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## Young women's consistency of contraceptive use – Does depression or stress matter?

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### Abstract

**Background**—We prospectively examined the influence of young women's depression and stress symptoms on their weekly consistency of contraceptive method use.

**Study Design**—Women ages 18-20 years (n=689) participating in a longitudinal cohort study completed weekly journals assessing reproductive, relationship and health characteristics. We used data through 12 months follow-up (n=8,877 journals) to examine relationships between baseline depression (CES-D) and stress (PSS-10) symptoms and consistency of contraceptive methods use with sexual activity each week. We analyzed data with random effects multinomial logistic regression.

**Results**—Consistent contraceptive use (72% of weeks) was 10-15 percentage points lower among women with moderate/severe baseline depression and stress symptoms than those without symptoms (p-values<0.001). Controlling for covariates, women with depression and stress symptoms had 47% and 69% reduced odds of contraceptive consistency each week than those without symptoms, respectively (OR 0.53, CI 0.31-0.91 and OR 0.31, CI 0.18-0.52). Stress predicted inconsistent use of oral contraceptives (OR 0.27, CI 0.12-0.58), condoms (OR 0.40, CI 0.23-0.69) and withdrawal (OR 0.12, CI 0.03-0.50).

**Conclusion**—Women with depression and stress symptoms appear to be at increased risk for user-related contraceptive failures, especially for the most commonly used methods.

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**Implications**—Our study has shown that young women with elevated depression and stress symptoms appear to be at risk for inconsistent contraceptive use patterns, especially for the most common methods that require greater user effort and diligence. Based upon these findings, clinicians should consider women's psychological and emotional status when helping patients with contraceptive decision-making and management. User-dependent contraceptive method efficacy is important to address in education and counseling sessions, and women with stress or depression may be ideal candidates for long-acting reversible methods, which offer highly effective options with less user-related burden. Ongoing research will provide a greater understanding of how young women's dynamic mental health symptoms impact family planning behaviors and outcomes over time.

## Keywords

mental health; depression; stress; contraceptive behavior; contraceptive methods; contraceptive misuse

## 1. Introduction

Contraceptive users account for over half of the annual 3.1 million unintended pregnancies in the United States, with 90% attributed to non-, inconsistent or incorrect use of contraceptive methods [1-4]. Factors contributing to contraceptive misuse leading to unintended pregnancy are complex and include a wide range of demographic, social, reproductive, relationship and attitudinal characteristics [1,5-15]. Young age, low educational attainment, low income, minority race/ethnicity, transient sexual partnerships, greater numbers of sexual partners, ambivalent attitudes towards pregnancy, dynamic life or professional circumstances (*e.g.* moving to a new home, starting/stopping a job, having a personal crisis), access issues, and method tolerability are a few examples of known predictors of poor contraceptive behavior [9-14].

What has been studied to a lesser extent is the influence of mental health symptoms on women's contraceptive use patterns. Depression, anxiety and related psychological stress are common among young women [16,17] and are known to impact health behaviors including prescription medication adherence [18,19]. These mental health symptoms have also been linked with potentially risky sexual practices correlated with negative reproductive sequelae including early and unprotected coitarche, higher number of sexual partners, acquisition of sexually transmitted infections, sex while under the influence of alcohol and drugs and intimate partner violence [20-24].

In contraceptive research, studies that have examined mental health symptoms have largely focused mood symptoms occurring with hormonal contraception [25-27] or have used cross-sectional or retrospective designs, limited psychological measures, or finite outcomes like OC discontinuation [28-32]. It is unclear how women's mental health symptoms may affect their use of contraceptive methods over time and within the context of their daily lives.

We prospectively investigated the influence of depression and stress on young women's weekly consistency of contraceptive use, overall and by contraceptive method.

## 2. Materials and Methods

### 2.1 Sample and design

We used data from 992 young women participating in a longitudinal cohort study. Young women residing in a racial/ethnically and socioeconomically diverse county in Michigan were identified from state driver's license and personal identification card registers. Names

and contact information were randomly selected from these public records and eligible women (age 18-20 years at time of recruitment and a resident of the county) were contacted by mail or phone and asked to participate. Sampling occurred between March 2008 and March 2009.

At baseline, a trained research assistant obtained informed consent and conducted a 60-minute in-person survey interview to elicit information on sociodemographics, relationship characteristics, reproductive attitudes, beliefs and intentions, contraceptive histories, and mental health symptoms. Women were then invited to participate in the weekly journal-based study which assessed contraceptive use patterns, relationship status and pregnancy outcomes for a period of 2.5 years. Journal surveys were completed online or by phone. Compensation included \$1 per weekly survey with \$5 bonuses for on-time completion of five consecutive surveys. The response rate for the baseline interview was 88%; 78% completed at least 12 months of weekly surveys. For this study, we used data from the first 12 months of follow-up.

The initial sample comprised 992 women, 99% of who reported that they were not trying or intending to become pregnant during the study period (Figure 1). We included weekly journal entries in which women were sexually active and/or not pregnant in the previous week in order to estimate contraceptive use among those at risk of pregnancy. We only excluded ineligible journal “weeks” (e.g. we retained weekly data a woman contributed before a pregnancy and excluded subsequent weeks in which she was pregnant), except in cases where a woman did not have any study weeks of sexually activity, non-pregnancy, or valid contraceptive data to contribute (n=362). Our final analytic sample included 689 women who completed 8,877 weekly journals during the first 12 months (mean journals per woman 81, range 4-146).

## 2.2 Measures

**2.2.1 Baseline psychological symptoms**—In this study, we considered depression and stress to be distinct constructs, which we examined as unique, individual determinants of contraceptive use. Although often highly correlated, as they are operationalized here, depression symptoms reflect feelings of sadness or despair whereas stress symptoms reflect a psychological and emotional response to situational events [33-41]. These definitions are evident within the items comprising the standardized instruments we used to measure baseline depression and stress, which are described below.

The Center for Epidemiologic Studies – Depression Scale-5 (CES-D-5) is an abbreviated screening tool that assesses depressive symptoms over the previous week [33-36]. Women were asked how often they felt the following five symptoms over the past 7 days: “like you could not shake off the blues,” “depressed,” “sad,” “life was not worth living,” and “happy.” Responses were scored on a 4-point scale (0=rarely or none of the time, 1=some or little of the time, 2=occasionally or moderate amount of time, 3=most or all of the time). Scores range from 0-15. A standardized cut-off of 4 points has been used to denote moderate/severe depression symptoms (one standard deviation above the population mean, top 20<sup>th</sup> percentile) and has demonstrated good sensitivity (>0.84), specificity (0.80), and high validity (>0.90) in identifying patients classified as depressed by the full 20-item scale [35]. The CES-D has also demonstrated strong content, concurrent, and discriminant validity and internal consistency (Cronbach's alpha 0.91) [36].

The Perceived Stress Scale (PSS-4) is a widely used global stress screen that assesses the degree to which life situations are appraised as stressful, unpredictable, uncontrollable, and overloading over the previous month [37,38]. Women were asked how often (0=never, 1=almost never, 2=sometimes, 3=fairly often, 4=very often) they felt the following 4

symptoms: “unable to control important things in life,” confident about ability to handle personal problems,” “things were going your way,” and “difficulties were piling up so high that you could not overcome them.” Scores range from 0-16. A standardized cut-off of 9 points (one standard deviation above population mean, top 20<sup>th</sup> percentile) has been used to denote moderate/severe stress symptoms [37,38]. High construct validity and internal consistency (Cronbach's alpha .85) has been demonstrated [37,38].

**2.2.2 Contraceptive use**—At baseline and each week, we asked women if they had been sexually active the previous week and if so, whether they had used any contraceptive method including non-coital methods (OCs, contraceptive patch, ring, injectable, implant, or intrauterine device (IUD)) or coital-specific methods (condoms, withdrawal, or other coital methods including diaphragm/cervical cap, spermicide, female condom, emergency contraception (EC), rhythm calendar method or other non-specified method). We included the contraceptive injectable in the long-acting method category for this analysis due to small number of women using these methods. We also categorized women into the “most effective method” reported, so women were top-coded to one of the following specific method categories: 1) long-acting methods, 2) OCs, 3) contraceptive ring or patch, 4) condoms, 5) other coital methods, and 6) withdrawal [3].

For consistent contraceptive use, women were further asked whether they were using or had used a contraceptive method at the time of every act of sexual intercourse during the previous week, even if they weren't trying to prevent pregnancy. For example, if a woman reported using only condoms in the previous week, she was asked whether she had used a condom with every sex during that week. If a woman reported having used OCs in the previous week, she was asked if she had been taking her OCs at the time of every sex during that week. We did not assess information related to method-specific behaviors – for instance, missed pills, delayed injections or timing of IUD or implant removals. We defined contraceptive consistency as use of any contraceptive method (either a previously mentioned method or other type of method) at the time of every act of intercourse since the previous week's journal (coded 1). Thus, a woman-week was coded 0 for inconsistent contraceptive use if a woman reported not having used a method during the time of every sexual act in the past week.

**2.2.3 Relationship, reproductive and sociodemographic characteristics**—We examined the following relationship, reproductive and sociodemographic characteristics at baseline and each week: relationship (married, engaged, in special romantic relationship, having physical/emotional contact with someone or none) and cohabitation (with marital or non-marital partner) status, sexual intercourse experience, age at coitarche, lifetime number of sexual partners, gravidity (none, one, two or more pregnancies), pregnancy status, age, race/ethnicity, educational attainment (type of school currently enrolled), employment status, public assistance recipient, and frequency of religious service attendance. Baseline and time-varying covariates did not differ significantly in preliminary models for the first year of follow-up data, so we focused on baseline characteristics for this analysis.

### 2.3 Statistical analysis

We used univariate statistics to describe women's background characteristics, baseline depression and stress symptoms (by women) and consistency of contraceptive use (by weeks). We used bivariate  $X^2$  tests and student's t-tests to estimate associations between: 1) proportions of weeks of consistent contraceptive use and sociodemographic characteristics; and 2) proportions of weeks of consistent contraceptive use and baseline mental health symptoms. Multivariable logistic regression models were used to estimate the effect of baseline moderate/severe depression and stress symptoms on weekly consistency of

contraceptive use, overall and stratified by contraceptive method. We took into account unobserved respondent-level heterogeneity by using random effects models and controlled for baseline sociodemographic and reproductive characteristics and the number of journals women completed during the first study year. Variables were considered for inclusion in regression models if their p-value in bivariate models was 0.25 or less. In final models, we retained only those covariates that were significantly associated with the outcome ( $p < 0.05$ ) or that significantly changed point estimates of other key predictor variables (e.g. depression). For variables that appeared to be collinear (e.g. reproductive history variables), we retained variables with the strongest effect in final models. Results are presented as adjusted odds ratios with 95% confidence intervals. A two-tailed alpha of 0.05 was considered significant. All data were analyzed using Stata 11.0 (StataCorp LP, College Station, TX).

### 3. Results

#### 3.1 Weekly contraceptive use

Characteristics of our sample are described in Table 1. Among the 689 women who were sexually active and not pregnant ( $n=8,877$  weeks), contraceptive nonuse was reported in 10% of study weeks, while 48% of weeks were covered by non-coital methods and 42% by coital methods alone. For contraceptive methods used each week ( $n=7,999$ ), women reported long-acting methods (injectable 6%, IUD  $<1\%$  and implant  $<1\%$ ), OCs (44%), other hormonal methods including the ring (1%) and patch (1%), condoms (27%), other coital methods (1%) and withdrawal (17%).

Consistent contraceptive use (method use with every act of intercourse) was reported in 72% of weeks, and weekly contraceptive consistency varied by all of women's sociodemographic characteristics (all p-values  $< 0.001$ ) (Table 1). Among the 28% of weeks of inconsistent contraceptive use, the most common inconsistently used methods were withdrawal (38%), condoms (16%) and OCs (8%). Reasons cited for not using a method at every intercourse included "forgot" (31%), "did not have method available" (21%), "not happy with the method" (6%), and "partner did not want to use method" (6%).

#### 3.2 Mental health symptoms

At baseline, 27% of women met criteria for moderate/severe depression symptoms (4 points CES-D) and 25% met criteria for moderate/severe stress symptoms (>9 points PSS). Depression and stress symptoms were correlated (Pearson's  $r=0.51$ ), with 62% of women with depression symptoms also having stress symptoms ( $p < 0.001$ ). Having depression symptoms was associated with sociodemographic (race/ethnicity  $p=0.002$  and educational enrollment  $p=0.005$ ), sexual and reproductive characteristics (number of sexual partners  $p=0.02$ , age at coitarche  $p < 0.001$ , and gravidity  $p=0.009$ ). Having moderate/severe stress symptoms was associated only with sexual history (number of sexual partners  $p=0.001$  and age at coitarche  $p=0.003$ ). Women with moderate/severe depression and stress symptoms completed fewer weekly journals on average than those without depression ( $< 4$  points CES-D) and stress ( $< 9$  points PSS) (mean number of journals: 75 and 72 versus 82 and 81, respectively,  $p$ -values  $< 0.001$ ).

#### 3.5 Associations between mental health symptoms and contraceptive consistency

The proportions of consistent contraceptive weeks were 10% and 15% lower among women with moderate/severe depression and stress symptoms respectively than those without depression and stress symptoms ( $p$ -values  $< 0.001$ ). In multivariable random effects logistic regression models controlling for sociodemographic covariates, respondent-level characteristics and number of journals completed, baseline moderate/severe mental health

symptoms remained independently and negatively associated with weekly contraceptive consistency, with stressed women having a 69% reduced odds of contraceptive consistency (OR 0.31) and depressed women having a 47% reduced odds of contraceptive consistency (OR 0.53) each week, compared to women without each symptom (Tables 2 and 3). In models stratified by contraceptive method, stress was negatively associated with weekly contraceptive consistency for nearly all contraceptive methods (Table 4).

#### 4. Discussion

Using a unique longitudinal population-based design with weekly measurement of both sexual activity and contraceptive behavior, our study provides a more nuanced understanding of contraceptive behavior and factors associated with contraceptive misuse among young women [1,2,8,9,10]. We found that while sexually active young women reported using a contraceptive method in 90% of study weeks, a method was not used with every act of intercourse just over one-quarter of the time. Inconsistent contraceptive use was most frequently reported for the most commonly used methods, which have effectiveness highly dependent upon user characteristics and behaviors (i.e. OCs, condoms and withdrawal).

In regards to associations between mental health symptoms and contraceptive use, this study addresses gaps in previous research by using a population-based sample and repeated measures design to identify an association between depression and stress and weekly inconsistent contraceptive use over a one year period. These findings build upon previous work by Hall *et al.* in which the researchers found positive relationships between elevated baseline depression and stress symptoms and 6-month OC discontinuation rates among a clinical sample of 354 young minority family planning patients [32]. Like this previous work, depression and stress in our sample were highly correlated but distinct constructs, with stress exhibiting the most consistently negative association with contraceptive use, overall and across method types. A few other researchers have noted similar findings with mood disorders and OC discontinuation [29-31], though ours is the first study of which we are aware to explicitly examine inconsistent contraceptive use in a weekly context and accounting for sexual activity.

Several limitations of our study are noteworthy. We were unable to evaluate time-varying relationships between dynamic mental health symptoms and contraceptive behavior given that depression and stress were only measured at baseline in this study. Moreover, our abbreviated standardized screening instruments for depression and stress reflected a limited set of mental health symptoms, rather than a more comprehensive assessment of mental health status as other instruments like the Structured Clinical Interview for DSM Disorders would have allowed. We did not measure other potentially correlated health-related characteristics such as psychiatric diagnosis or pharmacological treatment, sexually transmitted infection experience or chronic disease history, which may have been important confounders. We relied upon potentially biased self-reported measures of contraceptive behavior. On the other hand, our frequent assessments of contraceptive use may have influenced women's responses, though we found no evidence of such effects in a separate analysis [42]. Additionally, we did not examine specific contraceptive behaviors (e.g. missed pills, episodes of condom breakage, method use during their hormone-free intervals, delayed injections or dates of IUD/implant removals), which may have over- or underestimated consistent use of certain methods. Interpretations of failure to use methods at every intercourse are not entirely clear, especially for long-acting methods. Small sub-sample sizes for long-acting and other hormonal methods prevented adequate analysis of these data. Finally, findings from our sample of women 18-20 years old may have limited generalizability for adult populations.

## 5. Conclusion and Implications

Our study has shown that young women with elevated depression and stress symptoms appear to be at risk for inconsistent contraceptive use patterns, especially for the most common methods that require greater user effort and diligence. Based upon these findings which suggest that mental health status appears to be an important factor in women's contraceptive behavior, clinicians should assess and even address women's psychological and emotional status when helping patients with contraceptive decision-making and management. User-dependent contraceptive method efficacy may be an especially important topic for patient education and counseling sessions among women with mental health symptoms. Providers can also help patients make the most effective method choices that are tailored to their individual, dynamic psychosocial circumstances. Women with stress or depression may be ideal candidates for long-acting reversible methods, which offer highly effective options with less user-related adherence concerns. In future research, more frequent and comprehensive psychological measurements can provide greater understanding of how young women's dynamic mental health symptoms impact family planning behaviors and outcomes over time.

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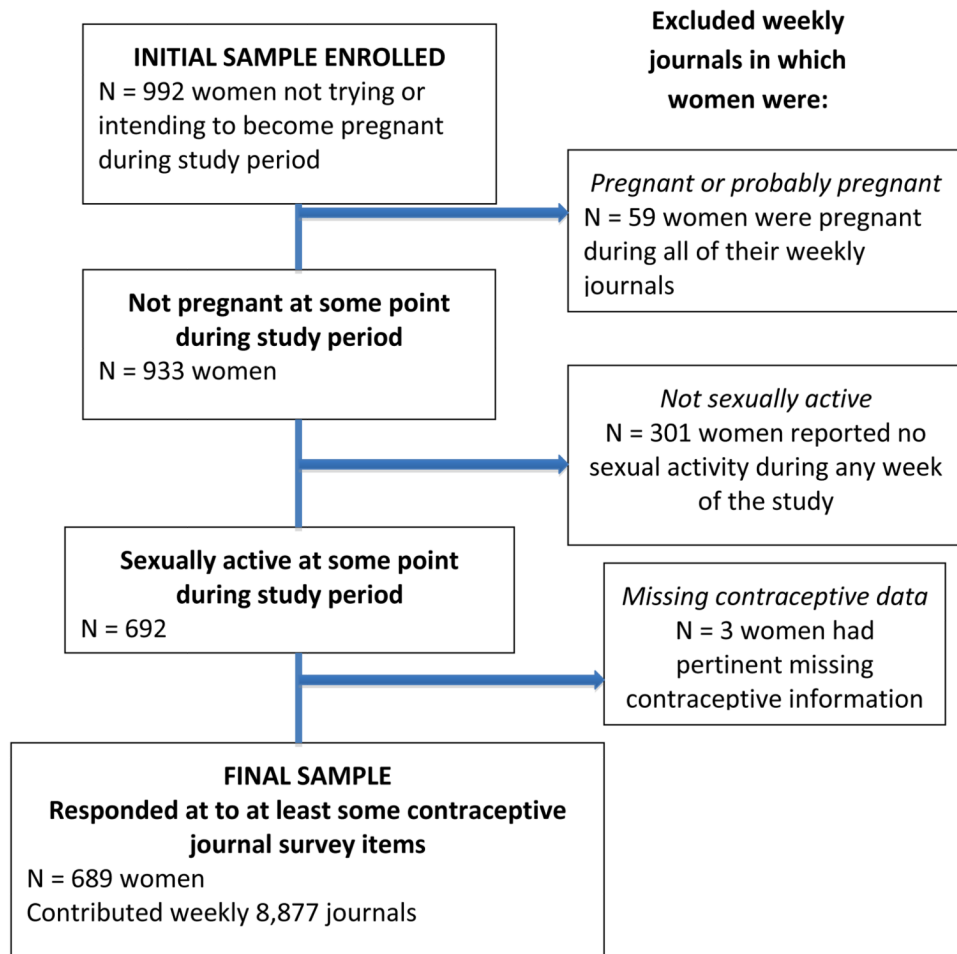


Figure 1. Selection of the Sample

**Table 1**  
**Weekly consistency of contraceptive use by women's baseline sociodemographic characteristics and mental health symptoms**

	Proportion of weeks of consistent versus inconsistent contraceptive use (N=8,877)		
	Weekly consistent contraceptive use n=6,351, 72%	Weekly inconsistent contraceptive use n=2,526, 28%	
<b>Baseline characteristics (N=689 women)</b>	<b>%</b>	<b>%</b>	<b>p-value</b>
Age			<0.001
18 years (n=291, 43%)	71	29	
19 years (n=340, 49%)	69	31	
20 years (n=58, 8%)	86	14	
Race/ethnicity			<0.001
Non-Hispanic White (n=397, 58%)	74	26	
Non-Hispanic Black (n=218, 32%)	64	35	
Hispanic (n=58, 8%)	75	24	
Asian/Other (n=16, 2%)	64	36	
Educational enrollment			<0.001
Not enrolled (n=162, 24%)	64	36	
Still in high school (n=90, 13%)	63	37	
2 year college (n=201, 29%)	72	28	
4 year college (n=174, 25%)	85	15	
High school drop-out (n=62, 9%)	52	48	
Employment status			<0.001
Employed (n=354, 51%)	78	22	
Unemployed (n=335, 49%)	64	36	
Receiving public assistance			<0.001
Yes (n=191, 28%)	62	38	
No (n=498, 72%)	74	26	
Frequency of religious service attendance			<0.001
Never (n=156, 23%)	77	23	
< weekly (n=386, 56%)	68	32	
weekly (n=147, 21%)	75	25	
Relationship status			<0.001
Married (n=13, 2%)	79	21	
Engaged (n=62, 9%)	60	40	
Special romantic relationship (n=390, 57%)	74	26	
Physical/emotional contact (n=120, 17%)	65	35	

	Proportion of weeks of consistent versus inconsistent contraceptive use (N=8,877)		
	Weekly consistent contraceptive use n=6,351, 72%	Weekly inconsistent contraceptive use n=2,526, 28%	
<b>Baseline characteristics (N=689 women)</b>	%	%	p-value
None (n=104, 15%)	74	26	
Cohabitation status			<0.001
Cohabiting (n=145, 21%)	63	37	
Not cohabiting (n=544, 79%)	74	26	
Age at first vaginal intercourse			<0.001
No sex at enrollment (n=62, 9%)	79	21	
< 14 years (n=138, 20%)	63	37	
15-16 years (n=289, 42%)	71	29	
17 years (n=200, 29%)	77	23	
Lifetime number of sexual partners			<0.001
0 (n=62, 9%)	79	21	
1 (n=134, 20%)	81	19	
2 (n=106, 15%)	72	28	
3 (n=118, 17%)	74	26	
4 (n=269, 39%)	63	37	
Pregnancies			<0.001
0 (n=519, 75%)	75	25	
1 (n=113, 16%)	61	39	
2 (n=57, 8%)	58	42	
<b>Baseline psychological symptoms</b>			
Depression symptoms			<0.001
Moderate/severe symptoms 4pts CES-D (n=185, 27%)	64	36	
<4 pts CES-D (n=504, 73%)	74	26	
Stress symptoms			<0.001
Moderate/severe symptoms 9pts PSS-4 (n=173, 25%)	60	40	
<9 pts PSS-4 (n=516, 75%)	75	25	

Results are presented as proportions of weeks of consistent versus inconsistent contraceptive use across baseline sociodemographic groups and moderate/severe psychological symptoms. Consistent contraceptive use defined as reported use of a contraceptive method during every act sexual intercourse in the past week. P-values from unadjusted chi-square tests all significant at alpha <0.001. Center for Epidemiologic Studies – Depression Scale (CES-D). Perceived Stress Scale - 4 (PSS-4).

**Table 2**  
**Associations between baseline depression symptoms and weekly consistency of contraceptive use**

Baseline depression symptoms	The odds of weekly consistency of contraceptive use OR (95% CI)	
	Full model	Reduced model
No depression symptoms	1	1
Moderate/severe depression symptoms	0.66 (0.38-1.12)	0.53 (0.31-0.91)
<b>Sociodemographic and reproductive covariates</b>		
Age		x
18 years	1	
19 years	0.69 (0.41-1.13)	
20 years	1.73 (0.69-4.32)	
Race/ethnicity		x
White	1	
Black	0.75 (0.42-1.34)	
Hispanic	1.20 (0.50-2.91)	
other	0.67 (0.15-3.03)	
Education enrollment		
Not enrolled	1	1
Still in high school	1.77 (0.78-4.01)	2.02 (0.90-4.53)
2-year college	2.20 (1.16-4.18)	2.27 (1.19-4.32)
4 year college	5.27 (2.60-10.69)	6.49 (3.20-13.04)
High school drop-out	0.84 (0.33-2.09)	0.71 (0.29-1.75)
Employment status		
Unemployed	1	1
Employed	2.67 (1.64-4.37)	2.87 (1.77-4.66)
Receiving public assistance		x
No	1	
Yes	0.98 (0.53-1.79)	
Frequency of religious service attendance		
Never	1	x
< weekly	0.60 (0.33-1.08)	
weekly	0.74 (0.35-1.59)	
Cohabitation status		x
Not cohabitating	1	
Cohabitating	0.61 (0.33-1.14)	
Age at coitarche		x

The odds of weekly consistency of contraceptive use OR (95% CI)		
Baseline depression symptoms	Full model	Reduced model
No sexual intercourse experience at enrollment	1	
< 14 years	0.80 (0.27-2.37)	
15-16 years	1.13 (0.43-3.00)	
17 years	1.19 (0.45-3.10)	
Lifetime number of sexual partners	0.95(0.91-1.00)	x
Number of pregnancies		x
0	1	
1	0.65 (0.33-1.30)	
2	0.49 (0.20-1.24)	

N=689 women; 8,877 weeks. Results are presented as odds ratios (OR) with 95% confidence intervals (CI) from multivariable logistic regression illustrating the effect of baseline moderate/severe depression symptoms on weekly consistency of contraceptive use. All regression models with random effects for woman and controlling for number of journal completed. (x) indicates not significant and not included in reduced final models. Center for Epidemiologic Studies – Depression Scale (CES-D). No depression symptoms = <4 points on CES-D and moderate/severe depression symptoms - 4points CES-D.

**Table 3**  
**Associations between baseline psychological stress symptoms and weekly consistency of contraceptive use**

Baseline stress symptoms	The odds of weekly consistency of contraceptive use OR (95% CI)	
	Full model	Reduced model
No stress symptoms	1	1
Moderate/severe stress symptoms	0.34 (0.20-0.59)	0.31 (0.18-0.52)
<b>Sociodemographic and reproductive covariates</b>		
Age		x
18 years	1	
19 years	0.70 (0.42-1.15)	
20 years	1.61 (0.65-4.00)	
Race/ethnicity		x
White	1	
Black	0.76 (0.43-1.35)	
Hispanic	1.24 (0.52-2.97)	
other	0.56 (0.13-2.55)	
Education enrollment		
Not enrolled	1	1
Still in high school	1.62 (0.72-3.66)	1.89 (0.81-4.43)
2-year college/vocational/technical	1.97 (1.03-3.72)	2.10 (1.07-4.16)
4 year college	4.77 (2.36-9.62)	7.18 (3.70-16.53)
High school drop-out	0.80 (0.32-1.97)	0.47 (0.18-1.23)
Employment status		
Unemployed	1	1
Employed	2.71 (1.67-4.41)	2.90 (1.81-4.71)
Receiving public assistance		x
No	1	
Yes	0.86 (0.47-1.58)	
Frequency of religious service attendance		
Never	1	x
< weekly	0.55 (0.31-1.00)	
weekly	0.79 (0.37-1.69)	
Cohabitation status		x
Not cohabitating	1	
Cohabitating	0.60 (0.32-1.12)	
Age at coitarche		x

The odds of weekly consistency of contraceptive use OR (95% CI)		
Baseline stress symptoms	Full model	Reduced model
No sexual intercourse experience at enrollment	1	
< 14 years	0.91 (0.31-2.68)	
15-16 years	1.19 (0.45-3.11)	
17 years	1.31 (0.51-3.40)	
Lifetime number of sexual partners	0.96 (0.91-1.01)	x
Number of pregnancies		x
0	1	
1	0.68 (0.34-1.36)	
2	0.48 (0.19-1.19)	

N=689 women; 8,877 weeks. Results are presented as odds ratios (OR) with 95% confidence intervals (CI) from multivariable logistic regression illustrating the effect of baseline moderate/severe stress symptoms on weekly consistency of contraceptive use. All regression models with random effects for woman and also controlling for number of journal completed. (x) indicates not significant and not included in reduced final models. Perceived Stress Scale - 4 (PSS-4). No stress symptoms = <9 points PSS-4 and moderate/severe stress symptoms = 9 points PSS-4.



**Table 4**  
**Associations between baseline depression and stress symptoms on weekly consistency of contraceptive use, stratified by contraceptive method**

Weeks of contraceptive method use (by most effective method) (n=7,999 weeks, 689 women)	The odds of using each contraceptive method consistently each week among women with mental health symptoms OR (95% CI)	
	Depression symptoms	Stress symptoms
<b>Non-coital methods</b> (n=4,304)	0.58 (0.30-1.15)	0.34 (0.17-0.65)
Long-acting methods (Intrauterine device, injectable or implant) (n=571)	0.72 (0.19-2.73)	0.50 (0.14-1.83)
Oral contraceptives (n=3,537)	0.57 (0.25-1.30)	0.27 (0.12-0.58)
Patch or Ring (n=195)	1.10 (0.75-16.71)	0.32 (0.02-4.84)
<b>Coital methods</b> (n=3,695)	0.69 (0.38-1.25)	0.32 (0.18-0.57)
Condoms (n=2,128)	0.69 (0.39-1.21)	0.40 (0.23-0.69)
* Other coital methods (n=106)	0.06 (0.01-1.05)	0.12 (0.01-1.48)
Withdrawal (n=1,366)	0.29 (0.65-1.28)	0.12 (0.03-0.50)

Results are presented as odds ratios (OR) with 95% confidence intervals (CI) from multivariable logistic regression illustrating the effect of baseline moderate/severe depression and stress symptoms on weekly consistency of contraceptive use (coded 1) stratified by type of contraceptive method where inconsistent use of each method is the reference category (coded 0). Regression models are reduced models with random effects for woman and controlling for number of journals complete, educational enrollment and employment status. Contraceptive method use is top-coded to the most effective method reported each week. Long-acting methods include the IUD, contraceptive injectable, or implant.

\* Other coital methods includes diaphragm/cervical cap, spermicide, female condom, emergency contraception (EC), rhythm calendar method or other non-specified method