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Correlates of incorrect condom use among depressed young women: An event-level analysis

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Abstract

Study Objective—Depressed young women are at particularly high risk of STIs, yet little is known about their condom use practices. This study sought (1) to describe condom use errors among depressed adolescent and young adult women and (2) to identify event- and individual-level correlates of incorrect use.

Design—Depressed, sexually active outpatients ages 15 to 22 responded to a computer-based questionnaire, then reported on penile-vaginal sex events on a handheld computer several times/day for two weeks. For each sex event with a condom, incorrect condom use was defined as a response indicating incorrect use on at least one of five questions. Event- and individual-level correlates of incorrect use were analyzed using logistic regression adjusted for age and within-individual clustering.

Setting—Participants were recruited from two adolescent clinics, a psychiatric clinic, and a young parents' program of an urban children's hospital and collected data in the settings of their everyday lives.

Participants—Thirty-one young women contributed 143 condom use events to these analyses.

Interventions—None.

Main Outcome Measure—Incorrect condom use.

Results—Incorrect condom use was reported for 51% of condom use events. The most common error was not holding the condom on withdrawal (31%). Having sex to change mood, to relax, or for physical pleasure increased the odds of incorrect condom use, but was no longer significant when individual-level variables were included in the model. In the multiple logistic regression model, impulsiveness increased and stronger belief that mood affects sexual behaviors decreased the odds of incorrect condom use (adjusted OR 1.3 and 0.81, respectively).

Conclusions—Even if they use condoms, depressed adolescent and young adult women are at increased risk of STIs because they frequently use condoms incorrectly. Psychological factors may help identify depressed young women who are at particularly high risk of incorrect condom use.

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Keywords

Condoms; Adolescent; Young Adult; Depressive Symptoms; Sexual Behavior

INTRODUCTION

Depressed young women are at particularly high risk of engaging in unsafe sexual behaviors and acquiring sexually transmitted infections (STIs).^{1–4} Most research on their condom use behaviors has focused on lack and/or inconsistency of use.^{2, 3} However, condom effectiveness in preventing STIs is predicated on correct as well as consistent use.^{5, 6} Although female secondary school and college students^{7, 8} and adolescent detainees,⁹ report frequent late application, early removal, slippage, and breakage of condoms, the correctness of condom use among depressed young women has not been examined.

In general, women have less power in sexual relationships than men, which may impair their ability to negotiate use of a condom, a male-controlled method of pregnancy and STI prevention.¹⁰ As a result of their psychological problems, depressed young women may especially struggle with engaging in condom use negotiation and other safer sexual behaviors.¹¹ Compared to non-depressed adolescents, those who are depressed have less knowledge or understanding about STI prevention,¹² which could extend to comprehending how to use a condom correctly. When depressed young women have sex, even if they use a condom, they may be distracted or ambivalent about either having sex or using a condom in ways that affect their ability to ensure that the condom is used correctly. Compared to non-depressed youth, those who are depressed report engaging more in risky sexual practices to gratify or placate their partners.¹³ They are also prone to using substances,¹⁴ which can impair their ability to take the steps necessary to use a condom correctly. Depressed individuals may be more impulsive,¹⁵ a trait that has been linked to condom nonuse and other sexual risk behaviors in adolescent and young adult women;¹⁶ associations between impulsiveness and incorrect condom use have not been established.

Ideally, evaluation of correct and consistent condom use involves assessing use for specific episodes of sexual intercourse (sex events). While consistent condom use can be measured solely by determining whether a condom has been used for every sex event, assessing correctness of use requires detailed information about condom use behavior for each sex event.¹⁷ Limitations of studies of condom use correctness have included using a simulated situation to demonstrate condom use ability,¹⁸ which may not be representative of actual condom use behavior, and using distant recall of sex events,⁹ which is subject to error associated with forgetting, revising, or telescoping information.¹⁹

Momentary sampling methods assess psychological processes and behavioral events in the context of everyday life.²⁰ Individuals are signaled at random times throughout the day to report momentary phenomena, such as feelings and social context, as well as behaviors that have occurred since the previous signal (limiting the recall period to no more than a few hours). Individuals can also be asked to initiate reports immediately after a behavior of interest, further minimizing the recall window. Restricting reporting to one very recent sex event at a time may be particularly important for optimizing the reliability of reporting condom use; more frequent condom use is associated with greater error in recalling the behavior.¹⁹ Momentary sampling methods have been used to assess adolescents' affective states and sexual behavior.²¹

The objective of this study was to examine the correctness of condom use in a sample of sexually active depressed adolescent and young adult women. Specifically, we sought first

to characterize their condom use errors, then to identify event-specific and individual-level correlates of incorrect use.

MATERIALS AND METHODS

Participants and procedure

Data were collected as part of a study of momentary factors associated with sexual intercourse events in depressed youth. Patients of two adolescent medical clinics, a psychiatric clinic, or a young parents program of an urban children's hospital were eligible to participate if they were between 15 and 22 years of age, reported clinically significant depressive symptoms over the previous two weeks (Beck Depression Inventory (BDI)-II²² score ≥ 16), and reported having penile-vaginal sexual intercourse at least once a week, on average. Informed consent was obtained after the study procedures were fully explained. The hospital institutional review board approved the study with a waiver of parental consent for adolescents under the age of 18.

Participants completed a baseline assessment via audio computer-assisted self-interview (A-CASI) and received training in momentary data collection using a handheld computer. Participants were then asked to use the handheld computer to complete two types of reports over two weeks. First, the computer was programmed to emit random signals 4 to 6 times a day during each participant's self-identified waking hours. In response, participants were asked to complete a brief questionnaire on the computer about their momentary affective states and sex and substance use events since the previous signal. Participants could specify up to 77 hours per week during which the signal would not sound to accommodate times when they knew that they would not be able to make a report (e.g., during sleep), and they could silence the computer at other times as needed. Second, participants were asked to initiate reports on their own as soon as possible after a sex event. Questions on the day and time of sex events and the automatic date- and time-stamp on every report were used to identify sex events that were reported on both signal-prompted and self-initiated reports; responses on the report that was closest in time following the time of the sex event were used for analysis. Participants returned at the conclusion of two weeks to return the computer and complete another A-CASI questionnaire. They were offered remuneration for their time and effort of up to \$120, depending on their rate of completing reports in response to signals.

Measures

On both types of reports, if a participant indicated having had a sex event, condom use was assessed with the question, "Did your partner use a condom?" If the response was yes, the questionnaire branched into five yes-no questions about the condom use, including whether the condom was put on before sex started, the condom broke or tore, the genitals touched after the condom was off, the condom stayed on during sex, and the condom was held when the penis was pulled out of the vagina. *Incorrect condom use* was defined as one or more responses indicating an error in use.

Event-level correlates—For each sex event, participants reported *partner type* (main, new, or other; categorized as main vs. non-main). They were asked to indicate their reason for having sex, selecting from a total of 11 reasons.²³ For the purposes of these analyses, *reason for sex related to physical or emotional feeling* (to change mood, to relax, for physical pleasure) was analyzed compared to all other reasons. Participants reported alcohol and marijuana use events similarly to sex events. Substance use two hours or less before each condom use event was determined (*substance use before condom use*).

On each report made in response to a random signal, momentary positive and negative affect was reported using a 12-item version of the Positive Affect-Negative Affect Schedule (PANAS).^{21, 24} The scores for positive affect and negative affect 24 hours or closer to each condom use event were averaged separately and scaled 1 to 5 (*positive/negative affect within the previous 24 hours*).

Individual-level correlates were identified from the A-CASI questionnaires. Participants reported their *age* (in years), *age at first sex* (in years), *number of sexual partners in their lifetime* and *in the past 3 months*, and whether they had *ever been treated for an STI*. Method of contraception was categorized as *hormonal contraception* (yes/no). *Condom use self-efficacy* was measured using a 6-item scale that asked how often the participant felt able to ask a partner to use a condom without fear of anger, rejection, or misunderstanding (5-point Likert-type response scale from never to always for each item, summed and averaged for a possible scale score range of 1 to 5).²⁵ *Strength of desire for pregnancy* was assessed using a 5-point Likert-type response scale (not at all to very much).

Severity of *depressive symptoms* was assessed by the BDI-II (possible score 16–63). *Impulsiveness* was measured with the 13-item narrow impulsivity subscale of the Eysenck Impulsivity Questionnaire.²⁶ Participants were asked to indicate the strength of belief that how they feel affects whether they engage in sexual activity with a partner (*strength of belief that feelings affect whether you have sex*) on a scale of 0 to 8, adapted from a question on strength of sexual desire.²⁷

Data analysis

Logistic regression models examined associations between potential correlates and incorrect condom use, using generalized estimating equation (GEE) methods to account for the clustering of condom use events within participant. Bivariate models tested a single potential correlate, adjusting for age. Variables with a *p* value < 0.10 on bivariate analysis were included in the multivariate model. SPSS software was used for all computations (version 16.0, Chicago, IL).

RESULTS

Characteristics of the participants and of their condom use events

Forty-five young women enrolled in the study. Thirty-one of 45 young women (68%) reported at least one sex event in which a condom was used, yielding 143 condom use events for analysis (range, 1 to 12 per participant). One participant did not report any sex events during the study. Compared to the 13 participants only reported sex events without a condom, those who had at least one condom use event had sex for the first time at a younger age (14.3 vs. 15.2 years, *t* = 2.194, *p* = 0.034) and more likely to report more than one sexual partner in the past three months (52% vs. 8%, Fisher's exact *p*=0.007).

The characteristics of the participants reporting condom use and of their condom use events are presented in Table 1. Participants reported a young age at first sexual intercourse (median 14 years, range 12 to 17) and multiple sexual partners in their lifetime (median 5, range 1 to 50); more than one-half (52%) reported more than one partner in the past three months. More than one-third of the sample (36%) gave a history of STI treatment. Median BDI score was 30, representing a severe level of depressive symptoms.²² Median impulsiveness score was 9, considerably higher than what has been reported in healthy adolescent and young adult women.¹⁶ Impulsiveness and BDI scores were correlated (Spearman rho .382, *p*<.034). Median condom use negotiation self-efficacy score was 4.5, which corresponded to a high degree of self-efficacy to negotiate condom use with a partner, consistent with scores seen in a previous study of young women.²⁵ At least one error was

reported in more than one-half (51%) of condom use events (Figure). The most common error was not holding onto the condom on withdrawal (31% of events). Most often, if condom use was reported as incorrect, only one error was indicated (82% of incorrect condom use).

Bivariate associations

Table 2 shows the bivariate associations of the event- and individual-level correlates with incorrect condom use. Of the event-level correlates, having sex for a reason related to physical or emotional feeling was associated with greater odds of incorrect condom use. Of the individual-level correlates examined, higher impulsiveness was most significantly associated with increased odds of incorrect condom use. Stronger belief that feelings affect whether you have sex was associated with decreased odds of incorrect condom use.

Multivariate associations

Table 2 also shows the results of the multiple logistic regression model. Once adjusted for the individual-level correlates, event-level reason for sex related to physical or emotional feeling was no longer significantly associated with incorrect condom use. Among individual-level correlates, stronger belief that feelings affect whether you have sex gained significance and impulsiveness remained highly significant in the multivariate model.

DISCUSSION

Depressed young women in this study reported using a condom incorrectly for more than one-half of condom use events. The most common error, not holding onto the condom on withdrawal, occurred in 31% of condom use events, a frequency similar to that reported in college students (37%).²⁸ Not holding onto the condom when withdrawing may result in the condom slipping or semen spilling, two potential sources of STI exposure for women. Condom breakage was uncommon (4%) and reported less frequently than in other studies that included women (14%–33%,^{7, 9} although at least one other study found a breakage rate of 4%¹⁷). Studies that do not ask about holding onto the condom when withdrawing or that exclusively focus on breakage may underestimate incorrect condom use among depressed young women.

Having sex for a reason related to physical or emotional feeling was strongly correlated with incorrect condom use in the model adjusting for age. Research in adolescents has found that having sex to cope with negative emotions,¹³ to experience pleasure,²⁹ or to enhance mood³⁰ is related to condom nonuse, but previous studies have not examined associations of these reasons for sex with correctness of use or in depressed populations. Adolescent and young adult women who have sex to relieve emotional distress may not be able to undertake the steps required for correct condom use. Alternatively or additionally, they may be ambivalent or uncertain about their decision to use a condom, and alter their behavior partway through use (e.g., not holding the condom on withdrawal to increase physical contact with their partner).

Once individual-level correlates were included in the model, event-specific reason for sex was no longer significant. The strongest correlate of incorrect condom use was impulsiveness, which has been associated with less frequent condom use³¹ and condom nonuse at last sexual intercourse¹⁶ in adolescents and young adults. To our knowledge, this is the first study linking impulsiveness to incorrect condom use. Cooper et al. proposed that impulsive individuals are prone to engaging in risk behavior for reasons related to immediate benefits of the behavior, which can include both coping and enhancement motives for sex.³¹ However, they did not find support for this hypothesis in a large,

longitudinal study of adolescents that assessed the frequency of having affect regulation motives for sex over the past six months.³¹ It may be important to examine event-specific motives for sex to determine the relative influence of personality characteristics and event-related phenomena on sexual behavior.

Interestingly, the less strongly depressed young women believed that how they feel related to whether they had sex, the more likely they were to use a condom incorrectly. Depressed young women may have poor insight into the connections between their disordered affect and sexual behavior. If they are more likely to have sex when they feel worse, they may be less able to attend to or be less interested in correct condom use. Further research is needed into the associations between affective states and condom use behaviors as they are occurring in the lives of depressed young women.

A strength of this study was its examination of condom use correctness at the level of the sex event. Research on condom effectiveness will be improved by assessing event-specific data on the partner and behaviors.⁵ Studies that have undertaken event-level analysis frequently examine last sexual intercourse.³² In this study, information was reported shortly after each sex event, minimizing problems associated with recall over longer intervals.

This study was limited by the validity and reliability of self-report. However, the use of computer-based assessments and the real-time collection of the sex event data sought to reduce self-report bias. The study assessed only five of the many types of incorrectness,⁷ and thus may have underestimated the prevalence of incorrect condom use. Although the unit of analysis was the condom use event, the size of the sample of participants contributing events was small. We conducted post-hoc power calculations based on the event sample size of 143, with approximately 50% incorrect use. The odds ratio detectable with 80% power was 1.6 per standard deviation of a continuous predictor; 2.6 for a dichotomous predictor with 50% prevalence; and 3.1 for a dichotomous predictor with 25% prevalence. Thus, the study may have been insufficiently powered to examine certain effects, such as the association between substance use and subsequent incorrect condom use that has been reported in adolescent girls.⁹

Because depressed adolescent and young adult women are at particularly high risk of STIs,¹ understanding their use of condoms is of critical importance. Consistent condom use—that is, condom use with every sex event—is necessary but not sufficient to reduce STI risk; for a given sex event, only *correct* condom use decreases the risk of STI transmission. Clinicians need to recognize that even if depressed young women use condoms with their male partners, they may frequently do so incorrectly, and efforts must be made to assess and intervene on their specific condom use errors. More event-level research is needed to better understand how personality characteristics such as impulsiveness relate to reasons for sex and to incorrect condom use in depressed young women.

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FIGURE.

Proportion of condom use events (N=143) with any and with specific types of incorrect condom use in a sample of depressed young women

Table 1

Characteristics of depressed young women and of their condom use events

Characteristics of depressed young women (N=31)	Median (range)	N (%)
Age (years)	18 (15–21)	
Age at first sex (years)	14 (12–17)	
Number of sexual partners in lifetime	5 (1–50)	
Number of sexual partners in past 3 months	2 (1–8)	
Ever been treated for an STI		11 (36%)
Hormonal contraception		17 (55%)
Condom use negotiation self-efficacy score	4.5 (2.5–5)	
Strength of desire for pregnancy	1 (1–5)	
Any desire for pregnancy		12 (39%)
Depressive symptoms score ^a	30 (17–50)	
Impulsiveness score	9 (3–13)	
Strength of belief that feelings affect whether you have sex	5 (0–8)	
Characteristics of condom use events (N=143)		
Incorrect condom use		73 (51%)
Condom not put on before sex started		15 (11%)
Condom broke or tore		6 (4%)
Condom did not stay on during sex		9 (6%)
Condom not held when pulling out		44 (31%)
Genitals touched after condom was taken off		19 (13%)
With main partner		108 (76%)
Reason for sex related to physical or emotional feeling		21 (15%)
Substance use before condom use		18 (13%)
Positive affect within the previous 24 hours ^b	2.0 (1–5)	
Negative affect within the previous 24 hours ^b	1.7 (1–5)	

^a A minimum BDI-II score of 16 was required for study participation.

^b n=136 who had made a report within previous 24 hours.

Table 2

Event- and individual-level associations with incorrect condom use among depressed young women

Event-level	Bivariate Models			Multivariate Model		
	p	Odds Ratio	95% CI	p	Odds Ratio	95% CI
With main partner	0.776	0.84	0.26 2.75			
Reason for sex related to physical or emotional feeling	0.058	1.99	0.98 4.05	0.373	1.51	0.61 3.76
Substance use before condom use	0.277	2.12	0.55 8.23			
Positive affect within the previous 24 hours ^{a, b}	0.442	1.19	0.76 1.85			
Negative affect within the previous 24 hours ^{a, b}	0.195	1.19	0.91 1.56			
Individual-level						
Age at first sexual intercourse (in years)	0.770	1.05	0.74 1.50			
Number of sexual partners in lifetime	0.874	1.00	0.95 1.05			
Number of sexual partners in past 3 months	0.425	0.90	0.68 1.17			
Ever been treated for an STI	0.171	0.45	0.14 1.42			
Hormonal contraception	0.171	2.25	0.71 7.15			
Strength of desire for pregnancy ^b	0.873	1.03	0.71 1.49			
Depressive symptoms score ^b	0.198	1.04	0.98 1.11			
Impulsiveness score ^b	0.001	1.28	1.11 1.47	0.001	1.28	1.10 1.48
Strength of belief that feelings affect whether you have sex ^b	0.052	0.82	0.67 1.00	0.045	0.81	0.66 0.996

N=143 condom use events. All models adjust for age.

^a n=136 events with at least one report within previous 24 hours.^b Odds ratio per 1-point increase in scale score.