HHS Public Access

Author manuscript

J Pediatr Adolesc Gynecol. Author manuscript; available in PMC 2016 October 21.

Use of dual methods for protection from unintended pregnancy and sexually transmitted diseases in adolescent African American women

Melissa Kottke[a], **Maura K. Whiteman**[b], **Joan Marie Kraft**[b], **Peggy Goedken**[a], **Jeffrey Wiener**[b], **Athena P. Kourtis**[b], and **Ralph DiClemente**[c]

[a]Department of Gynecology and Obstetrics, Emory University, School of Medicine, Atlanta, GA, USA

[b]Division of Reproductive Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA, USA

[c]Department of Behavioral Science and Health Education, Emory University, Rollins School of Public Health, Atlanta, GA, USA

Abstract

OBJECTIVES—To characterize factors associated with dual method use in a sample of adolescent women.

METHODS—We conducted a cross-sectional survey of sexually active African American females aged 14–19 years attending an urban Title X clinic in Georgia in 2012 (N=350). Participants completed a computerized survey assessing contraceptive and condom use at last two sexual encounters with their most recent partner. Dual method use was defined as use of a hormonal contraceptive or intrauterine device (IUD) plus condom. We applied multinomial logistic regression, using generalized estimating equations, to examine the adjusted association between dual method use (versus use of no methods or less effective methods alone, e.g. withdrawal) and select characteristics.

RESULTS—Dual methods were used by 20.6% of participants at last sexual intercourse and 23.6% at next to last sexual intercourse. Having a previous sexually transmitted disease (STD) (aOR 2.30, 95%CI 1.26–4.18), negative attitudes towards pregnancy (aOR 2.25, 95%CI 1.19–4.28) and a mother who gave birth as a teen (aOR 2.34, 95%CI 1.21–4.52) were associated with higher odds of dual method use. Having no health insurance (aOR 0.39, 95%CI 0.18–0.82), ≥ 4 lifetime sexual partners (aOR 0.42, 95%CI 0.22–0.78), sex at least weekly (aOR 0.54, 95%CI 0.29–0.99), and agreeing to monogamy with the most recent partner (aOR 0.40, 95%CI 0.16–0.96) were associated with decreased odds of dual method use.

Correspondence: Melissa Kottke, MD, MPH, MBA, 49 Jesse Hill Jr. Dr. SE, Atlanta, GA 3030, mkottke@emory.edu, Phone: 404-712-8730, Fax: 404-251-0143.

The authors do not report any financial conflicts of interest.

CONCLUSIONS—Dual method use was uncommon in our sample. Efforts to increase use of dual methods should address individual and relationship factors.

INTRODUCTION

The adverse consequences of early and unintended pregnancy and sexually transmitted diseases (STDs) are substantial and well documented (1–6). Adolescents, particularly African American adolescents, carry a disproportionate risk for these outcomes (7–9). With varying levels of success, young people may employ a range of behaviors (e.g., condom use alone, condoms combined with other contraceptive use, STI testing, monogamy) to protect themselves from STDs and pregnancy. The strategies chosen are influenced by individual, relationship and social/structural factors (10–12). Dual method use (i.e., condoms with hormonal contraceptive or IUD use) and use of condoms alone are encouraged for adolescents who are sexually active because they may be effective at preventing STDs and pregnancy at the same time (13). This study examines contraceptive use, including use of dual methods, condoms alone, or hormonal methods/IUD alone among a sample of young African American women living in a Southeastern city with high rates of STDs and teen pregnancy (7). This analysis seeks to confirm role of known associated factors and identify potential additional factors which have not been addressed in this population (e.g. perceptions of STDs and pregnancy, agreeing to monogamy, mutual STD testing). Understanding factors that may influence contraceptive use is essential in conceptualizing programs to promote dual method use and thus better protect adolescent females from pregnancy and STDs.

MATERIALS AND METHODS

This study reports on a cross-sectional survey that was part of a mixed methods study assessing attitudes and practices surrounding the prevention of pregnancy and STDs among African American adolescents and young women. Survey participants were recruited between April and September 2012 from a single urban hospital-based teen clinic that receives Title X funding (i.e., federal funding for comprehensive family planning services, including hormonal contraceptives, implants, IUDs and condoms available to teens without out-of-pocket costs). Eligible participants were female, seeking clinical care on the day of recruitment, self-identified as US born African American, aged 14–19 years and had vaginal sex with a male partner in the past six months. This study received Institutional Review Board approval (including a waiver of parental consent to protect confidentiality of teens' service use) from the Centers for Disease Control and Prevention and Emory University.

Teens were approached in the clinic waiting area and, if interested, discussed the study with a member of the study team in a private area. Interested and eligible teens completed informed consent or assent. Participants completed the survey using an Audio Computer-Assisted Self-Interviewing (ACASI) platform with individual tablet computers and headset. All participants received a $20 gift card for their participation.

Survey topics included demographics, family background, attitudes toward and outcome expectations for pregnancy and STDs, reproductive history (including sexual, pregnancy,

and STD history and testing), characteristics of the relationship with their most recent male sexual partner (including relationship type, length, coital frequency and whether the participant and her partner had agreed to monogamy) and sexual behaviors. Participants were asked about condom and contraceptive use for their last two sexual encounters with their most recent male partner in the past six months.

Our outcome of interest was contraceptive method use, which we categorized into four groups: dual method (defined as use of a condom plus hormonal contraception or IUD), condom alone, hormonal contraception or IUD alone (defined as a combined hormonal contraceptive, injection, implant or IUD without use of a condom), or other/no method (use of withdrawal, “other”, or no method). To examine factors associated with contraceptive use, we constructed models in which each sexual episode inquired about (maximum of two) for each participant was included. We estimated unadjusted and adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for a 4-level multinomial outcome (dual method, condom alone, hormonal/IUD alone and other/no method [Referent]) using Generalized Estimating Equations (GEE). GEE was used to account for intra-subject correlation given some participants reported on contraceptive methods used at two sexual encounters with their most recent partner in the past six months. Backwards elimination was used to fit a multivariable model after all candidate variables were entered. Variables with p-values of <0.05 were retained in the model. SAS v.9.2 and R were used for analyses.

RESULTS

Characteristics of the study population

During the study period, we approached 698 young women attending an urban Title X clinic for participation; 173 declined to be screened for eligibility. Of the 525 women screened, 374 (71%) were eligible and 350 (93% of all eligible) enrolled. The most common reason for not being eligible was not having had sex with a male partner in the past six months (78%, 118/151).

Most participants were seventeen years of age or older (65.1%) (Table 1). Over 43% had a previous STD; over one quarter (26.3%) of participants reported a previous pregnancy, and 11% reported they were living with their child(ren). Over 80% indicated they did not want a pregnancy in the next 6 months. Participants had more negative attitudes toward STDs than pregnancy; 76.3% thought an STD would be “the worst thing that could happen” in the next six months, but only 31.4% thought the same thing about a pregnancy. The majority had agreed to monogamy with her partner (83.3%) and approximately one-third (39.0%) of participants and their partners had been tested for STDs while they were together (Table 1).

Use of dual methods at last and next to last sex

At last sex, 20.6% (n=72) of participants used dual methods, 20.6% (n=72) used a condom alone, 22.0% (n=77) used hormonal contraception/IUD alone, and 36.9% (n=129) used no method, withdrawal (n=5) or another method (n=1) of contraception.

We examined the most common reasons why condoms and contraception were not used at last sex. When asked for up to three of the most important reasons they didn’t use condoms

at last sex (n=206), the most common reasons were that the participant and her partner trusted each other (60.7%), they did not think about condom use (51.0%), and they did not have a condom (37.9%). When asked for up to three of the most important reasons that contraception, other than condoms, was not used at last sex (n=155), the most common reasons were that she wasn't planning on having sex (36.6%), she and her partner used condoms (31.4%), and she was concerned about side effects (27.3%).

The distribution of contraceptive method use reported at next to last sex was similar to the distribution at last sex. At next to last sex, 65 (23.9%) used dual methods, 69 (25.0%) used condoms alone, 47 (17.0%) used hormonal contraception/IUD alone, and 95 (34.4%) used no method or other methods. The majority of participants reporting on two episodes of sex (76%) were consistent in contraceptive method use at the last two sexual encounters.

Predictors of contraceptive behaviors and dual method use

Table 2 presents bivariate associations between selected participant characteristics and contraceptive use (dual method, condom alone and hormonal contraception/IUD alone compared to use of no method/other). Having no insurance was associated with decreased odds of use of dual methods (OR 0.41, 95% CI 0.21 – 0.82). Participants who had previously experienced reproductive health outcomes (such as prior STDs, prior pregnancy, giving birth to a child that now lives with her) had increased odds of hormonal/IUD use alone. Having a prior STD was associated with elevated odds of dual method use (OR 1.94, 95% CI 1.12 – 3.36). Participants who had negative attitudes toward pregnancy (thinking it would be the "worst thing that could happen") had increased odds of dual method use (OR 2.51, 95% CI 1.40 – 4.52) and condom alone (OR 2.04, 95% CI 1.17 – 3.58). However, those who had negative attitudes toward STDs were not more likely than those without such attitudes to use any type of contraception. Having sex at least weekly was associated with a decreased odds of condom use (either alone or in dual methods, see Table 2). Mutual STD testing was associated with increased odds of dual method use (OR 1.78, 95% CI 1.03 – 3.10) and hormonal/IUD use alone (OR 1.90, 95% CI 1.09 – 3.32).

Adjusted associations between participant characteristics and contraceptive use are presented in Table 3. Having no insurance (aOR 0.39, 95% CI 0.18–0.82), having four or more lifetime sexual partners (aOR 0.42, 95% CI 0.22 – 0.78), coital frequency at least weekly (aOR 0.54, 95% CI 0.29 – 0.99), and agreeing to monogamy with most recent partner (aOR 0.40, 95% CI 0.16 – 0.96) were significantly associated with decreased odds of dual method use compared to use of no/other method. Conversely, participants who reported having a mother who gave birth while she was a teen (aOR 2.34, 95% CI 1.21–4.52) those who reported a previous STD (aOR 2.30, 95% CI 1.26 – 4.18), and those having a negative attitude towards pregnancy (aOR 2.25, 95% CI 1.19 – 4.28) had more than twice the odds of reporting dual method use compared to no/other method.

DISCUSSION

This study sought to characterize contraceptive use, including dual method use, and related factors in a sample of African American adolescents seeking care at a Title X urban family planning clinic. Dual method use at last sex (20.6%) was not common, but was higher than

dual method use at last sex (14.8%) reported for 15–24 year old African American females who were sexually active in the past 3 months in an analysis of the National Survey of Family Growth (14). Our sample differs in that participants were younger and were recruited from a reproductive health clinic and so had ready access to methods requiring clinical care. The higher rate of dual method use in our sample, was tempered by the relatively high rate of other/no use of contraception. Over one-third of participants used other/no contraception at last sex compared to 17.5%–20.9% reported in nationally representative samples for young African American females(14, 15).

Some family and background factors were associated with dual method use. Not having insurance was associated with a significant reduction in reporting dual method use. Previous studies have reported cost as a barrier to adolescents accessing contraception and family planning services (14, 16). Efforts in health care to expand insurance to all young people may improve this. However, most, if not all, of the adolescents attending this clinic are given condoms at the end of each visit and would qualify for free methods through the Title X grant support received by the clinic. Increasing awareness among adolescents about programs (e.g., Title X, Medicaid, other state-based and local programs) that remove cost and linking young people to clinical care via schools, other community organizations or new media channels (e.g., web, app) may be important strategies to improve access (17).

Having a previous STD and having negative attitudes towards pregnancy were associated with dual method use; having a child who lives with her was strongly associated with contraceptive use. Focus group discussions from this population support these findings. Young women who were confronted with pregnancies, pregnancy scares and/or STD diagnoses reported that facing difficult conversations (e.g., telling parents), parenting stresses (e.g., less time to pursue own interests), and what they learned about STDs (e.g., may cause infertility) increased their motivation to avoid pregnancy and STDs in the future and improved their contraceptive and condom use (18). Previous quantitative investigations also reported similar increases in risk assessments and motivations to avoid pregnancy and STDS among those who experienced previous outcomes (14, 19, 20). Unique in our analysis, participants whose mothers gave birth as a teen were also more likely to report dual method use. Using role models and other ways to learn from peers or family members may shift individual perception of risk and motivate an increase in dual method use among those who have not experienced pregnancy and STDs.

Relationship factors that suggested a more serious relationship (i.e., having sex at least once per week and having agreed to monogamy) were strongly associated with decreased odds of dual method use. Other investigators have also reported that those in relationships that they expect to last and that those in relationships they deem “important” use dual methods less frequently (12, 21, 22)(18). Frequent sex was associated with a decrease in any condom use (dual method or condoms alone), which may be related to inertia for non-condom usage, adoption of non-coitally dependent contraception or other relationship influences. Those who agreed to monogamy were half as likely to report dual method use. Although monogamy may be associated with a lower the risk of STDs , the prevalence of concurrent or overlapping sexual encounters in adolescent relationships is high (23, 24). Warren and colleagues examined monogamy agreements in young adult couples, aged 18–25, and found

high levels of discordance. Couples did not agree as to whether monogamy was discussed, agreed to or maintained (25). This raises concern for the high percentage (>80%) in this sample that reported agreeing to monogamy and the influence of this agreement on dual method use. We need a better understanding of the perceptions and processes of agreeing to monogamy, whether and how couples act out those agreements, and health outcomes in this population.

Taken together, our findings highlight issues that could be addressed in counseling and interventions to promote dual method use. First, efforts to encourage vicarious learning about STDs and pregnancy may help shift individual perception of risk and attitudes about protective behaviors. Those with strong negative perceptions of pregnancy were more likely to engage in protective behaviors, but those who had similar negative perceptions of STDs were not. Interestingly, those who had strong negative perceptions of pregnancy were more likely to use dual methods and condoms alone, but not hormonal contraception alone. Similarly, those who had had a previous STD were more likely to use dual methods, but were no more likely to report using a condom alone. While some young women may be able to apply dual method use after experiencing an STD or to avoid an unwanted pregnancy, many cannot. These inconsistencies also suggest knowledge gaps about transmission, risk and effective protection strategies from STDs and pregnancy (i.e., contraceptive and condom efficacy) as well as an urgent need to address the interplay between relationships and condom use. Our participants cited mutual trust most commonly as the reason a condom was not used at last sex. Trust is often a desirable trait in relationships, and some adolescents may perceive that not using protection demonstrates trust (18). However, this may lead to unfavorable health and emotional consequences for adolescents. In addition to providing information to improve knowledge gaps, future efforts need to concretely address relationships, acknowledging teens' desire for more serious relationships while trying to help them perceive protective behaviors, especially dual method use, as ways to demonstrate caring for one another and supporting the sexual health of both partners in the relationship.

There are some limitations of this analysis. First, this is a cross-sectional study and, therefore, temporality and causation cannot be determined. Next, our data rely upon self-report, and though we have taken steps to ensure confidentiality and increase comfort in disclosure by using ACASI (26), this remains a limitation. Finally, we worked with a specific population, which may limit the generalizability of these results.

ACKNOWLEGDEMENTS

This study was funded by the CDC as a Special Interest Project #20 through the Emory Prevention Research Center (Co-operative agreement number U48DP001909-01 Revised) in collaboration with the CDC's Division of Reproductive Health. The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention. The authors would also like to acknowledge our study participants, the clinic staff at Grady Health System, and the entire study team that participated in this project.

REFERENCES

1. Collier SA, Hogue CJ. Modifiable risk factors for low birth weight and their effect on cerebral palsy and mental retardation. Matern Child Health J. 2007; 11(1):65–71. Epub 2006/06/28. [PubMed: 16802187]

2. Forhan SE, Gottlieb SL, Sternberg MR, Xu F, Datta SD, McQuillan GM, et al. Prevalence of sexually transmitted infections among female adolescents aged 14 to 19 in the United States. Pediatrics. 2009; 124(6):1505–1512. Epub 2009/11/26. [PubMed: 19933728]
3. Finer LB, Zolna MR. Unintended pregnancy in the United States: incidence and disparities, 2006. Contraception. 2011; 84(5):478–485. Epub 2011/10/25. [PubMed: 22018121]
4. Satterwhite CL, Torrone E, Meites E, Dunne EF, Mahajan R, Ocfemia MC, et al. Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2008. Sex Transm Dis. 2013; 40(3):187–193. Epub 2013/02/14. [PubMed: 23403598]
5. Westrom L, Joesoef R, Reynolds G, Hagdu A, Thompson SE. Pelvic inflammatory disease and fertility. A cohort study of 1,844 women with laparoscopically verified disease and 657 control women with normal laparoscopic results. Sex Transm Dis. 1992; 19(4):185–192. Epub 1992/07/01. [PubMed: 1411832]
6. Owusu-Edusei K Jr, Chesson HW, Gift TL, Tao G, Mahajan R, Ocfemia MC, et al. The estimated direct medical cost of selected sexually transmitted infections in the United States, 2008. Sex Transm Dis. 2013; 40(3):197–201. Epub 2013/02/14. [PubMed: 23403600]
7. CDC. Sexually Transmitted Disease Surveillance 2012. Atlanta: US Department of Health and Human Services; 2013.
8. Brady E, Hamilton PD, Joyce A, Martin MPHa, Stephanie J, Ventura MA. Births: PreliminaryData for 2012. National Vital Statistics Report. 2013; 62(3)
9. Finer, LaZ; MR. Unintended pregnancy in the United States: incidence and disparities, 2006. Contraception. 2011; 84(5):478–485. [PubMed: 22018121]
10. Berer M. Dual protection: more needed than practised or understood. Reprod Health Matters. 2006; 14(28):162–170. Epub 2006/11/15. [PubMed: 17101435]
11. Bull SS, Shlay JC. Promoting "dual protection" from pregnancy and sexually transmitted disease: a social ecological approach. Health Promot Pract. 2005; 6(1):72–80. Epub 2004/12/03. [PubMed: 15574531]
12. Sales JM, Latham TP, Diclemente RJ, Rose E. Differences between dual-method and non-dual-method protection use in a sample of young African American women residing in the Southeastern United States. Arch Pediatr Adolesc Med. 2010; 164(12):1125–1131. Epub 2010/12/08. [PubMed: 21135341]
13. Condom use by adolescents. Pediatrics. 2013; 132(5):973–981. Epub 2013/10/30.
14. Tyler CP, Whiteman MK, Kraft JM, Zapata LB, Hillis SD, Curtis KM, et al. Dual Use of Condoms With Other Contraceptive Methods Among Adolescents and Young Women in the United States. J Adolesc Health. 2013 Epub 2013/10/01.
15. Eaton DK, Kann L, Kinchen S, Shanklin S, Flint KH, Hawkins J, et al. Youth risk behavior surveillance - United States, 2011. MMWR Surveill Summ. 2012; 61(4):1–162. Epub 2012/06/08. [PubMed: 22673000]
16. Heavey EJ, Moysich KB, Hyland A, Druschel CM, Sill MW. Differences in contraceptive choice among female adolescents at a state-funded family planning clinic. Journal of midwifery & women's health. 2008; 53(1):45–52. Epub 2008/01/01.
17. Ethier KA, Dittus PJ, DeRosa CJ, Chung EQ, Martinez E, Kerndt PR. School-based health center access, reproductive health care, and contraceptive use among sexually experienced high school students. J Adolesc Health. 2011; 48(6):562–565. Epub 2011/05/18. [PubMed: 21575814]
18. Murray CC, Hatfield-Timajchy K, Kraft JM, Bergdall AR, Habel MA, Kottke M, et al. In their own words: romantic relationships and the sexual health of young African American women. Public Health Rep. 2013; 128(Suppl 1):33–42. Epub 2013/03/02. [PubMed: 23450883]
19. Harvey SM, Henderson JT, Branch MR. Protecting against both pregnancy and disease: predictors of dual method use among a sample of women. Women Health. 2004; 39(1):25–43. Epub 2004/03/09. [PubMed: 15002881]
20. Sieving RE, Bearinger LH, Resnick MD, Pettingell S, Skay C. Adolescent dual method use: relevant attitudes, normative beliefs and self-efficacy. J Adolesc Health. 2007; 40(3):275, e15–e22. Epub 2007/02/27. [PubMed: 17321430]

21. Manlove J, Welti K, Barry M, Peterson K, Schelar E, Wildsmith E. Relationship characteristics and contraceptive use among young adults. Perspect Sex Reprod Health. 2011; 43(2):119–128. Epub 2011/06/10. [PubMed: 21651711]

22. Crosby RA, Voisin DR, Diclemente RJ, Wingood GM, Salazar LF, Head S, et al. Relational correlates of unprotected oral and vaginal sex and among African-American adolescent females. Sex Health. 2013; 10(3):284–286. Epub 2013/03/16. [PubMed: 23490198]

23. Waldrop-Valverde DG, Davis TL, Sales JM, Rose ES, Wingood GM, DiClemente RJ. Sexual concurrency among young African American women. Psychology, health & medicine. 2013; 18(6):676–686. Epub 2013/02/01.

24. Brown JL, Sales JM, Diclemente RJ, Latham Davis TP, Rose ES. Characteristics of African American adolescent females who perceive their current boyfriends have concurrent sexual partners. J Adolesc Health. 2012; 50(4):377–382. Epub 2012/03/27. [PubMed: 22443842]

25. Warren JT, Harvey SM, Agnew CR. One love: explicit monogamy agreements among heterosexual young adult couples at increased risk of sexually transmitted infections. J Sex Res. 2012; 49(2–3):282–289. Epub 2010/12/31. [PubMed: 21191869]

26. Ghanem KG, Hutton HE, Zenilman JM, Zimba R, Erbelding EJ. Audio computer assisted self interview and face to face interview modes in assessing response bias among STD clinic patients. Sex Transm Infect. 2005; 81(5):421–425. Epub 2005/10/04. [PubMed: 16199744]

IMPLICATIONS

In this analysis, dual method use among African American female adolescents was infrequent, and associated with several factors, including previous STD, perceptions about pregnancy and relationship characteristics. As a prevention strategy, dual method use may be effective in reducing STDs and unintended pregnancy. This study suggests efforts to increase dual method use in adolescents may benefit from leveraging the experiences of peers and family members to inform risk perception and attitudes toward pregnancy and STIs prevention. Further, it may be valuable to acknowledge adolescents' desire for more serious relationships while framing dual method use as supporting the sexual health of both partners.

Table 1

Characteristics of African American adolescent women (ages 14–19) seeking care in a reproductive health clinic

	n (%) N=350
Age	
14–16 years	122 (34.9%)
17–19 years	228 (65.1%)
Insurance	
None	86 (24.6%)
Private insurance	28 (8.0%)
Public insurance	188 (53.7%)
Don't know	48 (13.7%)
Participant's mother completed High School or GED	239 (68.3%)
Participant's mother's age at first birth <20	215 (61.4%)
Previous STD	153 (43.7%)
Previous pregnancy	92 (26.3%)
Participant has given birth to a child that lives with her	40 (11.4%)
Desires pregnancy in next 6 months	
Definitely or probably "yes"	32 (9.1%)
Definitely or probably "no"	288 (82.3%)
Don't know	30 (8.6%)
Perception of diagnosis of pregnancy in next six months	
It would be the worst thing that could happen	110 (31.4%)
It would be a problem, but I would deal with it	196 (56.0%)
It would not be a problem	30 (8.6%)
I'd be happy about it	14 (4.0%)
Perception of diagnosis of STD in next six months	
It would be the worst thing that could happen	267 (76.3%)
It would be a problem, but I would deal with it	82 (23.4%)
It would not be a problem	1 (0.3%)
Lifetime partners >3	161 (46.0%)
Relationship Length >6 months[¶]	193 (55.1%)
Considers partner[¶]:	
Serious boyfriend	196 (56.0%)
On and off boyfriend	69 (19.7%)

	n (%) N=350
Friend	53 (15.1%)
No one special/ex-boyfriend/other	32 (9.1%)
Coital frequency at least once/week¶	170 (48.7%)
Agreed to monogamy¶	290 (83.3%)
Mutual STD testing* ¶	136 (39.0%)

¶Refers to most recent partner

*Participant and most recent partner each had STD testing while they were together

Table 2

Associations between selected participant characteristics and use of dual methods, condom alone, or hormonal method or IUD alone; unadjusted odds ratios (OR) and 95% confidence intervals (CI)

	Dual Method OR[1] (95% CI)	Condom alone OR[1] (95% CI)	Hormonal/IUD alone OR[1] (95% CI)
Age 14–16 years	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
17–19 years	1.11 (0.62 – 1.98)	**0.59 (0.35 – 0.99)**	1.23 (0.68 – 2.22)
Insurance			
None	**0.41 (0.21 – 0.82)**	0.64 (0.35 – 1.14)	0.54 (0.28 – 1.04)
Private, public or don't know	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Participant's mother completed High School or GED			
Yes	1.18 (0.65 – 2.13)	1.58 (0.88 – 2.82)	**1.99 (1.05 – 3.76)**
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Participant's mother's age at first birth <20			
Yes	**1.88 (1.06 – 3.34)**	1.22 (0.73 – 2.06)	1.40 (0.79 – 2.45)
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Previous STD			
Yes	**1.94 (1.12 – 3.36)**	0.87 (0.51 – 1.49)	**2.04 (1.17 – 3.56)**
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Previous pregnancy			
Yes	1.80 (0.99 – 3.27)	0.82 (0.42 – 1.56)	**1.83 (1.01 – 3.31)**
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Participant has given birth to a child that lives with her			
Yes	2.01 (0.87 – 4.66)	0.84 (0.30 – 2.41)	**3.41 (1.56 – 7.45)**
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Desires pregnancy in the next 6 months			
Definitely or Probably Yes or Don't Know	0.52 (0.19 – 1.44)	0.41 (0.15 – 1.09)	1.25 (0.56 – 2.80)
Definitely or Probably No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Perception of diagnosis of pregnancy in next six months			
It would be the worst thing that could happen	**2.51 (1.40 – 4.52)**	**2.04 (1.17 – 3.58)**	1.25 (0.66 – 2.36)
Other	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Perception of diagnosis of STD in next six months			
It would be the worst thing that could happen	1.32 (0.68 – 2.56)	0.99 (0.55 – 1.79)	0.90 (0.49 – 1.67)
Other	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Lifetime partners			
1–3	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)

	Dual Method OR[1] (95% CI)	**Condom alone OR[1] (95% CI)**	**Hormonal/IUD alone OR[1] (95% CI)**
4 or more	0.65 (0.37 – 1.13)	1.00 (0.60 – 1.68)	1.03 (0.60 – 1.79)
Relationship length > 6 months			
Yes	0.86 (0.50 – 1.49)	**0.58 (0.34 – 0.97)**	1.15 (0.66 – 2.02)
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Considers partner a serious boyfriend[¶]			
Yes	0.64 (0.37 – 1.10)	0.74 (0.44 – 1.25)	1.34 (0.76 – 2.36)
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Coital frequency [¶]			
≥ once per week	**0.51 (0.29 – 0.88)**	**0.37 (0.22 – 0.63)**	0.98 (0.56 – 1.71)
< once per week	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Agreed to monogamy[¶]			
Yes	0.50 (0.25 – 1.01)	0.61 (0.31 – 1.21)	1.83 (0.73 – 4.61)
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Mutual STD testing[*]			
Yes	**1.78 (1.03 – 3.10)**	0.78 (0.44 – 1.38)	**1.90 (1.09 – 3.32)**
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)

[1] Versus use of no method or other methods

[¶] Refers to most recent partner

[*] Participant and most recent partner each had STD testing while they were together

Table 3

Adjusted associations between selected participant characteristics and use of dual methods, condom alone, or hormonal method or IUD alone; adjusted odds ratios (aOR) and 95% confidence intervals (CI)*

	Dual Method aOR[1] (95% CI)	**Condom alone aOR[1] (95% CI)**	**Hormonal/IUD alone aOR[1] (95% CI)**
Insurance			
None	**0.39 (0.18 – 0.82)**	0.84 (0.45 – 1.57)	0.57 (0.28 – 1.19)
Private, public or don't know	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Participant's mother completed High School or GED			
Yes	1.31 (0.68 – 2.51)	1.71 (0.92 – 3.17)	**2.56 (1.35 – 4.87)**
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Participant's mother's age at first birth <20			
Yes	**2.34 (1.21 – 4.52)**	1.46 (0.83 – 2.60)	1.54 (0.84 – 2.85)
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Previous STD			
Yes	**2.30 (1.26 – 4.18)**	0.98 (0.54 – 1.78)	**2.03 (1.12 – 3.69)**
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Participant has given birth to a child that lives with her			
Yes	2.13 (0.87 – 5.18)	0.88 (0.28 – 2.83)	**3.86 (1.72 – 8.65)**
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Perception of diagnosis of pregnancy in next six months			
It would be the worst thing that could happen	**2.25 (1.19 – 4.28)**	**2.10 (1.15 – 3.82)**	1.18 (0.59 – 2.34)
Other	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Lifetime partners			
1–3	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
4 or more	**0.42 (0.22 – 0.78)**	1.02 (0.57 – 1.84)	0.96 (0.52 – 1.74)
Coital frequency			
≥ once per week	**0.54 (0.29 – 0.99)**	**0.34 (0.19 – 0.59)**	0.91 (0.51 – 1.63)
< once per week	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Agreed to monogamy with most recent partner			
Yes	**0.40 (0.16 – 0.96)**	0.83 (0.38 – 1.83)	2.04 (0.74 – 5.60)
No	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)

[1] Versus use of no method or other methods

* All characteristics listed in Table 1 were entered into a full model. Generalized Estimating Equation was used to account for repeated measures in participants who reported more than one sexual encounter in the past six months with the same partner.