

A prospective study of the effects of oral contraceptives on sexuality and well-being
and their relationship to discontinuation

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Running head: Oral contraceptives, sexuality and well-being

ABSTRACT

The purpose of the study was to explore predictors of discontinuation of oral contraceptives (OC) including pre-OC characteristics and adverse physical, emotional and sexual effects of OCs. Women aged 18+ in committed, sexually active relationships were assessed before starting OC and reassessed at 3, 6 and 12 months or shortly after discontinuation. Assessment included: pre-OC attitudes and expectations about the pill; self-reported side effects; and perimenstrual symptoms including PMS, physical and emotional well-being, and sexual interest, enjoyment and frequency of sexual activity. Seventy-nine women completed the study, 38% continued OCs, 47% discontinued and 14% switched to another OC. Emotional side effects, worsening of PMS, decreased frequency of sexual thoughts and decreased psychosexual arousability correctly categorized 87% of cases using logistic regression. Emotional and sexual side effects were the best predictors of discontinuation/switching, yet such OC effects have been largely ignored in the research literature.

Key words: Contraceptives, oral; sex; sexuality; affect; mood; hormones

1. INTRODUCTION

The need for methods of contraception and fertility regulation that are acceptable and widely used remains a world-wide problem of major proportions. The scope for developing new techniques for fertility regulation is considerable and much research effort is currently being expended on this goal. However, the ultimate value of a method depends on its acceptability and usage. The 2 new hormonal methods introduced in the early 1990's in the US – hormonal implants and injectables – have had limited impact. In 1995, fewer than 2% of US women were using the implant, and under 3% were using the injectable[1]. Although US trends in contraceptive use suggest that there has been a decline in oral contraceptive (OC) use among certain subgroups of women (e.g., low income women and those under 25), the pill remains the most widely used form of reversible contraception, used by 27% of all contraceptive users[2]. However, in spite of the introduction of low-dose OCs with assumed reduction in side effects, a substantial proportion of women who begin taking the pill discontinue the method within the first few months of use. American surveys report annual discontinuation rates among OC users of 29%[3] with a much higher percentage among adolescents[4,5]. Comparable evidence from developing countries is limited, but suggests consistently higher discontinuation rates for OCs[6,7].

Although many authors cite the experience of side effects as a major factor involved in early discontinuation of OCs[8], the available data mainly relates to adolescent populations, and focuses on problems with 'cycle control', with only superficial attention paid to other behavioral side effects, such as changes in mood and sexuality. Few studies have attempted any systematic investigation of the factors related to discontinuation and most of the past research has relied on retrospective recall for past OC experiences; many studies have, for example, interviewed 'past' OC users about their experiences with OCs[9].

In 1987, the Human Reproduction Program (HRP) and Division of Mental Health of the World Health Organization (WHO) commissioned a review of the literature on the effects of

oral contraceptives on the sexuality and well-being of women[10] which demonstrated the paucity of research in this area, particularly with more modern low-dose OCs. Two types of study were proposed to address the problem: (i) assessment of the direct pharmacological or hormonal effect of OCs on well-being and sexuality in women who have been sterilized, so that placebo control is possible and there are no complicating psychological implications of fertility control, and (ii) study of women about to start on OCs for contraceptive purposes allowing for assessment of interactions between psychological factors and the direct hormonal effects of the OC.

The only example of the first type of study since that time, a placebo-controlled, double-blind comparison of combined (COC) and progestogen-only (POP) OCs, carried out in 2 contrasting cultures (Scotland and Philippines) and funded by the HRP was reported by Graham et al.[11]. This showed negative effects of the COC on sexual interest in the Scottish women, approximately half of whom reported loss of sexual interest as a side effect. The lack of this effect in the Filipino women was probably due to the fact that they reported significantly lower sexual interest and generally more negative sexual relationships than the Scottish women before starting on the OC. In both centers, the COC was associated with more negative mood change than the POP, which in general was strikingly free of adverse effects apart from the expected disruption of bleeding patterns.

The study reported in this paper is one of the few examples of the second type in which pre-OC characteristics and changes from the pre-OC baseline are assessed to see if they predict the acceptability and continuation of OC when used specifically for fertility control. Two earlier studies relating pre-pill characteristics to patterns of discontinuation focused on expectations of bleeding changes[12], and social/situational factors associated with switching to another method[13]. In contrast, the present study involved a comprehensive assessment of women before starting on OCs, providing a baseline of a woman's mood and sexuality as well as her attitudes and expectations about the pill, motivation for parenthood, etc. The

present small study was intended as a pilot for a larger study which will require external funding. It nevertheless is sufficient to demonstrate the relevance to discontinuation of adverse effects of OCs on mood and sexuality.

2. METHODS

2.1. Participants

Women attending family planning clinics and a university health center in Indiana, aged 18 and older, sexually active, in a committed relationship, and intending to use oral contraceptives for fertility control for at least one year were invited to participate. Other inclusion criteria included: (i) no previous use of oral contraceptives, Norplant, or Depo-Provera in the preceding year, (ii) no contraindications to oral contraceptive use, (iii) good physical health, (iv) menstrual cycle length of 21 to 35 days, (v) not currently using psychotropic medications, (vi) not diabetic, (vii) not breastfeeding, and (viii) not having been pregnant within the previous 6 months. Women were paid \$50 for the initial assessment and \$20 for each follow-up assessment.

2.2 Design

This study was approved by the Institutional Review Board for the Protection of Human Subjects. After obtaining informed consent, women were carefully assessed before starting on OCs. Participants were randomly assigned to Ortho-Cyclen (monophasic, 0.035mg ethinyl estradiol and 0.250 mg norgestimate) or Ortho Tri-Cyclen (triphasic, 0.035mg ethinyl estradiol and 0.180mg, 0.215mg, 0.250mg norgestimate). They were re-assessed at 3, 6, and 12 months or as soon as possible following discontinuation of OC use or switching to another pill.

2.3 Methods of Assessment

Some assessments were carried out only at the pre-OC stage. Follow-up assessments included some measures repeated from baseline and others used only during follow-up

evaluations. The initial assessment took approximately 2 hours and follow-up assessments approximately one.

2.3.1. Repeated measures

2.3.1.1. Demographic and Relationship Questionnaire (DRQ)

Completed/updated at all assessments, the DRQ included age, employment status, marital status, education, racial/ethnic background, income, assessment of relationship status and commitment (e.g., seriousness of, and commitment to, the relationship; length of relationship; sexual exclusivity vs. non-exclusivity; number of nights spent together; any change to a new partner during the study), and the extent to which the participant was concerned about sexually transmitted disease.

2.3.1.2. Interviewer Ratings of Sexual Function (IRSF)

The IRSF[11,14-16] is a semi-structured interview used to obtain frequencies of intercourse, lovemaking without intercourse, and masturbation during a specified period of time (in this study the previous 3 months or the time since last interview). It also obtains information regarding initiation of lovemaking, orgasm, vaginal lubrication, frequency of sexual desire, enjoyment, arousal, 'tense' feelings, feeling 'close and comfortable' with the partner during lovemaking, and male partners' experience of sexual problems. For most items, ratings are made on a 6-point scale corresponding to the percentage of occasions of sexual activity during the specified time period on which the behavior/response occurred. The IRSF was administered at each assessment.

2.3.1.3. Sexual Experience Scale (SES)

This measure, developed by Frenken and Vennix[17], has 4 primary scales: the Sexual Morality Scale (SES1); the Psychosexual Stimulation Scale (SES2); the Sexual Motivation Scale (SES3); and the Attraction to Marriage Scale (SES4) modified to refer to non-marital and marital relationships. All 4 scales were completed at the initial assessment. SES 2 and SES 4 were repeated at each follow-up.

2.3.1.4. *Menstrual Health Questionnaire (MHQ)[18-20]*

This covers menstrual history (including cycle length and variability, pain, blood loss, duration of flow and its variability, and intermenstrual bleeding and/or spotting), retrospective ratings of perimenstrual symptoms for the last menstrual cycle, self-assessment of premenstrual syndrome (PMS), previous contraception and pregnancy history (including births, miscarriages, abortion, and post-partum depression), and previous psychiatric illness and medications. Menstrual variables, perimenstrual symptoms, PMS, and the woman's perceptions of the effects of the pill on the pain, blood loss, and PMS were assessed at follow-up.

2.3.1.5. *Menstrual Bleeding Diary (MBD)*

This records bleeding (which days it occurs and its heaviness) and spotting across the cycle, occurrence of period-type pain and its severity, use of painkillers, and any days of missed pills. These were collected monthly.

2.3.1.6. *Side-Effects Questionnaire (SEQ)*

A modified version of the interviewer-administered questionnaire developed by Graham and colleagues[11], the first part elicits any spontaneous reports of changes noticed by the woman while on OC and the second part contains an 18-item checklist covering mood, physical changes and changes in sexuality, both positive and negative. Ratings of change (none, mild, moderate, or marked) and directionality (positive or negative) when appropriate, are recorded. Mean scores (ranging from marked negative to marked positive effects) were calculated combining items as follows: *physical side effects* (headaches, feeling bloated, tender breasts, weight gain, nausea, aches and pains, skin changes, abdominal cramps, tiredness); *emotional side effects* (feeling in a better mood, feeling in a worse mood, less emotional, more emotional); and *sexual side effects* (loss of sexual interest, increased sexual interest, loss of sexual enjoyment, increased sexual enjoyment, lack of vaginal lubrication). The SEQ was administered at all follow-up interviews.

2.3.2 Measures used only at initial assessment

2.3.2.1. Contraceptive Methods Questionnaire (CMQ)

Administered pre-OC, this assessed contraceptive history in detail, any problems with previously used contraceptive methods, contraceptive risk-taking, and attitudes about contraceptive characteristics. It incorporates a modified version of the Contraceptive Attributes Questionnaire[21] assessing the importance of various contraceptive characteristics in the woman's choice of a method. Women also rated the degree to which they believed that OC had each of these characteristics at baseline and at final follow-up. A subjective expected utility score for OC was calculated weighting the woman's perception of the pill's attributes by the value she placed on these attributes.

2.3.2.2. Motivation for Parenthood Questionnaire (MPQ)

This assesses a woman's desire to have a child in the future, when she would prefer to have that child, her perceptions of her partner's desires, the woman's determination not to become pregnant during the upcoming year including an item about whether she would consider abortion, and whether she has ever worried about her fertility.

2.3.2.3. Effects on Menstruation Questionnaire (EMQ)

This assesses the woman's attitude about changes in her menstrual bleeding pattern that could result from OC use.

2.4. Method of Analysis

Analyses were conducted using SPSS 10.0 for Windows. Women were classified into 2 groups for analysis: the DS group - those who discontinued OC use or switched from the originally assigned to another pill at any stage during the 12 months of the study; and the C group - those who continued the original OC. In the first stage of analysis, group comparisons were performed on 2 types of variables a) baseline measures, and b) measures of change on OC during the first 3 months of use (or until discontinuation or switching if less than 3 months). For baseline and non-repeated measures, analysis of variance, t-tests, and

multivariate GLM (General Linear Model) procedures were used. Chi-square analyses were used to compare groups on categorical variables. For repeated measures, change scores (follow-up – baseline) were calculated and examined using multivariate GLM analyses comparing groups and variables within a measure. Post-hoc analyses were performed to explore significant main effects and interactions.

In the second stage of analysis, variables showing significant group differences in the first stage were used as ‘predictors’ in logistic regression analyses with discontinuation/continuation as the dependent variable. Several models were explored using the Forward Stepwise procedure including all of the significant ‘predictor’ variables in various combinations until a sound statistical solution was reached. The combination of significant predictor variables identified through this process that resulted in the best model was then used to develop a logistic regression equation using the Enter method.

3. RESULTS

3.1. Participants

One-hundred-seven women entered the study; 26 were lost to follow-up (footnote 1), 2 became pregnant, leaving 79 participants with a known outcome. Of these, 30 (38%) were still on the same OC at the end of 12 months, 37 (47%) had discontinued OC, and 12 (14%) had switched to another pill. The cumulative numbers of participants who discontinued, switched to another OC, continued on the original OC, or were lost to follow-up over the 12 months of the study are shown in Figure 1. Of those who discontinued/switched, 3 did so for reasons unrelated to the effects of the OC. This leaves 76 women for whom we can evaluate the predictors of continuation or discontinuation. Of these, 46% had been assigned to Ortho-Cyclen and 54% to Ortho Tri-Cyclen. When asked the reasons for discontinuation or switching, the following were cited spontaneously: physical side effects (37%), emotional side

1. Comparison on a number of background variables of those lost to follow-up and those who remained in the study revealed no significant differences.

effects (33%), problems with bleeding or spotting (18%), relationship ended (18%) (footnote 2), sexual side effects (8%), forgetting pill (16%), and medical reasons (4%). Selected variables related to demographic and relationship characteristics and menstrual, contraceptive, and reproductive history of the participants are shown in Table 1.

3.2. *Discontinuation/Continuation – Group Comparisons*

Significant group differences on baseline and change variables are reported in Tables 2 and 3.

Only one baseline measure was related to discontinuation. The DS group had used a higher mean number of contraceptive methods in their lifetime ($M = 3.20$, $sd = 1.31$) than the C group ($M = 2.50$, $sd = 1.11$) ($t = -2.402$, $df = 74$, $p = 0.012$).

In contrast, several variables measuring change on OC were related to discontinuation.

3.2.1. Interviewer Ratings of Sexual Functioning

As shown in Table 3, more women reported a decline in the frequencies of sexual intercourse and sexual thoughts at follow-up than reported increases. Significantly more of the women reporting decreases in frequencies of intercourse and sexual thoughts discontinued or switched OC. Table 2 shows the means and standard deviations (sd) of the IRSF change scores that were significantly different between groups ($F(8,58) = 2.931$, $p = 0.008$). Significant reductions in the frequencies of intercourse ($F(1,66) = 7.127$, $p = 0.016$), lovemaking without intercourse ($F(1,66) = 26.869$, $p = 0.017$), and sexual thoughts ($F(1,66) = 12.236$, $p = 0.001$) were found for the DS group.

3.2.2. Side Effects Questionnaire

A significant difference between groups was found for SEQ scores ($F(3, 69) = 7.173$, $p < 0.001$). The DS group had significantly greater negative scores for all 3 types of side-effects:

2. Results of analyses conducted omitting participants who cited their relationship ended as a reason for discontinuation were substantially the same as those reported herein. Termination of a relationship may or may not be related to the effects of OC; therefore, we included these participants in the analyses reported herein.

sexual ($F(1, 72) = 6.869, p = 0.011$), emotional ($F(1, 72) = 15.641, p < 0.001$), and physical ($F(1, 72) = 8.352, p = 0.005$). Means (sd) for C and DS groups are reported in Table 2.

For each of the 3 SEQ scores, participants were classified as those with minimal side effects (scores -0.5 to $+0.5$), those who had predominantly negative side effects (scores < -0.5), those with predominantly positive side effects (scores > 0.5). As shown in Table 3, more women reported predominantly negative sexual, emotional, and physical side effects than reported predominantly positive changes. Significantly more of the women reporting predominantly negative side effects discontinued or switched OC.

3.2.3. Sexual Experience Scales

Change scores analyzed by group revealed a significant decrease in SES2 psychosexual arousability as measured by SES2 scores for the DS group ($F(2, 63) = 4.757, p=0.012$). Means (sd) are reported in Table 2.

3.2.4. Menstrual Variables

3.2.4.1. PMS

Fifty seven percent believed that they suffered from PMS prior to starting OC. Fourteen percent said they did not, and 29% were not sure. Asked about severity of their PMS, 35% rated it as mild, 35% as moderate, 11% as severe, and 18% as “varying too much to say” (this group was assigned a ‘moderate’ score for analyses). There were no group differences found for baseline ratings of PMS severity. As shown in Table 3, when asked about their perceptions of the pill’s effect on PMS, more women reported that it helped than reported that OC made PMS worse. All those that perceived that the pill made PMS better also indicated that the pill reduced menstrual pain. Significantly more women who reported that the pill made PMS worse discontinued or switched OC.

3.2.4.2. Blood Loss

Before starting OCs, 1% reported light, 55% moderate, 40% heavy, and 4% very heavy blood loss in the last month. No group differences were found in this initial rating. When asked about their perceptions of the pill's effect on blood loss, more women reported that their periods were lighter and/or shorter than reported that they were heavier and/or longer (Table 3). Significantly more women who reported that the pill made their periods heavier and/or longer discontinued or switched OC.

3.3. Logistic Regression

Table 4 presents the result of a logistic regression analysis showing the statistically most favorable model predicting discontinuation. This included 4 'predictor' variables: i) Emotional Side Effects Score (SEQ); ii) change score for the Frequency of Sexual Thoughts (IRSF); iii) the woman's rating of the Effect of the Pill on PMS (MHQ); and iv) change score for Psychosexual Stimulation Score (SES2). The model is based on data from 53 women with complete data on all 4 variables who were not among the 4 cases eliminated based on Studentized residuals greater than 2. The model successfully categorized 86.8% of the women into C and DS groups and explained 87% of the variance in outcome.

To test, to some extent, the predictive value of the model, the logistic regression equation was then used to predict the group membership for 15 women with missing data (and therefore not used in the first logistic regression analysis), but who had at least 2 of the 4 variables. Mean values were substituted for missing data. Eighty percent were classified correctly, suggesting some generalizability of the model to women similar to those in our sample.

4. DISCUSSION

The discontinuation rate found in this study falls within the range reported by others using different samples and methodologies [3,4,5,6,7]. It is difficult to ascertain whether the methodology used in this study might have influenced discontinuation. It is possible that participation in a prospective study with payment for reassessments for as long as OC use

continued during the first year may have influenced more women to continue than would have otherwise been the case. On the other hand, it is possible focusing on the effects of OC use may have increased discontinuation. However, it should be noted that our findings compare quite well with that of Rosenberg and Waugh[8] who reported a 32% discontinuation rate among new pill starters by the end of the sixth month in their prospective study. In our study 33% discontinued by the end of the sixth month.

This study demonstrates, in spite of a small sample size, that adverse effects on mood and sexuality are important factors in discontinuation of OCs. Although physical side effects were more marked in the women who discontinued, they did not enter into the best predictive model. Consistent with previous studies, most women who discontinued or switched OCs in this study did so within the first 3 months of use[8]. Furthermore, even those who discontinued after the first 3 months of use, often reported negative side effects related to mood and/or sexuality at the first (3-month) follow-up visit.

There is a substantial gap in the literature explaining the reasons for OC discontinuation[9,10], and yet these 2 potentially important factors – emotional and sexual well-being – have been virtually ignored. Although this study included careful assessment of pre-pill characteristics of women (social/situational and psychological) which might be associated with discontinuation, we found only one baseline measure associated with discontinuation (number of previous contraceptive methods used). In contrast, several variables which assessed *change* in sexual or emotional well-being after starting the pill were strongly related to discontinuation. The literature dating back to 1960 has acknowledged that negative mood changes are reported by women taking the pill, and may be a reason for discontinuation, and, today, the information provided to physicians on OCs includes “mental depression” in the category of adverse reactions which are “believed to be drug-related”[22]. Yet, systematic investigation of their occurrence and of pre-pill characteristics that might relate to such effects, and the possible

mechanism underlying such effects, is strikingly absent. A noteworthy early exception was interest in the possibility that OCs altered tryptophan metabolism[23,24].

There has been even less attention paid to sexual side effects. Most studies on discontinuation, even those which elicit detailed information about reasons for discontinuation or provide a list of possible side effects to participants, do not include sexual variables[9,25]. Our results are consistent with those of Graham et al.[11] in suggesting direct adverse hormonal effects of OCs on sexuality in a proportion of women. While this may not apply to all formulations of oral contraceptives, it is worth noting that the combined OCs used in these 2 studies contained different progestagens (norgestimate in this study, levonorgestrel in Graham et al.[11]). We remain ignorant of the mechanisms underlying adverse effect on sexuality. OC-induced reduction of free testosterone (T) or direct effects of the progestagen remain 2 possibilities; there may be others. We had hoped to measure the change in free T from baseline to 3 months of OC use and relate this to changes in sexual interest, but this was one of the casualties of our lack of funding. It is also distinctly possible that women vary in the behavioral impact of this reduction in free T, which would account for this effect being restricted to a subgroup.

Currently, despite 40 years of use, we have no way of predicting which women are likely to experience adverse effects of OCs on mood or sexuality, nor which OC formulations are more likely to be responsible. It has been suggested that, at least without the use of placebo control, the evaluation of such subjective changes, which can be influenced by a variety of factors in women's lives, is too difficult[26]. We believe that this study, plus our earlier placebo-controlled study[11] show that it can be done and that the dearth of such research can no longer be justified. It is worth noting that studies on the male contraceptive pill, although still in the developmental phase, have already included evaluation of possible effects on sexuality[27]. Similar evaluations are also needed on other hormonal methods such as the injectables and implants.

The impact of this state of affairs on clinical practice is clear. Reviewing recent publications which focused on improving clinician-patient communication about the benefits and risks of OCs[28], we found none recommending that clinicians raise the possibility that sexual and/or emotional side effects may occur. Indeed, we find the implication that drawing attention to such effects increases their likelihood and hence should be avoided[26]. Thus, the likelihood is that clinicians rarely inquire about possible sexual and emotional side-effects and may not take women's reports about any such changes seriously. In our view, women should be encouraged to discuss sexual and emotional effects of OCs with their health care provider in much the same way as they are encouraged to report physical effects such as bleeding, headaches, or breast tenderness.

Our interests are not in discrediting OCs. We see them as a profoundly important contraceptive method. We recognize that for the majority of women they do not produce such effects and have a variety of health benefits beyond effective contraception. But we are concerned about their apparently low acceptability and by the apparent gender bias in concern about contraceptive effects on sexuality and mood that might relate to acceptability. Only by identifying the mechanisms underlying adverse effects associated with discontinuation can we expect to develop OCs which are free of such effects. In the meantime, we believe that women should be fully informed and that clinicians need to discuss potential effects of OCs on sexuality and mood with their patients.

ACKNOWLEDGEMENTS

We thank Stephanie Hinton for assistance with interviewing and data collection; Dr. Judy Klein, Planned Parenthood of Central and Southern Indiana, and the Indiana University Health Center for help with recruitment; and Lori Carnes who worked on data entry and management. The opinions in this article do not necessarily reflect those of Planned Parenthood Federation of America, Inc., or others acknowledged here.

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Table 1. Comparison of the overall sample of women recruited to the study and the sample used for analyses of predictors of discontinuation

Background variable	Sample mean (sd) or percentage of sample	
	Recruited sample n= 107	Analysis sample n= 76
GENERAL DEMOGRAPHICS		
mean (sd) age in years	22.5 (3.3)	22.5 (4.42)
% attended college/university or technical school	85.8	86.8
mean (sd) years of education	14.07 (2.18)	14.27 (2.36)
race, % White	81.3	89.5
% African-American	9.3	5.3
% other minorities	9.3	5.3
mean personal income	“lower middle income”	“lower middle income”
MENSTRUAL & REPRODUCTIVE HISTORY		
mean age at first menstruation (years)	12.6 (1.5)	12.7 (sd = 1.5)
% 1 st time OC user	43.9	44.7
% reporting previous pregnancies	31.8	31.6
% reporting live births	16.8	15.8

(continued)

Table 1 (continued).

RELATIONSHIP HISTORY			
marital status	% single	67.0	65.3
	% separated, divorced	5.7	5.3
	% living with partner	23.6	22.7
	% married	3.8	6.7
current relationship	% serious/married	90.6	89.3
	% dating	9.4	10.7
	% sexually exclusive relationship	97.2	96.0
	mean nights/week spent with partner	3.9 (2.5)	4.1 (2.4)
	median (min-max) length of relationship (months)	12 (2 - 88)	11 (2 - 88)
CONCERN ABOUT STI			
	% not at all concerned	43.5	41.3

Table 2. Comparison of continuation (C) and discontinuation/switch (D/S) group means (sd) for outcome variables showing significant differences

Variables	Mean (sd)	
	C Group	DS Group
Number of contraceptives used previously (CMQ) *	2.50 (1.11)	3.20 (1.31)
Change in frequency of intercourse (IRSF) *	0.12 (1.08)	-0.57 (1.16)
Change in frequency of lovemaking without intercourse (IRSF) *	-0.10 (1.99)	-1.38 (2.19)
Change in frequency of thinking about sex (IRSF) ****	0.09 (0.66)	-0.78 (1.19)
Change in psychosexual arousability score (SES2) *	0.47 (4.48)	-2.78 (4.77)
Sexual side effects score (SEQ) *	-0.04 (0.26)	-0.25 (0.51)
Emotional side effects score (SEQ) ****	-0.02 (0.43)	-0.35 (0.69)
Physical side effects score (SEQ) ***	-0.04 (0.42)	-0.27 (0.58)

* $p \leq 0.05$

** $p \leq 0.01$

*** $p \leq 0.005$

**** $p \leq 0.001$

Table 3. Comparison of continuation and discontinuation/switching OC for those who experienced negative vs positive changes in sexuality, mood, and menstrual-related variables

Change from pre-OC baseline	% of overall sample	% Continued	% Discontinued or switched	Chi-sq df = 2	p
Frequency of intercourse				8.61	0.014
lower	36	20	80		
higher	23	50	50		
Frequency of sexual thoughts				19.15	<0.001
lower	39	11	89		
higher	17	58	42		
Sexual side effects				6.30	0.043
predominantly negative	19	14	86		
predominantly positive	1 person	1 person			
Emotional side effects				14.82	0.001
predominantly negative	40	14	86		
predominantly positive	7	60	40		
Physical side effects				5.93	0.052
predominantly negative	27	20	80		
predominantly positive	8	67	33		
Perceptions of OC effect on PMS				14.44	0.001
pill made PMS worse	21	14	86		
pill made PMS better	35	74	26		

(continued)

Table 3 continued.

Change from pre-OC baseline	% of overall sample	% Continued	% Discontinued or switched	Chi-sq df = 2	p
perceptions of OC effect on blood loss				9.54	0.008
pill made period heavier and/ or longer	16	22	78		
pill made period and/or shorter	59	38	62		

Table 4. Summary of logistic regression model predicting discontinuation

	B	S.E.	Wald	df	Sig.	Exp (B)	95% CI Exp (B)	
							Lower	Upper
Difference frequency of sexual thoughts	-4.866	2.227	4.774	1	0.029	0.008	0.0001	0.606
Difference psychosexual stimulation score	-0.978	0.456	4.594	1	0.032	0.376	0.154	0.920
Emotional side effects score	-10.891	5.060	4.634	1	0.031	0.000	0.000	0.377
Rating of pill's effect on PMS x pre-OC PMS severity rating	-0.981	0.621	2.496	1	0.114	0.375	0.030	1.266
Constant	-4.575	2.144	4.555	1	0.033	0.010		

FIGURE LEGENDS

Figure 1. Cumulative numbers of women who continued OC (C), discontinued (D), switched (S), became pregnant, and who had unknown outcome (drop-out or loss to follow-up) over 12 months of study.

