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Prevalence and correlates of being overweight or obese in college



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ABSTRACT

Recent statistics indicate that over one-third of college students are currently overweight or obese, however, the impact of weight in this population from academic and psychiatric perspectives is not fully understood. This study sought to examine the prevalence of overweight and obesity in college students and its association with stress, mental health disorders and academic achievement. A total of 1765 students completed the College Student Computer User Survey (CSCUS) online at a large Midwestern United States University. Responders were classified by weight as normal, overweight or obese based on body mass index. Data were stratified by sex, with cross-tabulation and *t*-tests, one-way analysis of variance, and logistic regression for analysis. A total of 492 (27.9%) students were overweight (20.2%; range 25.01–29.98) or obese (7.7%; range 30.04–71.26). Overweight and obesity were associated with significantly lower overall academic achievement, more depressive symptoms, and using diet pills for weight loss. Obese males had significantly higher rates of lifetime trichotillomania while overweight and obese females reported higher rates of panic disorder. Higher educational institutions should be aware of the significant burden associated with overweight and obesity in students, and of the differing demographic and clinical associations between overweight or obesity in men and women.

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1. Introduction

Obesity represents a leading public health concern, with the World Health Organization estimating that more than 1.4 billion individuals are obese worldwide (WHO, 2013). Although the rates of obesity have more than doubled in the general population since the 1980s, the greatest increase in rates of overweight individuals has continued to be young adults aged 18–29 years (Racette et al., 2005; Flegal et al., 2012). In fact, the American College Health Association (2011) reports that 34.1% of college students are currently overweight or obese.

Weight gain in college students is a particular concern given the large number of health problems associated with obesity, and young adults who are overweight will be exposed to greater cumulative risk over time (Finkelstein et al., 2008). The negative long-term consequences of being overweight include high blood pressure, heart disease, diabetes, arthritis-related disabilities, some cancers, and sleep apnea (Gortmaker et al., 1993; Poirier et al., 2006). The weight of

college students, in particular women, is especially important as the average age of first-time pregnancy is 25.8 years old in the US (Martin et al., 2013). Research has shown that women have a particular risk as overweight or obesity also increases the risk of pre-term delivery in females who are overweight or obese prior to pregnancy (Cnattingius et al., 2013) and is associated with reduced cognitive development in the early stages of their children, post-partum (Casas et al., 2013).

College students who are overweight or obese report a range of emotional and social problems, including depression, stigmatization, and lower academic achievement (Adams and Colner, 2008; Desai et al., 2008). Obese women tend to report more mental symptoms than their male counterparts (de Wit et al., 2010), however, it is currently unclear whether sex is a moderator of the relationship between mental distress and overweight status in college students. Less is known about the wider range of mental health effects—including psychiatric disorders such as those associated with impulsivity—in college students. The literature suggests that overweight and obesity are associated with difficulties inhibiting behaviors and higher sensitivity to reward (Mobbs et al., 2010; García-García et al., 2014), both features of impulsivity and impulsive behaviors. Very little is currently known, however, about whether overweight or obese individuals report higher rates of impulsive disorders,

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including gambling disorder, trichotillomania, and skin-picking disorder (among others) than their normal weight counterparts.

Therefore, this study sought to examine both the prevalence of a wide range of mental health disorders and associated health issues in male and female college students, who were categorized as being either normal weight, overweight or obese. We hypothesized that overweight and obese young adults, and in particular female students, would exhibit higher rates of most mental health disorders and have poorer self-esteem and greater impairments in academic performance. In addition, research indicates that the neurobiological underpinnings of obesity can be considered from the perspective of impulsivity (i.e. a tendency towards repetitive or habitual behaviors that are premature, risky, or poorly thought out) (e.g. Ziauddeen and Fletcher, 2013). Since being overweight in many individuals may be conceptualized as a problem with impulse control (Holtkamp et al., 2004; Braet et al., 2007) and reward processing deficiencies (García-García et al., 2014), we further hypothesized that being overweight would be associated with a variety of other impulsive behaviors.

2. Methods

2.1. Subjects

A university psychiatry department and student health center collaborated to develop the College Student Computer User Survey (CSCUS) to assess mental and physical health in a large sample of college students. In addition to basic questions about age, sex, ethnicity, weight, and height, the CSCUS used questions from a number of different clinically validated screening tools to examine mental health, stress, quality of life, general physical health, and specific demographic information. All study procedures were carried out in accordance with the latest version of the Declaration of Helsinki and were approved by the Institutional Review Board of the university.

A total of 6000 full-time college and graduate students from a large Midwestern United States University were randomly invited via email to take part in the CSCUS. Invited participants were required to view the IRB-approved informed consent page at the beginning of the online survey. All individuals who completed the study either partially or fully were considered respondents. As compensation for the study, respondents were entered into a drawing to receive a gift certificate (\$250, \$500, and \$1000 USD), as well as three portable music devices. From the initial group of 6000 students contacted, 2108 (35.1%) completed the survey.

2.2. Assessments

The entirely self-report survey consisted of 129 questions and took subjects approximately 30–45 min to complete. Survey questions consisted of demographic information, height and weight, health history, self-reported scholastic achievement (i.e. grade point average [GPA], and psychosocial functioning). Subjects were also asked two questions about their perceived attractiveness (e.g. 'On a scale from 1–10 [1 being extremely unattractive and 10 being extremely attractive] how attractive are you and how attractive do you think others find you?'). Subjects were also asked about their participation in extracurricular activities (including employment), mood, stress, psychiatric comorbidities, and items related to weight or weight loss, including weight loss attempts (and methods for weight loss). Amount of exercise was also obtained and compared to the Centers for Disease Control and Prevention's recommended amount of exercise per week, which entails 150 min of moderate-intensity aerobic activity a week, 75 min of vigorous-intensity aerobic activity a week, or an equivalent mix (Centers for Disease Control and Prevention [CDC], 2011).

Subjects completed the following measures:

Internet Addiction Test (IAT) (Young, 1998). The IAT is comprised of 20 questions examining levels of Internet use. Scores on the IAT range from 0–100 with 20–49 points reflecting mild Internet use, 50–79 moderate Internet use and 80–100 points for severe Internet use.

Patient Health Questionnaire (PHQ-9) (Kroenke and Spitzer, 2002; Kroenke et al., 2001). The PHQ-9 is a nine-item, client-administered scale based upon the diagnostic criteria for Major Depressive Disorder in the DSM-IV. It screens for current symptoms and functional impairment and provides a measure of depression severity.

Perceived Stress Scale (PSS) (Cohen et al., 1983). The PSS is a 10-item self-report measure assessing the degree to which individuals find their lives to be unpredictable, uncontrollable, and stressful. Each question is answered on a five-point Likert scale (ranging from "never" to "very often") based on experiences of the previous month. Scores range from 0 to 40 with higher scores indicating greater life stress.

Minnesota Impulsive Disorders Interview (MIDI) (Christenson et al., 1994; Grant, 2008). The MIDI is a self-report scale for identifying intermittent explosive disorder, kleptomania, gambling disorder, compulsive sexual behavior, pyromania, compulsive buying, excoriation (skin picking) disorder, and trichotillomania. The MIDI has been used in previous studies assessing impulse control disorders in college students with good reliability (Odlaug and Grant, 2010). The questions mirror those in DSM-IV-TR (American Psychiatric Association, 2004) except for compulsive sexual behavior, compulsive buying, and excoriation (skin picking) disorder which use criteria proposed by Black et al. (1997), McElroy et al. (1994), and Arnold et al. (2001), respectively.

Participants were asked a series of questions about being diagnosed with various psychiatric disorders within their lifetime. Based on responses to these questions, a dichotomous variable was created with where "0" = report never being diagnosed with any of 11 possible psychiatric disorder and "1" = report being diagnosed with at least one of the 11 possible psychiatric disorders.

2.3. Data analysis

As this study sought to examine a more traditional cohort of college students, the age range of our sample was limited to participants aged 18–40 with complete data. We applied a conservative upper limit of age at 40 years old in our analysis of the data in order to address outliers in our sample. This removal of subjects over the age of 40 applied to approximately 2% of all survey completers and was done to limit the negative effects on our statistical analysis (Osbourne and Overbay, 2004). These participants were then categorized a priori based on body mass index ranges as established by the CDC as being normal weight (BMI 18.5–24.9), overweight (BMI ≥ 25–29.9) or obese (BMI ≥ 30) (CDC, 2011). Analyses included: (1) prevalence of overweight and obese students; (2) cross-tabulation and *t*-test comparisons of those classified as being overweight versus the remaining respondents in terms of demographics, health behaviors, functioning and psychiatric diagnosis; (3) one-way ANOVA separated by normal weight, overweight, and obese, all stratified by sex; and (4) logistic regression was used to examine weight and an outcome of being diagnosed with at least one of the 11 listed psychiatric disorders run separately by sex and adjusting for age. Post-hoc tests were conducted on significant variables, to correct for multiple comparisons, a Bonferroni correction was used which set significance at $p \leq 0.008$. All analyses were conducted using SPSS version 22.

3. Results

A total of 2108 (35.1%; mean age 22.6 ± 5.1 [range 18–58]; 78.8% Caucasian; 41.8% male) students completed the survey. Respondent demographics were not significantly different from the overall demographic profile of the University (41.4% male; 79.5% Caucasian). Of the 2108 participants that completed the survey, 4 students were eliminated for inappropriate or careless responses (e.g. students who checked every possible box in the survey, with many of the responses contradicting each other), 226 were removed because of missing data on sex, age, weight and height, and 33 students were removed as they were over the age of 40. A total of 80 students whose BMI fell within the underweight category ($n=80$; 4.3%) were excluded as the research questions posed here corresponded solely on overweight and obese subjects compared to normal weight individuals. After these exclusions, the final sample size was 1765. Of the 1765 students, 492 (27.9%) had an overweight or obese BMI ($n=356$ [20.2%] overweight and $n=136$ [7.7%] obese). Compared to students whose BMI placed them within the normal category, overweight students were less likely to be female (60.7% versus 46.9%, respectively) (Table 1). The overweight and obese students were more likely to be older (Table 1). There were no other significant demographic differences between the groups. Data surrounding behavioral activities engaged in order to lose weight are given in Table 2. Overweight students were significantly more likely to try to lose weight than their normal weight peers and were more likely to use dieting and diet pills to do so.

Academic, physical and mental health comparison results are presented in Table 3. Obese male students reported significantly more depressive symptoms (PHQ-9 scores) compared to male students classified as normal weight ($F[2,64]=5.19$; $p=0.006$), and considered themselves significantly less attractive than their normal weight and

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