

Health Belief Model Offers Opportunities for Designing Weight Management Interventions for College Students

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ABSTRACT

Objective: Identify weight-related beliefs of college students and test the predictive power of the Health Belief Model for body mass index (BMI).

Design: Cross-sectional online survey with beliefs measured on 5-point scales.

Setting: University in North Carolina.

Participants: Undergraduates (n = 516; 91.9%), females (n = 399; 71.3%), white non-Hispanic students (n = 507; 86.2%), and 20.3% of overweight or obese status.

Variables Measured: Perceived severity, susceptibility, barriers, benefits, and internal and external cues to action.

Analysis: One-way ANOVA and regression. Significance was $P < .05$.

Results: Strongest beliefs concerned benefits of healthy eating and physical activity (mean, 4.1 ± 0.7); weakest beliefs concerned barriers to adopting such behaviors (mean, 2.6 ± 0.9). The regression model was statistically significant ($P < .001$) and explained 17% of variance in BMI (multivariate coefficient = 0.177). Perceived severity, susceptibility, external cues, barriers, and benefits predicted BMI.

Conclusions and Implications: Several beliefs were identified that could serve as the basis for weight-related interventions addressing specific concerns, needs, and goals of college students.

Key Words: health belief model, college students, overweight, food choices, physical activity participation (*J Nutr Educ Behav.* 2017;■■:■■-■■.)

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INTRODUCTION

Overweight and obesity are public health problems in the US.¹ Among the groups affected by these conditions are college students. Findings from the 2015 National College Health Assessment Reference Group Data Report indicated that approximately 34.1% of college students were overweight or obese.² The upward trend in these conditions among these young adults is of concern to health care professionals because the transition from overweight status to obesity often

occurs at ages 18–29³ and ample clinical and epidemiological evidence links body mass index of ≥ 25.0 to a variety of cardiometabolic disorders.⁴ Although these comorbidities were historically associated with older persons, several authors documented these conditions in overweight and obese college students. For example, Dubuque et al⁵ found that among a sample of 89 undergraduates, 14% and 49% had hypertension or prehypertension, respectively, 28% were overweight, and 16% were obese, and that overweight and obesity were

significant predictors of elevated blood pressures ($P < .008$). In addition, researchers identified associations between symptoms of depression and obesity among college students.⁶

Several authors proposed that the increasing rates of college student overweight and associated comorbidities are attributable, at least in part, to frequent consumption of high-fat, high-sugar products, low intakes of fruits, vegetables, and whole grains,^{7,8} and sedentary lifestyles.⁹ Accordingly, efforts to attenuate the rates of overweight emphasized compliance with recommendations that promote regular consumption of nutrient-dense foods and beverages¹⁰ and participation in regular aerobic physical activity.^{11,12}

The Health Belief Model (HBM) is a conceptual framework that identifies perceptions reflecting the extent to which people are willing to adopt health-protective behaviors.¹³ The constructs comprising the HBM are perceived susceptibility, severity, barriers, benefits, and internal and external cues to action. In combination,

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perceived susceptibility and severity provide a measure of the degree of perceived threat associated with the condition. Internal and external cues to action refer to motivators that may influence an individual to adopt a favorable behavior change, eg, memories of how the condition affected loved ones (internal cues) and information about the condition from friends, relatives, and the print or electronic media (external cues). Besides personal beliefs, behavior change is also influenced by sociodemographic variables such as age, gender, race/ethnicity, marital and employment status, and income and education level. The HBM was used successfully with college students to study compliance with food safety recommendations,¹⁴ adoption of osteoporosis-preventive behaviors,¹⁵ diabetes self-management,¹⁶ and participation in regular physical activity,¹⁷ among other behaviors. However, a literature search covering 1990–2017 located no study that used the HBM as a framework for identifying college students' weight-related beliefs or assessing their willingness to adopt dietary and physical activity habits conducive to healthy weight maintenance.

The increasing rates of overweight and related chronic conditions among US college students reflect a need for research that identifies the weight-related beliefs of this population that may be prompting them to adopt lifestyle behaviors conducive to unhealthy weight gain. These beliefs can serve as the basis for designing educational interventions tailored to specific subgroups of college students that offer information about these conditions and teach strategies for risk reduction.¹² Therefore, guided by the beliefs from the HBM, the aims of this descriptive, cross-sectional study were to (1) identify the weight-related beliefs of a random sample of undergraduate and graduate students attending a university in North Carolina, (2) identify associations between these beliefs and selected demographic variables, and (3) determine the power of the HBM to predict body mass index (BMI) among the student sample. Regarding the third objective, the researchers selected BMI as the dependent variable to test the predictive ability of the HBM because BMI is frequently re-

garded as an indicator of adiposity and the degree of adiposity is associated, at least in part, with dietary and physical activity behaviors. In the current study, beliefs about undertaking such weight management behaviors were addressed in the belief statements comprising the HBM. Because the terms *overweight* and *obese* refer to various levels of excess body fat as reflected in BMI values, the BMIs of overweight and obese students were combined rather than analyzed separately when determining whether significant associations existed between the students' adiposity and the beliefs from the HBM. Therefore, as used in this study, the term *overweight* refers to students who were either overweight or obese by BMI. The study site was a public university located in a rural community in the Appalachian region of North Carolina with a total student enrollment (undergraduates and graduates) of 17,932 during academic year 2015–2016 when data were collected. During that year, 67.7% of full-time undergraduate and 70.2% of full-time graduate students received some form of financial assistance from the university.

METHODS

Participants and Recruitment

A power calculation indicated that a sample of 581 students was required for a 95% confidence level. Power calculation was completed with a tool provided by Creative Research Systems.¹⁸ A random sample of 6,000 undergraduate and graduate students was recruited by electronic letters through 2 e-mail blasts (3,000 e-mails/blast) sent during mid-November, 2015 and mid-February, 2016, respectively. Because this study focused on beliefs related to dietary and physical activity behaviors, data collection was suspended from late November, 2015 through mid-February, 2016 to minimize the risk of collecting atypical data during the holiday season when changes in food access and winter weather could have altered students' usual eating and physical activity beliefs and behaviors. Each e-mail blast was followed by a reminder e-mail 1 and 2 weeks later, as recommended by Dillman et al.¹⁹ Students who were interested in participating clicked a link

in the recruitment letter taking them to a screen that outlined the elements of informed consent; those who wished to continue in the study clicked an Accept button that took them to the questionnaire. Anonymity of responses was achieved by detaching students' e-mail addresses from the questionnaires; breaches of confidentiality were minimized by retaining the surveys on the university Qualtrics (Provo, UT) server and by not printing out questionnaires. This research was approved by the institutional review board at Appalachian State University.

Survey Instrument

The researchers collected cross-sectional data by administering an anonymous, online, close-ended questionnaire using Qualtrics survey software (2015). The initial items asked for self-reported weight and height, which were used to calculate BMI. Students' weight-related beliefs were measured using 6 scales guided by constructs from the HBM. Accordingly, these scales focused on perceived severity of the consequences of overweight, susceptibility to becoming overweight, barriers to adopting healthy eating and physical activity habits to achieve a healthy weight, benefits to adopting such habits, and internal and external cues to action to adopt these habits. Preceding these scales, students were given definitions for the terms *healthy eating habits* and *healthy physical activity habits* and were instructed to consider these definitions when completing the scales. *Healthy eating habits* was defined as consuming fewer fried, high-fat, high-calorie, and sugary beverages, foods, and snacks, and more lean meats, fish, poultry, fruits, vegetables, and whole-grain foods. The term *healthy physical activity habits* was defined as undertaking at least 30 minutes of moderate-intensity activities such as taking formal exercise classes, brisk walking, jogging, dancing, playing sports, gardening, housework, etc, on most or preferably every day. Four belief scales were subdivided into subscales to measure more focused perceptions. The perceived severity scale began with *Being overweight could ...* and consisted of 3 subscales: emotional/mental health (4 beliefs), physical

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