



Perceived weight, not obesity, increases risk for major depression among adolescents



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ABSTRACT

This study examined the association between major depression, obesity and body image among adolescents. Methods: Participants were 4175 youths 11–17 years of age sampled from the community who were interviewed using the Diagnostic Interview Schedule for Children and Adolescents, Version IV, completed a self-report questionnaire, and had their weight and height measured. There were 2 measures of body image: perceived weight and body satisfaction. Obesity was associated with increased risk of depression, with no controls for covariates. However, when the association was examined in models which included weight, major depression, and body image measures and covariates, there was no association between major depression and body weight, nor between body satisfaction and major depression. Perceived overweight was strongly and independently associated with body weight (O.R. = 2.62). We found no independent association between major depression and body weight. If there is an etiologic link between major depression and body weight among adolescents, it most likely operates through processes involving components of body image. Future research should focus on the role of depression and body image in the etiology of obesity.

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1. Introduction

Obesity is a significant public health problem because of the high prevalence of the condition (Ogden et al., 2008), as well as the morbidity and mortality attributed to it (Must et al., 1999; Barlow & Dietz, 1998) and the medical expenditures resulting from obesity-related conditions (Finkelstein et al., 2004; Finkelstein et al., 2009). The increasing prevalence of obesity has been noted in children as well (Ogden et al., 2006; 2008). In terms of the etiology of adolescent obesity, we now have considerable evidence for the role of behavioral determinants such as physical activity, sedentary lifestyles, and a high calorie diet. We have considerable less data on the role of social and psychological factors in obesity. For example, the relation between obesity and depression is unclear, with mixed evidence thus far. For example, a review by Atlantis and Baker (2008) found that among adults, obesity modestly increased risk for depression among women but not men, and that studies from outside the United States found no association between obesity and

depression. Most studies have been cross-sectional, both for adults and adolescents.

Historically, obesity has been a stigmatized condition with reports documenting social exclusion, occupational and educational discrimination, and prejudice attributed to negative attitudes (Puhl and Brownell, 2001). This is true for adults (Puhl & Heuer, 2009) as well as children and adolescents (Puhl & Latner, 2007). The multiple, adverse social and interpersonal consequences of obesity have resulted in the widespread assumption that the obese suffer psychologically both as a direct consequence of social adversities and indirectly through negative “reflected appraisal” (Wardle et al., 2006). However, epidemiologic studies of adolescents have yielded mixed results for an association between obesity and the most common mental health outcome examined – depression (see Wardle et al., 2006; Zimetkin, 2004).

In their recent meta-analytic study, Luppino et al. (2010) identified only 6 papers that met their criteria for prospective studies of the relation between obesity and depression involving adolescents, that is, subjects were under the age of 18 at baseline. They found that the pooled data from the studies of adolescents which examined obesity as a risk factor for subsequent depression found little increased risk. Herva et al. (2006) and Anderson et al. (2007) found that obesity at baseline was not related to depression at follow-up for adolescents. Bardone et al. (1998) found obesity at baseline

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predicted subsequent depression only marginally. Other studies also have found mixed or no support for increased risk of depression associated with obesity (Wardle et al., 2006). Frisco et al. (2009) found no association between weight and depressive symptoms among girls, but did for boys. In their recent paper, Merikangas et al. (2012) found obesity was not associated with obesity among adolescents overall, but there was elevated risk for boys.

Merikangas et al. (2012) note that evidence thus far on obesity and depression among adolescents has been confounded by diverse sample characteristics and methodologic differences in measuring both depression and weight. Many studies have relied on self-reports of weight, which appears to contribute to confirmation bias (Ge et al., 2001). Many studies also have focused on symptoms of depressed mood, rather than diagnosed depression, thus ignoring more severe manifestations and more rigorously measured depression status.

While there are limited coherent epidemiologic data linking obesity to clinical depression among adolescents, there is evidence from the literature suggesting that the primary effect of obesity is indirect rather than direct. That is, the association between obesity and depression may be mediated by other factors. One of these factors is body image, in particular perceived weight and body satisfaction.

Longitudinal studies indicate that poor body image is associated with greater psychological distress, more disordered eating, binge eating and fewer health-promoting behaviors such as physical activity and consumption of fruits and vegetables (Holsen et al., 2001; Stice, 2001; Stice and Bearman, 2001; Neumark-Sztainer et al., 2006). ter Bogt et al. (2006) report that body image is a better predictor of internalizing problems (but not externalizing problems) than weight. Daniels (2005) finds no relationship between obesity and depressive symptoms, but poor body image was related to depressive symptoms. Neumark-Sztainer et al. (2007) report that poor body image was one of the strongest prospective predictors of obesity, binge eating, and extreme weight control behaviors. None of these papers focused on clinical depression.

Thus far, to our knowledge, no paper has examined the association between weight, body image, and diagnosed depression among adolescents. The purpose of this paper is to reexamine the association between obesity and DSM-IV major depression, taking into account the effects of body image. To this end, we use data from Teen Health 2000 (TH2K), a large community-based sample of adolescents 11–17 years of age which assessed DSM-IV major depression (among other psychiatric disorders) and also measured height and weight and included two measures of body image: perceived weight and satisfaction with one's body.

Our hypothesis is that there is an association between obesity and major depression and this relationship is mediated by body image, e.g., negative body image better accounts for risk of major depression than body weight per se.

2. Methods

2.1. Sample

The sample was selected from households in the Houston metropolitan area enrolled in two local health maintenance organizations. One youth, aged 11–17 years, was sampled from each eligible household, over sampling for ethnic minority households. Initial recruitment was by telephone contact with parents. A brief screener was administered on ethnic status of the sample youths and to confirm data on age and sex of youths. Every household with a child 11–17 years of age was eligible. Because there were proportionately fewer minority subscriber households, sample weights were developed and adjusted by poststratification to reflect the age, ethnic, and sex distribution of the 5-county Houston

metropolitan area in 2000. The precision of estimates are thereby improved and sample selection bias reduced to the extent that it is related to demographic composition (Andrews and Morgan, 1973). Thus, the weighted estimates generalize to the population 11–17 years of age in a metropolitan area of 4.7 million people.

Data were collected on sample youths and one adult caregiver in 2000–2001 using computer-assisted personal interviews and self-administered questionnaires. The computerized interview contained the structured psychiatric interview (see below) and demographic data on the youths and the household. Height and weight measures were conducted after the completion of the interviews. The interviews and measurements were conducted by trained, lay interviewers. The interviews took on average 1–2 h, depending on the number of psychiatric problems present. Interviews, questionnaires, and measurements were completed with 4175 youths at baseline, representing 66% of the eligible households. There were no significant differences in gender, age or among ethnic groups in completion rates. All youths and parents gave written informed consent prior to participation. All study forms and procedures were approved by the University of Texas Health Science Center Committee for Protection of Human Subjects.

Sample characteristics are presented in Table 1. As can be seen, the sample, in addition to being representative, was also diverse in terms of age, ethnic status, and family income (reported by parent).

2.2. Measures

2.2.1. Major depression

Data on psychiatric disorders were collected using the youth version of the Diagnostic Interview Schedule for Children, Version 4 (DISC-IV), a highly structured instrument with demonstrated reliability and validity (Shaffer et al., 2000).

Interviews were conducted by college-educated, lay interviewer who had been extensively trained using protocols provided by Columbia University. Interviews with the DISC-IV were administered using laptop computers.

We examine the association between obesity and major depression using DSM-IV diagnostic criteria (American Psychiatric Association, 2000). Thus, we define major depression as at least one major depressive episode in the previous 12 months (prevalence was 1.7%).

2.2.2. BMI and weight status

Height and weight were measured using standard field procedures such as a Tanita digital scale (see Armstrong & Welsman, 1997; Lohman et al., 1991; National Institutes of Health, 1998).

Table 1
Unweighted sample characteristics, Teen Health 2000

Characteristics		% Wave 1 N = 4175
Gender of youth	Male	51.1
	Female	48.9
Age of youth	16+	24.9
	Between 13 and 15	48.1
	12 or less	27.0
Ethnicity of youth	White American	35.4
	African American	35.4
	Latino American	24.4
	Others	4.6
Family Income	\$65,000+	35.3
	\$ 35,000–\$ 64,999	40.7
	<\$35,000	24.0
Major Depression	Yes	1.7
	No	98.3
Weight	Healthy weight	61.0
	Overweight (95th > BMI ≥ 85th)	18.2
	Obese (BMI ≥ 95th)	20.8

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