Dis 2000;27:101–110. [PubMed: 10676977]
20. O'Leary AO, DiClemente RJ, Aral SO. Reflections on the design and reporting of STD/HIV behavioral intervention research. AIDS Educ Prev 1997;9(SA):1–14.
21. Begley E, Crosby RA, DiClemente RJ, et al. Older partners and STD prevalence among pregnant African American teens. Sex Transm Dis 2003;30:211–213. [PubMed: 12616137]
22. DiClemente RJ, Wingood GM, Crosby RA, et al. Sexual risk behaviors associated with having older sex partners: A study of African American female adolescents. Sex Transm Dis 2002;29:20–24. [PubMed: 11773874]
23. Miller KS, Clark LF, Moore JS. Sexual initiation with older male partners and subsequent HIV risk behavior among female adolescents. Fam Plann Perspec 1997;29:212–214.

Table 1

Prevalence of Ten Selected Condom Use Errors and Problems (past 2 months)

	Percent
Did not discuss condom use before sex	34.3
Wanted to use a condom but did not have one	48.5
Used a damaged condom	1.5
Let a condom you were using contact sharp jewelry or fingernails	7.5
Began sex before condom was applied	21.6
Removed condom before sex was over	26.9
Re-used a condom during the same sexual encounter	1.5
Had a condom break during sex	32.8
Had a problem with a condom and needed another one	27.6
<u>Summary item</u>	<u>Mean (SD)</u>
Number of times you had a condom break, leak, or slip off	1.04 (1.62)