

Original research article

Dual method use at last sexual encounter: a nationally representative, episode-level analysis of US men and women[☆]

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Abstract

Objectives: Male condom use in conjunction with other contraceptives increases protection against pregnancy and sexually transmitted infections. However, few analyses contextualize dual method use within the sexual episode, include reports from men or explore gendered patterns in reporting.

Study design: We analyzed dual method use patterns using a nationally representative dataset of 18–44 years old in the US ($N=404$ men, 416 women). Respondents indicated contraceptive methods used at last penile–vaginal intercourse, condom practices and relationship and sexual information about that particular partner.

Results: More than one-in-three penile–vaginal intercourse episodes (40%) involved male condom use: 28% condom only and 12% condom plus a highly effective method. Dual method reporting did not differ significantly by gender. Among dual method users, only 59% reported condom use during the entire intercourse episode, while 35% began intercourse without one and 6% removed the condom during intercourse. A greater proportion of men than women reported incorrect use of condoms (49% versus 35%), though this difference was not statistically significant. Only 50% of dual method users reported condom use in all of their last 10 intercourse episodes.

Conclusions: Many people classified as “dual users” in previous studies may not be using dual methods consistently or correctly. Researchers and practitioners should inquire *how* and *how often* condoms are used when assessing and addressing dual method use. Furthermore, though men have rarely been surveyed about dual method use, they can provide consistent contraceptive estimates and may be more likely to report condom practices such as late application or early removal.

Implications statement: Many US women and men reporting dual method use also reported late application and early removal of condoms, as well as multiple condom-less prior sexual acts with that partner. Clinicians may wish to inquire *how* and *how often* clients use condoms; they may also wish to provide condom instruction and/or tips on better integrating condoms into the sexual experience with one's partner.

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1. Introduction

Using a male condom in conjunction with a highly effective contraceptive method (“dual method use”) has several benefits, including enhanced prevention of pregnancy, sexually transmitted infections (STIs) and long-term consequences of STIs such as infertility. Dual method use research

focuses on rates, trends, and sociodemographic patterns, as well as promotional programmatic efforts [1–5]. However, dual method use remains uncommon, ranging from 3–7% [2,3] of all reproductive aged women to 7–25% of adolescents [6–8]. At least two gaps remain in our knowledge of this reproductive health practice.

One major gap is that, as with contraceptive research more generally, little research explores *how* dual methods are used within sexual and relational contexts [9]. Condoms require some shared knowledge and/or partnered negotiation and must be integrated into the sexual encounter. Concerns pertaining to arousal [10,11], erectile functioning [12], lubrication [13] and pleasure [14,15] may undermine effective condom use, reducing STI and pregnancy protection [16]. User-side problems and practices account for far more condom “failure” than device-side structural deficiencies, breakage or slippage [16]. Condom use also decreases sharply after several sexual experiences with the same partner [17,18]. Information on sexual history with a specific partner and data on the sexual episode itself could give a more accurate picture of how dual methods are used.

Another gap is that most examinations of dual method use focus on women — even though male condoms are worn on male genitals. Though some research examines heterosexual men’s sexual health [19–21], the literature overwhelmingly classifies men’s sexual “risk” as relating to STIs versus pregnancy and thus rarely includes contraceptive information. Burgeoning research attends to men’s fertility intentions [22], but more in relationship to births than pregnancy prevention. Dual method use research almost always includes women alone [23], including the latest nationally representative analysis of dual method use [3]. However, men’s preferences and characteristics may influence dual method use patterns [23], and men play a key role in couple-based contraceptive negotiation and use — especially for condoms [24]. Men may be essential for interventions to increase dual method use [25].

We had the opportunity to address these gaps with a nationally representative study of sexual behavior among 14- to 94-year-old Americans. For this paper, we examined dual method use among adults ages 18–44 years. We analyzed data at the level of the sexual episode, including how condoms were used and how many prior intercourse episodes respondents had with that particular partner, and examined reports by gender.

2. Materials and methods

2.1. Sample

Data derive from the 2009 National Survey of Sexual Health and Behavior (NSSHB) [18,26]. Data were collected using a US population-based, cross-sectional survey via Internet research panels of Knowledge Networks (KN; Menlo Park, CA, USA). KN administered the survey using their KnowledgePanel, a national household panel recruited using probability-based methodologies. The panel totals approximately 50,000 household members older than 13

years and is representative of the US population. KN uses address-based sampling to recruit panel members¹; if a household invited to participate in the panel lacks a computer or Internet access, KN provides them free of charge. The sampling frame from which participants are recruited covers approximately 98% of all US households. This panel has been used previously in several peer-reviewed studies of sexual behavior and health, demonstrating panel members’ willingness to participate in sexually oriented surveys and the validity of such methods for obtaining data from nationally representative samples [18,26–29].

Once the sampling frame was established, adult individuals within that frame received a recruitment message from KN that provided a brief description of the NSSHB and invited them to participate. Of 6182 adults (>18 years), 5045 (82%) consented to and participated in the study. Study protocols were approved by the institutional review board of Indiana University.

2.2. Measures

Participants responded to closed-ended questions about their most recent sexual event, including sexual behavior that may have occurred (e.g., oral, vaginal or anal sex). Dual method use measures included behaviors specific to the most recent penile–vaginal intercourse event. Though typical assessments of contraceptive use rely on respondent reflections on the last 30 days or 3 months [30], shorter timeframes may garner more accurate recall, particularly for event-specific methods such as condoms [31,32]. A last or most recent event-specific measure is an adequate proxy of condom use over time [33].

If respondents indicated that they had used a condom at their last sexual episode, they were prompted with questions assessing whether the condom was used the entire time, applied late or removed early and who made the decision about condom use. Respondents were also asked “Did you or your partner use any of the following types of contraception (birth control) in order to prevent pregnancy?” Responses included hormonal methods (pill, patch or ring), shot or implant, intrauterine devices (IUDs) and coital-dependent methods such as withdrawal, natural family planning, cap or diaphragm and spermicide; participants could check all that applied. We created a 5-category contraceptive variable: use

¹ Originally, KN panelists were selected using random-digit dialing but address-based sampling (ABS) has been employed since 2009. ABS provides a statistically valid sampling method with a published sample frame of residential addresses that covers approximately 97% of US households, including households that (1) have unlisted telephone numbers, (2) do not have landline telephones, (3) are cell phone only, (4) do not have current Internet access and (5) do not have devices to access the Internet. The KnowledgePanel recruitment methodology uses the same or similar quality standards as mandated by the Office of Management and Budget in the “List of Standards for Statistical Surveys,” which indicates that “Agencies must develop a survey design, including... selecting samples using generally accepted statistical methods (e.g., probabilistic methods that can provide estimates of sampling error).”

of (1) a highly effective contraceptive method only (e.g., pill, patch, ring, shot, implant or IUD), (2) a condom only, (3) *both* a highly effective contraceptive method and condom, (4) withdrawal only or (5) no method. People who reported using a condom in addition to a less effective method such as spermicide, withdrawal or rhythm were included in the “condom only” group. People who exclusively reported rhythm, natural family planning, cervical cap, diaphragm or spermicide were excluded.

Sociodemographic characteristics involved standard measures included in contraceptive use research [3,30], including age, highest level of education completed and race/ethnicity. These participant characteristics were previously collected by KN and formed the foundation for establishing stratified samples and poststratification weights.

As *relationship and partner factors* can be strongly associated with contraceptive use (especially condom use) [17,18], we included variables that add greater detail than the typically used marital status category [34]. Respondents indicated their relationship with the partner at the last penile–vaginal episode (steady partner, casual dating partner, friend, someone just met or transactional), the number of prior intercourse episodes with that partner (0–1, 2–9 or 10+) and whether the partner had an STI at the time of the encounter (yes, no or unknown).

Condom practices are often associated with *STI history characteristics*, including recent HIV or other STI testing [35]. Thus, we included measures on time of last HIV test and (non-HIV) STI test (<6 months, 6–12 months or >1 year ago) and whether the respondent had ever been diagnosed with an STI and/or HIV.

2.3. Inclusion and exclusion criteria

To capture people at risk of unintended pregnancy, we excluded pregnant women, individuals trying to become pregnant and those who did not use contraception due to menopause, sterilization, infertility or another medical reason. Finally, we limited our sample to participants ages 18–44 years who completed both parts of our contraceptive measure ($N=840$; 404 men, 416 women).

2.4. Analysis

Prior to analyses, we applied poststratification data weights based upon recent US census data. In addition to descriptive statistics, we ran Pearson’s chi-squared tests by gender to determine which covariates involved significant differences in reporting by gender (Table 1). To explore differences across covariates by dual method use, we created a dummy variable containing the dual method users in one group and all other respondents in the other group. We ran crosstabs and chi-squared tests to compare dual users to other respondents in terms of their sociodemographic profile, relationship profile and STI profile (Table 2). Finally, for the subset of respondents who reported dual method use, we assessed percent distributions of condom-specific variables

(e.g., how the condom was used during the episode), with chi-squared tests assessing gender differences (Table 3).

To determine which covariates predicted dual method use at a multivariate level, we also ran multinomial logistic regression with the 5-category contraceptive variable as the outcome. However, we do not present multivariate results in this paper. One of our study’s most innovative variables, how the condom was used during the penile–vaginal intercourse episode, could not be included in multivariate models since not all contraceptive groups included condom use. However, we can confirm that the variables most strongly associated with dual method use in multivariate analyses were consistent with associations at the bivariate level (e.g., age, relationship status and number of prior penile–vaginal episodes with that partner).

3. Results

3.1. Contraceptive use patterns

Table 1 provides percent distributions for respondents’ contraceptive use at last penile–vaginal intercourse, their sociodemographic characteristics, relationship and partner factors and STI profile. Twelve percent of respondents used a highly effective contraceptive method plus a condom at last penile–vaginal intercourse (11% men, 13% women). About 15% of respondents used no method (13% men, 17% women), 28% used a condom only (34% men, 22% women) and 33% used a highly effective contraceptive method only (32% men, 34% women). Dual method use reporting did not differ significantly among women and men.

3.2. Factors associated with dual method use

Bivariate chi-squared tests compared dual method users to all other respondents in terms of their sociodemographic profiles, relationship profiles and STI profiles. Table 2 presents these comparisons for all dual method users combined, women only and men only.

Age was significantly associated with dual method use at last penile–vaginal intercourse (X^2 $p<.000$ overall, $p<.012$ for men and $p<.003$ for women), and younger respondents were more likely to report dual method use than older respondents (21% of all 18–24 year olds, 12% of 25–34 year olds and 7% of 35–44 year olds).

Other than age, relationship and partner characteristics were most strongly associated with dual method use at last penile–vaginal intercourse. Only 5% of those in a steady relationship used dual methods at last penile–vaginal intercourse, compared to 17% of casual dating partners, 23% of friends and 19% of new acquaintances or transactional partners (X^2 $p<.000$). In terms of number of prior sexual episodes with that partner, dual methods were used by 27% of respondents who had had 0–1 prior sexual intercourse episodes with that partner, compared to 12% with

Table 1
Percent distribution of descriptive characteristics, by gender, US adults aged 18–44 years (N=820)

	Total sample	Men (N=404)	Women (N=416)	p
Contraceptive use				
Type of contraceptive use at last penile vaginal intercourse (5 categories)				.005**
None	14.8	12.6	16.8	
Condom only	27.9	33.9	22.1	
Highly effective method only (pill, patch, ring, shot, implant, IUD)	32.9	31.6	34.3	
Withdrawal only	8.8	8.4	9.1	
Dual method use (condom plus highly effective method)	12.3	11.4	13.2	
Dual method use (2-category dummy variable)				.424
Yes	12.3	11.4	13.2	
No	87.7	88.6	86.8	
Sociodemographic characteristics				
Age (years)				.385
18–24	21.6	22.5	20.7	
25–34	47.9	45.4	50.2	
35–44	30.6	32.1	29.1	
Highest level of education achieved				.191
Less than high school	7.3	8.9	5.8	
High school	23.0	24.0	22.1	
some college	32.5	29.9	35.1	
Bachelor's degree or higher	37.1	37.3	37.0	
Race and ethnicity				.013*
White	66.3	65.6	67.1	
Black	9.8	6.9	12.5	
Hispanic	16.0	18.3	13.7	
Other	7.9	9.2	6.7	
Relationship and partner factors				
Relationship status with partner at last penile–vaginal intercourse episode				.013*
Steady partner (girlfriend, boyfriend, spouse)	46.9	48.9	45.0	
Casual dating partner	29.6	24.8	34.2	
Friend	13.2	13.8	12.7	
Other (someone just met, someone paid or received something in exchange for sex)	10.3	12.5	8.1	
Number of prior intercourse episodes with that particular partner				.002**
0 or 1 prior episode	10.7	12.6	8.9	
2–9 prior episodes	11.4	14.6	8.2	
10 or more prior episodes	77.9	72.8	82.9	
Whether partner had an STI at the time of sexual encounter				.855
Knew partner did NOT have an STI	82.1	82.8	81.4	
Knew person DID have an STI	3.4	3.2	3.6	
Didn't know	14.5	13.9	15.0	
STI/HIV profile and condom factors				
Time of last HIV test				.734
Within 6 months	21.7	22.2	21.4	
6–12 months ago	22.5	20.8	23.7	
Over 1 year ago	55.7	57.0	54.8	
Time of last STI testing				.000***
Within 6 months	26.6	20.4	26.6	
6–12 months ago	25.3	17.8	25.3	
Over 1 year ago	48.2	61.8	48.2	
Ever been diagnosed with an STI or HIV				.000***
Yes	12.0	6.9	16.8	
No	88.0	93.1	83.2	

*** p<.001 significance of gender difference.

** p<.01 significance of gender difference.

* p<.05 significance of gender difference.

2–9 prior episodes and 10% of those with 10+ prior intercourse episodes (X^2 p<.000).

The only other variable significantly associated with dual method use at last penile–vaginal intercourse was HIV

testing history (p<.01). Among those who had taken an HIV test in the last year, 18% reported dual method use, compared to 7% of those who had taken an HIV test more than a year ago.

Table 2

Proportion of respondents reporting dual method use across sociodemographic, relationship and STI variables, US adults aged 18–44 years (N=820)

	Dual method use, all users	p	Dual method use, men only	p	Dual method use, women only	p
Sociodemographic characteristics						
Age (years)		.000***		.012*		.003*
18–24	20.9		20.0		21.8	
25–34	12.0		9.8		13.9	
35–44	6.8		7.7		5.8	
Highest level of education achieved		.435		.428		.527
Less than high school	10.0		13.9		4.2	
High school	13.4		13.5		13.2	
Some college	10.1		7.4		12.3	
Bachelor's degree or higher	13.8		12.7		14.9	
Race and ethnicity		.479		.536		.854
White	13.4		13.2		13.6	
Black	11.3		7.1		13.5	
Hispanic	9.1		8.0		10.5	
Other	13.6		10.8		17.2	
Relationship and partner factors						
Relationship status with last penile–vaginal intercourse partner		.000***		.002**		.000***
Steady partner (girlfriend, boyfriend, spouse)	5.3		5.6		4.9	
Casual dating partner	16.7		13.1		19.3	
Friend	23.4		18.2		28.8	
Other (someone just met, someone paid or received something in exchange for sex)	19.0		22.0		14.7	
Number of prior intercourse episodes with partner		.000***		.000***		.019*
0 or 1 prior episode	27.3		27.5		27.0	
2–9 prior episodes	12.0		15.5		5.9	
10 or more prior episodes	10.3		7.8		12.5	
Whether partner had an STI at the time		.339		.128		.597***
Knew partner did NOT have an STI	12.4		10.5		14.3	
Knew person DID have an STI	3.6		0.0		6.7	
Didn't know	14.3		17.5		11.3	
STI/HIV testing history						
Time of last HIV test		.001**		.051		.001**
Within 6 months	18.2		10.9		23.4	
6–12 months ago	17.7		21.4		15.5	
Over 1 year ago	6.8		7.6		6.1	
Time of last STI testing		.044*		.019*		.265
Within 6 months	18.9		16.1		19.8	
6–12 months ago	17.9		28.6		14.6	
over 1 year ago	10.3		8.2		11.8	
Ever been diagnosed with an STI or HIV		.337		.908		.228*
Yes	15.3		10.7		17.1	
No	11.9		11.4		12.4	

*** p<.001 significant dual method differences.

** p<.01 significant dual method differences.

* p<.05 significant dual method differences.

3.3. Condom-related variables

Table 3 contains percent distributions of condom-specific variables among those respondents who reported dual method use at last penile–vaginal intercourse. Chi-squared statistics indicate the level of gender differences among these variables.

Among dual method users, only 50% said that they had used a condom in 100% of prior penile–vaginal intercourse episodes with that partner. A third (33%) reported condom

use in 50–90% of prior penile–vaginal intercourse episodes, 11% reported condom use in 10–40% of prior encounters and 6% reported no prior condom use with that partner. Gender differences for this variable were significant at the p<.05 level; a greater proportion of men than women (10% versus 2%) indicated that no prior intercourse episodes involved condom use.

Only 59% of people who used dual methods at last penile–vaginal intercourse reported wearing the condom throughout intercourse, while 35% reported that the condom

Table 3

Among people who used dual methods at last sexual episode, percent distributions of condom-related variables, by gender, US adults aged 18–44 years (N=101)

	All dual method users	Men dual method users	Women dual method users	p
Number of last 10 intercourse episodes with this partner that involved condom use				.039*
Zero (0%)	5.6	9.8	2.1	
1–4 times (10–40%)	11.1	2.4	16.7	
5–9 times (50–90%)	33.3	41.5	27.1	
Every time (10 out of 10) (100%)	50.0	46.3	54.2	
Who made decision about condom use during this act of intercourse				.141**
Respondent primarily made the decision	19.0	23.4	14.5	
Respondent's partner primarily made the decision	6.0	2.1	10.9	
Decision made together	75.0	74.5	74.5	
How condom was used during penile–vaginal intercourse episode				.335***
Entire time (genitals never touched without a condom)	59.2	51.1	64.7	
Sex started without condom, then condom applied	34.7	40.4	31.4	
Condom applied before starting intercourse but then removed	6.1	8.5	3.9	

*** p<.001 significance of gender difference.

** p<.01 significance of gender difference.

* p<.05 significance of gender difference.

was applied after initiating intercourse, and 6% reported that the condom was removed during the intercourse episode. A greater proportion of men than women reported condom use errors (49% versus 35%), though this difference was not statistically significant ($p=.335$).

In sum, half (50%) of dual method users did not use condoms in all prior intercourse episodes with their partner, and a significant minority (41%) reported using the condom incorrectly during their last penile–vaginal intercourse encounter.

4. Discussion

Much contraceptive research focuses on methods other than barrier methods. However, in this national probability sample of American 18–44 years old, we found that 40% of all penile–vaginal intercourse episodes involved condom use (28% condom only, 12% condom plus a highly effective method). Condoms play a substantial role in both pregnancy and STI prevention.

Regarding dual method use, we found a slightly larger rate of condom plus a highly effective method than a recent analysis of the National Survey of Family Growth (NSFG): 12% here versus 7% in the NSFG [3]. This rate masks a range of dual method use practices across ages, relationships and partner factors — with younger respondents and those with fewer prior intercourse episodes with their partner more likely to report dual method use.

However, we found that many people classified as “dual users” did not use dual methods correctly or consistently. Only 59% of dual method users used the condom throughout intercourse; the rest initiated intercourse without a condom or removed the condom prior to finishing intercourse. These incorrect condom practices, documented in a growing body of condom-specific research [11,12,16,36], can undermine pregnancy and STI prevention. Such practices may be

particularly prevalent among dual method users [36]. Further, only half of dual method users (50%) said that they used a condom during all prior intercourse episodes with this partner. Researchers may wish to interpret previous dual method use rates with an eye toward these incorrect use practices and prior condom inconsistencies. We encourage researchers and practitioners to inquire *how* and *how often* condoms are used when assessing dual method use.

Yet we hesitate to suggest that such incorrect condom practices (often called condom “errors”) are due to lack of education alone. Perfect use of condoms may be deterred by myriad sexual and relational factors [10,13–15]; use of other contraceptive methods can also be shaped by such factors, though less directly [37–39]. A man may remove, or a woman may suggest removing, a condom for numerous reasons, including concerns about erectile difficulties, orgasm likelihood, condom fit or feel, smell, sound or wetness [16,40,41]. Condom misuse is thus not always “accidental” but may be a conscious choice, even if sometimes a risky choice. Thus, while clinicians may wish to educate patients about the correct way to use condoms, they may also be well served in discussing how to better integrate condoms into the sexual context. Prior research also suggests that many men also may struggle with condoms’ fit and feel [42,43], which can lead to incorrect condom use [44,45]. Thus, practitioners may also encourage those who consistently misuse condoms to try a variety of condoms and lubricants to find products and methods of using them that minimize interference with sexual arousal or pleasure for both partners.

Finally, our study adds yet more evidence that men can and should be included in studies of contraceptive use. Though men were (as expected) slightly more likely than women to report condom use, their reports of dual method use did not differ significantly from women’s. Men and women also offered notably similar reporting on many other

sexual behavior items in our study. The sexual health literature overwhelmingly classifies men's sexual "risk" as relating to STIs versus pregnancy. This absence of men in contraceptive research is influenced by a number of underlying assumptions, including the notion that men's reports of contraceptive use are less reliable than women's, as well as the deeply rooted cultural idea that men cannot or will not take responsibility for pregnancy prevention [46]. This latter assumption in particular serves neither men nor women, and we encourage contraceptive researchers and practitioners to more actively include men. Dual method use in particular requires couple communication and negotiation, and men should be included in both research and programmatic efforts to increase use.

4.1. Strengths and weaknesses

One of the strengths of our analysis was our use of a nationally representative dataset that contained sexual-level variables not contained in standard reproductive health surveillance studies such as the NSFG. The changing dynamics of home phone use and cell phone use have made phone surveys less representative, and high costs make address-based in-person surveys impossible for many researchers. Online survey administration is an effective way to collect information from large, national samples. A possible limitation is the use of a web-based panel survey that depends on address-based sampling and thus excludes people who do not have an address due to homelessness or institutionalization. However, this limitation may have been offset by one of the strengths of Internet-based data collection (e.g., greater comfort answering sensitive questions online).

5. Conclusions

This study sheds light on *how* dual contraceptive methods are used within a sexual and relational context. Large proportions of US adults classified as dual method users reported late application and early removal of condoms at their last penile–vaginal intercourse; many also reported multiple condom-less prior sexual acts with that partner. Gathering information on sexual history with a specific partner and data on the sexual episode itself — in addition to including men — helps provide a more accurate portrayal of how dual methods are used in practice.

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