Newly Food-Insecure College Students in Appalachia During the COVID-19 Pandemic

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ABSTRACT

Objective: This study investigated if the coronavirus disease (COVID-19) pandemic influenced college student food insecurity and factors that might contribute to a student becoming newly food insecure.

Design: A convenience sample was assessed using a cross-sectional survey.

Setting: Online.

Participants: College students (n = 2,018) enrolled at a land-grant institution in Appalachia.

Main Outcome Measure(s): Food insecurity was assessed using the Hunger Vital Sign with reference before COVID-19 and since COVID-19. Demographic and pandemic-specific questions and their associations with food insecurity status were assessed.

Analysis: Students were categorized as food secure (food secure before and since COVID-19 or food insecure in the year before COVID-19 but not food insecure since COVID-19), consistently food insecure (food insecure before and since COVID-19), and newly food insecure (food secure before but food insecure since COVID-19). Multivariate logistic regression was used to investigate the relationship between new food insecurity and contributing factors.

Results: Of respondents, 68.4% were food secure, 16.5% were consistently food insecure, and 15.1% were newly food insecure. Loss of employment, increased grocery expenditure, anxiety, and a perceived threat posed by COVID-19 were significant indicators of students being newly food insecure.

Conclusions and Implications: More students were facing food insecurity as a result of the COVID-19 pandemic. Continued advocacy for sustainable solutions to college food insecurity is needed.

Key Words: college, university, food insecurity, COVID-19, pandemic (*J Nutr Educ Behav.* 2022;54:202–210.)

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INTRODUCTION

Food insecurity—defined as the lack of consistent access to enough food to live an active and healthy lifestyle¹ or the limited or uncertain availability of nutritionally adequate, safe foods obtained in socially acceptable ways²—has been impacted during the coronavirus disease (COVID-19) pandemic because of food shortages, increase cost of food, and loss of income.³ Since the declaration of the COVID-19 pandemic by the World

Health Organization in March, 2020 and the implementation of social distancing practices to flatten the curve,⁴ household food insecurity is reported to have increased.^{5,6} With the rise in unemployment rates⁷ and increased need for governmental benefits, which tracks similar to the Great Depression⁸ and the 2007–2008 recession, there is an increased risk of food insecurity and hunger.⁹ However, food insecurity is not only impacted by the ability to afford food but by food accessibility

and availability and monetary stability.¹⁰ The COVID-19 pandemic influenced many aspects of the food system that impact food accessibility and availability, including production, transportation, food costs, and shortages.⁵ With the changes to the food system during COVID-19^{5,11,12} and the known detrimental impacts on the health and well-being of populations,^{13–17} it is imperative to understand the risk of food insecurity among different populations in an attempt to prevent food insecurity from continuing to rise.

Research suggests that food insecurity rates among college students surpass the national household average with a weighted estimate of 37%.¹⁸ Food-insecure students struggle to maintain grade point average and academics requirements, have poor health outcomes, experience increased stress and anxiety, and grapple with managing money expenditure.^{19–24} In response to

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stress-inducing situations, many students develop behavioral patterns to cope, including changing their eating patterns, borrowing money, or postponing bill payments.^{19,20} These coping mechanisms are similar to food-insecure and newly food-insecure behaviors during the COVID-19 pandemic.⁵ With the suggested increased risk of food insecurity and its associations during the COVID-19 pandemic and the higher rates of food insecurity among college students, it is pertinent to study the possible impacts of the pandemic on college students' food security status.

Therefore, although research has shown college students to be susceptible to food insecurity, the COVID-19 pandemic adds another layer of burden on this population. Most college campuses provide students access to food (dining halls) and food assistance resources (food pantries), but COVID-19 restrictions limited students' ability to use campus resources.²⁵ College students report their ability to work during the COVID-19 pandemic was impacted by job loss or cut hours, resulting in already financially limited students being without income to support their basic needs.²⁶ Furthermore, many were forced to move out of college towns and back to their hometowns, where job opportunities may have been even more scarce.²⁶ Unlike most of the American population, which received federal stimulus checks to offset the financial burdens of the COVID-19 pandemic, a majority of college students were ineligible because of claimed dependence status.²⁵ Therefore, with the cost of goods increased, access to campus resources limited, and the financial opportunities for college students narrowed, the COVID-19 pandemic heightened a student's risk of food insecurity. To date, limited research has evaluated food insecurity among college students and investigated factors that may have contributed to the onset of food insecurity during the COVID-19 pandemic.^{25,27,28} This current study aimed to investigate if students became food insecure since the COVID-19 pandemic and factors related to a student becoming food insecure during the pandemic at an Appalachian university.

METHODS

This study was approved by the Institutional Review Board (no. 2003924134) at West Virginia University. This cross-sectional, online study was conducted between late March and early April, 2020, at which time courses were fully online and campus services were limited. To be eligible, students had to be currently enrolled at the university and aged ≥ 18 years. Students were recruited using the university listserv ($N = 39,903$), with an initial email sent in early March containing a link to complete a Qualtrics survey (Qualtrics XM, 2021). Three reminder emails were sent 4, 18, and 25 days later to students who had not completed the survey as recommended by Dillman's Tailored Design Methods for the implementation of surveys.²⁹ Before accessing the survey, students were required to read and accept the informed consent. Students who completed the survey were given the opportunity to provide their email for a chance to win 1 of 6 gift cards, each valued at \$100. Email information was entered on a separate Qualtrics link to ensure confidentiality.

Survey Design

A 161-item survey was developed by researchers to assess various aspects of health and well-being during the pandemic ([Supplementary Data](#)). The full survey took approximately 40–60 minutes to complete. Variables of interest in this study were guided by previous college food insecurity literature.³⁰

Demographics and Pandemic Changes

The survey asked students to self-report their race and ethnicity,^{31,32} year in school,^{20,21} gender identity,³³ disability status,³⁰ if they had dependents,^{19,34} current employment status,³⁵ if they were from the Appalachian region,^{19,21} and if they were a first-generation student.³⁰ Race was selected from a list that included White, Black, American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, and other. Students were able to select all that applied.

Students were asked about changes to their lives since the COVID-19 pandemic. These questions included if they had lost employment, had dropped any of their college courses and had lost access to food resources since the start of the COVID-19 pandemic. The survey asked if students had a meal plan and ate on campus before the COVID-19 pandemic, if they have struggled to have meals without access to campus dining and whether they had children or other dependents. Access to the adequate food supply in the grocery store was also assessed. Changes in student's meal intake were measured by asking, "Compared to before COVID-19, are you eating less, more, or the same?" and "Since COVID-19, has your cooking increased, decreased, or stayed the same?" Student expenditures were assessed by asking if spending on food and alcohol had increased, decreased, or stayed the same since the pandemic. Finally, students were asked the level of threat they perceived the COVID-19 pandemic to be for themselves on a scale of not a threat at all, a slight threat, a significant threat, or a very severe threat.

Depression

Depression was measured using the Patient Health Questionnaire-9 Item.³⁶ The Patient Health Questionnaire-9 Item is a validated tool that asks respondents a series of questions on the experience of depressive symptoms over the past 2 weeks.³⁶ Symptoms included problems such as little interest or pleasure in doing things with response options of not at all, several days, more than half the days, and nearly every day. Responses are summed for a total possible score of 27, with cutoffs of minimal depression (0–4), mild depression (5–9), moderate depression (10–14), moderately severe depression (15–19), and severe depression (20–27).

Anxiety

Anxiety was measured using the Generalized Anxiety Disorder-7 Item,³⁷ a validated tool widely used to measure an individual's presence of anxiety through the collection of responses to 7 questions about the experience

of symptoms such as feeling nervous, anxious, or on edge. Response options include not at all, several days, more than half the days, and nearly every day. Scores are summed for a possible score of 21 with cutoffs of minimal anxiety (0–4), mild anxiety (5–9), moderate anxiety (10–14), and severe anxiety (15–21).

Food Insecurity

Food insecurity was assessed using the Hunger Vital Sign, a tool derived from the US Department of Agriculture Household Food Security Survey Module³⁸ and validated as a screening tool in a pediatric population by Hager and colleagues.³⁹ This screener has been used in previous college food insecurity work.⁴⁰ This 2-item screener was modified to assess before and since the COVID-19 pandemic. Thus, the survey was asked twice for a total of 4 questions. The first questions asked, “Before the COVID-19 pandemic, did you worry whether your food would run out before you got money to buy more?” and “Before the COVID-19 pandemic, the food you bought just didn’t last and you didn’t have money to get more.” Affirmation of often true or sometimes true (vs never true) to either or both of the statements indicated a student was at risk for food insecurity. The questions were asked again with “Since the COVID-19 pandemic” substituted for “Before the COVID-19 pandemic.”

Analysis

The survey was initiated by 2,764 students, but only participants who completed the food insecurity questions, and 50% or more of the remaining survey, were included in the analysis. The resulting sample for analysis was 2,018 students. Because of limited response in some groups, to avoid potential identification of respondents, researchers collapsed race into White, Black, Asian, Bi/Mixed, and other before analysis.

Researchers followed the methodology of a previous COVID-19 food insecurity study and created 3 categories of food security status.⁵ These included: food-secure students (students who were food secure before and since COVID-19 and students

who were food insecure at some point before COVID-19 but were no longer food insecure since the COVID-19 pandemic), consistently food-insecure students (students who were both food insecure before COVID-19 and remained food insecure since the COVID-19 pandemic), and newly food-insecure students (students who were food secure before the COVID-19 pandemic but food insecure since COVID-19).

To determine associations among collected variables and the food security categories, the Pearson chi-square test was used. Significant variables were entered into a forward selection logistic regression model to determine which factors are correlated with a student being newly food insecure during the COVID-19 pandemic. The selection criterion for the model entry was $P < 0.05$. The forward selection was used⁴¹; thus, each variable was added independently, with nonsignificant variables being dropped from the model with only significant variables remaining in the final model. Results are presented in odds ratio and confidence intervals. Data were analyzed using JMP Pro (version 12.2, SAS Inc, 2012) and SAS (version 9.4, SAS Inc, 2013).

RESULTS

Survey results were available for 2,018 students (5.1% response rate). The mean age of the sample was 24.9 ± 5.54 years, and 29.6% were in graduate/professional school. The majority (70.7%) were female, White (83.0%), were not first-generation college students (71.5%), and did not identify as Appalachian (53.2%). Of the sample of students, 68.4% were food secure, 16.5% were consistently food insecure, and 15.1% were newly food insecure. Thus, 31.6% of the student sample were food insecure at the time of the study. Characteristics by food security status are presented in Table 1. Newly food-insecure students (68.1%) were more likely to report they had lost employment because of COVID-19 compared with consistently food-insecure (62.7%) and food-secure (40.6%) students ($P < 0.001$). More newly food-insecure students (9.4%) reported they lost

access to food resources compared with consistently food-insecure (8.6%) and food-secure (2.0%) students ($P < 0.001$). Students who were newly food insecure (50.9%) had higher reports of their expenditures on groceries increasing since COVID-19 than consistently food-insecure (43.7%) and food-secure (34.6%) students ($P < 0.001$). Furthermore, newly food-insecure students (14.0%) were more likely to perceive COVID-19 as a severe threat than consistently food-insecure (10.1%) and food-secure (4.5%) students ($P < 0.001$). Newly food-insecure (24.5%) students were more likely to have relied on a campus meal plan before COVID-19 than consistently food-insecure (38.2%) students ($P = 0.0103$). Newly (9.7%) and consistently (10.6%) food-insecure students were more likely to report they had a disability than food-secure (5.2%) students ($P < 0.001$). More newly (41.0%) and consistently (37.6%) food-insecure students reported being first-generation students than food-secure (23.7%) students ($P < 0.001$). Students who self-reported severe levels of anxiety and depression were more likely to be newly (32.1% and 16.7%) and consistently (30.6% and 26.1%) food-insecure than food-secure (16.5% and 8.6%) students ($P < 0.001$, respectively). Newly (45.7%) and consistently (46.5) food-insecure students were more likely to report they were eating less since COVID-19 ($P < 0.001$) than food-secure (31.0%) students.

Once entered into the forward selection logistic regression, loss of employment, grocery expenditure, anxiety, and the perceived threat posed by COVID-19 remained significant indicators of students being newly food insecure, as reported in Table 2. In fact, students who lost employment as a result of COVID-19 were 130% more likely to be food insecure than students who were consistently food insecure or food secure. Students were 58% more likely to be newly food insecure if they had increased grocery expenditure since COVID-19. College students who reported severe levels of anxiety were 59% more likely to be newly food insecure than students

Table 1. Respondent Characteristics For Food-Secure, Consistently Food-Insecure, and Newly Food-Insecure College Students

Variable	Food-Secure Students	Consistently Food-Insecure Students	Newly Food-Insecure Students	P
Gender identity				0.27
Male	364 (26.9)	92 (28.2)	89 (30.0)	
Female	960 (71.0)	232 (71.2)	203 (68.3)	
Transgender	20 (1.5)	0 (0)	2 (0.7)	
Nonbinary or other	8 (0.6)	2 (0.6)	3 (1.0)	
Race				0.05
White	1124 (83.2)	256 (78.5)	240 (80.8)	
Black	29 (2.2)	13 (4.0)	12 (4.0)	
Asian	54 (4.0)	9 (2.8)	13 (4.4)	
Bi/Mixed	79 (5.8)	19 (5.8)	16 (5.4)	
Other	65 (4.8)	29 (8.9)	16 (5.4)	
School year				< 0.001
Freshman	233 (17.2)	37 (11.4)	34 (11.3)	
Sophomore	215 (15.9)	47 (14.4)	46 (15.4)	
Junior	220 (16.2)	81 (24.9)	61 (20.3)	
Senior	257 (19.0)	94 (28.8)	69 (23.0)	
Graduate	430 (31.7)	67 (20.5)	90 (30.0)	
First-generation college student				< 0.001
No	1036 (76.3)	204 (62.4)	177 (59.0)	
Yes	321 (23.7)	123 (37.6)	123 (41.0)	
Appalachian				0.96
No	716 (52.8)	174 (53.4)	160 (53.7)	
Yes	639 (47.2)	152 (46.6)	138 (46.3)	
Disability status				< 0.001
No	1283 (94.7)	288 (89.4)	270 (90.3)	
Yes	71 (5.2)	34 (10.6)	29 (9.7)	
Has dependents				0.081
No	1301 (95.7)	311 (95.1)	278 (92.7)	
Yes	58 (4.3)	16 (4.9)	22 (7.3)	
Lost employment since COVID-19				< 0.001
No	387 (59.4)	75 (37.3)	59 (31.9)	
Yes	265 (40.6)	126 (62.7)	126 (68.1)	
Lost food resources since COVID-19				< 0.001
No	1323 (98.0)	296 (91.4)	269 (90.6)	
Yes	27 (2.0)	28 (8.6)	28 (9.4)	
Had campus meal plan before COVID-19				0.01
No	1003 (74.6)	266 (82.6)	222 (75.5)	
Yes	341 (25.4)	56 (17.4)	72 (24.5)	
Change in eating amount since COVID-19				< 0.001
Eating less	421 (31.0)	152 (46.5)	137 (45.7)	
Eating the same amount	330 (24.3)	50 (15.3)	42 (14.0)	
Eating more	609 (44.8)	125 (38.2)	121 (40.3)	
Change in cooking amount since COVID-19				0.07
Cooking less	773 (76.0)	181 (57.6)	193 (66.8)	
Cooking the same amount	349 (26.2)	79 (25.2)	56 (19.4)	
Cooking more	211 (15.8)	54 (17.2)	40 (13.8)	
Change in grocery expenditure since COVID-19				< 0.001
Decreased	318 (24.3)	72 (22.6)	52 (18.0)	
Stayed the same	539 (41.1)	107 (33.6)	90 (31.1)	
Increased	454 (34.6)	139 (43.7)	147 (50.9)	
Perceived COVID-19 threat				< 0.001
Not a threat at all	318 (23.7)	52 (16.3)	55 (18.8)	
A slight threat	739 (55.1)	152 (47.8)	133 (45.4)	

(continued)

Table 1. (Continued)

Variable	Food-Secure Students	Consistently Food-Insecure Students	Newly Food-Insecure Students	P
A significant threat	224 (16.7)	82 (25.8)	64 (21.8)	
A very severe threat	60 (4.5)	32 (10.1)	41 (14.0)	
PHQ-9 Depression Scale				
Minimal (0–4)	311 (22.9)	23 (7.1)	31 (10.4)	< 0.001
Mild (5–9)	408 (30.0)	56 (17.2)	68 (22.7)	
Moderate (10–14)	309 (22.7)	70 (21.5)	94 (31.4)	
Moderately severe (15–19)	215 (15.8)	92 (28.2)	56 (18.7)	
Severe (20–27)	117 (8.6)	85 (26.1)	50 (16.7)	
GAD-7 Anxiety Scale				< 0.001
Minimal (0–4)	431 (31.7)	49 (15.0)	51 (17.1)	
Mild (5–9)	436 (32.1)	69 (21.2)	85 (28.4)	
Moderate (10–14)	269 (19.8)	67 (20.6)	67 (22.4)	
Severe (15–21)	224 (16.5)	141 (30.6)	96 (32.1)	

COVID-19 indicates coronavirus disease 2019; GAD-7, Generalized Anxiety Disorder-7 Item; PHQ-9, Patient Health Questionnaire-9 Item.

Note: Values are n (%). Significant associations were represented by $P < 0.05$ from chi-square test of independence analysis; PHQ-9 assesses the number of depressive symptoms in the past 2 weeks; GAD-7 assesses an individual's presence of anxiety during the past 2 weeks.

who reported minimal anxiety. Finally, students who perceived COVID-19 as a severe threat to themselves were 120% more likely to be newly food insecure than students who were consistently food insecure or food secure.

DISCUSSION

This study aimed to investigate if changes related to the COVID-19 were related to a change in food security status among college students. This study adds to the research on

the high prevalence of food insecurity among college students,¹⁸ with 31.6% of the sample classified as food insecure. However, in light of the COVID-19 pandemic, students who were previously food secure potentially faced new burdens that

Table 2. Logistic Regression Model Predicting New Food Insecurity Among University Students

Variable	Levels	Odds Ratio	95% Confidence Interval
Lost employment since COVID-19	No	1 (REF)	1 (REF)
	Yes	2.30	1.61–3.29
Change in grocery expenditure since COVID-19	Stayed the same	1 (REF)	1 (REF)
	Increased	1.58	1.06–2.35
	Decreased	0.88	0.54–1.45
GAD-7 Anxiety Scale	Minimal (0–4)	1 (REF)	1 (REF)
	Mild (5–9)	0.79	0.47–1.32
	Moderate (10–14)	0.99	0.60–1.64
	Severe (15–21)	1.59	1.01–2.49
Perceived COVID-19 threat	Not a threat at all	1 (REF)	1 (REF)
	A slight threat	0.98	0.61–1.55
	A significant threat	1.03	0.58–1.84
	A very severe threat	2.20	1.16–4.16

COVID-19 indicates coronavirus disease 2019; GAD-7, Generalized Anxiety Disorder-7 Item; PHQ-9, Patient Health Questionnaire-9 Item; REF, reference.

Note: The logistic regression model reports the odds of being newly food insecure than both food-secure and consistently food-insecure students combined. The selection criteria for the model entry was $P < 0.05$. Variables from simple analyses were entered into a forward selection multiple logistic regression model. Variables were added in the following order: school year, first-generation college student, disability status, lost employment since COVID-19, had campus meal plan before COVID-19, lost food resources since COVID-19, change in eating amount since COVID-19, change in cooking amount since COVID-19, change in grocery expenditure since COVID-19, perceived COVID-19 threat, PHQ-9 depression scale, and GAD-7 anxiety scale. Only variables that remained significant in the model are shown.

contribute to food insecurity.^{25,27,28} In fact, this study identified 15% of students being newly food insecure since the COVID-19 pandemic. Factors that influenced the odds of new food insecurity included: loss of employment, increased grocery expenditure, and the perceived threat of COVID-19.

Since the beginning of the COVID-19 pandemic, rates of unemployment and food insecurity rose nationally. The highest unemployment rates during the pandemic are noted among adults aged 18–24 years, including much of the college population.^{7,42} This loss of employment is detrimental to college students, evidenced by students who faced the loss of employment being 130% more likely to be newly food insecure. This finding is consistent with research by Owens and colleagues,²⁵ which found the strongest predictors of student food insecurity during the pandemic were loss of employment and being furloughed. Furthermore, loss of employment, at both the personal and household level, was associated with higher odds of food security status changes.²⁷ However, the *#RealCollege* Report, conducted by the Hope Center, found that students who experienced no change in employment also experienced food and housing insecurity.⁴³ Thus, employment loss might exacerbate the experience of food insecurity but maintaining employment is not completely preventative. This may be especially true for students who report a disability, are in their upper-class academic years and are first-generation students, which were student populations associated with being food insecure in this study. Accordingly, as the *#RealCollege* Report suggests, food insecurity is likely associated with more than a temporary loss of income which college administrators need to consider when making decisions regarding COVID-19.⁴³

The US Department of Agriculture chief economist discussed the rise in food cost because of the impacts of COVID-19 on the food supply chain.⁴⁴ As a result, many Americans' grocery expenditures increased during COVID-19. Authors in this study found that newly food insecure students had increased expenditures on groceries since COVID-19. The

nationwide campus closures forced many students living on campus to relocate, which did not guarantee increased access to food²⁸ as many experienced decreased access to paid resources such as housing and dining.²⁶ In addition, students lost access to community resources such as food pantries and were ineligible for federal benefits, including *Supplemental Nutrition Assistance Program*,⁴⁵ at the time of this study despite requests to waive eligibility restrictions during the early days of the pandemic. Therefore, students who were financially independent and are more likely to be food insecure²³ also had to budget for higher-priced items. Altogether, the ineligibility of pandemic aid, and the loss of campus resources and meal plans likely resulted in many students having to purchase food at grocery stores, which could explain our findings that newly food insecure students experienced the loss of access to food resources and had increased expenditures on groceries.

Although students were 58% more likely to be newly food insecure if they had increased grocery expenditure since COVID-19, newly food-insecure students reported eating less since the start of the pandemic. These results are similar to Owens and colleagues²⁵ in which 46.2% of respondents said they eat less because there was not enough food or money. Taken together, newly food-insecure students maybe be spending more but not be buying nutritionally dense foods or foods that last potentially because of the limited knowledge of grocery shopping, cooking skills, and nutrition literacy among food-insecure students.^{23,46}

In addition, eating patterns are influenced by emotional responses, including anxiety, depression, worry, and stress which were found to be key determinants in food consumption during COVID-19 in Italy.^{47,48} Studies suggest that mental health and emotional responses, including anxiety, depression, worry, perceived threat, and stress, are increased when experiencing public health emergencies or epidemics.^{49–51} Furthermore, studies have reported increased anxiety, threat, and depression among college students during the COVID-19.^{26,49,52–54} In this study, depression

and anxiety were associated with student food security status. The relationship between mental health and food insecurity is considered bidirectional, with previous research that indicating that severe depression can influence the onset of food insecurity.⁵⁵ In this study, severe anxiety significantly predicted a student becoming newly food secure. This finding may relate to a student's anxiety during COVID-19 as students who perceived COVID-19 to be a severe threat to themselves were also 120% more likely to be newly food insecure. The perceived threat of COVID-19 varies among college students depends on many variables, including age, education and knowledge, media exposure, perceived severity of COVID-19, contraction of COVID-19, and mental health.^{56–58} Research has shown that students who perceived COVID-19 as a severe threat were more likely to have sufficient and correct knowledge about masking wearing, susceptible populations, symptoms of infection, hand washing, and preventative measures.⁵⁷ Therefore, those in this study who perceived COVID-19 as a severe threat may have had anxiety visiting the grocery shopping and instead taken grocery store precautions, which can lead to more expensive measures, such as purchasing a 2-week to 30 day supply of food or using delivery and/or curbside pickup.⁵⁹

Although this study highlights the potential impact of COVID-19 on student food security status and factors associated with becoming newly food insecure, this study is not without limitations. The use of cross-sectional data cannot infer causality. In addition, the response rate was low, and the sample cannot be generalized to the college population. At West Virginia University, the student population is 79.1% White, 53.6% male, and 52% are residents of the state.⁶⁰ The national college population is 55.2% White and 55.5% female.⁶¹ Thus, comparatively, the sample in this study had a higher proportion of respondents that were White and female. Although West Virginia University does not provide a breakdown of the student population by all school years, the main campus had 26,839 students enrolled, with 21,086 undergraduates, 4,821 in the freshman class, 1,490

professional students, 4,263 graduate students, and 1,864 international students.⁶² The sample in this study had a 29.6% completion rate among graduate and professional students, which is higher than the university population suggests. In addition, national student statistics suggest that first-generation college students make up a third of the student body, which is similar to the demographics shown here.⁶³ Similarly, national disability statistics suggest an estimated 20% of undergraduates and 12% of the post-baccalaureate report having a disability, which our sample does not reflect.⁶⁴ Therefore, our study population is not representative of our institution or college students nationally.

Furthermore, the use of a 2-item food insecurity screener could have impacted the accuracy of the prevalence of food insecurity measured. Although the 2-item food insecurity screener is validated,³⁹ and this screener has been used in previous college food insecurity research,⁴⁰ testing its validity in college populations is limited, which is a commonly reported issue with food insecurity survey tools.⁶⁵ Despite this, the level of food insecurity found within this study is similar to other research on college students, such as Owens et al,²⁵ reporting a 34.5% food insecurity rate compared with the 31.6% reported here during the COVID-19 pandemic. Regarding the change in food insecurity status, 2 research studies from the University of North Carolina-Chapel Hill²⁷ and the University of Florida²⁸ reported larger shifts in food insecurity than discussed in this study (20% and 59.6%, respectively, vs 15.1%), although methodology for assessing change in food insecurity status varies across all studies. Thus, there is potential the use of the 2-item screener had lower sensitivity than longer survey methods, although future research is needed.

Finally, other factors that could have influenced a student becoming newly food insecure, such as a change in living situation, living with parents, the impact of COVID-19 business restrictions, other indicators of financial status such as being financially dependent or independent and level of change in income, use of community resources, and

knowledge of nutrition, were not collected in this study and may be of value to collect in future research.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The COVID-19 pandemic has caused a major shift in the lives of college students across the US. College food insecurity was already an established public health issue plaguing campuses, and the COVID-19 pandemic has resulted in more students facing the burden of trying to access and afford food. As pointed out by Laska et al,⁴⁰ a multidisciplinary approach is needed to advocate for best practices to help these food-insecure students. It is essential that universities help students with COVID-19 related stressors and prioritize new approaches that support students in the hybrid-campus environment. A potential way to lessen food insecurity among college students is to maintain campus jobs and keep dining options open with take-out or delivery options. In addition, many college students have low nutrition literacy, food purchasing, and cooking skills. Therefore, first-year seminars, both online and in-person, that incorporate components of nutrition education, including food budgeting, recipes, and nutrition, are encouraged to assist students in understanding ways to appropriately manage money expenditure and healthy eating. Online educational modules can be developed and freely available to students to seek to achieve nutrition literacy.

Furthermore, higher education institutions would benefit by continuing access to mental health services in a variety of environments (ie, online and group counseling) and incorporating more comprehensive services that support and encourage healthy eating patterns and purchasing. Additional outreach and resources are needed for first-generation or newly and consistently food-insecure students with disabilities. University counseling, health, and outreach centers can increase their efforts to reach at-risk students with health messaging to share coping strategies, skills, and resources available during

campus shutdowns. Finally, college administration and policymakers are urged to consider investing in student emergency aid and lobbying for increased aid for college students during COVID-19. Thus, college administrators, nutrition educators, stakeholders, and policymakers may use the evidence in this study to support the claim that more students are facing food insecurity as a result of the COVID-19 pandemic. Future research can expand on these findings, with the potential for qualitative research to gain further insight into the barriers students have faced during the COVID-19 pandemic.

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SUPPLEMENTARY DATA

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jneb.2021.08.010>.

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