

# The Prevalence of Food Security and Insecurity Among Illinois University Students

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## ABSTRACT

**Objective:** This study aims to define the food security status of Illinois university students and whether sociodemographic characteristics are related to that status.

**Design:** A cross-sectional research design was used to analyze the food security status of undergraduate Illinois university students, employing a survey containing the Household Food Security Survey Module that was distributed via e-mail to student participants.

**Setting:** Four public Illinois universities were highlighted, including Eastern Illinois University, Northern Illinois University, Southern Illinois University, and Western Illinois University.

**Participants:** A total of 1,882 undergraduate students participated in the research study in April, 2013.

**Main Outcome Measure:** Variables include food security status and sociodemographic characteristics such as age, sex, race, and academic standing.

**Analysis:** Statistical analysis included frequencies and chi-square tests.

**Results:** The percentage of student respondents in the total sample who were considered food insecure was 35.0%. There were significant relationships between food security status and sociodemographic variables including race, grade point average, loan use, and living location.

**Conclusions and Implications:** This study suggests that 35% of respondents were food insecure based on quantitative assessment. Understanding the significant relationship between food security status and race, grade point average, loan use, and living location may be useful in developing services for those in need.

**Key Words:** food insecurity, food security, university students, hunger, college, school nutrition (*J Nutr Educ Behav.* 2016;48:376-382.)

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## INTRODUCTION

Food insecurity is the inability to obtain an adequate amount of food and sufficient nutrition.<sup>1</sup> Originally referred to as food insufficiency, food insecurity was first addressed in 1990 as part of the National Nutrition Monitoring and Related Research Act,<sup>2</sup> which mandated that a standardized food security measurement be created.<sup>3</sup> In 1995 the Food Security Supplement became the main instrument to measure annual food security and insecurity in the US.<sup>3</sup> The Household Food Security Survey Module (HFSSM)

is a small portion of the Food Security Supplement that specifically focuses on food sufficiency.<sup>2</sup> The HFSSM is the current reference standard for assessment of food security in various populations.<sup>4-13</sup> The HFSSM classifies individuals into 4 different categories regarding their food security status.<sup>3</sup> Those considered food secure may have high or marginal food security. Those considered food insecure may have low or very low food security.

Currently in the US, the percentage of food insecurity is 14.3% of the population, which is a 0.6% decline since 2011.<sup>14</sup> Of that, very low-food-secure

individuals comprise 5.6% or 6.8 million households.<sup>14</sup> The remaining 85.7% of the US population is considered food secure.<sup>14</sup> Some populations are at higher risk for food insecurity than others, including households with children, households headed by black, non-Hispanic, and Hispanic people, and households with incomes at or below 185% the poverty line.<sup>14</sup> Populations associated with a greater incidence of very low food security include single-parent households; individuals living alone; black, non-Hispanic households; Hispanic households; households with an income below 185% of the poverty line; metropolitan areas; and households in the southern portion of the US.<sup>14</sup> Although these high-risk characteristics comprise a portion of the university student population, a limited number of studies have considered the prevalence of food insecurity specifically among this population.<sup>4,9-11</sup>

In 2006, a study from the University of Alberta reported that overall risk of food insecurity was directly related to

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a lack of student loan money to pay for adequate amounts of food.<sup>4</sup> In 2009, the University of Hawaii at Manoa found 21% of the student body was food insecure, and people more likely to be food insecure included those living on campus, those living off-campus with roommates, and those identifying themselves as Hawaiian, Pacific Islander, or Filipino.<sup>9</sup> In 2011, the Queensland University of Australia found food insecurity to be 46.5% among undergraduate students.<sup>10</sup> Those renting, boarding, or sharing accommodations and those with low incomes or receiving government assistance were at higher risk for food insecurity.<sup>10</sup> A 2013 study examined female African American college students and observed food insecurity as a significant predictor of low self-esteem and poorer conflict resolution.<sup>15</sup> A recent study in Oregon found that 59% of students were food insecure at some point during the school year.<sup>11</sup> Being employed, having an income < \$15,000/year, and having poor to fair health were associated with food insecurity whereas higher grade point averages (GPAs) were inversely related to food insecurity.<sup>11</sup>

Food insecurity is associated with a multitude of health disparities such as undernourishment, chronic diseases, inflammation, obesity, and mental health conditions such as anxiety, depression, and aggression.<sup>5,7,8,12-14,16-22</sup> Specifically in university students, poor self-image is a documented occurrence with food insecurity.<sup>10</sup>

Nearly one third of college students are first-generation; within that number, approximately 24% represent disadvantaged groups.<sup>23</sup> In 2013, the average student loan debt for college graduates was nearly \$30,000.<sup>24</sup> As tuition rises and more low-income, first-generation students enroll, the idea of the frugal college student who exists on ramen noodles has been displaced by the hungry student in need of help, yet unsure of how to ask.

Food insecurity is a major public health concern because of its prevalence and underlying health complications. However, despite the severity of this issue, little known is about the food security status of university students. Previous research looking at US institutions is limited and is composed of smaller sample sizes. The current research available has been conducted

only in coastal areas (ie, Hawaii, Oregon) and may not reflect the Midwest. Moreover, no study has conducted thorough food-insecurity research on Illinois university students even though Illinois is in the bottom 20% of state economies, which may differ from students attending universities in more stable economies.<sup>25</sup> As such, this study will target 4 universities in various regions of Illinois to address not only the prevalence of food insecurity but also important sociodemographic factors. The importance of the findings presented here is that it provides clear data on the extent of food insecurity among Illinois university students. In the authors' opinion, this study represents the first step in a continuum of research that will focus on reducing food insecurity in university students.

## METHODS

A cross-sectional research design was used to analyze food security status of undergraduate Illinois university students. The HFSSM along with sociodemographic questions were used in this quantitative study to assess 4 public universities in Illinois including Eastern Illinois University, Northern Illinois University (NIU), Southern Illinois University (SIU), and Western Illinois University. Inclusion criteria for participants were (1) enrollment in the undergraduate programs at any of the 4 state institutions, (2) access to university e-mail system, (3) the ability to read and respond in English, and (4) being age  $\geq 18$  years. After the authors received approval from the institutional review boards of all 4 universities involved, a link to the HFSSM with sociodemographic questions was e-mailed to all enrolled students at the universities through each university's respected e-mailing system. All students were informed that survey completion implied consent for their responses to be used in the study. Web-based surveys have an average response rate between 6% and 15%<sup>26</sup>; therefore, an incentive of a gift card drawing for 3 \$100 gift cards allotted for books and groceries was used to increase student participation. Responses were collected during April and May, 2013.

The HFSSM included 10 questions assessing food security level (Table 1). Following US Department of Agricul-

ture procedure to calculate a participant's food security level, the number of affirmative answers were counted.<sup>3</sup> An affirmative answer included answering often or sometimes to the 3-point questions and answering yes to the yes/no questions. The total number of affirmatives was participants' total score. A score of 0 classified someone as having high food security. Scores of 1–2 signified marginal food security. Scores of 3–5 signified low food security. Any score  $> 6$  indicated very low food security. Therefore, a score of  $\geq 3$  signified food insecurity.

The remaining questions on the survey determined sociodemographic characteristics about the students to identify groups with greater amounts of food insecurity. These questions included information about age, sex, race, academic standing, living situation, employment, GPA, financial support, and hometown region. The questionnaire, including both sociodemographic questions and the HFSSM, was pilot-tested on a 300-level university class in the Food and Nutrition Department at SIU; reliability was found to be .80 (Cronbach  $\alpha$ ).

Frequencies of food security status and demographic information were calculated. Chi-square analysis was used to assess the statistical association between observed values and expected values of the sociodemographic variable and food security variable. As part of the chi-square analysis, standard residuals were calculated to determine where the significant differences in observation vs expectation lie. To adjust for multiple comparisons, a Bonferroni correction was applied, which left statistical significance at  $P < .001$ . IBM SPSS software (version 22, Armonk, NY, 2013) was used to analyze the data.

## RESULTS

A total of 48,658 students were solicited via e-mail. There were 1,882 undergraduate participants who completed and submitted the survey through [www.Limesurvey.org](http://www.Limesurvey.org) (3.87% response rate). The number of responses from each university included 350 Eastern Illinois University students, 484 NIU students, 812 SIU students, and 236 Western Illinois University students. A large percentage of students were from SIU

**Table 1.** Household Food Security Survey Module

Question	Response
In the past 9 months, I worried whether my food would run out before I got money to buy more.	Rarely / Sometimes / Often
In the past 9 months, the food that I bought just didn't last, and I didn't have money to get more.	Rarely / Sometimes / Often
In the past 9 months, I couldn't afford to eat balanced meals.	Rarely / Sometimes / Often
In the past 9 months, did you or other adults in the household ever cut the size of your meals because there wasn't enough money for food?	Yes / No
(If yes to the previous question) How often did this happen?	Rarely / Sometimes / Often
In the past 9 months, did you ever eat less than you felt you should because there wasn't enough money for food?	Yes / No
In the past 9 months, were you ever hungry but didn't eat, because there wasn't enough food?	Yes / No
In the past 9 months, did you lose weight because there wasn't enough food?	Yes / No
In the past 9 months, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?	Yes / No
(If yes to the previous question) How often did this happen?	Rarely / Sometimes / Often

(43.1%); NIU was the next largest representative (25.7%). Senior (41.6%) and junior (28.2%) students made up the majority of the sample. white/Caucasian students were overrepresented whereas African American and Hispanic students were underrepresented compared with the current ethnic demographics of Illinois university students used in the study. [Table 2](#) provides a further breakdown of the study's respondents.

Over half of the sample (62.1%) received financial support for college from a parent or guardian, or relative. A majority of students received financial support that does not require repayment, such as grants or scholarships (63.8%), as well as financial support that does require repayment, such as loans (70.0%). Slightly more than half of the student sample had a part-time job (56.1%) and over a third were unemployed (36.3%) ([Table 3](#)). Of those who were unemployed, 71% received financial support from a parent or guardian and 61% received financial support such as grants and scholarships that does not require repayment.

The frequency of responses to the HFSSM survey questions was quantified. Students were classified as having food security or insecurity. Based on definitions by the US Department of Agriculture, food security was broken down further into high food security and marginal food security.<sup>3</sup> Likewise, food insecurity was further specified into low food security or very low food security ([Table 4](#)). Of the total

**Table 2.** Sociodemographic Characteristics of Illinois University Student Sample

Factor	Total (n = 1,882)	Valid %
Sex		
Male	629	33.4
Female	1,253	66.6
Race		
African American	181	9.6
Hispanic	93	4.9
White/Caucasian	1,456	77.4
American Indian, Asian/Pacific Islander, other	152	8.1
University		
Eastern Illinois University	350	18.6
Northern Illinois University	484	25.7
Southern Illinois University	812	43.1
Western Illinois University	236	12.5
Academic level		
Freshman	269	14.3
Sophomore	299	15.9
Junior	532	28.2
Senior	782	41.6
Grade point average		
0.00–1.99	34	1.8
2.00–2.99	476	25.3
3.00–3.99	1,221	64.9
4.00	151	8.0
Hometown		
Rural	772	41.0
Suburban	864	45.9
Urban	246	13.1%
Where do you live?		
On-campus	697	37.0
Off-campus with parent or guardian	146	7.8
Off-campus not with parent or guardian	1,039	55.2
Do you live alone?		
Yes	378	20.1
No	1,504	79.9

**Table 3.** Financial Status of University Student Sample

	Total (n = 1,882)	Valid %
Do your parents/guardians or other relatives offer you financial support for college?		
Yes	1,168	62.1
No	714	37.9
Do you receive financial support through grants, scholarships, or any funding source besides relatives that does not require repayment?		
Yes	1,201	63.8
No	681	36.2
Do you receive financial support through student loans or any other funding that does require repayment?		
Yes	1,318	70.0
No	564	30.0
Besides being a student, do you currently hold a part-time or full-time job?		
Full-time	143	7.6
Part-time	1,056	56.1
No job	683	36.3

sample, 35.0% was found to have low (16.6%) or very low (18.4%) food security. All 4 universities had similar percentages in each of the 4 food security levels, which suggested that food security status was similar across these 4 public higher education institutions.

Chi-square test of independence was used to compare food security status with each sociodemographic factor within the entire sample of Illinois university students (Table 5). There was a significant association be-

tween food security status and race, GPA, living situation, and student loan use ( $P < .001$ ).

Food security status was significantly associated with race ( $\chi^2 = 46.989$ ;  $P < .001$ ). A high number of African Americans had less high food security and more very low food security than was expected. A high number of white/Caucasian students were associated with greater high food security.

Table 6 displays the significant association between GPA and food security status ( $\chi^2 = 84.466$ ;  $P < .001$ ). Students with the lowest GPA (0–1.99) were less likely to be highly food secure. A large number of students in the GPA range of 2.00–2.99 had more food insecurity compared with students in the other GPA ranges. A high number of student respondents with the highest GPA range ( $\geq 3.00$ ) had more high food security and less very low food security. Lower GPA students with significantly less high food security and higher GPA students with significantly greater high food security are present in all GPA ranges.

Living situation and food security status were significantly associated ( $\chi^2 = 42.064$ ;  $P < .001$ ). A large number of students living off-campus with parents or guardians had more high food security and less food insecurity. On the other hand, a large number of those living off-campus without their parents or guardians had less high food security and more very low food security.

The association between financial status and food security status was significant ( $\chi^2 = 70.033$ ;  $P < .001$ ). A high number of students who did not use financial support requiring repayment (ie, student loans) had much more high food security and less food inse-

curity. A high number of those receiving financial support such as student loans had less high food security and more very low food security.

## DISCUSSION

Food insecurity has become an important research topic in the nutrition community owing to its negative effects on individuals' health and well-being. There are few existing studies examining food security levels at US colleges and universities. In addition, no studies to date have used 4 different universities to compare the prevalence of food insecurity and associated sociodemographic factors in the Midwest. As such, the purpose of the current study was to determine the level of high, marginal, low, and very low food security among Illinois university students.

This study determined that the prevalence of low food security was 16.6% and very low food security was 18.4%. Thus, 35.0% of respondents were food insecure, which is comparable to findings of previous studies. Chaparro et al<sup>9</sup> found that 21% of students at the University of Hawaii at Manoa were food insecure, based on a sample of 441 non-freshman students. Alternatively, Hughes et al<sup>10</sup> reported that the food insecurity rate was 46.5%, using a sample of 399 students from the University of Australia. The variation from these studies may be due to several factors, including different geographic locations, institutional variability, and small sample size.<sup>9,10</sup>

Data collected in 2013 confirmed that the national and Illinois food insecurity rates were 14.3%<sup>14</sup> and 13.6%,<sup>27</sup> respectively, which is significantly lower than the food insecurity rate among student respondents (ie, 35.0%). This study was looking at a population that exhibits risk factors of food insecurity including a high unemployment rate, lower-paying jobs for those who are employed, and variable living situations. Coupled with the large expenditures for school-related expenses, these factors may explain why high levels of food insecurity occur in this population. Although Illinois university students are included in state and national rates, the higher prevalence of very low food security among college students (ie, 18.4%) vs

**Table 4.** Prevalence of High, Marginal, Low, and Very Low Food Security Among EIU, NIU, SIU, and WIU Student Samples

Food Security	EIU (n [%])	NIU (n [%])	SIU (n [%])	WIU (n [%])	Total (n [%])
High	163 (46.6)	198 (40.9)	315 (38.8)	113 (47.9)	789 (41.9)
Marginal	77 (22.0)	107 (22.1)	198 (24.4)	52 (22.0)	434 (23.1)
Low	56 (16.0)	90 (18.6)	134 (16.5)	32 (13.6)	312 (16.6)
Very low	54 (15.4)	89 (18.4)	165 (20.3)	39 (16.5)	347 (18.4)
Total	350	484	812	236	1,882

EIU indicates Eastern Illinois University; NIU, Northern Illinois University; SIU, Southern Illinois University; WIU, Western Illinois University.



**Table 5.** Chi-Square Test of Independence for Food Security Level and Sociodemographic Characteristics for University Student Sample

Characteristic	$\chi^2$	Degrees of Freedom	P
Sex	4.816	3	.186
Race	46.989	9	< .001*
Academic level	10.098	9	.343
Grade point average	84.466	9	< .001*
University	13.211	9	.153
Hometown	20.544	6	.002
Where do you live?	42.064	6	< .001*
Do you live alone?	8.550	3	.036
Do you receive financial support through grants, scholarships, or any funding source besides relatives that does not require repayment?	0.098	3	.992
Do you receive financial support through student loans or any other funding that does require repayment?	70.033	3	< .001*
Besides being a student, do you currently hold a part-time or full-time job?	2.839	6	.829

\*Significance at  $P < .001$  after adjusting for multiple comparisons with a Bonferroni correction.

the national population (ie, 5.6%) emphasizes the need to identify factors responsible for this disparity.<sup>14</sup>

One potential factor influencing food insecurity may be a student's living arrangements. Hughes et al<sup>10</sup> found an increased association between food insecurity and students who rent, board, or share accommodations. Similarly, Chaparro et al<sup>9</sup> found an increased risk of food insecurity among those living

on-campus or living off-campus with roommates. This study also found an association with a large number of students living off-campus with parents or guardians and having high food security and an inverse association with food insecurity. Only a small number of students living off-campus without parents or guardians were likely to have high food security whereas a large number had very low food security. These find-

ings reflect parental or guardian assistance with food costs for students who live with their parents or guardians; yet food insecurity is an issue for those living off-campus without their parents or guardians. It is apparent that college students need to develop a sense of independence and self-sustaining, but at what cost? Continued investigation is necessary to elucidate this relationship.

One factor associated with food insecurity was a student's racial background. For instance, students who identified as Hawaiian/Pacific Islander, Filipino, or  $\geq 2$  races were more likely to be food insecure.<sup>9</sup> In the current study, African American students were more likely to be very low food secure and less likely to be high food secure. However, because African American people were underrepresented in this sample population, the rate of food insecurity in African American students may be significantly greater than that reported. In contrast, white/Caucasian students were more likely to be highly food secure. The association between race and food security level in this study is consistent with that shown in the national data, which similarly found that African American individuals are at the highest risk for food insecurity.<sup>14</sup> Interactions between race and food insecurity are complex and likely involve a variety of socioeconomic factors that need to be understood to better serve African American students who may be at greater risk for low food security.

In the current study, a significant association between food security and GPA was also identified. Previous work by Patton-Lopez et al<sup>11</sup> similarly reported that higher GPAs  $> 3.10$  were negatively associated with food insecurity in a sample of 354 students at a midsize rural university in Oregon. This study also observed that students with higher GPA ranges ( $\geq 3.00$ ) had the best food security profile characterized by more high food security and less very low food security. In contrast, lower-GPA students had less high food security compared with higher-GPA students. Future research will need to develop the relationship further between food insecurity and academic performance (ie, GPA) to determine whether 1 variable in fact influences the other.

The association between financial support and food security level was

**Table 6.** Cross-Tabulation for Grade Point Average and Food Security Status

Grade Point Average	Food Security Status				
	High	Marginal	Low	Very Low	Total
0.00–1.99					
Count	6	9	10	9	34
SD	−2.2	0.4	1.8	1.1	
2.00–2.99					
Count	131	117	102	126	476
SD	−4.9	0.7	2.6	4.1	
3.00–3.99					
Count	566	277	181	197	1,221
SD	2.4	−0.3	−1.5	−1.9	
4.00					
Count	86	31	19	15	151
SD	2.9	−0.6	−1.2	−2.4	
Total	789	434	312	347	1,882

Note:  $P < .001$  after adjusting for multiple comparisons with a Bonferroni correction.

found to be significant. Students who received financial support through student loans or other types of funding requiring repayment were more likely to have low or very low food security and less likely to have high food security. Those students who did not receive financial support through student loans or funding that requires repayment were more likely to be highly food secure and less likely to be marginal, low, or very low food secure. There are limited data on the association between food insecurity and financial support for higher education. However, owing to the increasing number of first-generation college students, coupled with the rising costs of tuition and enormous student loan debt, this factor may have a significant impact on food security for current and future students. Students who are financially constrained to pay for college may be limited in other resources as well. Providing food assistance programs and services to students with financial limitations may be a critical component to building a healthy university environment.

Limitations of this study include a self-reported survey that does not take into account issues concerning honesty and accuracy of responses. The self-selected sample of students at public universities in Illinois may limit generalizability of the results to other college students in other college settings. This study was looking at a population with multiple risk factors for food insecurity, so higher levels of food insecurity were likely to occur.

This study consisted of only a quantitative assessment of food security in the college environment. The benefits of qualitative assessment would include providing insight into the perceptions of university students who are food insecure as well as those who are not. Focus groups, community discussions, and other qualitative assessment tools could be used to gain greater insight into the underlying and basic causes of food insecurity in university students.

## IMPLICATIONS FOR RESEARCH AND PRACTICE

Future research should attempt to orchestrate a more generalizable study

that includes universities from multiple states to determine whether the percentage of low and very low food security is a constant across several geographical locations throughout the country. Future studies should also consider different types of higher education institutions such as private universities, junior colleges, or trade schools. Additional research should focus on sociodemographic characteristics and how they relate to food security of university students.

In this study, a quantitative assessment tool was used to evaluate food insecurity in Illinois university students. Although the researchers were able to identify certain characteristics associated with food insecurity in this population, the underlying factors contributing to food insecurity remains unclear. In future studies, use of qualitative assessment tools (eg, focus groups or interviews) may provide greater insight into the causes of food insecurity. In addition, qualitative differences between food insecurity in university students and other at-risk populations. For instance, college students may have distinct perceptions and attitudes about food insecurity. College students exhibit lower coping self-efficacy as well as inadequate knowledge of dietary recommendations.<sup>28</sup> As such, it will be important for future research to identify how college students differ from other at-risk populations so that strategies designed to reduce food insecurity can be tailored specifically to each group.

Practitioners and university counselors can use this information to provide assistance to guard against food insecurity on campus. Campus food banks or pantries could be established to provide free food to students in need. In addition, campus counselors and nutrition educators could provide information to students regarding eligibility for the Supplemental Nutrition Assistance Program. These federal benefits are available to low-income people and families to buy the food they need for good health. Erasing the stigma surrounding students in need of food assistance and providing support for those striving to get an education is paramount.

Overall, this study took the first step in combating food insecurity on university campuses by defining the food

security profile of Illinois university students. The findings demonstrate that university students exhibit significant levels of food insecurity. By identifying what factors influence food security status, future research studies can take the discussion a step farther, both quantitatively and qualitatively. As new studies are completed on this topic, researchers and public health officials should begin developing and implementing strategies to promote food security on university campuses.

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## **CONFLICT OF INTEREST**

The authors have not stated any conflicts of interest.