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The Impact of Sexual Satisfaction, Functioning, and Perceived Contraceptive Effects on Sex Life on IUD and Implant Continuation at 1 Year

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A B S T R A C T

Introduction: Contraceptives improve women's lives and public health, but many women discontinue their contraceptive method owing to dissatisfaction. An underexamined aspect of contraceptive discontinuation is sexual acceptability, or how contraception affects sexual experiences. Investigators' aims were two-fold: 1) to document changes in multiple domains of women's sexual experiences with their intrauterine device (IUD) or contraceptive implant over time and 2) to examine whether these sexuality factors were associated with method continuation at 12 months.
Methods: We enrolled 200 eligible family planning clients and collected data at baseline and at 1, 3, 6, and 12 months. Sexual acceptability measures included the Female Sexual Function Index-6, the New Sexual Satisfaction Scale, and participants' perceptions of whether their contraceptive method had had a neutral, positive, or negative effect on their sex life. Survival analysis and Cox regression with time-varying covariates related sexuality measures to method continuation over time while controlling for other relevant factors.
Results: Among 193 women who received an IUD or implant, 20% selected the copper IUD, 46% the levonorgestrel IUD, and 34% the etonogestrel implant. Ten percent discontinued their method during the year. Although changes in Female Sexual Function Index-6 and New Sexual Satisfaction Scale scores were not associated with discontinuation, individuals who perceived that their method detracted from their sexual experience had significantly higher removal rates than those who reported no sexual changes or positive sexual changes (adjusted hazard ratio, 8.04; 95% CI, 1.53–42.24), even when controlling for method type, bleeding changes, and a variety of covariates and controls.
Conclusions: Although limited by the small sample of discontinuers, we found that women's perceptions of how their method affects their sex life were associated with contraceptive continuation over time. Sexual acceptability should receive more attention in both contraceptive research and counseling.

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Contraceptive methods are critical to women's[1] life goals and desired family size: they prevent unintended pregnancy and improve women's social and economic well-being (Kavanaugh & Anderson, 2013; Sonfield, Hasstedt, Kavanaugh, & Anderson, 2013). Although contraceptives must be effective to prevent pregnancy, they also must be acceptable, so that women and couples will use them (Peipert et al., 2011; Severy & Newcomer, 2005). Despite wide uptake and decades of research, many women are unsatisfied with their methods and stop using them after several months. For example, more than one-half of new-start oral contraceptive pill, patch, ring, and depot medroxyprogesterone acetate users discontinue their method within 1 year of initiation (Frost, Singh, & Finer, 2007). In the United States, there is increasing uptake of intrauterine devices (IUDs) and contraceptive implants, which are designed for extended use and typically have better continuation rates than the shorter acting methods.

Researchers increasingly document that sexuality plays a role in women's contraceptive preferences, practices, and use over time (Higgins & Smith, 2016). Sexuality is a broad construct that includes domains such as sexual functioning, psychological factors, and relationship aspects. Contraceptives may affect all these sexual domains, which in turn will influence overall method acceptability—this is the foundation for the sexual acceptability concept (Higgins & Smith, 2016). Within this emerging literature, many research participants have cited sexual interference as a reason for contraceptive discontinuation (Higgins & Davis, 2014; Higgins & Hirsch, 2008; Sanders, Graham, Bass, & Bancroft, 2001; Smith, Jozkowski, & Sanders, 2013). In one study of new-start oral contraceptive users, negative sexual side effects were more strongly associated with discontinuation than any other factor measured (Sanders et al., 2001). Despite this compelling emerging evidence base, several gaps remain. Here, we highlight two gaps particularly relevant to the current paper.

First, existing studies have taken a narrow approach to assessing sexual acceptability (Wiebe, 2010). Most often, they use measures of classic sexual functioning that solely capture physiologic aspects of sexuality (such as arousal, lubrication, orgasm, and pain), such as those on the commonly used Female Sexual Function Index (FSFI; Rosen et al., 2000). The FSFI and similar measures were originally developed to help identify sexual dysfunction in midlife women experiencing sexual or other health problems. Such measures were not designed to identify contraceptive-related sexual outcomes in younger, healthy women. Moreover, other key sexual facets, including psychological factors such as sexual disinhibition, relationship aspects such as partner preferences, side effects such as vaginal bleeding, and women's perceptions of whether their methods affect sexuality, may also be important in shaping contraceptive satisfaction and use over time (Higgins & Hirsch, 2008; Higgins, Ryder, Skarda, Koepsel, & Bennett, 2015; Higgins, Sanders, Palta, & Turok, 2016).

A second gap is the lack of studies on sexual acceptability addressing IUDs and implants. IUDs and implants are the most effective forms of reversible contraception and are designed for extended use (from 3 to 12 years depending on the device). In the literature to date, patients' most commonly cited reasons for discontinuing these methods before 12 months include cramping, pain, and bleeding (Grunloh, Casner, Secura, Peipert, & Madden, 2013; Weisberg, Bateson, McGeechan, & Mohapatra, 2014). However, researchers have yet to document how sexual acceptability influences satisfaction and continuation of IUDs and implants, despite the surge of interest in these methods (Grunloh et al., 2013; Sanders, Smith, & Higgins, 2014).

This study addresses both gaps. We prospectively and longitudinally assessed a variety of sexual domains of user experiences among family planning clients initiating IUDs and implants. We then examined whether changes, if any, in these sexual domains could help predict IUD and implant continuation during the first year, all while holding constant other factors we know influence both sexuality and contraceptive continuation.

Methods

Participants

We recruited 200 contraceptive clients[2] from two family planning clinics in Salt Lake City, Utah. Patients who presented for a contraceptive visit engaged in a structured counseling session with a clinic assistant trained in research. Patients then selected the contraceptive method of their choice per standard of care. After the contraceptive method selection, the clinic assistant informed patients who selected one of three methods (the nonhormonal, copper T380 IUD; hormonal, levonorgestrel 52 mg IUD; or the etonogestrel contraceptive implant) of the opportunity to participate in a study about the sexual aspects of IUDs and implants. We use the term sexual aspects as a catchall phrase for both explicitly sexual factors, such as libido and sexual satisfaction, as well as domains that may not be explicitly sexual in nature, but have impact on sexual experiences, pleasure, and acceptability. Eligible participants included individuals between the ages of 18 and 45 years who desired to prevent pregnancy for at least 1 year, were fluent in English, and had a working phone number or email address at the time of enrollment. Patients were ineligible if they were sterilized, were currently pregnant or trying to get pregnant, or wanted to become pregnant in the next year. Interested and eligible individuals completed the informed consent process, then completed the enrollment survey.

We previously published information about this patient population's baseline characteristics and shorter-term sexual outcomes as measured by the FSFI-6, the New Sexual Satisfaction Scale (NSSS), and subjective measures of impact of contraception on one's sex life (Higgins et al., 2016). In this article, we share data from beyond the first 3 months of use, including the relationship between women's sexual outcomes and contraceptive method continuation out to 1 year.

Study Design

Participants completed self-administered surveys at the time of enrollment (baseline) and at 1, 3, 6, and 12 months after enrollment. We created surveys using the Research Electronic Data Capture (REDCap), a secure web application for building and managing databases and collecting survey data (Harris et al., 2009). Participants completed the initial survey immediately after their contraceptive counseling and method selection (but

[1] We use the terms "women," individuals, participants, and patients throughout this manuscript but acknowledge that not all people who need contraceptive services identify as women.

[2] Cisgender women, transgender men, and gender nonconforming individuals were all eligible for participation. As noted, we use a variety of terms to refer to people in our study (e.g., women, individuals, participants, clients, patients), but acknowledge that not all people who need contraceptive services identify as women.

before device insertion). Depending on participants' preferred contact method, research personnel either sent follow-up surveys via email or initiated a call and administered the survey over the phone. If participants had agreed to complete surveys via email, we sent reminder emails up to three times. If participants did not respond to the survey within 1 week of the final email, study personnel attempted contact via alternate methods, including phone, text, and additional contacts (partners, parents, roommates, or other next-of-kin contact provided by participants at baseline). Study personnel attempted up to ten contacts at each follow-up point before identifying the respondent as lost to follow up. Participants received a $20 gift card at the time of enrollment and a $20 electronic gift card after their 6-month and 12-month surveys, for a total of $60. The University of Utah's Institutional Review Board reviewed and approved the study (IRB#00065794).

Methods of Assessment

The baseline questionnaire collected information on age, race and ethnicity, insurance status, highest level of education completed, obstetric history, and contraceptive history. Participants also reported on recent sexual activity, relationship type, and relationship duration. One other important baseline control factor was baseline functional health and well-being, which we measured with the World Health Organization-Wellbeing Index (WHO-5), a validated self-assessment screening tool for depression in a primary care setting (Primack, 2003).

The baseline survey also included the following two validated sexuality measures: The FSFI-6 (Rosen et al., 2000) and the NSSS (Stulhofer, Busko, & Brouillard, 2010). The FSFI-6 explores sexual domains of desire, arousal, lubrication, orgasm, satisfaction, and pain. The NSSS assesses multiple domains of sexuality, including sensation, awareness and focus, emotional closeness, and general activity. Both the FSFI-6 and the NSSS ask about individuals' experience during the last 4 weeks. To help us assess the potential sexual domains of contraceptive side effects, participants reported on menstrual bleeding patterns and menstrual-related symptoms (duration and frequency) in the month before enrollment by completing the Menstrual Symptoms/Side Effect Questionnaire (MSQ). The MSQ assesses frequency of headache, bloating, breast tenderness, irritability, acne, cramping, weight gain, weight loss, moodiness, and depression, as well as gastrointestinal symptoms (Negriff, Dorn, Hillman, & Huang, 2009). The MSQ refers to the last 30 days and includes the following answer choices: not once, once a month, a couple of days a month, once a week, a couple of days a week, or every day.

At each follow-up survey, participants reported whether they were still using their contraceptive method and, if not, the date of discontinuation. They also updated information on recent sexual activity, current partner, relationship status, and relationship length. To assess bleeding changes, we asked, "Which of the following responses best describes your vaginal bleeding in the past 4 weeks?", with response options of no vaginal bleeding, less bleeding than before, no change from before, and more bleeding than before. We repeated the FSFI-6, NSSS, MSQ, WHO-5, and bleeding changes questions at each timepoint. To capture a more subjective domain of sexual acceptability, each follow-up survey also included a question about participants' perceived impact of their current contraceptive method on their sex life in the last month ("In the last 4 weeks, would you say that your birth control or method to avoid pregnancy has: made your sex life better, made your sex life worse, or had no effect on your sex life?"). We used this measure to assess perceived sexual improvements or perceived sexual detraction related to a contraceptive method. We used the term sexual detraction to capture the negative impact a contraceptive method can have on an individual's sexual experiences.

Analyses

This analysis documents sexual acceptability measures' associations with contraceptive continuation at 12 months while controlling for factors that can influence sexual measures/outcomes (e.g., relationship duration) as well as contraceptive continuation (e.g., bleeding changes). Control variables included contraceptive method type, changes in bleeding, relationship status, relationship duration, age, insurance, race/ethnicity, education, and pregnancy history. This article presents results on a secondary analysis. The original study was powered to detect differences in FSFI-6 scores between copper T380 IUD, levonorgestrel 52 mg IUD, and etonogestrel contraceptive implant users. Published results of the power analyses appear elsewhere (Higgins et al., 2016).

The first step was exploratory. We used survival analysis to visualize the effects of individual variables on continuation using Kaplan-Meier survival plots (Singer & Willett, 2003). We examined all variables of primary interest (i.e., perceived impact on sexual experience, bleeding, FSFI-6, NSSS, MSQ, and WHO-5) at each time point (Cox, 1972).

Second, we used factor analyses to assess the dimensionality of the four multi-item questionnaire instruments (FSFI-6, NSSS, MSQ and WHO-5), using exploratory factor analysis (standard principle factor method with communalities equal to one; Mulaik, 2009). After identifying the optimal factor solution for each questionnaire, we estimated factor scores using the regression scoring method (Thomson, 1956). The factor scores were then explored as predictors of interest in survival analyses (Loehlin, 2004). We compared the performance of the factor scores of sexual functioning (FSFI-6), sexual satisfaction domains (NSSS), and general health (WHO-5, MSQ) with perceived impact on sexual experience and controlled for the covariates, including contraceptive method type, bleeding changes, relationship status, and age. All data management and statistical analyses took place with Stata 14.2 Statistical Software (StataCorp, 2015).

Results

Two hundred women enrolled in the study. Seven women either withdrew before insertion or had a failed insertion procedure. A total of 193 women received an IUD or contraceptive implant. Of women who had an insertion, 10 (5%) reported a spontaneous IUD expulsion and 3 had their device removed because they desired pregnancy. We excluded these 13 participants from the analysis since these discontinuations were not influenced by factors related to method acceptability. After these exclusions, 180 participants remained in the primary analysis sample.

At baseline, the method distribution included 33 copper T380 IUDs (18%), 82 levonorgestrel 52 mg IUDs (46%), and 65 etonogestrel contraceptive implants (36%). Across methods, participants had a mean age of 26.6 years (range, 18–42 years; standard deviation of 6 years), the majority were unmarried and not cohabitating (68%) and had at least some college or vocational training (63%), and two-thirds (65%) identified as non-Hispanic and White. Participants in each method group had similar

sociodemographic characteristics. In addition, patient characteristics did not differ between participants who discontinued their baseline method over the course of the year and those without a documented removal. Table 1 displays baseline characteristics of participants according to continuation at 1 year.

Factor scores summarizing the FSFI-6, NSSS, MSQ, and WHO-5 were included as predictors in the Cox proportional hazard model of discontinuation. Of the variables assessed in the Cox proportional regression analysis, only two showed a statistically significant association ($p < .05$) with discontinuation: perceived impact of contraceptive method on sex life (no effect, positive effect, or negative effect) and menstrual symptoms/side effects (i.e., the composite factor scores for MSQ frequency). As presented in the Cox regression output of Table 2, and the Kaplan-Meier curve plotted in Figure 1, individuals who reported that their method detracted from their sexual life at any time point in the study had substantially higher removal rates (adjusted hazard ratio, 8.04; 95% CI, 1.53–42.24) compared with women who reported no effect or a positive effect on their sex life. As shown in Table 2, models 1 and 2 show the unadjusted models only including the perceived impact on sex life and bleeding changes, which were found to be significant independent factors. Table 2 (model 3) has a fully adjusted model and demonstrates that the association of perceived sexual detraction with discontinuation was robust ($p < .05$) to a range of potential confounders and covariates, including contraceptive method type, bleeding changes, relationship status, age, insurance, race and ethnicity, cohabitation, education, and pregnancy history.

Table 3 compares the performance of the factor scores of sexual functioning (FSFI-6), sexual satisfaction domains (NSSS), and health (WHO-5, MSQ) to perceived impact on sexual experience in the full model, all while controlling for the covariates listed above. Model 1 shows the robust association of perceived sexual detraction to discontinuation. The FSFI, NSSS, and WHO-5 yielded null results, as shown in models 2, 3, and 4. Model 5 shows the significant positive association of the MSQ with discontinuation. Finally, model 6 includes both perceived sexual impact and MSQ in a single model, controlling for all covariates listed. The results of this model indicate that perceived sexual detraction is robustly associated with discontinuation adjusting for menstrual symptoms (adjusted hazard ratio, 5.35; 95% CI, 1.00–28.53), but the reverse is not true. That is, the MSQ factor score was no longer significantly associated with discontinuation after adjusting for perceived sexual impact ($p = .11$). It is also of note that both perceived sexual detraction and MSQ coefficients were substantially attenuated in the final model 6, consistent with the degree of (Spearman rank) correlation observed between these variables ($r = -0.26$; $p < .001$). This finding shows that perceived sexual detraction and symptom/side effect items are strongly correlated.

Even when controlling for a range of factors known to affect sexuality as well as contraceptive continuation, women who perceived negative sexual effects of their methods were significantly more likely to discontinue using their IUD or implant at 1 year compared with women perceiving no sexual change or positive sexual changes.

Table 1
Participant Characteristics Stratified by Contraceptive Method Continuation

Characteristics	Total, n (%)*	Continuing, n (%)	Discontinued, n (%)	*p* Value*
Total	180 (100)	162 (90)	18 (10)	
Method chosen at baseline				
Cu IUD	33 (18)	29 (88)	4 (12)	.899
LNG IUD	82 (46)	74 (90)	8 (10)	
ENG implant	65 (36)	59 (91)	6 (9)	
Highest level of education completed				.682
High school or less	63 (37)	56 (89)	7 (11)	
Some college, vocational training or higher	109 (63)	99 (91)	10 (9)	
Race/ethnicity				.386
Non-Hispanic, White	112 (65)	99 (88)	13 (12)	
Hispanic, non-White	44 (26)	42 (96)	2 (5)	
Non-Hispanic, non-White	16 (9)	14 (88)	2 (13)	
Annual household income				.682
<$10,000	39 (25)	36 (92)	3 (8)	
$10,000-$29,999	84 (55)	75 (89)	9 (11)	
≥$30,000	30 (20)	26 (87)	4 (3)	
Marital status				
Single/divorced/separated	116 (68)	101 (87)	15 (13)	.062
Married/living with partner	54 (32)	52 (96)	2 (4)	
Previous pregnancy				.623
No	81 (47)	74 (91)	7 (9)	
Yes	92 (53)	82 (89)	10 (11)	
Baseline concern about sexual functioning				.508
No	146 (85)	130 (89)	16 (11)	
Yes	21 (12)	20 (95)	1 (5)	
Unsure	5 (3)	5 (100)	0 (0.0)	
Any intercourse in the last 4 weeks				.084
No	19 (11)	15 (79)	4 (21)	
Yes	153 (89)	140 (92)	13 (9)	
Age in years, mean ± SD	26.7 ± 5.8	26.4 ± 5.7	28.0 ± 5.8	.185

Abbreviations: Cu IUD, copper intrauterine device; LNG IUD, levonorgestrel intrauterine device; ENG implant, etonorgestrel contraceptive implant; SD, standard deviation.

Totals vary between 158 and 180 owing to missing data items.

* The *p* values are for the null hypothesis of no difference in percentage distribution (tested via Pearson's chi-square test) or means (tested via *t* test) between continuers and discontinuers.

Table 2
Cox Proportional Hazard Models Examining the Association of Perceived Sexual Impact of the IUD or Implant to Method Discontinuation

	Model 1	Model 2	Model 3
	HR (95% CI)	HR (95% CI)	HR (95% CI)
Perceived sexual impact			
No effect on sex life	2.52 (0.63–10.03)	2.28 (0.56–9.28)	2.61 (0.55–12.40)
Improved sex life (ref)	-	-	-
Worsened sex life	7.07** (1.80–27.76)	5.67* (1.27–25.43)	8.04* (1.53–42.24)
Type of method			
CU IUD (ref)	-	-	-
LNG IUD	0.46 (0.15–1.43)	0.52 (0.13–2.04)	0.32 (0.06–1.77)
Contraceptive implant	0.34 (0.09–1.17)	0.40 (0.11–1.43)	0.18 (0.03–1.01)
Changes in bleeding			
No bleeding		0.38 (0.07–1.98)	0.22 (0.04–1.26)
Decreased bleeding (ref)		-	-
No change in bleeding		0.57 (0.06–5.37)	0.58 (0.05–7.26)
Increased bleeding		0.95 (0.23–3.93)	1.11 (0.22–5.59)
Relationship length			
<3 months			6.12 (0.93–40.37)
3–6 months (ref)			-
6–12 months			0.87 (0.12–6.32)
1–2 years			2.44 (0.37–16.00)
2–3 years			3.01 (0.30–30.81)
>3 years			4.86 (0.56–42.38)
Age category			
18–19			1.29 (0.14–12.20)
20–24 (ref)			-
25–29			0.42 (0.07–2.31)
30–34			0.65 (0.13–3.27)
≥35			0.43 (0.06–2.99)
Insurance status			
No insurance (ref)			-
Any insurance			0.83 (0.44–1.58)
Race/ethnicity			
Non-Hispanic, White (ref)			-
Hispanic, non-White			0.25 (0.05–1.34)
Non-Hispanic, non-White, other			0.66 (0.07–6.02)
Relationship status			
Single (ref)			-
Married/cohabiting			0.33 (0.07–1.62)
Educational attainment			
High school graduate or less			0.84 (0.28–2.52)
More than high school (ref)			-
Ever pregnant			3.13 (0.74–13.16)
Observations	576	576	576
N	161	161	161
Discontinuations	18	18	18
Risk	50376	50376	50376
Log likelihood	−81.26	−80.29	−73.19

Abbreviations: Cu IUD, copper intrauterine device; LNG IUD, levonorgestrel intrauterine device; ENG implant, etonorgestrel contraceptive implant; SD, standard deviation.
*$p < .05$; **$p < .01$.
Model 1 includes the perceived sexual impact and device selected at baseline; Model 2 includes perceived sexual impact, device selected at baseline, and bleeding changes; Model 3 is a fully adjusted model that controls for additional covariates that may impact continuation.

Discussion

We found that some, but not all, sexual experience measures strongly affect continuation patterns. The sexual functioning, as measured by the FSFI-6, and satisfaction measures, as measured by the NSSS, were not significantly associated with method continuation, while women's perceptions of their contraceptive methods' sexual impacts were significantly associated with continuation even in this small sample of discontinuers. In fact, the perception that a new IUD or implant made one's sex life worse was the strongest predictor of discontinuation within the first year of use when adjusting for many other factors. This finding is notable given the wide range of examined factors in this study, including common side effects previously attributed to method dissatisfaction and discontinuation (e.g., increased bleeding and cramping). More specifically, the finding that validated sexual functioning and sexual satisfaction measures were not associated with contraceptive continuation may suggest that the FSFI-6 or the NSSS are less influential aspects of sexual acceptability in contraceptive-seeking populations. That said, this topic would benefit greatly from studies with larger sample sizes in which participants use a wider range of methods.

Nonetheless, this study addresses some of the limitations of existing research on other reversible methods. Such limitations included cross-sectional study design and sole use of sexual functioning measures that may not be best suited for healthy contraceptive-seeking populations (Boozalis, Tutlam, Chrisman Robbins, & Peipert, 2016; Sanders et al., 2014). This study provides a much-needed longitudinal assessment of contraceptive continuation in the context of sexual acceptability and sexual

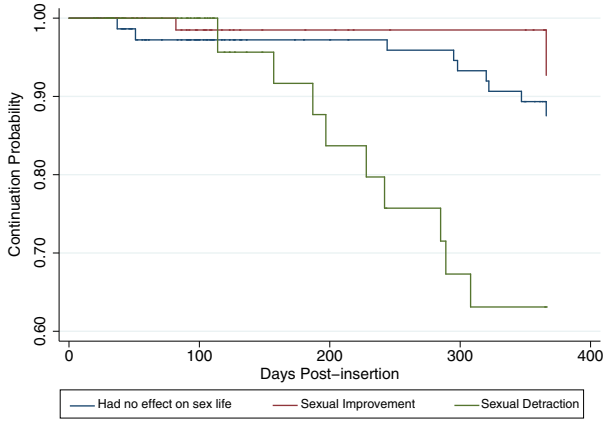

Figure 1. Kaplan-Meier curve of removals by perceived impact of contraception on sex life. In the unconditional, bivariate survival model, self-reporting sexual detractions, that contraception made sex life worse, was significantly associated with contraception discontinuation (hazard ratio 7.07; 95% CI 1.80-27.76; $p = .005$), relative to the reference category, sexual improvement or made sex life better.

experience. Study strengths include use of multiple sexuality measures and domains. Although the validated measures (FSFI-6 and NSSS) did not independently relate to discontinuation, unique domains contributed to an increasingly nuanced understanding of sexual acceptability.

Readers should interpret these findings in light of study limitations, including the potential for selection bias. As published previously, women in this cohort selecting IUDs and implants reported that the sexuality-related criteria of not interrupting sex and not reducing libido were on par with method effectiveness in importance when selecting a method of contraception (Higgins et al., 2016), Although these initial findings built a strong foundation for the current study, we must acknowledge that we informed participants about the study's focus on sexuality, and this may have biased the sample toward participants who cared more about sexual acceptability than the average contraceptive user. This limitation could be ameliorated in future research by making sexual acceptability measures a more standard part of contraceptive research and care. An additional weakness of the study includes its regional sample limited only to English speakers; future researchers should endeavor for increasingly diverse patient populations, both in the United States and elsewhere. Another potential limitation is the unknown impact of respondent anxiety or stress on the baseline survey, given that some patients may fear procedures such as IUD or implant insertion. Our study specifically asked that respondents think about their sexual activity with a man when answering questions. This language may have excluded individuals whose partner does not identify as a cisgender man or who are not exclusively heterosexual, and may both need contraceptive services and value sexual acceptability. Additionally, although we did not have inclusion criteria or survey questions on gender identity, the language used in the survey may have been inappropriate for individuals who do not identify as cisgender women. This inclusion of gender and sexual diversity would have been an improvement to the study design. Despite these limitations and our study's relatively small sample size, our exploratory findings create a compelling basis for the notion that sexual acceptability may indeed shape contraceptive satisfaction and continuation—a heretofore critically understudied area of contraceptive research.

Implications for Practice and/or Policy

Although definitive conclusions require replication with larger samples involving a wider range of methods, this study provides initial evidence that domains of sexual acceptability, particularly women's perceptions of their method's sexual impact, are key factors in women's continued IUD and implant use over time. Increased attention to sexual acceptability in contraceptive research could inform more personalized approaches to education, counseling, and decision support tools in the future.

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Table 3
Cox Proportional Hazard Models Comparing Self-Reported Sexual Satisfaction with Measure Factor Scores for Sexual Experience (FSFI, NSSS), Menstrual Symptoms (MSQ), and General Health (WHO-5) Questionnaires

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)
Improved sex life (ref)	-					-
No effect on sex life	3.29 (0.66–16.36)					2.15 (0.44–10.58)
Worsened sex life	7.64* (1.38–42.30)					5.36* (1.00–28.53)
FSFI factor score		0.70 (0.40–1.23)				
NSSS factor score			0.77 (0.47–1.26)			
WHO-5 factor score				0.75 (0.40–1.40)		
MSQ factor score					2.73** (1.29–5.80)	1.97 (0.86–4.48)
Observations	571	571	571	571	571	571
N	160	160	160	160	160	160
Discontinuations	17	17	17	17	17	17
Risk	50191	50191	50191	50191	50191	50191
Log likelihood	−69.23	−71.57	−71.79	−71.89	−68.67	−67.4

Abbreviations: FSFI, Female Sexual Function Index; HR, hazard ratio; MSQ, Menstrual Symptom Questionnaire; NSSS, New Sexual Satisfaction Scale; WHO-5, WHO Well-Being Index.
*$p < .05$; **$p < .01$.
Each model controls for contraception method, bleeding, relationship status, age, insurance, race/ethnicity, cohabitation, education, previous pregnancy.

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