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Weight Status: A Predictor of the Receipt of and Interest in Health Promotion Information among College Students

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Abstract

Background: Negative health behaviors such as consumption of excess calories, low intake of fruits and vegetables, sedentariness and weight gain are associated with entry into college. **Purpose:** To determine if weight status is associated with students' receipt of health promotion (nutrition, physical activity and stress reduction) information, and students' interest in receiving these types of information from their college or university. **Methods:** Data from the Spring 2011 ACHA-NCHA II dataset was used to complete secondary data analyses. Students (N=116,254) from 148 postsecondary institutions completed the Spring 2011 ACHA-NCHA II survey. Logistic regression was used to examine the effect of BMI category on receipt of, and interest in receiving, health promotion information. **Results:** Approximately 32% of respondents were overweight or obese. Students in the obese class III category were the least likely to receive health promotion information and least likely to be interested in receiving the information. **Conclusion:** Weight status based on BMI classification is a weak predictor of the dissemination of health promotion information. The largest gaps related to the dissemination appear to be among obese students. Future research is needed to determine factors contributing to the observed gaps and strategies should be developed to reach underserved groups.

Keywords: College students, obesity, nutrition, physical activity, stress reduction, health promotion

Introduction

College Students and Health Behaviors

Emerging adulthood describes the transition period from adolescence to adulthood, ages 18-25 (Nelson, Story, Larson, Neumark- Sztainer, & Lytle, 2008). This developmental stage overlaps with entry into college and can be a vulnerable period for young adults (Gow, Trace, & Mazzeo, 2010). Factors contributing to the vulnerability of this period include increased autonomy, a change in environment and academic workload (Greaney, et al., 2009). Associated with these changes are also changes in health behaviors. Some of the negative health behaviors most notable during the time of college attendance include consumption of excess calories, low intake of fruits and vegetables, sedentariness, weight gain (Laska, Pelletier, Larson, & Story, 2012), and increased levels of stress-related cortisol (REFs), all of which can contribute to excessive weight gain.

Approximately 22.5% of students were overweight and 12.1% were obese based on self-reported height and weight from the American College Health Association-National College Health Assessment II (ACHA-NCHA II; American College Health Association [ACHA], 2014). Data from the ACHA-NCHA II Spring 2014 reference group showed that only 5.6% of male and female students (n = 6,727) reported

eating 5 or more servings of fruits and vegetables daily (ACHA, 2014). Approximately 50% of students did not meet the American College of Sports Medicine and the American Heart Association guidelines for aerobic physical (moderate intensity cardio or aerobic exercise for at least 30 minutes on 5 or more days per week or vigorous-intensity cardio or aerobic exercise for at least 20 minutes on 3 or more days per week) (ACHA, 2014).

Implications of Excessive Weight Gain

Weight gain during college and practice of negative health habits has immediate and long term implications. Excess body weight during childhood and young adulthood can lead to increased risk for chronic illnesses during adulthood such as metabolic syndrome, insulin resistance, pre-diabetes, type 2 diabetes and cardiovascular disease (Wane et al., 2010; Ovesen, Rasmussen, & Kesmodel, 2011). Additional health risks include obstructive sleep apnea syndrome, nonalcoholic fatty liver diseases, musculoskeletal problems, and psychological problems (Ovesen et al., 2011). Reproductive health risks for nulliparous young women with excess pre-pregnancy bodyweight can increase infertility and perinatal complications such as preeclampsia, gestational diabetes, macrsomia, emergency cesarean delivery, low Apgar score, shoulder dystocia and a stillborn fetus (Wane et al., 2010; Ovesen et al., 2011).

Opportunities for the Dissemination of Health Education Information

Institutions of higher education are similar to traditional communities because they possess the same potential and assets to affect the health of its members with the emphasis on supporting student success ("ACHA guidelines: Standards of Practice for health promotion and higher education", n.d.). In the 2006 ACHA-NCHA II report, 46% of college students reported that they did not receive any health information from their college or university (Kwan, Arbour-Nicitopoulos, Lowe, Taman, & Faulkner, 2010). Baxter and colleagues (2008) conducted a study exploring the extent to which students generally sought health related information and whether this varied by topic or purpose. They noted that of all the reported health communication experiences, only 27% resulted from students actively seeking health related information (Baxter et al., 2008). To date there is limited evidence exploring the extent to which students would like to receive nutrition, physical activity and stress reduction information and the extent to which such information is given to students by college and university personnel, especially to those who are overweight or obese.

The Current Study

The purpose of the current study was to explore potential associations between weight status and students' interest in receiving health promotion (nutrition, physical activity and stress reduction) information from their college or university. We also explored potential associations of students' weight status with their self-reported receipt of health promotion (nutrition, physical activity and stress reduction) information from their academic institution.

Methods

Study Design

Secondary data analyses were conducted using data from the Spring 2011 ACHA-NCHA II dataset was used for this study (ACHA, 2011). The ACHA-NCHA II is a national research survey organized by the American College Health Association to assist college health service providers, health educators, counselors, and administrators in collecting health-related data about their students' habits, behaviors (Garcia et al., 2010). The ACHA-NCHA II instrument is a 65 question survey. The ACHA-NCHA II instrument is a 65 question survey focused on assessing health behaviors and outcomes of college students such as nutrition, exercise, sleep, mental health, tobacco, and alcohol use (ACHA, 2011). The ACHA-NCHA II is administered as a web-based survey on college campuses.

Participants

One hundred forty eight postsecondary institutions (out of 4,495 degree-granting institutions in the U.S.) self-selected to participate in the Spring 2011 ACHA-NCHA II survey administration and 116,254 surveys were

completed by students on these campuses (ACHA, 2011). The Reference Group included only institutions located in the United States that surveyed all students or used a random sampling technique, yielding a final data set consisting of 105,781 students and 129 schools (ACHA, 2011). IRB approval was obtained prior conducting this study (#0924150015NG).

The ACHA-NCHA II is administered as a web-based survey on college campuses. Researchers from each participating campus complete and submit documentation of IRB approval to ACHA, along with a school-specific survey invitation email and an Excel spreadsheet with student email addresses. ACHA administers the survey electronically, including sending scheduled reminders. For the current study, raw datasets from the Spring 2011 survey administration were obtained for analyses.

Measures

Independent Variable

The independent variable of interest for the current study was weight status, calculated using the respondents' self-reported height and weight (weight (kg)/height (m^2)). The National Heart Blood and Lung Institute (NHLBI) BMI classification categories were used to determine the respondents' weight status: (1) Underweight [BMI: <18.5] , (2) Normal weight [BMI: 18.5-24.9, (3) Overweight [BMI: 25.0- 29.9, (4) Obese Class I [BMI: 30.0-34.9, (5) Obese Class II [BMI: 35.0-39.9], and (6) Obese Class III [BMI: >40.0] ("Classification of Overweight and Obesity by BMI, Waist Circumference, and Associated Disease Risks", n.d.).

Outcomes Measures

The outcome measures were students' self-reported receipt of nutrition, physical activity and stress management information from their college or university, and students' interest in receiving health information. To operationalize students' receipt and interest the following questions were used from the ACHA-NCHA II survey: (1) *"Have you received information on the following topics from your college or university?"* and (2) *"Are you interested in receiving information on the following topics?"* A list of the possible types of information that students could receive from their college or university included nutrition, physical activity, sleep, and stress reduction. Response options for both questions were "yes" or "no".

Covariates

Covariates of interest included: (1)*Gender* (male, female, transgender), (2) *race/ethnicity* (White/Non-Hispanic, Black/Non-Hispanic, Hispanic/Latino(a), Asian/Pacific Islander, American Indian/Alaskan Native/Native Hawaiian, Biracial/Multiracial, Other), (3) *year in school* (1st year undergraduate, 2nd year undergraduate, 3rd year undergraduate, 4th year undergraduate, 5th year undergraduate, graduate/professional, not seeking a degree, other), (4) *enrollment status* (full-time, part-time, other), and (5)*current residence* (campus residence hall, fraternity/sorority housing, parents/guardian's home, other off-campus housing).

Students also provided information related to their physical health such as (1) general *health* (excellent, very good, good, fair, poor, don't know), (2) *diagnosis or treatment within the last 12 months of chronic illnesses* (diabetes, high blood pressure, high cholesterol), *weight management practices* (not trying to do anything about weight, stay the same, gain weight, lose weight) and self-reported height and weight.

Analyses

Mean and standard deviation were calculated for the age variable. Frequencies and percentages were used to characterize the demographic and health characteristics of the respondents. In addition, frequencies and percentages were used to identify the prevalence of underweight, normal weight, overweight and obesity, and receipt and interest in receiving health promotion information. Logistic regression analyses were conducted to determine the associations between BMI classification and students' receipt of health promotion information from their academic institution and their interest in receiving health promotion information. Statistical analyses were conducted using Statistical Package for Social Sciences Software (SPSS) version 23.

Results

Participant Demographics

Table 1 presents the demographic data for students completing the spring 2011 ACHA NCHA-II survey and included in the sample. Respondents were, on average, 23 years of age, female, non-Hispanic white, not married and full-time undergraduate students. Approximately one-third lived in a campus residence hall, and 40% reported living in other off-campus housing not related to fraternity/sorority housing or parent/guardian housing.

Health Characteristics, Experiences and Intention

Selected health characteristics of the respondents, dissemination of, and interest in health promotion information are presented in Table 2. Most students reported that their general health was either good or very good. Approximately one-third (32.4%) of the respondents were overweight or obese and 52% were trying to lose weight. Fifty-four percent of the students reported receiving nutrition information from their academic institution, 57% received physical activity information, and 58% received stress reduction information. Fifty-nine percent of the respondents reported that they were interested in receiving nutrition information from their academic institution, 55% physical activity information, and 62% were interested in receiving stress reduction information.

Relationship between Weight Status and Receipt of Health Promotion Information

Table 3 presents the odds that students reported receiving nutrition, physical activity, and stress reduction information according to BMI classification. Students who were classified as underweight, overweight or obese were significantly less likely to report receiving health promotion information compared to students who were classified as normal weight.

Table 1.
Demographic Characteristics of College Students Reporting Receipt and Interest in Receiving Health Promotion Information; **(N=103,539)**

Characteristics	Mean/N	SD or %
Age (years)	22.67	5.9
Gender		
Male	35,783	34.5
Female	67,560	65.2
Transgender	222	0.2
Race/Ethnicity		
White, Non-Hispanic	76,734	72.5
Black, Non-Hispanic	6,143	5.8
Hispanic/ Latino(a)	8,220	7.8
Asian/Pacific Islander	12,161	11.5
American Indian/Alaskan Native/Native Hawaiian	1,904	1.8
Biracial/Multiracial/Other	6,585	6.2
Year in School		
1st year undergraduate	21,657	20.9
2nd year undergraduate	20,746	20.0
3rd year undergraduate	20,495	19.8
4 or more years undergraduate	21,862	21.2
Graduate/Professional	17,793	17.2
Not seeking a degree/Other	958	0.9
Enrollment Status		
Full-time	95,174	91.6
Current Residence		
Campus residence hall	37,253	35.8
Fraternity/Sorority housing	1,194	1.1
Other campus housing	6,545	6.3
Parents/Guardian's home	11,074	10.6
Other off-campus housing	42,075	40.4
Marital Status		
Single	89,651	86.2
Married	11,007	10.6
Separated/Divorced/Other	3,350	3.2

Table 2.

Participant Health Characteristics, Receipt of Health Promotion Information, and Interest in Receiving Health Promotion Information

Characteristic	n	%
General Health		
Excellent	16,484	15.8
Very good	48,141	46.3
Good	31,833	30.6
Fair	6,412	6.2
Poor	964	0.9
Don't know	249	0.2
Body Mass Index (kg/m^2)		
Underweight (<18.5 kg/m^2)	4,964	4.9
Normal Weight (18.5- 24.9 kg/m^2)	64,056	62.7
Overweight (25.0- 29.9 kg/m^2)	21,866	21.4
Class I obesity (30.0-34.9 kg/m^2)	7,080	6.9
Class II Obesity (35.0-39.9 kg/m^2)	2,612	2.6
Class III Obesity (>40.0 kg/m^2)	1,557	1.5
Trying to Do Something About Weight		
Not trying to do anything	16,231	15.5
Stay the same weight	24,406	25.2
Lose weight	54,267	51.8
Gain weight	7,886	7.5
Diagnosed or Treated in the last 12 months		
Diabetes	1,063	1.0
High blood pressure	3,262	3.1
High cholesterol	3,139	3.0
Received Information		
Received Nutrition Information	56,782	54.2
Received Physical Activity Information	59,913	56.6
Received Stress Reduction Information	61,081	58.3
Interested in Information		
Interested in Nutrition Information	61,588	59.3
Interested in Physical Activity Information	57,171	55.1
Interested in Stress Reduction Information	64,515	62.0

Table 3.

Odds Ratios for Students' Receipt of Specific Health Promotion Information According to BMI Status

	Nutrition	Physical Activity
Body Mass Index (kg/m^2)	OR (CI)	OR (CI)
Underweight (<18.5 kg/m^2)	0.88* (0.83, 0.93)	0.84* (0.79, 0.88)
Normal Weight (18.5-24.9 kg/m^2)	1.00 (Reference)	1.00 (Reference)
Overweight (25.0- 29.9 kg/m^2)	0.96* (0.93, 0.99)	0.97 (0.94, 1.00)
Class I obesity (30.0-34.9 kg/m^2)	0.87* (0.83, 0.92)	0.89 * (0.85, 0.93)
Class II Obesity (35.0-39.9 kg/m^2)	0.89* (0.82, 0.96)	0.89* (0.82, 0.96)
Class III Obesity (>40.0 kg/m^2)	0.78* (0.71, 0.86)	0.78* (0.71, 0.87)

Note: OR-Odds Ratio, CI-95% Confidence Interval
* Denotes statistically significant OR
Adjusted for age, gender, ethnicity, enrollment status, residence, health coverage and chronic illness

Relationship between Weight Status and Interest in Receiving Health Promotion Information

Table 4 presents the odds that students reported being interested in receiving nutrition, physical activity and stress reduction information based on their BMI classification. Statistically significant associations were noted between interest in receiving health information and BMI, with underweight, overweight, and obese students being less likely to report interest in receiving nutrition or physical activity information. Underweight students were more likely than normal weight students to report interest in receiving stress reduction information, while overweight and obese students were less likely to report interest in receiving stress reduction information compared with normal weight students.

Table 4.

Odds Ratio and Confidence Interval for Students' Interest in Receiving Health Promotion Information According to BMI Status

	Nutrition	**Physical Activity**	**Stress Reduction**
Body Mass Index (kg/m^2)	OR (CI)	OR (CI)	OR (CI)
Underweight (<18.5 kg/m^2)	0.90* (0.85, 0.95)	0.97 (0.91, 1.03)	1.10 (1.04, 1.17)
Normal Weight (18.5- 24.9 kg/m^2)	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Overweight (25.0- 29.9 kg/m^2)	0.89* (0.86, 0.92)	0.93* (0.90, 0.96)	0.87* (0.85, 0.90)
Class I obesity (30.0-34.9 kg/m^2)	0.76* (0.73, 0.80)	0.87* (0.83, 0.92)	0.88* (0.84, 0.93)
Class II Obesity (35.0-39.9 kg/m^2)	0.92* (0.73, 0.86)	0.80* (0.74, 0.87)	0.85* (0.79, 0.92)
Class III Obesity (>40.0 kg/m^2)	0.70* (0.63, 0.78)	0.83* (0.75, 0.92)	0.88* (0.79, 0.98)

Note: OR-Odds Ratio, CI-95% Confidence Interval
*Denotes statistically significant OR
Adjusted for age, gender, ethnicity, enrollment status, residence, health coverage and chronic illness

Discussion

The aim of this study was to explore the potential associations between weight status and receipt of, and interest in receiving, health-related information on college and university campuses. The average age of the respondents was 23 years old, reflecting the national trend in the increase of college enrollment among students age and older ("Enrollment Fast Facts", n.d.). Overall, more than half of students in the sample reported receiving health information related to nutrition, physical activity, or stress reduction, which is similar to other analyses of NCHA data. At each iteration of survey administration, the ACHA publishes a reference group report that compiles data from all participating schools. Reference reports from Fall 2008 – Fall 2010 indicate similar proportions of students reporting receipt of health information on campus ("Publications and Reports: ACHA-NCHA II", n.d.). While our study examined the ACHA-NCHA II survey questions about whether students received information about specific health topics from their college or university, other studies have queried college students more generally about where they receive their health information. Kwan and colleagues (2010) noted that 46% of students who completed the 2006 NCHA-ACHA II questionnaire reported receiving no health-related information from their academic institution. They also collected data regarding the rates of receipt of several types of health information, including sexual assault/relationship violence prevention, tobacco use prevention, suicide prevention and pregnancy prevention (Kwan et al., 2010). In comparison to this study, rates of receipt for physical activity and nutrition information were lower in Kwan's analysis (25.5% and 16.6%, respectively) than the current study (54.2% and 56.6%, respectively). The original ACHA-NCHA survey was rewritten and introduced as the ACHA-NCHA II beginning in Fall 2008, and questions about where students received health information were not included in later iterations of the survey. It is possible that a higher proportion of students might have indicated receiving health information if the query included whether students received information from *any* sources, and not just the college or university.

Data from the current study also showed that over half of student desired to receive health-related information from their college or university, which is a promising indicator of the potential success of health promotion interventions focused on obesity-related behaviors on college campuses. Baxter and colleagues conducted a study similar to ours, exploring the extent to which students sought health related information and whether this varied by topic or purpose (Baxter et al., 2008). Nutrition was among the four major types of health related information sought by students; in addition they were most likely to seek information about exercise, body weight and

sleep (Baxter et al., 2008). A secondary analysis of 2006 ACHA-NCHA data indicated that most students reported parents as their primary source of health information (73.2%), followed by health center medical staff (59.7%), health educators (51.6%), and faculty/coursework (37.8%) (Vader, Walters, Roudsari, Nguyen, 2011). Another study of college student health information-seeking behaviors indicated that family and friends were the most popular sources of health information for students (Percheski & Hargittai, 2011). With regard to college or university sources, if students primarily receive health information from health center medical staff on campus, they might not have been exposed to the information if they did not visit the campus health center or if they sought health care from sources other than the university health center. Similarly, if students were not directly involved with peer health education or courses that included information about nutrition, physical activity, or stress reduction they might not have been exposed to health information about these topics. In addition, neither of the previously mentioned studies indicated the health topic areas for which students were seeking information and it is not clear if students were seeking any information regarding obesity-related behaviors.

The current study examined self-reported receipt of health information, and interest in receiving health information, by BMI status and found that students not classified as normal weight were less likely to report having received, or wanting to receive, health information from the college or university. Respondents in this study were primarily female and non-Hispanic white and, if this population was also primarily normal weight, this could have impacted BMI-related findings about receipt of health information. A previous study of health information-seeking among college students found that young women were the most likely to report looking for health information, in general, and that online sources were frequently used to seek health information (Baxter, 2008). Other studies of college students also indicate that a high proportion of students use online sources for information about health behaviors (Hogan & Sweeney, 2012). Depending on the availability of, and real or perceived access to, health information on campus, college students may choose to seek health information on their own or through known sources (e.g., parents/family, friends) rather than utilizing lesser known university resources.

In the current study, weak associations were noted between some BMI categories and the desire to receive health information from college campus resources. Therefore BMI did not appear to be a major predictor of college students' desire to receive health information from their academic institution. It is possible that college students lack awareness about how the transition to college increases the risk for poor eating habits, decreased physical activity and increased stress. Students may also lack awareness of the health implications of excessive body weight reflected by high BMIs. It is also possible that students may be aware of the health implications of excessive body weight but they may lack the necessary resources (i.e. education, support, access to healthcare providers, adequate exercise facilities) to lose weight healthfully, or they may choose to obtain health information from sources not related to their academic institution (Das & Evans, 2014). Therefore, efforts should be made to increase students' awareness regarding how the transition to college can negatively impact their health behaviors, health implications of excess body weight. Additional efforts should be made to provide them with the resources necessary to facilitate positive health behavior and healthy weight management such as access to a Registered Dietitian-Nutritionist, cooking and stress management classes.

Findings from our study indicate that a considerable proportion of college students may not be receiving information to assist them with preventing the development of negative health behaviors which are often associated with excessive bodyweight (Laska, et al., 2012; Wane et al., 2010). Interestingly, Harrington and Ickes (2016) concluded that regardless of BMI status, college students do not seem to be interested in meeting health recommendations. It is also possible that students receive, but do not retain, health-related information provided on college campuses. Many campuses provide basic information about health and related resources

on campus during orientation periods, primarily freshman orientation, when students might be overwhelmed with information already. While some college campuses require students to take at least one health-related course to fulfill graduation requirements, students generally have options for courses that could fulfill the requirements and all courses might not provide relevant information about nutrition, physical activity, or stress reduction.

The development of negative health behaviors among college students has been noted, especially during freshman year (Kasparek, Corwin, Valois, Sargent, Morris, (2008). Our findings may inform administrators, healthcare and public health professionals on college campuses about the gaps that exist in facilitating health promotion and weight management among college students. Stratifying according to BMI status may provide additional insight regarding which groups of students may need greater attention as it relates to health promotion and weight management. This knowledge may allow for more strategic use of resources and tailored approaches. Given the manner in which students report receiving health information on campus, strategies should be implemented campus wide to be sure all students are reached, regardless of whether they specifically seek services (e.g., student health center) or enroll in courses or programs covering these topics.

The results of our study suggest that there may be opportunity for improvement in the dissemination of nutrition, physical activity and stress reduction information at colleges and universities. These types of information address some of the factors contributing to poor health habits and weight gain among college students. Unhealthy eating, sedentary behavior and increased stress are associated with poor health habits and weight gain among college students (Deliens, Clarys, De Bourdeaudhuij, & Deforche, 2014; Nanney et al., 2015). In our study the greatest opportunity for disseminating health information related to healthy eating, physical activity and stress reduction appear to be among students who are obese. Therefore, thoughtful consideration should be given regarding systematic methods for disseminating information to this group of students while avoiding the appearance of discrimination based on body weight.

Limitations

The current study is not without limitations. College campuses self-select participation in the ACHA-NCHA II survey, and college students voluntarily participate in the survey. It is possible that college campuses, and students, that chose to participate in the survey are different from the general population. The NCHA website provides documentation of the generalizability of data from their college student populations, which is in line with national data from non-college student populations, suggesting that the data are somewhat generalizable. The sample included in the current study was mostly White females, and the average age of students was 23 years old. Therefore generalizability for males, other ethnic groups and younger students may be limited. All NCHA data are self-reported, and it is possible that respondents received health-related information but did not retain it, resulting in misreporting of data. Data were not available to specify what venues students received the information such as health services, dining or residence halls, and fraternity/sorority houses. Furthermore, we could not elucidate the circumstances under which students received this information, such as freshman orientation, residence hall meeting, and/or during a visit to student health dormitories; whether a health professional gave them the information or they picked up the information from a kiosk.

Conclusion

Findings from this study demonstrate that opportunities for health promotion on college campuses exist. Innovative methods for the dissemination of nutrition, physical activity and stress reduction information should be considered by stakeholders working in the area of student health to enhance the physical health of students. Strategies should be developed to meet the needs of underserved groups.

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