Correlates of Condom-Associated Erection Problems in Young, Heterosexual Men: Condom Fit, Self-Efficacy, Perceptions, and Motivations

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Abstract

Questionnaire data from 479 heterosexual men 18–24 years old were analyzed for correlates of CAEP during application (CAEP-Application) and CAEP during penile-vaginal intercourse (CAEP-PVI). Potential correlates were self-efficacy (condom application, product selection, and maintaining arousal), condom perceptions (condom worry/distraction, negative condom perceptions, concerns about application speed), condom fit, and motivation to use condoms. We conclude that 1) experiencing CAEP may become a repeating cycle, both affecting and being affected by, worry and distraction related to losing erections and maintaining arousal while using a condom, 2) poorly fitting condoms may contribute to CAEP, and 3) CAEP may decrease motivation to use condoms.

Keywords

condoms; condom use; erection problems; condom self-efficacy; condom perceptions

Introduction

The consistent and correct use of male condoms can be a highly effective method of preventing sexually transmitted infections (STI), including HIV. Although the efficacy of condom use for STI and HIV prevention has been well established, studies show that STIs are acquired even by individuals who self-report 100% condom use. Although inaccuracy in self-reporting on condom use consistency may account for this, so might condom use errors and problems that compromise condom protection [1,2]. The condom problems that are most commonly reported in the sexual health literature are breakage and slippage, problems with 'fit or feel' of condoms, and sensation loss [1,2,3,4]. However, another problem that is increasingly recognized in the literature is the experience of erectile difficulties during condom application or use [3,4,5,6,7].

A recent literature review found that condom-associated erection problems (CAEP) during application ranged from 14% to 28% of participants in four studies and from 5% to 9% of events in two others [3]. In addition, CAEP during intercourse was reported by 10% to 20%

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of participants across four studies and reported to occur in 6% to 14% of events in two other studies [3]. Men experiencing CAEP reported significantly more frequent unprotected vaginal intercourse and less consistent condom use than men who did not experience this problem [4,5,8]. Further, men experiencing CAEP were more likely to report removing the condom before intercourse was over (i.e., incomplete condom use), more problems with 'fit or feel', and lower self-efficacy to use condoms correctly [5]. Therefore, CAEP may significantly impede adequate condom protection and warrants further investigation to help inform the development of appropriate behavioral interventions.

The current study examined correlates of CAEP during condom application (CAEP-Application) and CAEP while wearing a condom during penile-vaginal intercourse (CAEP-PVI) in a sample of young, heterosexual men. Men who have sex with women play a major role in HIV transmission to women, who can also pass it on to offspring. The Centers for Disease Control and Prevention (CDC) attribute the majority of HIV/AIDS diagnoses among females in the USA to heterosexual transmission. The National Institutes of Health (NIH) have called for research concerning heterosexual men's perspectives and behaviors with regard to sexually transmitted disease prevention. Correct and consistent condom use remains the most effective way to reduce HIV/STI transmission during sex, but this method relies on men's willingness and ability to use male condoms. CAEP appears be a barrier to correct and consistent condom use that requires further understanding. Additionally, the CDC reports that young people age 15 to 24 years old account for about half of the new STI diagnoses. We believed it was important to focus on young men in this research because they are still learning about their own sexual response patterns and the use of condoms in sexual interactions with others.

Four hypotheses were tested, each applying to both types of CAEP (during application and during PVI while using a condom) in separate analyses. Specifically, it was predicted that CAEP would be significantly associated with 1) less than "just right" fit of condoms, 2) lower self-efficacy for correct condom use, 3) less favorable condom-associated perceptions, and 4) less motivated to use condoms. This study adds to the literature by assessing these variables simultaneously within a single study, using multi-item measures, and conducting analyses separately for CAEP during application (CAEP-Application) and CAEP during penile-vaginal intercourse while using a condom (CAEP-PVI).

Methods

Participants

A convenience sample of young men was recruited using electronic flyers on Facebook (with advertising in several major US cities) and through university listservs (e.g., university student groups and department listings). Eligibility criteria included, being between 18–24 years old, self-identifying as heterosexual, having used a condom for penile-vaginal intercourse within the past 90 days, the ability to read English and having access to the Internet. Additionally, men were excluded if they had been in a sexually-exclusive (monogamous) relationship for at least one month as men in such relationships are less likely to use condoms and have multiple partners than are men who are not in sexually-exclusive relationships. Men reporting condom-associated erection problems were oversampled using targeted advertising. The final sample consisted of 479 men. All study procedures and questionnaires were approved by the university's Institutional Review Board.

Measures

Correct Condom Use Self-Efficacy—Condom use self-efficacy was measured using a stem question "How easy or difficult would it be for you to…" followed by 14 items related to correct condom use. A 5-point semantic differential type response scale is used with 1 labeled "very easy" and 5 labeled "very difficult." Principal components factor analysis resulted in a three-factor solution using 13 items accounting for 62% of the variance.

The Self-Efficacy-Application subscale (accounting for 21% of variance) was comprised of: 1) apply condoms correctly, 2) apply a condom quickly, 3) find the top of the condom, 4) get air pockets out, and 5) apply lube to a condom (Cronbach's α = .82). The Self-Efficacy-Product subscale (accounting for 21% of variance) included: 1) getting really good quality condoms, 2) finding condoms that fit properly, 3) keeping a condom from drying out during sex, and 4) keeping a condom from breaking during sex (Cronbach's α = .74). The Self-Efficacy–Maintain Arousal subscale (accounting for 20% of variance) included: 1) keeping an erection while using a condom, 2) keeping a condom on when withdrawing after sex, 3) wearing a condom from start to finish, and 4) keeping an erection while putting a condom on (Cronbach's α = .81). Higher scores reflect more difficulty/lower self-efficacy.

Condom Perceptions—Eighteen items, developed specifically for this study, assessed men's perceptions of condom attributes, including fit and feel, impact on their arousal, and degree of worry and distractions involved with condom use. All items were assessed using a 5-point response scale (1 = strongly disagree, 3 = neither agree or disagree, 5 = strongly agree). The items were entered into a principal components factor analysis resulting in a three-factor solution using 14 items accounting for 68% of the variance.

The Condom Distraction/Worry subscale (accounting for 30% of variance) was comprised of: 1) wearing a condom is too distracting and makes it difficult for me to stay aroused, 2) I worry about losing my erection during intercourse when I have a condom on, 3) putting a condom on is too distracting and makes it difficult for me to stay aroused, 4) wearing a condom is too distracting and makes it difficult for me to have an orgasm (cum), and 5) I worry about losing my erection when putting on a condom. Although it loaded on this factor, the item "condoms interfere with my erections" was omitted in calculating this score for this study as it overlaps with membership in the CAEP group which is predicated on the participant reporting that he at least occasionally lost or started to lose his erections in the past 90 days. (Cronbach's α = .92). The Negative Condom Attributes subscale (accounting for 23% of variance) included the items: 1) condoms do not fit me well, 2) condoms are uncomfortable, 3) condoms decrease my sensation, 4) most condoms are not the right shape for me, 5) I do not like the texture of condoms, and 6) I do not like the smell of most condoms (Cronbach's α = .83). The Concerns about Condom Application Speed subscale (accounting for 15% of variance) included: 1) it takes too long to put a condom on, 2) I feel pressure to put a condom on quickly (Cronbach's α = .78). Higher scores reflect stronger agreement.

Condom Fit—Men indicated, on a 5-point rating scale, how well condoms fit. Ratings were made for "overall length," "overall width," "fit at tip," and "fit at base." The middle response option for each of these four rating scales was "just right." A dichotomous variable was created to compare those men rating all four measures as "just right" to the remaining men.

Motivation to Use Condoms—Men indicated, using a 5-point rating scale (strongly agree to strongly disagree), their level of motivation to use condoms as well as their partners' level of motivation to use condoms. A composite score, calculated as the mean of

these two variables, was used for analyses with lower scores indicating higher levels of motivation.

Assessment of Covariates—Four covariates were assessed. To gauge men's degree of experience using condoms, a single-item assessed the number of times condoms were used in the past 90 days and the resulting distribution was then dichotomized using a median split. In addition, whether men had multiple penile-vaginal sex partners in the past 90 days and whether men relied on condoms as their method of birth control were included as covariates, as was their age.

Condom-Associated Erection Problems—Two types of condom-associated erection problems were assessed: CAEP occurring during application of the condom (CAEP-Application) and CAEP occurring during penile-vaginal intercourse while using a condom (CAEP-PVI). CAEP-Application was assessed by the question: "How often over the PAST 90 DAYS did you lose or start to lose your erection while PUTTING THE CONDOM ON before vaginal intercourse?" CAEP-PVI was assessed by the question: "IN THE PAST 90 DAYS, how often did you lose or start to lose your erection WHILE WEARING A CONDOM DURING vaginal intercourse?" Response options for both questions were: never, occasionally, less than half the time, most of the time, always. CAEP was coded as "yes" when men indicated to have at least "occasionally" experienced erection problems.

Data Analysis

Descriptive statistics were used to describe the sample. Factor analyses for Self-Efficacy and Condom Perceptions were conducted by entering items into a principal components factor analysis based on Eigenvalues greater than 1 using Varimax rotation. Items were eliminated from the analyses if no inter-item correlation or communality was greater than .30. All items loaded on their final factors at .40 or greater. KMO and Bartlett's statistics were well within the acceptable range for factor analysis. Items were assigned to the one subscale reflecting the factor on which they were most highly loaded and mean scores were developed for each subscale.

Given the highly skewed distributions for scores on motivation and the self-efficacy and the condom perception subscales, these data were dichotomized for further analyses using a median split (at or below the median versus above). Analyses were conducted separately examining correlates of the two types of CAEP (CAEP-Application and CAEP-PVI). Bivariate screening analyses were conducted to determine which of the eight potential correlates (three self-efficacy subscales, three condom perceptions subscales, "just right" fit, and motivation) and the four potential covariates warranted inclusion in the multivariate models. For continuous variables independent groups t-tests were used to compare men reporting CAEP to those not reporting CAEP. When distributions were highly skewed the t-test findings were confirmed by Mann-Whitney U tests. For dichotomous level variables, contingency table analyses were used. Correlates and covariates achieving bivariate significance at $p < .05$ were entered into multiple logistic regression models conducted separately for CAEP-Application (yes v no) and CAEP-PVI (yes v no). The Forward Wald procedure was used to guide model entry, with model confirmation being achieved using the entry method. Analyses were conducted using IBM SPSS 19.

Results

Sample Characteristics

There were 479 men in the study sample. CAEP-Application was reported by 220 and CAEP-PVI was reported by 229 men. A total of 154 (52%) of these men reported both types

of CAEP. The mean age of the participants was 20.4 years (SD = 1.6). The majority identified as White (80.1%), with 6.8% identifying as Asian, 4.7% as African American/ Black, 4.2% as multiracial, and the remainder identifying as members of other races. Hispanic ethnicity was reported by 4.2% of the men. Just over half of the total sample (54.7%) indicated their personal income level was lower-middle class or less. The mean number of times men used condoms in the 90-day recall period was 10.8 (SD = 14.3 times) with the median at 6. The median split placed 52.5% at or below the median. Just over half of the men (54.9%) indicated reliance on condoms as their only form of birth control at least some of the time. The majority (60.4%) had more than one female sex partner in the past 90 days. About one in four of men (25.3%) reported that condoms fit "just right." The median scores used for median splits were as follows: Self-Efficacy - Application = 1.4 (50.8% classified low), Self-Efficacy - Product = 1.8 (58.6% classified low), Self-Efficacy - Maintain Erection = 1.8 (57.6% classified low), Condom Distraction/Worry = 2.2 (49.8% classified high), Negative Condom Attributes = 2.9 (50.0% classified high), Concerns about Condom Application Speed = 2.5 (43.7 classified high), and Motivation = 2.0 (38.2% classified low).

CAEP-Application—The upper half of Table 1 presents the results of the group comparisons (CAEP-Application vs. No-CAEP) of the potential correlates. Compared to the No-CAEP group, significantly more men in the CAEP-Application group reported that condoms did not fit "just right", supporting Hypothesis 1. Using the dichotomized variables, significantly more men in the CAEP-Application group as compared to the men in the No-CAEP group, scored low on the three subscales measuring correct condom use self-efficacy (condom application, product selection and use, and maintaining arousal). Similarly, more men in the CAEP-Application group scored high on the three subscales of condom perceptions (condom distraction and worry, negative condom attributes, concerns about condom application speed). They also scored lower in motivation to use condoms. These findings support Hypotheses 2 through 4 for CAEP-Application. No significant associations were found between CAEP-Application and demographic variables including age, number of times condoms were used, whether men had multiple penile-vaginal sex partners in the past 90 days, or whether men relied on condoms as their method of birth control.

Given the above results, all variables listed in Table 1 were entered as covariates in a logistic regression model predicting CAEP-Application. The model fit the data well (Hosmer & Lemshow Test X^2 = 3.66, with 2 df, p = .160) and included only two of the eight covariates. Men with higher scores on worry and distraction related to sexual arousal during condom use were more than three times more likely to report CAEP-Application (AOR = 3.54, 95% CI = 2.35 – 5.33, p < .001). Men with lower scores on self-efficacy to maintain arousal were almost twice as likely to report CAEP-Application than those with higher scores (AOR = 1.86, 95% CI = 1.23 – 1.80, p = .003).

CAEP-PVI—The lower half of Table 1 presents the results of the group comparisons for the potential correlates. Compared to the No-CAEP group, significantly more men in the CAEP-PVI group reported that condoms did not fit "just right", supporting Hypothesis 1. Using the dichotomized variables, significantly more men in the CAEP-PVI group compared to the No CAEP group were found to score low on the three subscales of correct condom use self-efficacy (condom application, product selection and use, and maintaining arousal). In addition, more men in the CAEP-PVI group scored high on condom distraction and worry. They also scored lower in motivation to use condoms. However, negative condom attributes and concerns about condom application speed did not differ between groups. These findings supported Hypotheses 2 and 4, and Hypothesis 3 in part for CAEP-PVI. Age was significantly different between the CAEP-PVI (M=20.62, SD=1.65) and No-CAEP (M=20.25, SD=1.59) groups (t(447)=2.49, p=.013). No significant associations were found

between CAEP-PVI and demographics other than age, whether men had multiple penile-vaginal sex partners in the past 90 days, or whether men relied on condoms as their method of birth control.

Given these findings, age, whether condoms fit "just right", all three self-efficacy variables, the condom distraction/worry variable, and the motivation variable were entered as covariates in a logistic regression model predicting CAEP-PVI. The model fit the data well (Hosmer & Lemshow Test X^2 = 11.878, with 8 df, p = .157). Men reporting more worry and distraction related to sexual arousal during condom use were more than three times more likely to report CAEP-PVI (AOR = 3.35, 95% CI = 2.22 – 5.06, p < .001). Men with lower self-efficacy to maintain arousal were almost twice as likely to report CAEP-PVI (AOR = 1.78, 95% CI = 1.17 – 2.71, p = .007). Men indicating that condoms did not fit "just right" were almost twice as likely to report CAEP-PVI compared to those reporting that condoms fit "just right" (AOR = 1.81, 95% CI = 1.14 – 2.87, p = .012). Even though the age range was limited to 18 to 24 years, for each additional year of age, there was a slight but significant increase in risk of CAEP-PVI (AOR = 1.16, 95% CI = 1.03 – 1.32, p = .014).

Discussion

To our knowledge this is the first study to use simultaneous, multi-item, multi-factorial assessments of the constructs of condom fit, correct condom use self-efficacy, condom perceptions, and motivation to use condom in relation to CAEP. Further, we examined these relationships independently for CAEP-Application and CAEP-PVI.

Generally speaking, the young condom-using heterosexual men who participated in this study had reasonably high self-efficacy for correct condom use, did not have particularly negative perceptions toward condoms, and were motivated to use condoms. Nonetheless, significant bivariate relationships were found between at least some subscales of each of these aspects of condom use and whether or not men reported condom-associated erection problems (CAEP) in the past 90 days either during application or during penile-vaginal intercourse. We predicted that CAEP-Application and CAEP-PVI would be significantly associated with less than "just right" fit of condoms, lower self-efficacy for correct condom use, less favorable condom-associated perceptions, and less motivated to use condoms. In bivariate analyses, all of the hypotheses were supported at least in part.

Researchers and clinicians may have interest in the specific bivariate relationships we found. Specifically, CAEP-Application was significantly associated with: 1) condoms not fitting "just right"; 2) low scores on all three subscales of correct condom use self-efficacy (condom application, product selection and use, and maintaining arousal); 3) high scores on all three subscales of condom perceptions (condom distraction and worry, negative condom attributes, concerns about condom application speed); and 4) low scores on motivation to use condoms. For CAEP-PVI, all of these were significant except negative condom attributes, and concerns about condom application speed. Although it may make sense that concerns about condom application speed would be more relevant to CAEP-Application than CAEP-PVI, it is less clear why perceptions of negative condom attributes would be significantly associated with CAEP-Application but not with CAEP-PVI. Condom application requires a stronger focus on the condom as an object than does intercourse while using a condom. So perhaps those who experience erections problems during application are more likely to "blame" condom attributes.

Subsequent multivariate logistic regression analyses were then conducted to examine the relative predictive of each of these in predicting CAEP-Application and CAEP-PVI independently. Slightly different models were obtained for the two types of CAEP. For both

types of CAEP, only the condom perception subscale of condom distraction/worry related to sexual arousal during condom use retained significance -- suggesting this is the more salient aspect of condom perceptions for CAEP. Compared to men scoring lower, men scoring high on Condom Distraction/Worry were more than three times more likely to report CAEP-Application and CAEP-PVI. It is noteworthy that this is the strongest predictor in both multivariate regression models indicating that worrying about condoms interfering with erections/arousal and/or finding condoms distracting represents greater risk for CAEP than the other variables in the models. Being distracted from erotic stimulation and worrying about sexual performance are known to be more common among men with erectile difficulties, and studies have repeatedly shown that distraction reduces sexual arousal in sexually functional men [9]. Additionally, it is known that worrying about erections problems can become a self-fulfilling prophecy [10]. Not surprisingly, low self-efficacy to maintain erections/arousal also retained significance in the multivariate analyses for both types of CAEP. These were the only two significant predictors in the multivariate analysis for CAEP-Application. The fact that these two variables rather than the other aspects of condom perceptions (negative condom attributes and concerns about condom application speed) and self-efficacy (condom application and product selection and use) are retained in the multivariate models highlights the importance of addressing arousal concerns in promoting condom use.

The condom fit variable retained significance in the multivariate model only for CAEP-PVI. This suggests that poorly fitting condoms pose challenges to men in terms of their arousal. During intercourse, perhaps poorly fitting condoms distract from arousal or cause worry about slippage or breakage, or simply interfere with pleasurable sensations that then lead to CAEP-PVI. Actively assisting men to find condoms that fit well may decrease the frequency of CAEP-PVI and the behavioral problems that are associated with it such inconsistent and incomplete use [e.g.,4,5,8].

Despite the age limits set for the sample, higher age was associated with a slight increase in risk of CAEP-PVI. Perhaps this reflects the self-fulfilling prophecy. Slightly older men may have had more CAEP-PVI experiences leading them to worry about it happening again. The worry and distraction then may make them more likely to have the experience again.

In light of the other variables on which we had data, motivation was not retained in the final regression models for either type of CAEP. However, in bivariate analyses both types of CAEP were associated with men reporting that they and their partners were less motivated to use condoms. It is possible that a history of CAEP leads to lower motivation to use condoms. It is also possible that higher motivation to use condom is protective against CAEP, but is not as proximal a predictor as worry/distraction related to condom interfering with arousal and low-self-efficacy to maintain arousal.

These findings are consistent with the Condom Use Experience (CUE) model [3]. The model proposes that aspects of the sexual experience (including arousal, erection, sensations, orgasm) as well as the fit and feel of condoms are important aspects of the condom use experience. Fit and feel of condoms can affect how condoms are used (whether errors are made) and can impact various aspects of the sexual experience. The significant associations between fit and CAEP found in the current study support this aspect of the CUE model. Furthermore, in the CUE model, self-efficacy, attitudes (including condom perceptions), and motivation to use condoms are included as important contextual factors for the condom use experience. The model proposes the potential for a bidirectional influence between condom use experiences and such contextual factors. The significant associations found between self-efficacy, condom perceptions, motivation, and CAEP support these aspects of the model.

More research on CAEP is needed across a wider variety of populations. Although we have no specific hypotheses regarding how findings might differ across populations, the generalizability of our findings may be limited. It is possible that men with more negative attitudes toward condoms or those who were embarrassed by experiencing CAEP may have been reluctant to participate in the study. Alternatively, such men may be more motivated to tell researchers about their problems by participating in research. The degree of such volunteer bias is unknown. However, to maximize diversity of condom use experience, in addition to recruitment messages simply seeking condom-using men, we specifically included recruitment messages seeking men who had problems using condoms and men for whom condoms interfered with their arousal. Given that condom use was an eligibility criterion, men who have given up on condom use, perhaps due to CAEP or other problems, are not represented in our sample.

Conclusion

Our findings suggest that breaking the cycle of CAEP experience and worry and distraction related to sexual arousal during condom and low self-efficacy for maintaining arousal should be an important goal of interventions aiming to help men who experience CAEP. This is critical to maximizing the effectiveness of condoms, as previous studies have found more frequent unprotected vaginal intercourse, less consistent condom use, and more frequent removal of condoms before intercourse was over among men reporting CAEP [4,5,8].

CAEP may be amenable to two different forms of intervention. First, encouraging men who experience CAEP to try a variety of sizes and shapes of condoms may help them find better fitting condoms and that may decrease the likelihood of CAEP. A recent study found that an experiential intervention that provided men with a range of condom sizes and types improved attitudes regarding condoms and favorably increased self-reported comfort when using condoms [11]. Second, men with CAEP may be helped by interventions to improve self-efficacy for condom application and use, perceptions of condoms, and condom-use motivation in general and also by addressing ways of avoiding and overcoming CAEP. Indeed, interventions have demonstrated efficacy in improving condom self-efficacy, attitudes, and motivation among men not necessarily known to have CAEP [11,12]. Such interventions may be particularly beneficial to men experiencing CAEP. Specifically, more directly addressing the issue of CAEP and the self-fulfilling cycle of worry/distraction and CAEP may enhance condom promotion efforts.

Acknowledgments

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Table 1

Comparison of correlates for those reporting each type of condom-associated erection problem (CAEP) compared to those not reporting that type of problem (No-CAEP).

Score	% No-CAEP	% CAEP	Chi-Square	*p*
CAEP-Application				
Condoms Did Not Fit "Just Right"	69.9	80.5	7.040	.008
Low Self-Efficacy – Application[1]	44.2	55.0	5.576	.018
Low Self-Efficacy – Product[1]	36.8	46.8	4.839	.028
Low Self-Efficacy – Maintain Arousal[1]	31.0	56.0	30.124	<.001
High Condom Distraction/Worry[2]	34.1	69.3	58.422	<.001
High Negative Condom Attributes[2]	45.0	56.0	5.721	.017
High Concern about Condom Application Speed[2]	34.1	55.0	21.054	<.001
Low Motivation to Use Condoms[3]	32.8	44.7	7.148	.008
CAEP-PVI				
Condoms Did Not Fit "Just Right"	68.4	81.7	11.130	.001
Low Self-Efficacy – Application[1]	43.0	55.9	7.999	.005
Low Self-Efficacy – Product[1]	36.9	46.3	4.241	.039
Low Self-Efficacy - Arousal[1]	30.5	55.5	30.344	<.001
High Condom Distraction/Worry[2]	34.1	67.8	53.960	<.001
High Negative Condom Attributes[2]	47.0	53.3	1.895	.169
High Concern about Condom Application Speed[2]	40.2	47.6	2.655	.103
Low Motivation to Use Condoms[3]	31.3	45.9	10.654	.001