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Eating disorders and disordered eating behaviors among women: associations with sexual risk

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Abstract

Purpose: To evaluate the association between eating disorders or disordered eating behaviors and sexual risk in young women.

Methods: We used prospective cohort data of young women ages 18-26 from the National Longitudinal Study of Adolescent to Adult Health (N=5,931). Exposures of interest (at 18-26 years) included a self-reported eating disorder diagnosis or disordered eating behaviors including fasting/skipping meals, vomiting, diet pills, or laxative/diuretic use to lose weight and binge eating. Sexual risk outcomes at seven-year follow-up included number of new sexual partners, condom use, and sexually transmitted infections (STIs).

Results: Having either an eating disorder or reporting any disordered eating behavior was associated with greater number of new sexual partners (B=1.09, 95% CI 0.18-2.00) and lower odds of condom use (OR .70, 95% CI .53-.94 among a subsample of sexually active, unmarried women). However, purging behaviors (vomiting or laxative/diuretic use) were associated with fewer new sexual partners (B=−1.97, 95% CI −3.83- −.11).

Conclusions: Young women with eating disorders or who engage in disordered eating behaviors are at higher risk for multiple new sexual partners and unprotected sex. Clinicians caring for young adults with eating disorders may consider screening for sexual risk behaviors.

Keywords

eating disorder; young adult; sexually transmitted diseases; sexual partners; weight loss

Introduction

An estimated 11% of young adults report disordered eating behaviors such as vomiting, fasting, skipping meals, or laxative/diuretic use to lose weight and 2% report being diagnosed with an eating disorder in nationally representative surveys of the US, such as the

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National Longitudinal Study of Adolescent to Adult Health (Nagata, Garber, Tabler, Murray, & Bibbins-Domingo, 2018b). Young women disproportionately engage in disordered eating behaviors compared to young men (Stephen, Rose, Kenney, Rosselli-Navarra, & Weissman, 2014). Eating disorders and disordered eating behaviors are associated with depression (Neumark-Sztainer, Wall, Larson, Eisenberg, & Loth, 2011), cardiometabolic risk factors (Nagata et al., 2018), and several risk behaviors including alcohol use (Fouladi et al., 2015), tobacco use (Solmi et al., 2016), and illicit drug use (Baker et al., 2018).

There is increasing evidence that risky health behaviors, which can include disordered eating, substance use, and sexual risk behaviors tend to cluster together (Hingson & Zha, 2018; Mewton et al., 2019). Sexual risk behaviors that may cluster together include number of sexual partners and unprotected sex (Ashenhurst, Wilhite, Harden, & Fromme, 2017), which are both associated with higher risk for sexually transmitted infections (STIs) (Kahn & Halpern, 2018; Pflieger, Cook, Niccolai, & Connell, 2013; Van Wagoner, Harbison, Drewry, Turnipseed, & Hook, 2011). One factor that may link risky behaviors such as disordered eating and risky sex is the personality trait of impulsivity (Culbert & Klump, 2005; Liang & Tseng, 2011). Furthermore, both disordered eating and sexual risk behaviors are associated with depression and other psychiatric disorders (Nagata, Garber, Tabler, Murray, & Bibbins-Domingo, 2018a; Ramrakha, Caspi, Dickson, Moffitt, & Paul, 2000).

Few studies have investigated associations between disordered eating behaviors and sexual risk outcomes, particularly STIs. One cross sectional study found that adolescent girls who engaged in disordered eating behaviors were more likely to engage in unprotected sex and have multiple sexual partners (Neumark-Sztainer et al., 1997). Unadjusted comparisons have shown that young women with versus without eating disorders or disordered eating behaviors have more lifetime sexual partners (Tabler & Geist, 2016). One theory posits that purging (versus restrictive eating) behaviors may be associated with sexual behavior due to the personality trait of impulsivity (Culbert & Klump, 2005). However, more research is needed to understand the prospective association between eating disorders and disordered eating behaviors and sexual risk in young adult women to better inform screening and clinical management.

Therefore, the objective of this study is to evaluate the prospective association between eating disorders and disordered eating behaviors, and sexual risk in young adulthood. Specific sexual risk outcomes include number of sexual partners, unprotected sex, and STIs. We hypothesize that engaging in disordered eating behaviors will be associated with higher sexual risk among young women.

Methods

Study population

We used prospective cohort data of adolescent and young adult women ages 18-26 (Wave III, 2001-2002) who were followed through ages 24-32 (Wave IV, 2008) from the National Longitudinal Study of Adolescent to Adult Health. The baseline adolescent sample (Wave I, 1994-1995, ages 11-18) was nationally representative with respect to region, urbanicity, size, type and ethnicity of students from 80 U.S. high schools with paired middle schools.

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Further details about the study design have been described elsewhere (Harris et al., 2017). Only women were included in the study. Of the 7,563 women providing Wave III data for the nationally representative sample, 878 were lost-to follow-up at Wave IV and additional participants were excluded for missing sexual risk outcome data (n=314) or covariate data (n=472), leaving a total of 5,899 in the final cohort (Supplemental Appendix A). The University of North Carolina Institutional Review Board approved all Add Health study procedures.

Measures

Exposures

Weight loss behavior exposures of interest at ages 18-26 (Wave III) included 1) eating disorder diagnosis or disordered eating behaviors (fasting or skipping meals, vomiting, laxatives, diuretics, or weight loss pills to lose weight) (Nagata et al., 2018; Nagata et al., 2018b; Neumark-Sztainer, 2010); 2) purging behaviors (vomiting, laxatives, or diuretics to lose weight); 3) restrictive eating behaviors (fasting or skipping meals); and 4) binge eating behaviors.

Outcomes

Sexual risk outcomes were measured at seven-year follow-up when participants were 24-32 years old (Wave IV) and included 1) number of new sexual partners (number of lifetime sexual partners at Wave IV adjusted for number of lifetime sexual partners at Wave III), 2) condom use in the past 12 months among a subsample of sexually active, unmarried women, and 3) sexually transmitted infections in the past 12 months. Number of sexual partners has been used as a proxy for sexual risk in other studies using Add Health data (Tabler & Geist, 2016) and a greater number of sexual partners has been shown to be associated with unprotected sex (Ashenhurst et al., 2017) and acquisition of STIs (DiClemente et al., 2005; Van Wagoner et al., 2011). Condom use was a measure for safe sex practices (Pflieger et al., 2013; Walsh, Fielder, Carey, & Carey, 2013).

Covariates

Age, sex, race/ethnicity, education, sexual orientation, marital status, alcohol, tobacco, depressive symptoms, and childhood sexual abuse were based on self-report (Harris et al., 2017). Body mass index (BMI) was based on interviewer-measured height and weight (BMI = weight/height^2). A full description of measures is listed in Supplemental Appendix B.

Statistical analysis

Data analysis was performed in 2018 using STATA 15.0 with statistical significance threshold set at a two-sided alpha of 0.05. We incorporated Add Health's pre-constructed sample weights for all analyses to yield nationally representative estimates. Descriptive statistics are reported for demographic characteristics, and chi-squared tests and t-tests were used to compare those with disordered eating behavior or eating disorders to those without, allowing those exercising for weight loss in either group. Multivariable linear and logistic regression was used to predict sexual risk outcomes according to eating disorder or

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disordered eating behavior status, adjusting for age, race/ethnicity, education, marital status, sexual orientation, alcohol, tobacco, childhood sexual abuse, and BMI.

Results

There were 5,899 women that met inclusion criteria at Wave III, with a mean age of 21.7 (SE=0.12). Demographic and health characteristics can be found in Table 1. Overall, 19.1% reported an eating disorder diagnosis or any disordered eating behavior; 12.6% reported restrictive eating, 1.1% reported purging, and 7.0% reported binge eating. The mean number of lifetime sexual partners in our sample was 4.9 (SE: 0.16) at Wave III and 8.8 (SE: 0.25) at seven-year follow-up (Wave IV). At ages 24-32 years, 13% reported having a STI in the past 12 months.

Multivariate analyses of the association between eating disorder or disordered eating behavior exposures and sexual risk outcomes are shown in Table 2. Having either an eating disorder or reporting disordered eating behaviors was associated with a greater number of new sexual partners (B=1.09, 95% CI .18-2.00) and lower odds of condom use (OR .70, 95% CI .53-.94 among a subsample of sexually active, unmarried women). However, purging behaviors (vomiting or laxative/diuretic use) were associated with fewer new sexual partners (B=−1.97, 95% CI −3.83- −.11).

Discussion

This study has several important findings regarding the health of young women. First, young women with eating disorders or disordered eating behaviors have increased sexual risk as measured by increased number of new sexual partners and unprotected sex. These findings use a nationally representative sample of female young adults and integrates research on eating disorders with sexual health domains.

We find an association between eating disorders or disordered eating behaviors and sexual risk. This confirms findings from prior studies reporting that adolescent girls who engaged in disordered eating behaviors were more likely to engage in unprotected sex and have multiple sex partners (Neumark-Sztainer et al., 1997). Another study found that young adults with disordered eating behaviors had a greater number of sex partners compared to those without disordered eating (Tabler & Geist, 2016), although these comparisons did not adjust for potential confounders. We confirm these findings even after adjusting for a number of potential confounders. We did not find an association between eating disorders or disordered eating behaviors and STI risk at seven year follow-up; however, future research may use laboratory measures of STIs or longer follow-up durations.

One theory suggests that purging behaviors are associated with sexual risk through the personality trait of impulsivity (Culbert & Klump, 2005), although findings have been mixed. One study found no difference in the likelihood of engaging in sexual intercourse or age of onset of sexual activity among restricting versus binge/purge subtypes of anorexia nervosa (Pryor, Wiederman, & McGilley, 1996). In contrast, we find that purging behaviors are associated with fewer new sexual partners. The explanation for this finding is not entirely clear. One prior study examining the association between eating disorders/disordered eating

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and reproductive health outcomes similarly found contrasting findings in Add Health versus a regional sample in Utah (Tabler, Schmitz, Geist, Utz, & Smith, 2018). Some reasons that our findings may differ from those previously reported include the short response frame (past seven days) for disordered eating behaviors, relatively small proportion of participants reporting purging behaviors (1.1%), different ages given that Culbert and Klump (2005) were undergraduate students and by Wave IV Add Health participants were 24-32 years old, and different regions given that Culbert & Klump (2005) was a sample of midwestern undergraduate students whereas Add Health is nationally representative of the US. Engaging in purging may be associated with lower self-esteem (Ackard, Cronemeyer, Franzen, Richter, & Norstrom, 2011), and women with lower sexual self-esteem may be less likely to engage in sexual risk behavior (Schick, Calabrese, Rima, & Zucker, 2010). We did not find an association between binge eating and sexual risk behaviors, similar to one previous study (Culbert & Klump, 2005), which posited that binge eating is not a particularly risky behavior (except for long-term weight gain).

There may also be a bidirectional relationship between sexual behaviors and disordered eating. More frequent sexual activity may lead to heightened body image concerns (Pujols, Seal, & Meston, 2010). Furthermore, childhood sexual abuse is a risk factor for both eating disorders and sexual risk behaviors; thus, we controlled for childhood sexual abuse in the regression analyses (Castellini, Lelli, Ricca, & Maggi, 2016). Health risk behaviors including disordered eating, substance use, and sexual risk-taking have been shown to cluster together (Hingson & Zha, 2018; Mewton et al., 2019).

This study has several limitations. The measures were based on self-report, which can be subject to reporting bias. We were unable to determine if women were in a serious relationship other than marital status. While number of sexual partners was asked, we were not able to determine if there were multiple sexual experiences with the same partner. Due to the design of the Add Health survey, we were unable to measure the severity or duration of reported disordered eating behaviors. The timeframe used for measuring disordered eating behaviors in Add Health was shorter (past seven days) than is often asked in other measures of disordered eating behaviors such as the Eating Disorder Examination Questionnaire (past 28 days) (Fairburn & Beglin, 2008). Earlier waves of Add Health (Waves I and II) did not collect information about eating disorder diagnosis, binge eating, and several disordered eating behaviors; however, results may have differed had these questions been asked during adolescence and with a longer timeframe. Although we controlled for a number of potential confounders including age, race/ethnicity, education, sexual orientation, childhood sexual abuse, BMI, alcohol, tobacco, and marital status there is the possibility for unmeasured confounders and given the observational nature of the data we cannot establish causality. Selection bias is possible as subjects lost-to follow-up or with missing data were excluded; a higher proportion of college educated and White compared to Black/African American or Hispanic participants had complete data (Appendix A). Given that young Black/African American and Hispanic women have been shown to be at higher risk for sexual risk behaviors (Norris et al., 2019), our findings may be biased towards the null. Nonetheless, our study had several strengths including a large, nationally representative sample of US young adults and a longitudinal cohort study design that allowed us to examine exposure seven years prior to outcome.

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Findings from this study may have several clinical implications. First, early sexual activity and disordered eating behaviors are both problematic behaviors in the adolescent and young adult developmental period. Persons with eating disorders or who engage in disordered eating behaviors are at higher risk for multiple new sexual partners and unprotected sex; therefore, clinicians caring for young adults reporting disordered eating may consider screening for sexual risk behaviors.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviations:

B	beta coefficient
CI	confidence interval
DEB	disordered eating behaviors
ED	eating disorders
SE	standard error
STI	sexually transmitted infection
US	United States

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Table 1.

Demographic and health characteristics of U.S. young adult women by disordered eating status

	No ED or DEB *n*=4,811 Mean (SE) / %	ED or DEB *n*=1,088 Mean (SE) / %	*p*
Demographic characteristics			
Age, years (Wave III)	21.6 (0.13)	21.7 (0.14)	0.258
Race[a] (Wave I)			
White	79.5	78.2	0.423
Black/African American	15.6	17.0	0.249
Asian/Pacific Islander	4.5	3.7	0.479
Native American	3.5	6.5	<0.001
Hispanic (Wave I)	10.4	10.4	0.941
College education (Wave III)	81.0	77.8	0.107
Married (Wave IV)	55.1	55.4	0.916
Tobacco use (Wave III)	26.8	36.8	<0.001
Alcohol use (Wave III)	48.0	55.2	0.002
Sexual orientation (Wave III)			0.339
Heterosexual	95.8	94.5	
Bisexual	2.1	2.5	
Homosexual	1.6	2.6	
Asexual	0.5	0.4	
Childhood sexual abuse (Wave III)	4.0	6.6	0.010
Body mass index, kg/m^2 (Wave III)	26.2 (0.16)	29.2 (0.34)	<0.001
Sexual behavior			
Number of lifetime sexual partners (Wave III)	4.6 (0.15)	6.1 (0.34)	<0.001
Number of lifetime sexual partners (Wave IV)	8.2 (0.24)	11.6 (0.69)	<0.001
Condom use in the past 12 months (Wave IV)[b]	60.6	53.5	0.022
Sexually transmitted infection in the past 12 months (Wave IV)	12.9	14.2	0.493

All means and percentages are calculated with weighted data to reflect the representative proportion of the target US population

ED = eating disorder; DEB = disordered eating behavior including fasting or skipping meals, vomiting, diet pills, laxatives, or diuretics to lose weight; SE = standard error

[a] participants can select more than one race, total % may not add to 100%

[b] among subsample of sexually active, unmarried women (n=2,288)

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Table 2:

Associations between eating disorders or disordered eating behaviors and sexual risk outcomes (n=5,899)

	Number of new sexual partners [a]		Condom use past 12 months [b]		Sexually transmitted infections (STIs) in past 12 months	
	B (95% CI)[c]	*p*	OR (95% CI)[d]	*p*	OR (95% CI)[e]	*p*
Weight loss behavior						
Eating disorder or disordered eating behavior[f]	**1.09 (0.18 - 2.00)**	**0.020**	**0.70 (0.53 - 0.94)**	**0.016**	1.03 (0.77 - 1.38)	0.852
Restrictive eating behavior[g]	0.87 (−0.19 - 1.93)	0.108	0.81 (0.57 - 1.14)	0.219	1.11 (0.81 - 1.52)	0.513
Purging behavior[h]	**−1.97 (−3.83 - −0.11)**	**0.038**	0.66 (0.22 - 1.96)	0.448	0.89 (0.41 - 1.95)	0.769
Binge eating	−0.17 (−1.56 - 1.21)	0.802	1.02 (0.64 - 1.64)	0.928	0.73 (0.48 - 1.10)	0.133

Note: Bold indicates p < .05

[a] Number of new sexual partners was based on self-reported lifetime number of sexual partners at follow-up (Wave IV) adjusted for lifetime number of sexual partners at Wave III

[b] Only includes sexually active, single women

[c] B = beta coefficient; CI = confidence interval; adjusted for age, body mass index, sexual orientation, education, race/ethnicity, childhood sexual abuse, alcohol, tobacco, marital status, and lifetime sexual partners at Wave III.

[d] OR = odds ratio; CI = confidence interval; adjusted for age, body mass index, sexual orientation, education, race/ethnicity, childhood sexual abuse, alcohol, and tobacco

[e] OR = odds ratio; CI = confidence interval; adjusted for age, body mass index, sexual orientation, education, race/ethnicity, childhood sexual abuse, alcohol, tobacco, and marital status

[f] ED = eating disorder; DEB = disordered eating behavior including fasting or skipping meals, vomiting, diet pills, laxatives, or diuretics to lose weight

[g] Restrictive eating behavior = fasting or skipping meals

[h] Purging behavior = vomiting, laxatives, or diuretics to lose weight

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