Published in final edited form as:

Eat Behav. 2009 January ; 10(1): 56–58. doi:10.1016/j.eatbeh.2008.10.012.

Cigarette Smoking is Associated with Body Shape Concerns and Bulimia Symptoms Among Young Adult Females

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Abstract

Elevated rates of cigarette smoking have been reported among individuals with Bulimia Nervosa. However, little is known about eating disorder symptoms within non-clinical samples of smokers. The purpose of the present study was to compare the eating disorder symptoms of young adult female smokers ($n = 184$) and non-smokers ($n = 56$), to determine whether smokers were more likely to endorse bulimic symptoms and report greater body shape concern than non-smokers. Analyses indicated that smokers scored significantly higher than non-smokers on the Body Shape Questionnaire, $p = .03$, and the Bulimia Test-Revised, $p = .006$. In addition, a higher proportion of smokers than non-smokers scored ≥ 85 on the Bulimia Test-Revised, $p = .05$, suggesting the possibility that Bulimia Nervosa diagnoses were more prevalent among smokers. No differences were found between smokers and non-smokers on other measures of eating behavior. Overall, findings suggest that smoking is specifically associated with symptoms of Bulimia Nervosa and body shape concern among young adult females.

Keywords

Smoking; Tobacco; Binge Eating; Purging; Bulimia Nervosa

1. Introduction

Higher rates of cigarette smoking and other substance use have consistently been reported among individuals with eating disorders, and particularly among those with Bulimia Nervosa (Anzengruber et al., 2006; Holderness, Brooks-Gunn, & Warren, 1994). Similarly, elevated rates of eating disorders have been found among females with substance use disorders (Holderness et al., 1994; Wilson, 1992). Recent research suggests that shared genetic factors, behavioral dysregulation, impulsivity, and affective instability may underlie

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both substance use and bulimic behaviors (Baker, Mazzeo, & Kendler, 2007; Dawe & Loxton, 2004; Engel et al., 2005; Lilenfeld et al., 1997; Wolfe & Maisto, 2000). In addition, many women with Bulimia Nervosa endorse the belief that smoking decreases appetite and may be a useful means by which to control appetite and weight (Bulik et al., 1992; Welch & Fairburn, 1998).

The purpose of the present study was to compare the eating disorder symptoms of young adult female smokers and non-smokers. Although studies have documented the relationship between alcohol and other substance use and eating disorders, less attention has been paid to the co-occurrence of cigarette smoking and eating disorder symptoms in non-clinical samples. Moreover, little is known about the prevalence of eating disorders symptoms specifically among young female smokers. It was hypothesized that females who were currently smoking would be more likely to endorse bulimic symptoms including binge eating, purging, disinhibition, and concern about body shape than females who did not smoke. Finally, it was expected that a greater proportion of smokers than non-smokers would endorse symptoms consistent with a diagnosis of Bulimia Nervosa.

2. Method

2.1 Participants

Participants were recruited via fliers posted on the campus of Louisiana State University (LSU), local newspaper advertisements, and through the LSU subject pool. Individuals were eligible to participate if they were female, between 18 and 29 years of age, and identified themselves as either a smoker or non-smoker.

2.2 Measures

The *Demographics and Health Questionnaire* (DHQ) assessed demographic characteristics and health information including sex, race, age, and smoking rate. Height and weight were measured and recorded by the experimenters.

Expired Carbon Monoxide (Vitalograph Incorporated, Lenexa, KS, USA; CO) levels were measured with a portable Vitalograph ecolyzer.

The *Fagerström Test for Nicotine Dependence* (FTND; Heatherton, Kozlowski, Frecker, & Fagerström, 1991) is a self-report measure of nicotine dependence.

The *Eating Inventory* (EI; Stunkard & Messick, 1985; Stunkard & Messick, 1988) is a self-report measure of eating behavior which contains three subscales: 1) Cognitive Restraint of Eating, 2) Disinhibition, and 3) Hunger. Cognitive Restraint scores of ≥ 14 , Disinhibition scores of ≥ 12 , and Hunger scores of ≥ 11 are considered to be within the clinical range (Stunkard & Messick, 1988).

The *Eating Attitudes Test* (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982) is a self-report measure of eating disorder symptoms, which contains three subscales: 1) Dieting, 2) Bulimia and Food Preoccupation, and 3) Oral Control. Scores of 20 or greater are associated with a diagnosis of Anorexia Nervosa (Garner et al., 1982).

The *Bulimia Test – Revised* (BULIT-R; Thelen, Farmer, Wonderlich, & Smith, 1991) is a self-report measure of Bulimia Nervosa symptoms, which contains five subscales: 1) Binging/Control/Body Image, 2) Radical Measures/Fasting, 3) Exercise, 4) Vomiting/Laxatives, and 5) Diuretics. Scores of ≥ 104 are associated with a diagnosis of Bulimia Nervosa, although a score of ≥ 85 has been recommended as an alternative cutoff when attempting to limit the number of false negatives (Thelen et al., 1991).

The *Body Shape Questionnaire* (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) is a self-report measure of body shape concern. BSQ scores of less than 81 suggest little or no worry about body shape, scores of 81-110 suggest slight worry, scores of 111-140 suggest moderate worry, and scores greater than 140 suggest extreme worry about body shape (Cooper & Taylor, 1988).

2.3 Procedure

Females were scheduled to visit the LSU Psychological Services Center, where informed consent was obtained, all questionnaires were administered, and CO, height, and weight were measured. Participants received either a \$20 payment or extra credit to be applied to their Psychology coursework.

3. Results

3.1 Participant Characteristics

A total of 240 females (184 smokers and 56 non-smokers) completed the study. The sample was 90% Caucasian, 3.8% African American, 3.3% Hispanic, 1.7% Asian, and 1.2% other. The mean age of the participants was 20.13 years (± 1.89), and the mean BMI was 23.60 (± 4.81). No differences in BMI or in the distribution of race/ethnicity were found between the groups. However, the smoking group was of significantly greater age than the non-smoking group (20.29 vs. 19.59 years), $F(1, 238) = 6.08, p = .01$. The smokers reported smoking an average of 7.97 (± 5.55) cigarettes per day for 3.11 (± 2.36) years. The mean FTND score among the smokers was 1.71 (± 1.91), and the mean CO level was 5.55 (± 6.83) parts per million (ppm).

3.2 Body Shape Concerns

Analysis of Covariance (ANCOVA) indicated that smokers scored significantly higher than non-smokers on the BSQ after controlling for age, $F(1, 237) = 5.10, p = .03$ (see Table 1). Chi-square analysis revealed significant differences between smokers and non-smokers in the distribution of participants across BSQ categories, $\chi^2(3, N = 240) = 8.56, p = .04$ (see Figure 1).

3.3 Bulimia Symptoms

ANCOVA indicated that smokers scored significantly higher than non-smokers on the BULIT-R, $F(1, 237) = 7.74, p = .006$, as well as the Binging/Control/Body Image, $F(1, 237) = 7.57, p = .006$, and Radical Measures/Fasting subscales after controlling for age, $F(1, 237) = 4.17, p = .04$. Differences between smokers and non-smokers approached significance on the Diuretics, $F(1, 237) = 3.53, p = .06$, and Vomiting/Laxatives subscales, $F(1, 237) = 2.83,$

$p = .09$. No differences were found between groups on the Exercise subscale, or in the proportion of individuals who scored within the clinical range of the BULIT-R. However, chi-square analysis indicated that a greater proportion of smokers than non-smokers scored within the clinical range when the alternative BULIT-R cutoff score of 85 was utilized, $\chi^2(1, N = 240) = 3.77, p = .05$ (see Table 1). Analysis of Variance (ANOVA) indicated that smokers who scored 85 ($n = 18$) on the BULIT-R smoked significantly more cigarettes per day than smokers who scored < 85 , ($n = 166$; 11.47 vs. 7.61), $F(1, 181) = 7.75, p = .006$. In addition, FTND scores were marginally higher among those who scored 85 on the BULIT-R than those who scored < 85 (2.50 vs. 1.63), $F(1, 182) = 3.34, p = .07$. Years of smoking, CO level, and BMI did not differ by BULIT-R score.

3.4 Anorexia Symptoms

ANCOVA indicated that there were no differences between the groups on the EAT-26 total score or any of the EAT-26 subscales after controlling for age. Further, no differences were found between groups in the proportion of individuals who scored within the clinical range of the EAT-26 (i.e., ≥ 20 ; see Table 1). Among the smokers only, ANOVA indicated that there were no significant differences in the smoking or anthropometric characteristics of those who scored within the clinical and normal ranges of the EAT-26.

3.5 Eating Behavior

ANCOVA indicated that there were no differences between the groups on the EI Cognitive Restraint, Disinhibition, or Hunger scales after controlling for age. Further, no differences were found between groups in the proportion of individuals who scored within the clinical range of the Cognitive Restraint, Disinhibition or Hunger scales (see Table 1).

4. Discussion

The results of the current study suggest that smoking is associated with body shape concerns and symptoms of Bulimia Nervosa. Nearly 10 percent of smokers, compared with only two percent of non-smokers, scored 85 on the BULIT-R, suggesting the possibility of a higher frequency of Bulimia Nervosa diagnoses among smokers. Among the smokers only, those who scored 85 on the BULIT-R smoked more cigarettes per day than those who scored below 85. Notably, the proportion of smokers who endorsed extreme concern about body shape was more than twice that of non-smokers. However, no differences between smokers and non-smokers were found on a measure of Anorexia Nervosa symptoms (EAT-26) or on a more general measure of eating behavior (EI). Thus, smoking may be uniquely related to symptoms of Bulimia Nervosa.

Acknowledgments

Manuscript preparation was supported, in part, by grant R25T-CA57730 awarded by the National Cancer Institute.

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Figure 1.

Frequency of body shape concerns among female smokers and non-smokers as measured by the Body Shape Questionnaire.

Table 1

Differences between female smokers and non-smokers on measures of eating disorders and eating behavior.

	Smokers (<i>n</i> = 184)	Non-Smokers (<i>n</i> = 56)	<i>p</i>
Body Shape Questionnaire			
Total Score	102.43 (±35.13)	89.75 (±34.11)	.03
Bulimia Test-Revised			
Binging/Control/Body Image	47.43 (±15.78)	40.62 (±13.78)	.006
Radical Measures/Fasting	12.01 (±5.33)	10.31 (±5.21)	.04
Exercise	3.01 (±1.17)	3.18 (±1.21)	.55
Vomiting/Laxatives	4.99 (±1.51)	4.63 (±1.02)	.09
Diuretics	2.40 (±1.18)	2.11 (.41)	.06
Total Score	57.76 (±18.54)	49.69 (±16.20)	.006
Clinical Range (scores 104; %)	2.72	1.79	.70 [†]
Clinical Range (scores 85; %)	9.78	1.79	.05[†]
Eating Attitudes Test			
Dieting	8.47 (±7.48)	7.27 (±7.66)	.26
Bulimia & Food Preoccupation	1.16 (±2.10)	.76 (±1.70)	.28
Oral Control	1.57 (±2.07)	1.34 (±1.77)	.61
Total Score	11.20 (±9.75)	9.37 (±9.73)	.23
Clinical Range (%)	16.30	12.50	.49 [†]
Eating Inventory			
Cognitive Restraint	9.84 (±5.88)	10.53 (±5.85)	.52
Disinhibition	7.88 (±3.72)	7.01 (±3.62)	.17
Hunger	6.49 (±3.55)	5.77 (±3.13)	.18
Clinical Range of Cognitive Restraint (%)	29.35	32.14	.69 [†]
Clinical Range of Disinhibition (%)	18.48	16.07	.68 [†]
Clinical Range of Hunger (%)	16.85	10.71	.27 [†]

Note: Age was included as a covariate in all analyses with the exception of the chi-square analyses. Unadjusted means and standard deviations are presented unless otherwise specified. Bolded outcomes indicate p-values .05.

[†] p-value based on chi-square test for differences by smoking status.