



Smoking status and psychosocial factors in binge eating disorder and bulimia nervosa



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ABSTRACT

Objective: To examine eating-disorder psychopathology and depressive symptoms by smoking status (never, former, or current smoker) in persons with binge eating disorder (BED) and bulimia nervosa (BN).

Methods: Participants were 575 adult volunteers from the community (mean age = 36.0 ± 12 years and BMI = 32.9 ± 9.5 kg/m²; 80% white; 88% female) who were classified with BED (n = 410) or BN (n = 165). Participants completed a battery of questionnaires, including items about current and historical cigarette smoking, the Eating Disorder Examination—Questionnaire, and the Beck Depression Inventory.

Results: Among those with BED, depressive symptoms were significantly higher in current smokers than former or never smokers ($p = .001$). There were no significant differences in depressive symptoms by smoking status in participants with BN and no differences in eating-disorder psychopathology by smoking status in either the BED or BN groups.

Discussion: In this non-clinical group of community volunteers, we found that smoking history or status was not associated with eating disorder psychopathology in participants classified with BED and BN but was significantly associated with depressive symptoms in participants with BED.

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1. Introduction

Smoking continues to be one of the leading causes of preventable death and is associated with lung cancer, chronic obstructive pulmonary disease, ischemic heart disease, stroke, and increased risk of mortality (Thun et al., 2013). Although widespread public health campaigns and policies have helped to decrease the prevalence of smoking in the United States, currently 18.1% of US adults smoke cigarettes (Agaku, King, Dube, & Centers for Disease Control and Prevention, 2014). Though smoking is driven by multiple factors, some of the most common reasons that people smoke are the perceived impact of cigarettes on weight, eating, and mood (Crisp, Sedgwick, Halek, Joughin, & Humphrey, 1999).

Nicotine suppresses appetite (Jo, Talmage, & Role, 2002) and decreases food intake (Donny, Caggiula, Weaver, Levin, & Sved, 2011; Mineur et al., 2011) through mechanisms that are not fully understood but are likely a result of both physiological and behavioral factors (Audrain-McGovern & Benowitz, 2011). There is evidence that a subset

of individuals use smoking as an appetite and weight control method and fear of weight gain is a frequently cited barrier to smoking cessation in both non-eating disorder and eating disorder samples (Harakeh, Engels, Monshouer, & Hanssen, 2010; Pomerleau, Zucker, & Stewart, 2001; Welch & Fairburn, 1998; White, 2012). Indeed, females who engage in weight-control smoking are more likely to have elevated eating disorder symptoms (White, 2012).

Cigarette smoking and depression commonly co-occur; individuals with major depressive disorder are twice as likely to report smoking than those without mental illness (Lasser et al., 2000). There are multiple models and hypotheses that have been developed and tested to help explain this relationship (Wilhelm et al., 2006) including individuals use of cigarettes as “self-medication” for their depressive symptoms (Khantzian, 1997) and genetic factors that predispose individuals to both smoking and depression (Dierker, Avenevoli, Stolar, & Merikangas, 2002); however, there is not clear evidence for support of one model versus another.

Individuals with eating disorders have higher prevalence rates of current and lifetime cigarette smoking compared to other groups (Krug et al., 2008) with the highest prevalence among binge/purge eating disorder subtypes (Anzengruber et al., 2006; Wiseman, Turco,

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Sunday, & Halmi, 1998). Individuals who binge eat are more likely to report weight gain in the year following smoking cessation (White, Masheb, & Grilo, 2010) and individuals who binge eat are less successful at smoking cessation (White, Peters, & Toll, 2010). Understanding of factors associated with cigarette smoking is necessary to help determine ways to decrease this behavior.

Few studies have examined how psychosocial and biobehavioral factors differ by smoking status in individuals with binge eating disorder (BED). The few available data suggest that among treatment-seeking obese women with BED, former smokers have significantly higher dietary restraint and use of rigid dieting strategies, and more frequent occasions of fasting compared to never smokers (White & Grilo, 2007). In clinical studies, women who are obese with BED and who are lifetime smokers are more likely than never smokers to meet criteria for Axis I psychiatric disorders including major depressive disorder (White & Grilo, 2006). A more recent clinical study of patients with BED who are obese found that current smokers are significantly more likely to meet criteria for metabolic syndrome compared to never smokers (Udo et al., 2016).

There is a similar paucity of literature exploring the association of smoking status on psychosocial factors in bulimia nervosa (BN). Of the studies that have been conducted, clinical samples of adolescent females with BN who smoke had significantly greater eating-disorder psychopathology (drive for thinness, body dissatisfaction, and interoceptive awareness) than nonsmokers (Wiseman et al., 1998). Another study conducted in women with BN recruited from treatment, observational, and community sites found that those who smoked cigarettes daily had significantly higher depressive symptoms compared to those who had not smoked in the past 10 years (Sandager et al., 2008). In a study of young adult female smokers and non-smokers recruited from the community, smoking was associated with body shape concerns and symptoms of BN (Kendzor, Adams, Stewart, Baillie, & Copeland, 2009).

Taken together, these studies performed mostly with clinical samples suggest that smoking status may be an indicator of heightened eating disorder psychopathology and depressive symptoms. The present study seeks to expand this literature by comparing eating-disorder psychopathology and depressive symptoms by smoking status (i.e., more specifically by comparing never, former, and current smokers) in persons with BED and BN. Our study groups are comprised of community volunteers in an effort to complement the limited literature to date based primarily on clinical samples which may have treatment-seeking confounds or biases. We hypothesized that individuals who were current smokers would have higher eating-disorder psychopathology and depressive symptoms compared to never and former smokers.

2. Method

2.1. Participants

Participants included 575 community volunteers who met criteria for BED ($n = 410$) or BN ($n = 165$). The mean age was 36.02 ($SD = 11.98$) years and the mean BMI was 32.94 ($SD = 9.48$) kg/m². The majority of the sample was female (88%). Eighty percent of the sample self-identified as White, non-Latino, 7.5% as Hispanic, 5.2% as Black, 3.5% as Asian, and 3.5% as other.

2.2. Procedures

Participants were recruited via online advertisements requesting participation in a research study on eating and dieting from around the United States. Participants completed a battery of self-report questionnaires via SurveyMonkey (<https://www.surveymonkey.com/>), a research-based and secure data-encrypted web server. Participants affirmed willingness to participate and provided informed consent

prior to accessing questionnaires. No personal identifying information was collected. Yale University's Institutional Review Board approved the parent study.

2.3. Measures

2.3.1. Demographics

Participants provided basic demographic information including self-reported height and current weight and completed a battery of self-report questionnaires.

2.3.2. Smoking

We assessed historical and current smoking behaviors. Determination of smoking status was based on the questions: "In your entire life, have you smoked at least 100 cigarettes?" and "do you currently smoke?" This method has been used previously to determine smoking status (Ebrahim, Floyd, Merritt, Decoufle, & Holtzman, 2000; Gilpin, Choi, Berry, & Pierce, 1999) and a similar method is used to assess smoking status in the Behavioral Risk Factors Surveillance System, the National Health Interview Survey, and the National Health and Nutrition Examination Survey (Li et al., 2012). Participants were categorized based on their responses into never, former, and current smokers. We also asked smokers how many cigarettes they smoke per day, how many years and months they have been at their current level of smoking, and the age they started smoking (which was used to calculate the number of total years they had been smoking).

2.3.3. Questionnaire for eating and weight patterns – Revised (QEWP-R)

The QEWP-R assesses specific diagnostic criteria for BED and BN and has been used in DSM-IV field trials (Yanovski, 1993). The QEWP-R has received psychometric support for screening for these eating disorders (Barnes, Masheb, White, & Grilo, 2011; Celio, Wilfley, Crow, Mitchell, & Walsh, 2004).

2.3.4. Eating Disorder Examination – Questionnaire (EDE-Q)

Eating disorder psychopathology, bulimia nervosa, and binge eating disorder were assessed with the self-report EDE-Q (Fairburn & Beglin, 1994). The EDE-Q assesses features of eating disorder psychopathology over the past 28 days. It assesses the frequency of different forms of overeating including objective bulimic episodes (i.e., eating an unusually large amount of food while experiencing a sense of loss of control over the eating) and purging (e.g., via self-induced vomiting, laxative misuse, diuretic/diet pill misuse). The EDE-Q also produces four scales (dietary restraint, eating concerns, weight concerns, and shape concerns) and an overall global score reflecting eating disorder psychopathology. The EDE-Q has received psychometric support in studies with diverse clinical and community groups, including those with BED and BN, and good test-retest reliability (Mond, Hay, Rodgers, Owen, & Beumont, 2004; Reas, Grilo, & Masheb, 2006).

2.3.5. Beck Depression Inventory (BDI)

The BDI was used to assess depressive symptoms (Beck & Steer, 1987). Higher scores indicate higher depressive symptoms. The BDI has demonstrated strong reliability and validity in adult clinical and community-based samples (Beck, Steer, & Carbin, 1988). The BDI also has support as a screening measure for mood disorders in individuals with binge eating disorder (Udo, McKee, & Grilo, 2015).

2.4. Creation of BED and BN study groups

The BED and BN study groups were created based on responses to the QEWP-R and EDE-Q per DSM-5 criteria (American Psychiatric Association, 2013). These study groups were created first using a minimum frequency of once-weekly binge-eating (QEWP-R) without any purging (self-induced vomiting, laxative misuse, or diuretics) behaviors (for BED) and a minimum frequency of once-weekly for both binge-eating

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