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An Exploratory Analysis of Associations Between Eating Disordered Symptoms, Perceived Weight Changes and Oral Contraceptive Discontinuation Among Young Minority Women

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Abstract

Purpose—To explore associations between eating disordered (ED) symptoms, perceived oral contraceptive (OC)-related weight changes and OC discontinuation among young minority women.

Methods—We conducted a prospective sub-study of a randomized controlled trial evaluating the impact of pill pack supply (three vs. seven months) on OC continuation among young urban women presenting to a university-affiliated community-based family planning clinic for OC management. Participants (n=354) were adolescent (n=173) and young adult (n=181) women ages 13 to 24 years, predominantly underinsured and largely Hispanic (92%). We conducted a structured baseline interview which included an ED screening instrument. At six months, we

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Implications and Contribution: Young, urban, minority women with eating disordered symptoms and perceived oral contraceptive-related weight changes may be at risk for oral contraceptive discontinuation.

conducted a telephone interview to determine OC continuation and dimensions of perceived OC-related weight changes over the study period.

Results—At baseline, 24% of subjects fulfilled the moderate/severe ED symptom screen criteria (n=60). By 6 months, 57% of the sample (n=200) reported weight changes and 62% (n=218) had discontinued OC use. Unadjusted discontinuation rates were similar across age and ED symptom groups. In multivariate analysis, both ED symptoms (OR 0.49, CI 0.25—0.96, p=0.04) and perceived weight changes (OR 0.60, CI 0.38—0.94, p = 0.03) were negatively associated with OC continuation.

Conclusions—ED symptoms and perceived weight changes were associated with an increased likelihood of OC discontinuation among these young women. Reproductive health practitioners should consider psychological symptoms when managing OC.

Keywords

eating disorder; oral contraceptives; perceived side effects; weight gain; discontinuation

Introduction

More than 80% of the over 800,000 annual pregnancies among U.S. adolescents are unintended [1-5]. Young minority women, including Hispanic women, have a two-to-three-fold higher unintended pregnancy rate than Caucasian women [4]. Although 60% of sexually active adolescents use oral contraceptives (OCs) [1,6,7], up to 60% will discontinue by six to twelve months [7]. Half of all unintended pregnancies are due to pill discontinuation [6-13].

The most frequently reported reasons for discontinuation are perceived side effects of OC, especially weight gain [8-12]. In fact, adolescents who worry about OC-related body weight changes alone are at risk for discontinuation [8]. Among a racially-diverse group of 209 sexually-active OC-initiators, adolescents who expressed concern over weight gain at study onset had a 15% lower three-month compliance rate than those without weight concerns [8]. Even without measured weight change, OC-users who self-reported weight gain during the study had a 23% lower compliance rate [8].

Concerns about OC-attributed weight changes may be even more prevalent among young women with unhealthy eating behaviors. While eating disorders (ED) are the third most common chronic health problem among all adolescents [13], national surveys suggest that over 90% of girls report body dissatisfaction and nearly half restrict their diet to control body weight [13].

Young women, particularly adolescents, have been shown to exhibit other unhealthy behaviors including sexual risk behavior and medication non-compliance. ED symptoms predict early onset of sexual activity, condom nonuse and misuse, increased number of partners and acquisition of sexually transmitted infections [14,15]. In a cross-sectional study of 76 young Caucasian females with type one diabetes mellitus and preclinical ED attitudes, 30% reported self-adjusting insulin doses to facilitate weight loss [16]. Halmi et al found a 56% discontinuation rate for antidepressant therapy among 122 Caucasian adolescents with anorexia nervosa [17].

In addition to risky health behaviors, ED patients exhibit a magnified fear and distorted perception of weight gain [18]. Whether ED symptoms also amplify perceived OC-attributed weight changes and hinder OC use is unknown. We conducted an exploratory analysis of associations between ED symptoms, perceived weight changes and OC

discontinuation among a cohort of minority urban adolescent and young adult women participating in a larger OC behavior intervention trial.

Materials and Methods

Sample and Setting

Data for this prospective cohort study was collected as part of a randomized trial evaluating the impact of OC pill pack supply on six-month OC continuation rates among urban family planning patients. The trial was conducted between December 2006 and September 2009 at a university-affiliated community-based clinic in New York City, which serves a predominantly Latina population. We randomly assigned participants to either a conventional three-month supply or an enhanced (seven-month) OC supply. A detailed description of the intervention and primary outcomes of the larger trial is reported elsewhere [19]. The Institutional Review Board of Columbia University Medical Center approved this research and all participants gave informed consent prior to participation. Parental consent was not required of minors for sexual and reproductive health care under New York State law.

Women ages 13 to 35 years presenting to the clinic requesting OCs were eligible to participate in the primary trial. Potential participants were excluded if they had 1) contraindications to OC; 2) a desired pregnancy within six months; or 3) intended to leave the area within six months. The sample of analysis for the present sub-study was limited to adolescent and young adult participants, ages 13 through 24 years.

Study Procedures

After screening for eligibility and obtaining informed consent, study staff administered a structured baseline interview. Information obtained included demographic and social characteristics, self-reported height and weight, and reproductive and contraceptive histories. The baseline interview also included the Eating Disorder Screen for Primary Care (ESP [20], a standardized instrument to screen for ED symptoms in non-psychiatric settings. Subjects respond yes or no to five questions on ED thoughts and behaviors. A score of two or more positive answers is considered high, denoting moderate symptoms predictive of an ED. The ESP has demonstrated 100% sensitivity and 71% specificity in non-psychiatric adult populations [20].

Participants in the primary trial were stratified by age (<18 years or ≥18 years) and insurance status (uninsured or Medicaid/private insured) and then randomized to receive either a three-month standard of care supply or enhanced seven-month OC supply. Participants saw a clinician and received routine care per clinic protocols, including relevant history, targeted physical examination, pregnancy and other lab testing as indicated, instructions for revisits, and standardized pill-taking instructions. All study materials were available in English and Spanish and study staff was bilingual.

We interviewed subjects by telephone at six months to assess OC use over the study period, pregnancy since last interview, adverse events, and symptoms considered OC side effects including weight changes.

We asked about dimensions of weight change occurring with OC use using questions from our previous contraceptive studies [21]. Items included: whether participants had experienced weight changes during the study (occurrence); whether the change was an increase or decrease (type); whether it was a little, some, or a lot of change (severity); whether it was a good, bad, or neither change (quality); whether changes were attributed directly to OC use (OC-attributed). Responses to occurrence, type, and OC-attributed

dimensions were dichotomous variables. Responses to severity and quality were categorical variables on a three-point Likert scale.

We classified participants as OC continuers or discontinuers based on responses at the six-month interview. We defined OC continuation as having taken a pill the past seven days. Women who had not taken any OC for greater than seven days prior to the interview (not including nonuse of placebo pills) were considered OC discontinuers. The seven-day threshold was based upon sensitivity analyses from a previous trial and pilot studies [21].

Data Analysis

We used descriptive statistics to report rates of ED symptoms, reported weight changes and OC continuation and to compare adolescents (ages 13-19 yrs) and young adults (20-24 yrs) on all study variables. We used t-tests and χ^2 tests as appropriate. We conducted multiple variable analyses with logistic regression. Two-sided significance tests were used throughout. The following relationships were assessed: 1) proportions of ED symptoms at baseline and proportions of OC continuation at six months; 2) proportions of ED symptoms at baseline and proportions of reported weight changes at six months; 3) proportions of reported weight changes and OC continuation at six months. Baron and Kenny's technique [22] was used to explore any mediation effect of reported weight changes (overall or by dimension) on ED symptoms and OC continuation. Results are presented as adjusted odds ratios with 95% confidence intervals. An alpha of 0.05 was considered significant. All data were analyzed using SPSS 18.0 software (Chicago, IL).

Results

The primary trial enrolled 700 women, including 474 adolescents and young adults. The six-month follow-up rate was 75%, providing a final sample of 354 (173 adolescents and 181 young adults). Table 1 presents baseline characteristics of the total sample enrolled compared to participants with and without 6-month follow-up data. There were no significant differences in demographic, social and reproductive history characteristics between participants with and without follow-up data, except for body mass index (BMI) category. A greater percentage of those in the final sample were overweight (BMI 25-29.9) ($n = 89$, 25%) compared to those lost to follow-up ($n = 15$, 13%) ($p = 0.01$).

Of the 354 adolescents and young adults in the final sample, the first 105 enrollees did not complete the ESP. This was a function of timing of Institutional Review Board approval for the sub-study and insertion of the ESP into the baseline questionnaire coinciding with onset of enrollment for the larger trial. This left 249 subjects with ED data available. Subjects who completed the ESP were compared to subjects who did not complete the ESP and no significant differences were found between the two groups on any baseline demographic, social or reproductive history characteristics. Thus, the final sample was comprised of all 354 participants.

Participants were predominantly Hispanic (92%), underinsured, and approaching overweight (average self-reported BMI 24.50 ± 5.00). Almost half (46%) reported prior OC use; of these 25% had stopped pill use due to side effects.

A summary of participant responses to the five ESP questions is given in Table 2. ESP scores ranged from 0 to 4, with the average participant reporting less than one ED symptom (mean $0.88 \pm$ standard deviation 0.52). Sixty participants (24%) met criteria for moderate/severe ED symptoms, scoring two or more points. Adolescents and young adults had similar ESP scores (0.97 ± 0.9 versus 0.79 ± 0.9 , $p = 0.13$) and rates of ED symptoms (22% versus 26%, $p = 0.52$).

Over half of participants (57%, $n = 200$) reported weight changes at six months, with similar proportions between the two age groups ($p = 0.42$). Proportions of reported weight change was also similar for those with moderate/severe (62%) and low ED symptom scores (59%) ($p = 0.74$).

For weight change dimensions, reported weight gain (68%, $n = 135$) was more common than weight loss (32%, $n = 65$), as was “a little” weight change (52%, $n = 104$) rather than “some” (22%, $n = 44$) or “a lot” (26%, $n = 52$). A majority of respondents qualified the weight change as “bad” (51%, $n = 79$) and attributed the weight change to the pill (51%, $n = 102$). There were no significant differences in any dimension of reported weight change between age groups or by ED symptom score.

Only 38% of participants ($n=136$) were still using OCs at six months; proportions of OC continuation were similar among adolescents and young adults ($p = 0.45$). Unadjusted associations between ED symptoms, perceived weight changes, sociodemographic factors and OC continuation are presented in Table 3. A non-significant negative trend between ED symptoms and continuation was observed, with women reporting ED symptoms having lower proportions of continuation than those without ED symptoms (30% versus 42%, $p = 0.09$). Participants with reported weight changes had lower proportions of continuation than those without changes (34% versus 45%, $p = 0.03$), but there were no differences in any dimension of weight change experienced between OC continuers and discontinuers (p -values for dimensions range 0.09-0.66, not shown).

Final multiple logistic regression results are presented in Table 4. Education ($p=0.02$), BMI (0.05) and treatment assignment ($p<0.001$) were included as significant covariates. Both ED symptoms and reported weight changes were associated with OC continuation. Participants with moderate/severe ED symptoms (ESP score ≥ 2 points) were 51% less likely to continue OC use at 6 months (OR 0.49, CI 0.25-0.96, $p = 0.04$) than participants without ED symptoms. Participants reporting weight changes overall (OR 0.60, CI 0.38-0.94, $p = 0.03$), weight gain (OR 0.60, CI 0.36-0.99, $p = 0.04$) and “a lot” of weight change (OR 0.47, CI 0.23-0.97, $p = 0.04$) were also less likely to continue OCs than those without these weight changes.

No associations were found between ED symptoms and reported weight changes (OR 1.07, CI 0.57-2.01, $p = 0.82$, not shown in Tables). We applied Baron and Kenny’s model to test for a potential mediation effect of reported weight changes (overall and by dimension) on relationships between ED symptoms and OC continuation. Since the point estimates and p -value for ED symptoms were the same with and without controlling for perceived weight changes overall (OR 0.49, $p = 0.04$), weight changes did not meet criteria for mediation; the significant effect of ED symptoms on OC discontinuation remained the same. This was also the case for all specific dimensions of weight change.

Discussion

The proportion of OC discontinuation at six months was high among this predominantly Hispanic adolescent and young adult sample (62%), and especially so for young women with ED symptoms (70%). Participants with elevated ED symptoms were less likely to continue OCs compared to women without symptoms ($p = 0.04$). However, participants with elevated ED symptoms were not more likely to report weight changes ($p = 0.82$), and weight changes did not mediate the relationship between ED symptoms and OC continuation in the regression analysis. While we are not aware of any similar existing studies of ED symptoms and OC continuation, these preliminary findings suggest that ED symptoms may negatively influence contraceptive behavior.

Patients with ED may mistakenly believe they are not at risk for pregnancy due to amenorrhea or irregular menses [23]. Higher rates of delayed menarche, amenorrhea, polymenorrhea, and irregular menstruation have been associated with ED symptoms in adolescent populations [24,25], which may increase the risk for contraceptive non- or misuse.

Unintended pregnancy in patients with ED can result in significant negative outcomes. Malnourishment from ED can affect pelvic structure development during early adolescence and lead to obstetric complications [26]. Patients exhibiting ED symptoms during pregnancy may have increased risk for low birth weight, preterm labor, and perinatal mortality [27-29]. Researchers have noted high rates of therapeutic abortion in ED patients [27]. Psychologically, pregnancy can magnify ED symptoms [30-32]. Worries about weight and body image can worsen during the ante- and post-partum periods [33,34]. The time immediately following delivery may be the most vulnerable [27,35,36], when psychological stressors of new motherhood are prevalent and body image concerns are intensified [37].

Previous research, including several of our studies, have supported our findings that OC-using women with perceived weight gain are at increased risk for discontinuation [10-12,20]. Yet researchers who have found associations between women's reports of weight gain and OC discontinuation have failed to find measured weight increases for those women [8, 11,12,38-40]. Unfortunately we did not examine measured weight gain. Additionally, given the design of our study and cross-sectional measurement of both perceived weight changes and OC continuation at six month, we can only comment on the associations between perceived weight gain and the likelihood of OC discontinuation. These results do not reflect other reasons why participants may have perceived side effects or discontinued their OC; factors contributing to their OC use patterns are likely multifaceted and complex. Future studies can more comprehensively assess a range of biopsychosocial factors, including objectively measured body weights, which may influence psychological symptoms and OC behavior.

Findings from this Hispanic, inner-city convenience sample may not be generalizable to other populations and settings, especially where the incidence of ED symptoms may be higher. Our screening measure for ED symptoms assesses only five symptoms of EDs and does not distinguish between anorexic, bulimic or other disordered eating symptomatology. The ESP has largely been used in adult primary care settings and less is known about its effectiveness as a screening tool among adolescents or Hispanic women [20]; thus, misclassification bias may be of concern for this study. Moreover, with a high sensitivity and low specificity [20], we may have overestimated women screening positive for ED symptoms which would influence our ability to detect significant associations.

Perceived weight changes and OC continuation at six months were also self-reported, which can lend to poor recall and bias. Our OC continuation measurement may have limited sensitivity given that it did not fully reflect misuse, restarts, gaps with pill switching and other patterns that may place women at risk for unintended pregnancy. Similarly, our six-month assessment of perceived weight change is somewhat imprecise, although we were able to capture dimensions of weight side effects that have not been previously described in relation to ED symptoms and OC use. While the analysis was prospective in nature, the sub-study was designed after the larger randomized trial was launched. Cross-sectional measurement of individual variables limited our ability to assess temporal relationships, particularly between perceived weight changes and OC discontinuation at six months. Finally, the study as designed limited power to fully investigate independent associations between variables, although the small sample size was appropriate for such an exploratory analysis.

Despite these limitations, our exploratory study suggests that young women's ED symptoms may influence their perceptions of weight change and OC continuation, which has implications for risk of unintended pregnancy and its long-term physiologic and psychological consequences. While further study on the relationships between ED, perceived weight changes and OC use is warranted, reproductive health settings offer a front-line opportunity to provide screening and referral for ED. In addition to ED assessment, clinicians prescribing OCs should elicit detailed information on OC use and any experiences with symptoms or side effects. Clinicians can also consider women's knowledge, attitudes and beliefs about hormonal contraception when providing method counseling and initiation. Specifically, clinicians can work to dispel myths about OC-attributed weight gain and educate women on other biopsychosocial factors that may be associated with weight changes. Ultimately, clinicians should consider psychological symptoms when developing contraceptive education and counseling strategies and when managing OC.

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Table 1

Baseline Demographic, Social and Reproductive Characteristics of the Final Sample and Participants Lost to Follow-up

	All Enrolled Participants (N = 474)	Participants Completed 6- Mth Follow-up (N = 354)	Participants Lost to Follow-up (N = 120)	X ²	T-test	P-value
Age Group						
Adolescents (aged 13-19yrs)	227 (48%)	173 (49%)	54 (45%)	0.54		0.46
Young Adults (aged 20-24yrs)	247 (52%)	181 (51%)	66 (55%)			
Randomization Group						
Treatment	224 (47%)	171 (48.3%)	53 (44.2%)	0.62		0.43
Control	250 (53%)	183 (51.7%)	67 (55.8%)			
Insured (yes)	203 (43%)	152 (43%)	51 (43%)	0.58		0.45
Medicaid Insurance (yes)	184 (39%)	133 (38%)	51 (43%)	0.24		0.63
Education # Years Completed	11.70 ± 1.89	11.70 ± 1.88	11.60 ± 1.91		0.18	0.86
Tobacco Use Past 30 Days (yes)	58 (12%)	46 (13%)	12 (10%)	0.75		0.39
BMI by Category				9.38		0.01
Normal/underweight (BMI<25)	305 (64%)	215 (61%)	90 (75%)			
Overweight (BMI 25-29.9)	104 (22%)	89 (25%)	15 (13%)			
Obese (BMI>30)	54 (11%)	41 (16%)	13 (11%)			
Age at First Sex	15.0 ± 2.36	15.90 ± 2.29	15.90 ± 2.56		0.03	0.98
Ever Pregnant (yes)	186 (39%)	137 (39%)	49 (41%)	0.17		0.68
Previous OC User (yes)	220 (46%)	163 (46%)	57 (48%)	0.08		0.78
Main Sexual Partner (yes)	449 (95%)	338 (96%)	111 (93%)	1.59		0.21

Results reported as frequencies with percentages or means (M) ± standard deviations (SD). Statistical comparisons by X² = Pearson's Chi-square or T-test = independent samples student's T-test. Statistically significant at alpha <0.05 and <0.01. BMI = body mass index in kg/m². 11 enrolled subjects and 9 in final sample did not report BMI.

Table 2

Summary of Participant Responses to the Eating Disorder Screen for Primary Care (ESP)

RESPONSES	YES	NO
(N = 249) ESP QUESTIONS (Eating Disordered Symptoms)	n (%)	n (%)
1. Are you satisfied with your eating patterns?	180 (72%)	69 (28%)
2. Does your weight affect the way you feel about yourself?	117 (47%)	132 (53%)
3. Do you ever eat in secret?	12 (5%)	237 (95%)
4. Have any members of your family suffered with an eating disorder?	16 (6%)	233 (94%)
5. Do you currently suffer with or have you ever suffered in the past with an eating disorder?	6 (2%)	243 (98%)

Results are proportions of participant responses, presented as frequencies with percentages. A “yes” to question numbers 2-5 is considered abnormal. A “no” to question number 1 is abnormal.

Table 3

Unadjusted associations between ED symptoms, perceived weight changes, sociodemographic factors and oral contraceptive continuation

OC Continuation Status at 6-Months	OC Continuers (N = 136, 38%)	OC Discontinuers (N = 218, 62%)	X ²	T-test	P-value
ED symptoms (2 pts ESP)	18 (18%)	42 (28%)	2.90		0.09
Perceived weight changes (yes)	67 (33%)	133 (67%)	4.72		0.03
Age group			0.57		0.45
Adolescents (aged 13-19 years)	63 (46%)	110 (50%)			
Young adults (aged 20-24 years)	73 (54%)	108 (50%)			
Randomization group			11.20		<0.001
Treatment	81 (60%)	90 (41%)			
Control	55 (40%)	128 (59%)			
Insured (yes)	54 (40%)	98 (45%)	0.94		0.33
Medicaid (yes)	49 (36%)	84 (39%)	0.22		0.64
Highest Level of Education (grades)	11.95 ± 1.68	11.51 ± 1.99	-2.15		0.03
Tobacco Use Past 30 Days (yes)	13 (10%)	33 (15%)	2.31		0.13
BMI by Category					
Normal/underweight (BMI<25)	77 (57%)	138 (63%)	0.63		0.73
Overweight (BMI 25-29.9)	36 (27%)	53 (24%)			
Obese (BMI>30)	16 (12%)	25 (12%)			
Age at First Sex (years)	16.13 ± 2.50	15.8 ± 2.15		-1.42	0.16
Ever Pregnant (yes)	57 (42%)	80 (36.7%)	0.96		0.33
Previous OC User (yes)	70 (52%)	93 (43%)	2.62		0.11
Main Partner (yes)	132 (97%)	206 (96%)	1.28		0.26

Results reported as frequencies with percentages or means (M) ± standard deviations (SD). Statistical comparisons from X² = Pearson's Chi-square or independent samples student's T-test Statistically significant at alpha <0.05, <0.01, or <0.001. OC = oral contraception. BMI = body mass index in kg/m². Nine subjects did not report BMI. ESP – Eating Disorder Screen for Primary Care.

Table 4

Final Multiple Logistic Regression Results on Relationships Among Eating Disordered Symptoms, Perceived Weight Changes and Oral Contraceptive Continuation

Predictors variables	aOR	95% CI	P
ED Symptoms			
None/low (ESP <2-pts)	ref		
Moderate/severe (ESP ≥ 2-pts)	0.49	0.25-0.96	0.04
Weight Changes			
None	ref		
Reported changes	0.60	0.38-0.94	0.03
Weight Change Dimensions*			
Type of Weight Change			
None	ref		
Gain	0.60	0.36-0.99	0.04
Loss	0.60	0.31-1.14	0.12
Severity of Weight Change			
None	0.63	0.37-1.09	0.10
Little	0.67	0.37-0.09	0.10
Some	0.67	0.32-1.42	0.30
A Lot	0.47	0.23-0.97	0.04
Quality of Weight Change			
None	ref		
Good	1.00	0.55-1.83	1.00
Bad	0.74	0.42-1.32	0.31
Attribution of Weight Change			
Other reasons	ref		
To pill	0.97	0.59-1.60	0.90
Education (# Grades Completed)	1.24	1.04-1.48	0.02
BMI category			
Normal Weight	ref		
Overweight	1.88	0.99-3.58	0.05
Obese	2.17	0.89-5.22	0.09

Results are presented as adjusted odds ratios with 95% confidence intervals from the final multiple logistic regression model with oral contraceptive continuation (OC) as the outcome. Alpha <0.05 is considered significant. Variables from bivariate tests were tested in multivariable models and only those significant were included in final model: education (continuous) and randomization group which was significant at alpha <0.001. Weight changes overall and by dimensions were entered into separate OC continuation models; ED symptoms and covariate point estimates stable in all models. BMI = body mass in kg/m² index. (ED) eating disorder = ≥ 2 pts on the Eating Disorder Screen for Primary Care (ESP) (Cotton et al., 2003). BMI categories are based upon self-reported height and weight: normal/under weight (BMI < 25), overweight (BMI 25-29.9) and obese (BMI ≥ 30).a