

A High Prevalence of Food Insecurity Among University Students in Appalachia Reflects a Need for Educational Interventions and Policy Advocacy

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ABSTRACT

Objectives: To measure prevalence and correlates of food insecurity among college students in Appalachia, compare food-insecure and food-secure students on correlates, and identify predictor variables.

Design: Cross-sectional, online questionnaire.

Setting: University in Appalachia.

Participants: Nonprobability, random sample of 1,093 students (317 male [30.1%]; 723 females [68.4%]).

Main Outcome Measures: Food insecurity, coping strategies, money expenditure, academic progress, and demographics.

Analysis: Correlational, chi-square, and regression.

Results: A total of 239 students experienced low food security (21.9%) whereas 266 had experienced very low food security (24.3%) in the past 12 months. Predictor variables were higher money expenditure and coping strategy scale scores, lower grade point averages, male gender, receiving financial aid, fair or poor self-rated health status, and never cooking for self or others. These variables accounted for 48.1% of variance in food security scores. Most frequently used coping strategies included purchasing cheap, processed food (n = 282; 57.4%), stretching food (n = 199; 40.5%), and eating less healthy meals to eat more (n = 174; 35.4%).

Conclusions and Implications: Food-insecure students need interventions that teach budgeting skills and how to purchase and prepare healthy foods, as well as policies that increase access to food resource assistance.

Key Words: Appalachia, coping strategies, college students, food insecurity (*J Nutr Educ Behav.* 2017;■■:■■–■■.)

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INTRODUCTION

Food insecurity means having limited or uncertain access to an adequate and safe food supply, in socially acceptable ways.^{1,2} Researchers have identified several risk factors for food insecurity, including poverty,³ living in food deserts,⁴ low educational attainment,⁵

and substance abuse.⁶ The consequences of food insecurity can manifest as adverse impacts on the growth and development of infants, children, and adolescents⁵ and on the physical and mental health of persons of all ages.^{7,8} Moreover, among adults, epidemiologic studies have linked food insecurity to the metabolic syndrome.⁹

Survey data collected from several US campuses indicated that college students are among the population subgroups vulnerable to food insecurity.¹⁰⁻¹⁶ Reported rates of student food insecurity ranged from 14.8% at an urban university in Alabama¹¹ to 59.0% at a rural university in Oregon.¹⁰ Several authors identified correlates of food insecurity specifically associated with being in college. These included lower grade point average (GPA),^{10,12,14} on-campus residence,^{13,15} living off-campus with roommates,¹⁵ and being employed while in school.¹⁰ Other sociodemographic characteristics associated with college student food insecurity included poor or fair self-rated health status and having an annual income <\$15,000¹⁰; older age; receiving food assistance; having lower self-efficacy for cooking cost-effective, nutritious meals, having less time to

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prepare food and having less money to buy food¹¹; identifying with a minority race/ethnic group^{11,15}; and having an increased risk for depression and anxiety.¹⁶ Searches in PubMed, Science Direct, and Google Scholar located only 1 study¹¹ that examined food insecurity among students attending institutions of higher learning in a southern state, and the authors acknowledged that data were collected after a natural disaster that may have affected their findings.

The Southeastern Consortium for Research in Food Security is a partnership between the US Department of Agriculture (USDA) Food and Nutrition Service and researchers from regional universities. This consortium focuses on topics related to food access and policy advocacy, and added the topic of college student food insecurity to its research agenda in 2016. This article is the first to report on the scope of the student food insecurity problem at a Consortium member school. The study site was a university located in the Appalachian region of North Carolina showing high rates of poverty, obesity, and food insecurity.^{17,18} Therefore, the aims of this descriptive, cross-sectional study were to: (1) measure the prevalence of food insecurity and identify associated correlates in a nonprobability sample of college students, (2) compare food-insecure and food-secure students on correlates, and (3) identify predictors of food insecurity.

METHODS

Participants and Recruitment

A nonprobability sample of 6,000 sophomores through graduate students attending a university in the Appalachian region of North Carolina during the 2015–2016 academic year was recruited. Recruitment was accomplished by electronic letters through 2 e-mail blasts (3,000 e-mails/blast) using e-mail addresses provided by the Office of Institutional Research, Assessment and Planning at the university. Freshmen were excluded because a primary objective was to measure the prevalence of food insecurity over the previous 12 months, and freshmen would not have begun their college career during that time. The first e-mail blast was sent in

mid-November, 2015, and the second in mid-February, 2016; data collection was concluded on March 31, 2016. Data collection was suspended from late November until mid-February to avoid collecting data during the holiday season, when food and financial resources may have been more accessible to the students. Each e-mail blast was followed by a reminder e-mail (along with the survey) 1 and 2 weeks later, as recommended by Dillman et al.¹⁹ This research was deemed exempt from human subjects protection by the institutional review board at Appalachian State University.

Survey Questionnaire and Measures

Data were collected using a 73-item cross-sectional, anonymous, online questionnaire administered using Qualtrics survey software (Provo, UT, 2015). Students' food security status was measured using the 10-item USDA Adult Food Security Survey (AFSS).² Next, students were asked to report how they generally felt about their current food situation, by selecting all applicable descriptors from a list of 16 descriptors such as satisfied, fine, embarrassed, and angry. This was followed by an 8-item money expenditure scale (MES) that asked students to indicate how often over the past 12 months they had spent money on the following items instead of using the money to buy food: alcohol, cigarettes, recreational drugs, car repairs, gasoline, public transportation to school or work, pet care, and tattoos. The MES was followed by a 29-item coping strategies scale (CSS) based on strategies used by food-insecure persons.^{20,21} Items focused on saving ($n = 9$), support ($n = 10$), food access ($n = 6$), and selling ($n = 4$); students were asked to indicate how often they had used each strategy over the past 12 months. Response options for the MES and CSS items were *often*, *sometimes*, and *never*. Students next completed a 4-item academic progress scale (APS) on which they rated their perceived class attendance, overall academic progress including graduating on time, attention span during class, and understanding of concepts taught in class, by selecting *excellent*,

good, *fair*, or *poor*. Items in the CSS were guided by the food insecurity literature,^{20,21} whereas the authors developed the MES and APS scales. Access to social support for food assistance was assessed using 4 questions from the National Health and Nutrition Examination Survey Social Support Scale.²² The respondents provided information on demographic, economic and anthropometric variables, and BMI was calculated from their self-reported height and weight. The questionnaire concluded by eliciting information on self-rated health status, and food preparation and intake behaviors.

Two nutrition professors with experience in survey item construction and familiarity with the food security literature determined content validity of all items. The questionnaire was pilot-tested online with 41 students enrolled in a community nutrition class. Based on students' feedback, an *other* option was added to the gender question and the wording of 2 coping strategies was changed for greater clarity.

Statistical Analyses

Data were analyzed using SAS software (version 9.1.3, SAS Institute, Cary, NC, 2002–2004). Descriptive statistics were computed for all scaled and demographic variables as appropriate. Students' food security status was determined using the USDA's scoring system for the 10 AFSS questions, such that zero affirmative answers reflected high food security, 1–2 marginal food security, 3–5 low food security, and 6–10 very low food security.² When comparing student groups, those who scored in the high or marginal food-secure categories were combined, as were those who scored in the low and very low food-secure categories.² Body mass index (BMI) was categorized as underweight, normal weight, overweight, or obese using the cut-points 18.5, 25, and 30 kg/m², respectively.²³

When the 8-item MES and 29-item CSS were scored, 1 point was allotted for a response of *never*, 2 for *sometimes*, and 3 for *often*. Therefore, scores on the MES could range from 8 to 24 points whereas scores on the CSS could range from 29 to 87 points. The 4-item APS and the items

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