Starting Late, Ending Early: Correlates of Incomplete Condom Use Among Young Adults

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Abstract

Objective: Investigate incomplete use of condoms which can compromise their efficacy.

Methods: 397 female and male undergraduates (18 - 24 years) completed self-administered questionnaires comprehensively assessing condom use errors/problems during the past 3 months as well as several potential correlates of incomplete condom use.

Results: 46% reported not using condoms from start to finish of penetrative sex. Those not highly motivated to use condoms were 1.5 times more likely to report incomplete use (*P*=0.4). Those who engaged in sex more frequently were 1.9 times more likely to report incomplete use (*P*=.003). Finally, erection problems during sex were associated with a two-fold increase in incomplete use (*P*=.03). Sex, age, race and the other potential correlated were not significantly related to incomplete use.

Conclusion: Health care providers and educators could benefit clients by emphasizing the importance of using condoms throughout sexual activity and by discussing condom-related erection problems.

Key words: condoms, condom use, sexual behavior, sexually transmitted diseases, acquired immunodeficiency syndrome, prevention

Introduction

Recent studies have demonstrated that late adolescents (ages 18 to 24) may experience multiple errors and problems when using male condoms (Civic et al., 2002; Crosby, Sanders, Yarber, Graham, & Dodge, 2002; Mertz et al., 2000; Sanders, Graham, Yarber, & Crosby, 2003; Warner, Clay-Warner, Boles, & Williamson, 1998). Evidence strongly suggests that condom failure can be attributed to these errors and problems thus interventions designed to reduce condom use errors and problems will mitigate condom failure rates thereby reducing the likelihood of transmitting sexually transmitted diseases (STDs), including HIV, and the event of unplanned pregnancy.[6,7] An understudied, yet critical, condom use error that may occur frequently among late adolescents is incomplete condom use (i.e., not using the condom from start to finish of penetrative sex)(Civic et al., 2002, Crosby et al., 2002; Sanders et al., 2003, Warner et al., 1998). Given the potential for pre-ejaculate to contain viable sperm and sexually transmitted pathogens (Hatcher, Trussell, Stewart, & Cates, 1998), putting on condoms after sex has already begun clearly compromises their protective value (Crosby, DiClemente, Holtgrave, & Wingood, 2002). Additionally, removing condoms before sex is over, even if ejaculation has already occurred, enhances risk of pregnancy or infection through residual semen on the penis or in the urethra. Given the magnitude of the sexually transmitted disease (STD) epidemic among young people in the U.S., coupled with endemic rates of unplanned pregnancy, it is clear that college-level health promotion efforts must include education designed to address the use of condoms throughout penetrative sex. Preliminary research regarding correlates of incomplete use is therefore important.

Little work has been published on the correlates of incomplete use. One recent study of young women (18 to 24 years of age) reported that putting on condoms after sex has begun was more common among younger adolescent females (18 to 20 years

of age) than older females (21 to 24). The study also found that incomplete use was more common among those with a primary sex partner, a non-supportive sex partner, multiple sex partners, those using condoms as a form of birth control, and those using condoms on a frequent basis (Civic et al., 2002). The study did not assess the practice of removing condoms before sex was over and males were not included.

Empirical investigations designed to identify correlates of incomplete condom use among late adolescents could yield findings useful for targeting at risk adolescents and guiding the development of education programs that redress the problem. Based on evidence that university undergraduates may commonly engage in risky sexual practices including incomplete condom use (Crosby et al., 2002; Sanders et al., 2003; Warner et al., 1998), studies among this population are warranted.

The purpose of this study was to identify correlates of incomplete condom use among female and male undergraduates engaging in heterosexual (penile-vaginal) intercourse.

Methods

Study Sample

From November 2000 through April 2002, research assistants enrolled 1486 single/never married Indiana University undergraduates age 18 to 24 years old in an anonymous survey of condom use errors and problems. A convenience sample of undergraduates were solicited from courses that had not included instruction regarding correct condom use. The Institutional Review Board approved the study protocol. Incentives for participation were not provided.

Of those enrolled, 698 reported using condoms in the past 3 months for at least one episode of sex (defined as putting the penis in the mouth, vagina, or rectum) with a partner of the other sex. Of these 427 students (62%) completed the section of the

questionnaire on condom errors and problems and had no missing data on questions related to incomplete use. The rate of 62% was mostly a function of a decision we initially made relative to female students. We began the study by only assessing condom use errors and problems for female who had actually applied condoms. Although we later removed this restriction data from women who had not applied condoms was thus not obtained during approximately the first half of the data collection.

Finally, the sample of 427 students was further reduced due to a critical analytic concern. Because experiencing condom slippage or breakage might lead to taking the condom off before sex was over, we omitted from the final sample those individuals reporting taking the condom off before sex was over if they also reported breakage or slippage during sex (n=30). Thus, the final sample for analysis was comprised of 397 students (195 females, 49%, and 202 males, 51%).

Measures

The selection of measures was guided by the few related studies that had been published (Civic et al., 2002; Crosby et al., 2002; Mertz et al., 2000; Sanders et al., 2003; Warner et al., 1998) as well as the Information-Motivation-Behavioral Skills Model (IMB). Developed by Fisher and Fisher this model is an eloquent synthesis of elements found in the Health Belief Model, the Theories of Reasoned Action and Planned Behavior, and Social Cognitive Theory (Fisher & Fisher, 2002).

Using a pencil-and-paper format, students completed an instrument known as the Condom Use Error Survey (CUES). The CUES is a comprehensive assessment of errors and problems that people may experience using male condoms that has been used in previous research with college students (Crosby et al. 2002; Sanders et al., 2003; Graham, Crosby, Sanders, & Yarber, 2003). Questions were based on widely cited condom use guidelines (Centers for Disease Control and Prevention, 1998; Warner & Hatcher, 1998) and were designed to measure key constructs as specified by the

guiding theoretical model (IMB). On the basis of previous research, a 3-month recall period was used (Kelly et al., 1994; Orr, Fortenberry, & Blythe, 1997). The questionnaire assessed socio-demographic variables (sex, age, racial minority, rural or non-rural residence while growing up), whether students had ever received instruction about correct condom use, whether they discussed condom use before sex, number of partners, frequency of sex, frequency of condom use, consistency of condom use for sex, and erection difficulties with condom use. The questionnaire also measured incomplete use of condoms. Incomplete use was defined as answering "yes" to at least one of two questions: 1) "Did you start having sex without the condom, then put the condom on later?"; 2) "Did you start having sex with the condom **on**, then take it **off** before sex was over?" Sex was clearly defined as placing the penis in the partner's mouth, vagina, or rectum (anus, butt).

In addition, the CUES assessed students' motivation to use condoms by two items: "I am highly motivated to use male condoms" and "My partner(s) is (are) highly motivated to use male condoms." Responses were provided on a 5-point Likert scale, ranging from "strongly agree" to "strongly disagree". Due to marked skewness, we subsequently dichotomized responses to the two motivation items by "strongly agree" versus all other responses. This created a measure assessing the joint motivation level of the couple.

Data Analysis

We compared those reporting any incomplete use to those reporting no incomplete use on the following variables: sex, age, race (minority vs. non-minority), residence while growing up (rural vs. non-rural), previous instruction on correct condom use (yes vs. no), motivation to use condoms (self, partner, & both), discussing condom use before sex (yes vs. no), number of sexual partners in the past 3 months, frequency of sex in the past 3 months, frequency of condom use in the past three months,

consistency of condom use in the past 3 months (using condoms 100% vs <100% of the times when sex occurred), and erection problems associated with condom use.

T-tests and Mann-Whitney U tests were used for group comparisons of continuous variables with normal and non-normal distributions, respectively. Even in cases in which Mann-Whitney U tests were conducted due to skewed distributions, group means and standard deviations are presented in the text for clarity. Given their skewed distributions the following variables were dichotomized for additional analyses: number of sexual partners (1 vs. more than one partner), frequency of sex (1-12 times in 3 months [average one or fewer times per week] vs. 13+ times [average more than once a week]), and frequency of condom use (1-5 times vs. 6 or more times). Chi-square analyses were conducted for group comparisons on dichotomous variables.

Correlates achieving a screening level of significance ($P < .20$) were entered into a forward Wald binary logistic regression model to assess the independent effects of each correlate in the presence of the others. Adjusted odds ratios, their 95% confidence intervals, and respective *P*-values are presented for each variable retaining significance in the multivariate model.

Results

Average age of the sample was 19.5 years (SD = 1.4). The majority (90.4%) self-identified as White, 5.8% identified as Black or African American, and the remainder identified as members of other minorities. 18% were from small towns or rural areas. Forty-six percent (46.3%) of the undergraduates reported incomplete condom use over the past three months. Forty-two percent (42.3%) reported starting sex before the condom was put on and 7.8% reported taking the condom off before sex was over. Bivariate analyses comparing those reporting incomplete use of either kind to those reporting no incomplete use are presented in Table 1. There were no differences

between men and women in the proportion reporting incomplete use (*P* = .83); therefore, the data from men and women were combined for subsequent analyses.

Those who reported that they were highly motivated to use condoms (56.7% of the sample) and participants who reported that both they and their partner were highly motivated to use condoms (42.2% of the sample) were less likely to report incomplete use. Partner motivation was not related to incomplete use.

Participants reporting incomplete use had a higher frequency of sex in the past 3 months (M = 26.2 episodes, SD= 25.2) compared to those reported no incomplete use (M = 16.5 episodes, SD=18.6) (Mann-Whitney U= 13980.0, *P* < .001). The 49.6% who reported having sex 13 or more times in the past three months were more likely to report incomplete use. Those reporting incomplete use reported more occasions of condom use (M = 13.7 times, SD = 15.1) than those not reporting incomplete use (M = 9.3 times, SD = 13.5) (Mann-Whitney U = 14519.5, *P* < .001). The 48.9% who reported using condoms 6 or more times in the past 3 months were more likely to report incomplete use. 29.5% of the sample reported using condoms 100% of the times they had sex. This group reported significantly less incomplete use. Loss of erection during sex when a condom was used was significantly associated with incomplete use, but loss of erection while putting the condom on was not.

No significant group differences were found for age, race, previous rural residence, previous instruction in correct condom use, discussing condom use before sex, and number of sex partners.

The following seven variables were entered into the multivariate logistic regression based on attaining *P*-values of <.20: high motivation to use condoms (yes vs. no for self, partner, and both; frequency of sex in the past 3 months (1-12 vs. 13 or more times); frequency of condom use in past three months (1-5 vs. 6 or more times); consistency of condom use (100% vs. less than 100%); and erection problems during

sex when a condom was used (yes vs. no). The final model (χ^2 = 21.16, df = 3, *P* <.001), presented in Table 2, accounted for 7% of the variance. Students who were less than highly motivated to use condoms were about one and a half times as likely to report incomplete condom use compared to those who were highly motivated. Also, participants who reported sex 13 or more times in the past 3 months were almost twice as likely to report incomplete condom use compared to those reporting less frequent sex. Finally, respondents reporting erection problems during sex when condoms were used were nearly twice as likely to report incomplete condom use compared to those who did not report erection problems.

Discussion

Findings from this exploratory study suggest that incomplete condom use may be fairly common among university undergraduates, regardless of sex. In the present sample, almost half of the participants reported either 1) putting the male condom on after penile-vaginal sex had started, or 2) taking the condom off before penile-vaginal sex ended, or 3) both. These results suggest that condom failures may be attributable in part to incomplete use, rather than to product failure or other specific condom use errors. Clearly, undergraduates not using condoms from start to finish of sex may unknowingly be placing themselves at risk of pregnancy or STD pathogens. Condom use guidelines should emphasize the importance of using condoms from start to finish of penetrative sex. By “penetrative sex” we mean anytime the penis is in the vagina.

Our exploratory study also identified three important correlates of incomplete use. Our findings suggest that individuals highly motivated to use condoms may be less likely to report incomplete condom use. Thus, enhancing motivation in addition to technical skills may benefit the effectiveness of condom instruction.

At a bivariate level, three measures of sexual behavior were related to incomplete condom use: frequency of sex, frequency of condom use, and 100% vs. less

than 100% condom use. However, because of colinearity between these three correlates, only one of these variables could be retained in the multivariate model. Thus, in this sample, only frequency of sex retained multivariate significance; in other samples, these other two sexual behavior variables may be equally, or more, important. Potentially, all three of these measures may reflect a tendency to engage in sexual risk-taking. Therefore, it follows that incomplete use would be more common among these individuals.

We also found that incomplete use was more common among those who reported that they, or their male partners, had erection problems during sexual activity when a condom was used. This finding was not unexpected, given that negative experiences with condoms could lead to incomplete use. Individuals may believe that condoms need only be used for ejaculation (Quirk, Rhodes, & Stimson, 1998). Anecdotally, there is a perception that condom use can lead to loss of erection but little empirical evidence exists. Although we do not have event-specific information, it is likely that the loss of erection may be the precipitating event for incomplete use. Future research could examine this issue qualitatively, and may also benefit from the use of daily diary assessment.

Limitations

As is true for most sexuality research, findings are limited by the validity of self-report and possible recall bias over the three-month period. Also, the study assessed a relatively limited number of potential correlates for incomplete use. In addition, our data do not permit an examination of event-specific temporality that could clarify the cause and effect relationships between the correlates studied and incomplete condom use. A further limitation is that we defined sex as placing the penis in the partner's mouth, vagina, or rectum; therefore, our data cannot specify level of risk based on incomplete condom use. For example, an individual may have had oral sex without a condom,

followed by vaginal intercourse with a condom, and answered "yes" to the incomplete sex item. To promote brevity of the questionnaire, and based on CDC recommendations that condoms be used for oral, vaginal, and anal intercourse (Centers for Disease Control and Prevention, 2003), we defined "sex" as any of these three behaviors. Also, the use of a convenience sample implies that our findings are not generalizable to other populations of university undergraduates. Further research should investigate these questions with more diverse populations of young adolescents and adults.

Conclusions

This exploratory study found that incomplete use of condoms (not using condoms from start to finish of sex) was more common among undergraduates reporting more frequent sex, erection problems during sex when condoms were used, and among those not highly motivated to use condoms. Given the high prevalence of incomplete use found in this sample, health care providers and educators need to emphasize the importance of using condoms throughout penetrative sexual activity, particularly to young people who have frequent sex and are not highly motivated to use condoms. Health care providers should also be encouraged to inquire about condom-associated erection problems when counseling young people. Further research should also investigate the utility of eroticizing condom use as one approach to addressing this issue. Moreover, subsequent investigations should examine the potential role of other correlates of incomplete condom use that may indeed be amenable to educational intervention.

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Table 1. Bivariate Associations Between Potential Correlates and Incomplete Use

Dichotomous Measures	% reporting incomplete use	PR[2]	95% CI[3]	*P*≤
Sex				
men	45.5	.96	.78 – 1.19	.83
women	47.2			
Minority				
yes	47.4	1.02	.72 – 1.45	1.00
no	46.4			
Lived in rural area				
yes	49.3	1.08	.83 – 1.40	.69
no	45.8			
Instructed about correct condom use				
yes	46.7	1.08	.79 – 1.47	.73
no	43.3			
Self - Highly motivated to use condoms				
yes	41.1	.77	.62 - .95	.02
no	53.2			
Sex partner - highly motivated to use condoms				
yes	41.8	.83	.67 – 1.03	.12
no	50.2			

Table 1 continued

Self and sex partner highly motivated to use condoms				
yes	39.8	.78	.62 - .98	.04
no	51.1			
Discussed condom use with partner				
yes	48.3	1.08	.88 – 1.34	.52
no	45.5			
More than 1 sex partner, past 3 months				
yes	45.3	.97	.78 – 1.22	.90
no	46.5			
Frequency of sex, more than 12 times in past 3 months				
yes	55.2	1.49	1.19 – 1.86	.001
no	37.1			
Frequency of condom use, more than 5 times in past 3 months				
yes	55.2	1.45	1.17 – 1.81	.001
no	37.9			
Used condoms 100% of the time for sex in past 3 months				
yes	34.8	.68	.52 - .90	.005
no	50.9			

Table 1 continued

Lost erection putting condom on		
yes	48.4	.85
no	46.2	
Lost erection during sex when a condom was used		
yes	63.0	.014
no	44.0	

[1] Incomplete use was defined as starting sex before the condom was put on, taking the condom off before sex was over, or both in the past 3 months.

[2] Prevalence ratio

[3] Confidence interval

Table 2. Significant Multivariate Correlates of Incomplete Use

Correlate	**AOR[1]**	**95% CI[2]**	**P≤**
Self – not highly motivated to use condoms	1.55	1.02 - 2.36	.039
Frequency of sex, 13 or more times in past 3 months	1.87	1.23 – 2.83	.003
Lost erection during sex when a condom was used	1.94	1.05 – 3.57	.034

[1] Adjusted odds ratio -- adjusted for the influence of all other variables in the model

[2] Confidence interval