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Condom Use Completeness, Perceptions, and Sexual Quality at Most Recent Sexual Event: Results from a U.S. Nationally Representative Probability Sample

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ABSTRACT

Objectives: To explore perceptions of condoms associated with complete use and evaluate relationships between condom perceptions, condom use, and sexual quality.

Methods: Using data from a U. S. nationally representative probability sample, we assessed individuals' condom use perceptions and related characteristics of their most recent sexual event through bivariate and regression analyses ($n = 234$).

Results: Most participants reported complete condom use and neutral or positive perceptions of condoms. Though incomplete use was associated with orgasm among women, arousal and pleasure did not differ by gender or duration of condom use.

Conclusions: We found no evidence that delayed application or early condom removal increased sexual arousal or pleasure, which may help sexual health promotion interventions address negative cultural ideas about condoms.

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Introduction

Condoms remain the most widely available, inexpensive, and highly effective method for preventing both sexually transmitted infections (STIs) and unintended pregnancies when used consistently and correctly (Davis & Weller, 1999; Holmes, Levine & Weaver, 2004). However, condoms are often described by some as being less efficacious than other contraceptive methods for the prevention of pregnancy often citing failure rates of 2% for “perfect use” and 18% for “typical use” (Hatcher et al., 2007). The significantly greater failure rate for “typical use” is due to errors users make in using condom for sexual events, rather than problems with the structural integrity of the condoms per se. A common error that compromises the efficacy of condoms is incomplete condom use (i.e., late application and/or early removal). Late application means

that the condom was applied after initiation of intercourse. Early removal refers to removing the condom and continuing intercourse without a condom. Such incomplete use is known to occur more frequently than condom breakage or slippage, with delayed condom application occurring far more frequently than early removal (Hensel, Stupiansky, Herbenick, Dodge & Reece, 2012; Sanders et al., 2012; Warner et al., 2007).

Among the various reasons for delayed condom application and early condom removal are user perceptions of erectile difficulty and diminished sexual quality (Hensel, Stupiansky, Herbenick, Dodge, & Reece, 2011; Wang, 2013). Indeed, studies of clinic and convenience samples have demonstrated a significant relationship between loss of erection during condom use and incomplete condom use (Graham, Crosby, Milhausen, Sanders, & Yarber, 2011; Graham, Crosby, Yarber, et al., 2006; Sanders, Yarber,

Crosby, & Graham, 2008; Yarber et al., 2007). Research suggests a repeating cycle in which condom-associated erection problems may both affect and be affected by worry and distractions related to problems of maintaining arousal and erections while using a condom (Sanders, Hill, Crosby, & Janssen, 2014). The belief that condom use reduces sexual pleasure is strongly associated with condom nonuse in men and women (Higgins & Wang, 2015). Beyond negative perceptions of condoms borne of experience, negative cultural narratives about condoms undermine their consistent and correct use as well (Braun, 2013). Indeed, the belief that condoms diminish sexual quality is so widespread that such beliefs are even reported by individuals who have yet to engage in sexual intercourse (Rosenberger, Bell, McBride, Fortenberry & Ott, 2010).

While misunderstood efficacy rates and overestimated perceptions of negative impact to erectile and sexual quality are used to justify incomplete use, recent research findings challenge the negative reputation of condoms. For example, men who report erectile problems associated with condom application and use are also more likely to experience generalized erectile difficulties when not using condoms (Sanders et al., 2015). Further, subjective reports of pleasure during sexual events both with and without a condom do not significantly differ (Herbenick et al., 2013; Sanders et al., 2010). Such findings point to a need to better understand the characteristics and perceptions of condoms that may facilitate their correct use. Thus, the aim of the present study was to explore self-reported feelings associated with condom use among those who report complete versus incomplete condom use for sexual intercourse during their most recent sexual event using a U.S. probability sample. A second aim was to examine associations between duration of condom use and sexual arousal, sexual pleasure, and orgasm.

Materials and methods

Study design and data

These data come from the National Survey of Sexual Health and Behavior (NSSHB). The NSSHB is a population-based survey of adults

and adolescents in the U.S. that began in 2009 and has been administered a total of seven times (Herbenick et al., 2010). Data from this wave were collected during the Fall of 2014, from a KnowledgePanel[®] sampling frame identified by GfK Research (Menlo Park, CA). This was the first wave for which measures assessing perceptions of condom use were included in the NSSHB. The KnowledgePanel[®] is designed to be a U.S. nationally representative, probability-based online panel. Such panels are frequently utilized by scientists to collect U.S. nationally representative probability data on a range of topics, including health and sexuality (Chang & Krosnick, 2019; Eisenberg, Freed, Davis, Singer, & Prosser, 2011; Harris, Schonlau & Lurie, 2009; Herbenick, Fu, Arter, Sanders, & Dodge, 2018; Herbenick et al., 2010). The study protocol was approved by the Institutional Review Board of the authors' institutions at the time of data collection.

An initial recruitment message was sent to 4,596 individuals. In order to decrease the non-response rate, those individuals who did not respond to the initial recruitment email received a follow-up email 3 days after data collection began. Of the 4,596 individuals invited to participate, 2,648 (58%) completed the screener and 2,098 (46%) completed the survey. Of complete responders, 1,674 (79.8%) were adults (ages 18–101) and 424 (20.2%) were adolescents ages 14–17 (three of the adolescent responses were excluded from analyses due to mischievous responses, resulting in 421 adolescent cases). Analyses for this paper were limited to a restricted sample of participants who reported using a condom during either penile-vaginal intercourse (PVI) or penile-anal intercourse (PAI) during their most recent sexual event (MRSE) with a partner ($n = 234$). Prior research has established that measuring condom use during the MRSE is an adequate proxy for condom use over time (Younge et al., 2008).

Measures of interest

We collected data on the socio-demographic characteristics of the sample and factors related to event-level condom use. Participants were shown a list of sexual behaviors and asked which

Table 1. Measures of Sexual Quality during Most Recent Sexual Event.

Covariate	Measure	Response Options
Pleasure	How pleasurable was your most recent sexual event?	Not at all pleasurable, A little pleasurable, Moderately pleasurable, Quite a bit pleasurable, Extremely pleasurable
Arousal	How sexually aroused did you feel during this most recent sexual act?	Not at all aroused, A little aroused, Moderately aroused, Quite a bit aroused, Extremely aroused
Orgasm	During this most recent sexual experience, did you have an orgasm?	No Yes, I had one orgasm Yes, I had more than one orgasm Not sure
Feelings between partners	Which best describes the feelings between you and the person with whom you engaged in sexual activities during this most recent event?	We both loved each other I loved my partner but I don't think he/she loved me I loved my partner but I'm not sure if he/she loved me My partner loved me but I didn't love him/her Neither one of us was in love with the other I disliked him/her I think he/she disliked me
Lubrication use	During this event, which of the following lubricating substances did you use?	Lubricant (e.g. lube or a vaginal moisturizer) Saliva or spit Vaseline or some other petroleum product Hand or body lotion Mineral oil, baby oil, cooking oil Massage oil Other I am not sure of the lubricant type None of these
Erection or lubrication difficulty	How difficult was it for you to become naturally lubricated ("wet")/ maintain erection during this sexual encounter?	Extremely difficult or impossible, Very difficult, Difficult, Slightly difficult, Not difficult, Does not apply (we weren't doing anything that required me to be lubricated/have an erection)

of them they engaged in during their MRSE. Participants could select any that applied. If they selected vaginal or anal intercourse, they were then asked about condom use.

Condom use

To assess complete or incomplete condom use, participants were asked how they used the condom during their MRSE, with the following response options: "We used a condom the entire time (our genitals never touched each other unprotected);" "We started having intercourse with a condom, then took off the condom and finished intercourse without a condom;" or "We started having intercourse without a condom, then put on a condom and finished intercourse with a condom." If they indicated any condom use—complete or incomplete—during this most recent event, they were asked the questions below.

Condom application

Participants were asked, "who actually put on the condom," and provided with response options to indicate that they did, their partner did, or both

the participant and their partner applied the condom.

Perceptions of condom use

Participants were asked, "How did you feel about the act of putting on a condom," and provided with 14 prompts to which they could answer yes or no, (e.g. "it enhanced the sexual experience," "it was awkward"; full listing provided in Results).

Event-level characteristics of sexual quality

Table 1 presents the measures used to assess characteristics of participants' most recent sexual event. Participants were asked about pleasure, arousal, orgasm, feelings between partners, lubrication use, and erection or lubrication difficulty using single-item, event-level measures similar to established multi-item measures of sexual quality (Rosen et al., 1997, 2000).

Statistical analysis

All statistical analyses were conducted in SPSS v23 and Stata v15. Post-stratification data weights were applied to all analyses to adjust for survey

non-response and to maximize generalizations to the target population. An iterative proportion fitting (raking) procedure was used to produce data weights that aligned with study benchmark distributions based on the March 2014 Current Population Survey. Variables used for weighting include age, gender, race/ethnicity, education, Census region, household income, metropolitan area, and internet access. Analyses were restricted to respondents who reported using a condom for PVI or PAI at their MRSE. Sociodemographic and relationship characteristics were stratified by complete condom use (e.g., applying the condom before intercourse and wearing it for the duration of intercourse) versus incomplete condom use (e.g., applying the condom after intercourse had started or removing the condom before intercourse was completed) during the event, and chi-square tests were used to identify differences with respect to such use.

Feelings associated with condom use at the MRSE were stratified by gender and complete/incomplete use. Chi-square tests were used to identify statistically significant differences and, where significant, post-hoc tests were performed to determine which demographic groups differed. Ordinal logistic regression was used to assess the effect of event level condom use completeness on sexual pleasure and sexual arousal, respectively. Logistic regression was used to assess the effect of condom use completeness on the presence of orgasm at the event level. Those who reported that they were not sure if they had an orgasm were excluded. Adjusted logistic models were constructed separately by gender to further assess the association between event-level condom use completeness on orgasms—because it was statistically significant in the unadjusted logistic regression model—adjusting for feelings between partners (we both loved each other/other), lubrication use (any/none), and difficulty to maintain erection (for men, not difficult/any difficulty) or become naturally lubricated (for women, not difficult/any difficulty), as well as interactions between condom use completeness and difficulty to maintain erection (for men) or become naturally lubricated (for women).

Results

Sociodemographic characteristics by condom use completeness

Among 1350 participants who reported PVI or PAI at MRSE, those who reported condom use ($n=234$; 17.3%) were included in the present analysis. Of these, 51.7% were men and 48.3% were women. About half (54.7%) of these participants were White, non-Hispanic ($n=128$), and the majority identified as straight/heterosexual (95.2%, $n=223$).

Table 2 presents a comparison of the sociodemographic characteristics of those who reported condom use at the MRSE by condom use completeness. Of the 234 individuals who reported any condom use during the event, 74.8% ($n=175$) reported complete use, or condom use for the entire duration of sexual intercourse, and 23.2% ($n=59$) reported incomplete use. Delayed application, reported by 21.7% of condom users ($n=51$), occurred more frequently than early condom removal (3.4%, $n=8$).

Fewer of those who reported complete condom use (60%, $n=105$) described themselves as having at least some college education compared to those who reported incomplete use (80%, $n=47$). Among those who reported complete condom use, 31.7% ($n=52$) were currently married and living together, 30.9% ($n=50$) were single and not dating, and 24.3% ($n=40$) were single and dating someone. Far more of those who reported incomplete condom use were married (60.7%, $n=34$), while 21% were single and not dating ($n=12$).

Condom application

Nearly three-quarters of men whose most recent sexual partner was a woman reported applying the condom themselves (74.3%; $n=83$) as opposed to their partner applying it (13.8%; $n=15$). Reports from women whose most recent sex partner was a man were similar, with 77.2% ($n=87$) reporting that their partner applied the condom, as opposed to applying the condom themselves (14.0%, $n=16$). Fewer than a tenth of men (7.1%, $n=6$) and women (8.3%, $n=9$)

Table 2. Participant Sociodemographic Distribution by Condon Use Completeness Using Post-Stratification Weights.

Characteristics	Condom Use Completeness at Most Recent Sexual Event					
	Complete Use (<i>n</i> = 175)		Incomplete Use (<i>n</i> = 59)		Total (<i>n</i> = 234)	
	%	(<i>n</i>)	%	(<i>n</i>)	%	(<i>n</i>)
Gender						
Man	55.3	(97)	41.0	(24)	51.7	(121)
Woman	44.7	(78)	59.0	(35)	48.3	(113)
Age (years)						
14–17	7.3	(13)	5.0	(3)	6.7	(16)
18–29	31.7	(56)	33.1	(19)	32.0	(75)
30–44	25.2	(44)	36.7	(22)	28.1	(66)
45–59	27.9	(49)	18.2	(11)	25.5	(60)
60+	7.9	(14)	7.0	(4)	7.7	(18)
Race/Ethnicity						
White, non-Hispanic	56.4	(99)	48.9	(29)	54.7	(128)
Black, non-Hispanic	20.4	(36)	6.0	(4)	16.7	(39)
Other, non-Hispanic	8.6	(15)	10.4	(6)	9.0	(21)
Hispanic	13.4	(24)	29.9	(18)	17.5	(41)
Multi-racial, non-Hispanic	1.3	(2)	4.7	(3)	2.1	(5)
Sexual Orientation Identity						
Straight or heterosexual	96.8	(170)	90.6	(53)	95.2	(223)
Gay, lesbian, or homosexual	1.9	(3)	7.4	(4)	3.3	(8)
Bisexual	1.3	(2)	2.0	(1)	1.5	(3)
Education*						
Less than high school	7.5	(13)	0.5	(0)	5.7	(13)
High school	33.0	(58)	19.2	(11)	29.5	(69)
Some college	24.9	(44)	51.8	(30)	31.7	(74)
Bachelor's degree or higher	34.6	(61)	28.5	(17)	33.1	(78)
Relationship Status*						
Single and not dating	30.9	(50)	21.0	(12)	28.4	(62)
Single and dating someone	24.3	(40)	9.2	(5)	20.5	(45)
In a relationship but not living together	4.8	(8)	6.1	(3)	5.1	(11)
Living together but not married	8.3	(14)	3.1	(2)	7.0	(15)
Married and living together	31.7	(52)	60.7	(34)	39.1	(86)
Sex Partner Gender						
Man	45.9	(52)	61.8	(27)	50.3	(79)
Woman	53.9	(61)	38.2	(17)	49.5	(78)

* $p < 0.05$ by chi-squared test assessing differences between individuals who report complete vs. incomplete condom use.

reported that they shared the role of putting on the condom.

Perceptions of condom use

Table 3 presents the results of participants' perceptions associated with event-level condom use by participant gender and by completeness. The most frequently endorsed perception associated with condom use was neutral: about half of participants reported that condom use was "no big deal" (49.1%, $n = 115$). Two positive assessments of condom use comprised the next most frequently reported feelings, including: "I felt relieved we were using protection" (29.5%, $n = 69$) and "It allowed me to relax and enjoy the sex because I wasn't worried about pregnancy/STDs" (28.2%, $n = 66$). About 1 in 6 respondents reported that condom use was associated with being sexy because it meant they were about to have sex (16.6%, $n = 39$) and the same proportion

(16.8%, $n = 39$) indicated that they "didn't like to use a condom, but it was necessary for protection." The latter of the two was the most frequently endorsed negative perception. Fewer respondents felt that using a condom "interrupted the moment" (14.4%, $n = 34$), and no participants indicated wondering whether using a condom was "worth the trouble" (0.2%, $n = 0$).

While few participants reported feeling nervous about applying the condom or uncertainty about applying the condom *correctly*, only 22.9% ($n = 54$) of the participants reported feeling confident that the condom was put on correctly. The only statistically significant difference between genders occurred around the idea that using a condom demonstrates care for a partner. Men more frequently reported feeling that condom application "showed my partner that I care" than women (20.7% [95% CI: 12.8–31.6%] of men, 3.1% [95% CI: 1.0–9.4%] of women). Women

Table 3. Condom Use Perceptions at Most Recent Sexual Event by Gender and Condom Use Completeness.

Condom use perceptions	Total (n = 234)		Participant Gender				Condom Use Completeness			
	%	(n)	Men (n = 121)		Women (n = 112)		Complete (n = 175)		Incomplete (n = 59)	
It was no big deal	49.1	(115)	48.0	(58)	50.3	(57)	48.0	(84)	52.9	(31)
I felt relieved we were using protection [†]	29.5	(69)	29.1	(35)	30.0	(34)	34.3	(60)	15.9	(9)
It allowed me to relax and enjoy the sex because I wasn't worried about pregnancy/STDs [†]	28.2	(66)	28.3	(34)	28.1	(32)	32.3	(57)	16.6	(10)
I felt confident it was put on correctly	22.9	(54)	25.3	(31)	20.5	(23)	23.4	(41)	21.4	(13)
I didn't like to, but it was necessary for protection	16.8	(39)	21.0	(25)	12.3	(14)	15.7	(27)	20.0	(12)
It was sexy because it meant we'd be having sex soon	16.6	(39)	17.6	(21)	15.5	(17)	20.1	(35)	5.9	(3)
It was sexy because of how it was done	15.2	(35)	17.8	(22)	12.3	(14)	13.9	(24)	18.8	(11)
It interrupted the moment	14.4	(34)	15.9	(19)	12.8	(14)	12.4	(22)	20.2	(12)
It showed my partner that I care*	12.2	(28)	20.7	(25)	3.1	(4)	14.3	(25)	7.0	(4)
It showed that my partner cares about me	10.4	(24)	6.7	(8)	14.3	(16)	12.4	(22)	5.1	(3)
It enhanced the sexual experience	5.0	(12)	6.6	(8)	3.3	(4)	5.9	(10)	2.3	(1)
I worried whether I/my partner had done it correctly	2.5	(6)	2.2	(3)	2.8	(3)	2.3	(4)	3.0	(2)
I got nervous about putting it on	0.8	(2)	0.9	(1)	0.6	(1)	0.6	(1)	1.1	(1)
I wondered if it was worth the trouble	0.2	(0)	0.4	(0)	0.0	(0)	0.3	(0)	0.0	(0)

* $p < 0.05$ by chi-squared test assessing differences between men and women.

[†] $p < 0.05$ by chi-squared test assessing differences between individuals who report complete vs. incomplete condom use.

reported a similar item, “it showed that my partner cares about me,” more frequently than men, but the difference was not statistically significant.

Compared to incomplete users, complete condom users more frequently described feeling “relieved we were using protection” (15.9% [95% CI: 6.7–33.1%] vs. 34.3% [95% CI: 25.7–44.1%], respectively) or that condom use allowed them “to relax and enjoy the sex because I wasn't worried about pregnancy/STDs” (16.6% [95% CI: 7.4–33.2%] vs. 32.3% [95% CI: 24.1–41.8%], respectively); these results are statistically significant. No other significant differences regarding feelings about event-level condom use were observed between complete and incomplete users.

Condom use completeness and sexual arousal, pleasure, and orgasm

We assessed the association between condom use completeness and sexual pleasure, arousal, and orgasm, respectively (Table 4). No significant associations were observed between condom use

completeness and sexual pleasure or sexual arousal. However, individuals reporting incomplete condom use during the event were significantly more likely than complete users to report having one or more orgasms ($OR = 3.07$, 95% CI: 1.05–8.99).

Table 5 presents the association between condom use completeness and orgasm during the sexual event adjusted for other factors. In unadjusted analyses, being a woman, love between partners, use of lubricating substances, and difficulty maintaining one's erection were statistically significantly associated with reported orgasm. Among men, after adjusting for feelings between partners, lubrication use, and difficulty to maintain erection, incomplete condom users were no longer significantly more likely than complete condom users to report an orgasm during the event ($OR = 2.36$, 95% CI: 0.79–7.02). Among women, after adjusting for feelings between partners, lubrication use, and difficulty become naturally lubricated, incomplete condom users were 4.1 times more likely than complete

Table 4. Association between Condom Use Completeness and Sexual Pleasure, Sexual Arousal, and Orgasm at Most Recent Sexual Experience.

Experiences at Most Recent Sexual Event	Condom Use Completeness				Effect of Condom Use Completeness on Experiences at Most Recent Sexual Event		
	Complete (n = 175)		Incomplete (n = 59)		OR	(95% CI)	p-value
	%	(n)	%	(n)			
Sexual Pleasure					1.16	(0.60, 2.26) ^a	0.649
Not at all pleasurable	1.5	(3)	0.6	(0)			
A little pleasurable	10.4	(18)	5.5	(3)			
Moderately pleasurable	21.3	(37)	24.9	(15)			
Quite a bit pleasurable	32.4	(57)	32.4	(19)			
Extremely pleasurable	34.4	(60)	36.6	(22)			
Sexual Arousal					1.16	(0.60, 2.22) ^a	0.652
Not at all aroused	0.7	(1)	0.0	(0)			
A little aroused	6.9	(12)	1.1	(1)			
Moderately aroused	20.8	(36)	24.9	(15)			
Quite a bit aroused	35.0	(62)	35.7	(21)			
Extremely aroused	36.6	(64)	38.3	(23)			
Orgasm							0.041
No	20.1	(34)	7.6	(4)	1.00	–	
Yes	79.9	(136)	92.5	(49)	3.07	(1.05, 8.99)	

^aOdds ratios generated using ordinal logistic regression, represent odds ratios for one unit increase in sexual pleasure/arousal on condom use completeness.

users to report an orgasm during the event (95% CI: 1.25–13.40). Interaction terms between condom use completeness and erection and lubrication difficulties were not significant.

Discussion

The sexual and reproductive health landscape of the United States has experienced substantial and important shifts in recent years. Specifically, we have seen declining condom use, greater promotion and use of long-acting reversible contraceptives, and increasing rates of STIs (Braxton et al., 2017; Buhi & Helmy, 2018; Hathaway, Torres, Vollet-Krech & Wohltien, 2014; Kavanaugh & Jerman, 2018). As such, it is critical to understand the factors that may influence complete condom use in order to best support the work of clinicians, health educators, and the public health community.

In this nationally representative probability sample, we found that about half of the participants who reported using a condom at their MRSE felt that it was “no big deal.” Individuals who used condoms for the entire duration were more likely to report that using a condom provided them with relief and allowed them to enjoy their sexual event more compared with those who reported incomplete condom use during PVI or PAI. Men were more likely than women to endorse that using condoms demonstrated

caring towards a partner. These findings can be used to challenge common negative narratives about condom use which are obstacles to public and sexual health promotion. The associations between complete use allowing people to relax and enjoy their sexual experiences and feel relief associated with protection from worry about pregnancy/STDs are important messages in working to reframe perceptions and social norms related to condom use. The significant finding herein may be beneficial to our continued efforts to improve STI and unintended pregnancy prevention via condoms, which remain affordable, accessible, and highly efficacious when used correctly (Hood & Shook, 2014).

We found no evidence to support that early condom removal or delayed condom application led to higher levels of pleasure or arousal during the sexual event. Though incomplete condom use was associated with increased likelihood of reporting an orgasm among women, the relationship between incomplete use and orgasm for men was not statistically significant after accounting for other factors. Unfortunately, without knowledge of the specific sexual acts that comprised the MRSE, we are unable to determine whether or not a participant’s orgasm/s occurred, for example, before delayed application or after early removal. Some studies have reported that inconsistent and/or incomplete condom use may be associated with women’s experiences of decreased

Table 5. Factors Associated with Orgasm at Most Recent Sexual Experience using Logistic Regression.

Variables	Men			Women		
	aOR*	(95% CI)	p-value	aOR*	(95% CI)	p-value
Condom Use Completeness						
Complete use	1.00	–		1.00	–	
Incomplete use	2.36	(0.79, 7.02)	0.120	4.10	(1.25, 13.40)	0.021
Difficulty in maintaining erection (men) or becoming naturally lubricated (women)						
No difficulty	1.00	–		1.00	–	
Any difficulty	0.09	(0.01, 0.54)	0.010	0.70	(0.20, 2.44)	0.572
Feelings between Partners						
We both loved each other	1.00	–		1.00	–	
Other	0.04	(0.00, 0.31)	0.004	0.60	(0.16, 2.21)	0.437
Lubrication Use						
Any lubricating substance	1.00	–		1.00	–	
None	0.27	(0.02, 3.29)	0.295	0.70	(0.21, 2.06)	0.504

*Odds ratio adjusted for all other variables in the table.

sensations during sex while using a condom or discomfort associated with condom use or condoms drying out during sex (Crosby, Milhausen, Yarber, Sanders & Graham, 2008; Crosby, Yarber, Sanders & Graham, 2005; Lifshay et al., 2009; Mullinax et al., 2017). Future research is needed to explore the factors influencing incomplete condom use and orgasm experiences alongside the temporal relationship between incomplete use, erection and lubrication difficulties, sexual arousal, and orgasm.

Several contextual findings provide additional guidance to sexual health promotion efforts. For example, while there were some differences in condom use characteristics by education level, perhaps the more important point is that there are still relatively high rates of incomplete use among those who graduate high school and those who have some college or a college degree. These data suggest the need to continue efforts to ensure that adolescents and young adults receive comprehensive sexuality education that includes accurate information about the importance of correctly using condoms and other forms of contraception. In particular, these segments of the population are perhaps ideal for efforts that seek to reframe the social norms around condoms and their use. Sexual health educators might consider how they address condoms and condom use as part of their curricula, taking into account how young women and men actually feel about condom use. Further, for those concerned that condom-use may reduce pleasure, sexual health intervention efforts can encourage strategies such as incorporating lubrication use (Herbenick et al., 2011; Jozkowski et al., 2013)

and mindfulness (Bossio, Basson, Driscoll, Correia & Brotto, 2018; Brotto, Basson & Luria, 2008).

Individuals who reported being married were more likely to report incomplete condom use during the sexual event when compared to those who were single. These findings are consistent with a prior study, which found partial condom use was more prevalent in main partnerships (53.0%) compared to non-main partnerships (66.6%) (D'Anna, Korosteleva, Warner, & Malotte, 2012). Though people in truly monogamous partnerships may perceive themselves to be—or may actually be—at lower risk of STIs, this finding reinforces opportunities to continue to suggest STI testing among partners as they initiate such relationships. More importantly perhaps, is the possibility that some of those individuals who applied condom after intercourse had begun were using condoms for pregnancy prevention and more concerned with applying them before ejaculation than before intercourse began. These data may indicate a lack of understanding about the importance of complete condom use during PVI. This specific scenario also highlights the need to ensure that individuals understand the condom efficacy information that educators and health providers deliver, particularly that “typical use” rates are calculated based on pregnancy rates from individuals who reported using a condom, but not necessarily correctly, and pointing out that incomplete use is incorrect use and contributes to the lower condom efficacy associated with “typical use.”

Knowledge of who applied the condom may also be valuable to the development of more

effective sexual health messages and education intended to promote correct and consistent condom use. Condom application was a highly gendered activity; both women and men reported that men most frequently applied the condom. This presents an opportunity to promote a couple's-based approach to condom application, particularly given the field's increased interest in understanding and promoting dual protection (combining a condom with another form of contraception) (Lopez, Stockton, Chen, Steiner & Gallo, 2014). Especially among those who are at mutual risk for both STIs and pregnancy, incorporating the application of condoms into the event and performing condom application as a shared behavior (i.e. "we both did it") may prove useful. Within the public health community, there have long been conversations about empowering women to share responsibility for condom use. These data show us that there is still significant room for improvement.

A strength of this research is that we utilized data from a nationally representative probability sample of men and women in the United States but, as we restricted our analyses to condom users, the resulting sample size was notably smaller than the entire survey sample. Our findings regarding condom use perceptions may be more positive than those of the general population given that those who chose not use condoms during their MRSE, who may have more negative views of condoms, were not included in the analytic sample. We are not able—nor is it our intention—to make comparisons between condom users and nonusers, as only those who reported condom use were asked about their perceptions of the condom use. As well, there were more positive or neutral items than negative items among those included to assess perceptions of condom use. The purpose of this study was to focus on condom use completeness, and there are certainly other factors associated with perceptions of condom use that we did not include in our measures, including perceptions of condoms reducing sexual pleasure. Therefore, all results should be interpreted in the context of these limitations. Future research could assess relationships between perceptions of condom use reducing pleasure and whether or not pleasure was

associated with incomplete use or nonuse at MRSE. Such findings may prove useful for educational and sexual health promotion efforts.

Due to space limitations, we used single item measures to assess sexual quality, given that single item measures have long been used in other large survey studies of sexual experiences (Heiman et al., 2011; Levine, Herbenick, Martinez, Fu & Dodge, 2018; Herbenick et al., 2018) and often correlate well with multi-item measures (Mark, Herbenick, Fortenberry, Sanders & Reece, 2014). However, our results may have been different had we used multi-item measures or larger scales, such as the Female Sexual Function Index or International Index of Erectile Function (Rosen et al., 1997; 2000). The validity of our study was likely improved by asking participants to report on condom use during their MRSE, as opposed to events over a longer time period. Restricting to the most recent event, however, limits our ability to look at condom use duration in main partnerships versus non-main partnerships of the same individual (D'Anna et al., 2012; Senn, Scott-Sheldon & Carey, 2014). We did not separate out late application from early removal due to lack of statistical power. It is likely that these two types of incomplete use occur in different contexts and that warrants further investigation. For example, A previous study of men found that late condom application was associated with higher propensity for sexual arousal; whereas early removal was associated with orgasm difficulty (Graham et al., 2011). The current study was part of an annual national survey covering many aspects of sexual health and, as such, we are not able to assess all issues in depth.

Conclusions

Ideas about condoms diminishing erectile quality and sexual pleasure are widespread and likely play a role in their misuse (e.g., delayed application, early removal). Among our participants, we found no evidence that those who delayed application or removed the condom early reported greater sexual arousal or pleasure compared to those participants who used a condom for the duration of their sexual event. Incomplete use

was not significantly associated with orgasm for men; but there was an association for women that warrants further investigation of covariates and contexts. These findings from a nationally representative sample are consistent with previous research and may help address negative cultural ideas about a contraceptive method that is inexpensive, widely available, easy to use, and effective for both STI and pregnancy prevention.

Disclosure statement

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