COMPARISONS OF FOOD INSECURITY CORRELATES DURING AND BEFORE THE COVID-19 PANDEMIC AMONG MARRIED STUDENTS ATTENDING A UNIVERSITY IN APPALACHIA

A Thesis by SARAH MORGAN ADKISSON

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A Thesis by SARAH MORGAN ADKISSON May 2022

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Abstract

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Background: Food insecurity, a public health problem among US college students, means having limited or uncertain access to nutritious and safe food. There is currently limited research concerning the impact of the Covid-19 pandemic on the food security status of married college students. Accordingly, the aims of this study were to identify food insecurity among married students with and without children during the pandemic and identify associated correlates. Methods: A cross-sectional online questionnaire measured food insecurity status using the USDA 18-item Household Food Security Survey (HFSS) and evaluated dietary patterns, food access challenges and strategies, sources of support, and sociodemographic characteristics. Descriptive and inferential procedures compared food secure and food insecure households, and linear regression identified predictor variables for food insecurity controlling for race, employment status, number of children, and whether the student's spouse was also enrolled at the university (p<0.05). Results: A total of 169 of the 691 recruited students (24.5%) submitted completed questionnaires, of whom 65.1% were

female, 81.9% were non-Hispanic white, with a mean age of 34.3 years (\pm 9.7). The overall sample was 70.4% food secure and 29.6% food insecure. The rates of food insecurity in households with and without children, respectively, were 32.9% and 26.4%. If given greater access, food insecure students identified that they would have eaten more vegetables (57.5%) and red meat (52.5%), and food secure students identified vegetables (57.5%) and fruit (28.3%). Students from food insecure households identified "unemployment or reduced employment" (69.6%) and "anxiety or worry about becoming infected with the Covid-19 virus by shopping for food in person" (67.4%) as their key challenges for accessing food, whereas food secure students reported that they had no challenges (51.9%). The food access strategy most frequently used by food insecure students with children was "prepared food and beverages at home to save money" (85.7%) and for those without children "purchased and ate cheap processed foods" (91.3%). The strategy used most frequently by food secure students with children was "shopped for food online" (53.1%) and by those without children was "prepared food and beverages at home to save money" (47.3%). The source of support identified most often by the majority of students was their "spouse" (77.7%). Conclusions: The Covid-19 pandemic had a more severe unfavorable impact on the food consumption patterns and on the perceived mental/emotional health and academic performance of food insecure households with children compared to food secure households with children. Findings indicate a need for continued efforts from university administrators and policy makers to facilitate food access among married college students, particularly those with children.

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Foreword

Chapter Two of this thesis is a manuscript that will be submitted to the *Journal of Nutrition Education and Behavior*, the peer-reviewed journal of the Society for Nutrition Education and Behavior. This manuscript complies with the guidelines for authors for that journal.

Chapter One Introduction

1.1 LITERATURE REVIEW

Food Security Definition and Measurement

Food security means having regular access, in socially acceptable ways, to a nutritious and safe food supply that supports an active, healthy life.¹ The 18-item Household Food Security Survey (HFSS), published by the United States Department of Agriculture Economic Research Service (USDAERS), is administered annually to measure the food security status of US Households.² All households are classified as either high (no reported indications of food access problems or limitations), marginal (one or two reported indications with little or no changes in diet or food intake), low (reports of reduced quality, variety, or desirability of diet, but little to no indication of reduced food intake), and very low (multiple indications of disrupted eating patterns and reduced food intake).³

The first two levels (high and marginal) define households that are food secure, and the latter two (low and very low) define food insecure households.² For households with children, high food security is designated with a raw score of 0 (zero) points, marginal food security with scores between 1-2 points, low food security with scores between 3-7 points, and very low food security with scores between 8-18 points.³ For households without children, a score of 0 (zero) reflects high, 1-2 marginal, 3-5 low, and 6-10 very low food security.² Scores are based on the number of affirmative responses, i.e., "yes," "often," "sometimes," "almost every month," and "some months but not every month," to questions concerning the quantity, quality, variety, and desirability of the available food supply.²

The rate of food security among US households in 2020 was 89.5%, which was unchanged from 2019.⁴ Furthermore, in 2020, 38.3 million people were living in food insecure

households, with 9.4 million adults living in households with very low food security, and 6.1 million children living in food insecure households where both children and adults were food insecure.⁴ The consequences of living with prolonged food insecurity for persons of all ages include compromised nutrient reserves,⁵ anxiety and depression,^{6,7} unfavorable impacts on physical health such as obesity⁸ and onset of chronic diseases such as asthma, hypertension, or diabetes.^{6,9}

College Student Food Insecurity Prevalence

Ample evidence indicates that college student food insecurity is a public health problem.¹⁰ A national study that analyzed prevalence and correlates of food insecurity among students from eight US universities found that 19% of participating students were food insecure and an additional 25.3% were at risk for food insecurity.¹¹ Another national study that surveyed twenty-two higher education institutions found a food security rate of 42.4%.¹² Research conducted at ten colleges and universities in the Appalachian region found rates of student food insecurity ranging from 22.4% to 51.8%, with an average rate of 30.5%.¹³

The present study was conducted at Appalachian State University (AppState) located in the western region of North Carolina in Watauga County. This county's food insecurity rate was 15.2% in 2019, with 8,340 food insecure residents.¹⁴ During the Spring 2016 semester, the food insecurity rate among AppState students was 46.2%.¹⁵ The predictors for food insecurity among college students include receiving financial aid,^{15,16} lower grade point average (GPA),¹⁵ male gender,¹⁵ and fair or poor self-rated health status.^{15,16}

Outcomes of Food Insecurity for College Students and Coping Strategies

Prolonged periods of food insecurity, as over a four-year academic career, can have unfavorable impacts on the mental, emotional, and physical health of college students.¹⁷⁻²⁰ The mental and emotional problems associated with food insecurity for this population include stress

and anxiety,^{18,19} depression,^{17,18} and hopelessness.^{17,19} Furthermore, food insecurity is associated with obesity and poor dietary intake among college students.²⁰ Higher rates of poor sleep quality have also been found among food insecure students.²⁰

Food insecure college students use several coping strategies for accessing food. McArthur et al.²¹ found that the most frequent strategies used by food insecure students at AppState were purchasing cheap processed food, stretching food to make it last longer, and sharing groceries and/or meals with relatives, friends, or neighbors. Other investigators have identified being employed while in school, planning menus before buying food, and eating less healthy meals to eat more¹⁵ among the coping strategies used by food insecure college students. Additionally, Stebelton et al.¹⁹ reported that food insecure college students used the following coping strategies: skipping meals, snacking rather than consuming full meals, borrowing friends' meal cards, intentionally going to bed early to avoid late-night hunger, and ignoring hunger signs or pretending not to be hungry.

Food insecure college students identifies the following interventions as those they believe would improve their food access: more opportunities for part-time or full-time employment, more affordable campus meal plans, learning how to manage money and make a budget, learning how to shop for affordable healthy food, and learning how to eat healthy.^{10,21} Campus administrators have responded to the problem of student food insecurity by establishing food pantries, offering cooking classes and personal budget training, and discounting meal plans.^{10,21,22}

Food Insecurity Nationally During the Covid-19 Pandemic

In March 2020 the first cases of Covid-19, a highly infectious, severe respiratory disease that includes symptoms such as fever, cough, shortness of breath, fatigue, and loss of taste and

smell, were reported in the US.²³ The pandemic has not only infected and led to the death of millions of persons but has also increased the rates of food insecurity across the US. Wolson and Leung²⁴ found that low-income food insecure households were significantly more likely to experience problems accessing food, medications, and healthcare services compared to low-income food secure households during the pandemic. Another study showed a higher Covid-19 infection rate among food insecure households verses their food secure counterparts during the pandemic.²⁵ Among US food insecure individuals surveyed in a national study, African American households were more likely to report that they had trouble affording food during the pandemic and racial/ethnic minorities were significantly less confident about their household's food security during the pandemic.²⁶

Food Insecurity and College Students During the Covid-19 Pandemic

Food insecure college students have experienced a further decline in their ability to access an adequate food supply due to the challenges brought on by the pandemic.²⁷ A study conducted by Mialki et al.²⁸ found that out of 3206 surveyed college students attending a large, public university in the Southeastern US, 38% (n=1218) experienced a change in their food security status as a result of the pandemic, with 59.6% (n=726) reporting a decline in their food access. Other investigators surveyed 2,039 students attending a large southeastern university and reported that food insecurity increased by approximately one-third during the Spring 2020 semester compared to before the pandemic.²⁹ Hagedorn et al.³⁰ found that among 2018 college students enrolled at a university in Appalachia, 16.5% were consistently food insecure and another 15.1% were newly food insecure since the onset of the pandemic.

Some of the challenges for accessing food reported for college students associated with the pandemic include evacuation from on-campus housing,^{28,31} closure of campus resources

(including dining halls and work-study programs),³¹ and job loss.^{30,31} Accordingly, the pandemic has caused US college students to make major changes to their everyday lives that may increase their food insecurity. A cross-sectional survey of 502 college students at one university found that 25% reported having their current living arrangement directly impacted by the pandemic, and that these students were more likely to be food insecure.³² Another study found that following school closures and restricted access to campus resources, 44% of students moved in with a parent or guardian, but those who did not were more likely to experience worsened food security, increased stress, and declines in their health status.³³

1.2 STUDY OBJECTIVES

Although there is a growing body of research concerning the effects of the pandemic on the food security status of US college students, to our knowledge there is currently no published research that examines the impacts of the pandemic on the food security status of married college students. Accordingly, the objectives of this cross-sectional survey research were to 1) measure the food security status of married students with and without children attending AppState during the spring 2021 semester, a period encompassing the pandemic, 2) compare food secure and insecure households on dietary patterns, perceived health and academic performance of household members, food access challenges, strategies, and sources of support, and sociodemographic characteristics during and before the pandemic, and 3) identify predictor variables for food insecurity during the pandemic. Throughout this paper, the Covid-19 pandemic is referred to as the pandemic.

1.3 STUDY HYPOTHESES

The following hypotheses were tested in this study:

1) Households with children will have a higher rate of food insecurity than those without children, 2) Households with children will consume fruits and vegetables less frequently during the pandemic compared to those without children, 3) Households with children will identify their friends/neighbors and government food assistance programs as most helpful for accessing food during the pandemic more often than those without children, 4) Households with children will identify using unemployment benefits and shopping for food online as ways they accessed food during the pandemic more often than those without children.

1.4 JUSTIFICATION OF STUDY

The pandemic has presented food access challenges for the US college student population. The purpose of this study was to examine food security status and strategies used to access food in a population of married college students, with and without children, at AppState during the pandemic compared to before the pandemic. This study expands our understanding of the college student food insecurity problem by highlighting the dietary, health, academic, food access, and socioeconomic challenges brought on by the pandemic for students in households with and without children. These findings can inform university administrators about the specific types of programs and policies needed by married college students and their families for improving food access.

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Chapter Two Manuscript

Title Page

COMPARISONS OF FOOD INSECURITY CORRELATES DURING AND BEFORE THE COVID-19 PANDEMIC AMONG MARRIED STUDENTS ATTENDING A UNIVERSITY IN APPALACHIA

Intended For: Research Article

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Notes: This study was exempt by the office of Research Protections at Appalachian State University (study number 21-0083).

Abstract

Objectives: Measure the food security status of married students with and without children during the Covid-19 pandemic, compare food secure and insecure households on correlates during and before the pandemic, and identify predictors for food insecurity.

Design: Online questionnaire.

Setting: University in Appalachia.

Participants: Married students (n = 169), 65.1% female, 81.9% Caucasian.

Main Outcome Measures: Food insecurity, dietary patterns, food access strategies, social support, demographics.

Analyses: Descriptive, chi-square, linear regression.

Results: Overall food insecurity rate was 29.6%, 32.9% for households with children, and 26.4% for households without children. Overall, about 20% reported food access was worse during verses before the pandemic. With greater access, food insecure students would have eaten more vegetables (57.5%), red meat (52.5%), whereas food secure students identified vegetables (57.5%), fruit (28.3%). Food access strategies identified were "prepared food at home" (52.1%), "purchased cheap, processed food" (34.3%) for the overall sample. "My spouse" was the most helpful source of support for 77.7% of the sample.

Conclusions and Implications: The pandemic had a more severe unfavorable impact on the dietary patterns of food insecure than food secure households with children, suggesting a need for expanded programs to facilitate food access for married students, particularly those with children.

Key Words: married college students, food insecurity, Covid-19, dietary patterns, food access, social support

INTRODUCTION

Food insecurity means lack of access to safe and nutritious food in socially acceptable ways to support an active and healthy life.¹ The Household Food Security Survey (HFSS)² is administered annually, and classifies households as either high, marginally, low, or very low food secure based on the number of affirmative responses to questions assessing the quantity, quality, variety, and desirability of the available food supply.³ In 2020, 10.5% of US households were food insecure, including 3.9% (5.1 million households) that had experienced very low food security at some time during that year.⁴ The outcomes associated with prolonged food insecurity for persons of all ages include compromised nutritional status,⁵ depression and anxiety,^{6,7} obesity,⁸ and presence of chronic diseases.^{6,9}

Ample data from two and four-year public and private post-secondary institutions indicate that US college students are a vulnerable group for food insecurity.^{10,11,12} A national study that analyzed prevalence and correlates of food insecurity among students from eight US universities found that 19% of participating students were food insecure and an additional 25.3% were at risk for food insecurity.¹³ Research conducted at ten colleges and universities in the Appalachian region found rates of food insecurity ranging from 22.4% to 51.8%.¹⁴ The present study was conducted at a public university in Appalachia where the rate of food insecurity for the county was 15.2% in 2019,¹⁵ and the rate of campus food insecurity during the spring 2016 semester was 46.2%.¹¹

Characteristics associated with college student food insecurity include receiving financial aid,^{11,12} lower grade point average (GPA),¹¹ male gender,¹¹ and fair or poor self-rated health status.^{11,12} The food access strategies used by food insecure college students include purchasing cheaper, less healthy foods,^{11,16} stretching food to make it last longer,¹⁶ sharing groceries with

friends or neighbors,¹⁶ skipping meals,¹⁷ and borrowing friends' meal card swipes.¹⁷ The longterm consequences of these behaviors can include compromised nutritional status and unfavorable impacts on mental and physical health.¹⁶⁻²⁰

Since the first cases of Covid-19 were identified in the US in March 2020, several authors have reported increases in campus food insecurity.^{21,22} Researchers surveyed 2,039 students attending a large southeastern university and reported that food insecurity increased by approximately one-third during the Spring 2020 semester.²² Hagedorn et al.²³ found that among 2018 students enrolled at a university in Appalachia, 15.1% were newly food insecure since the onset of the pandemic. Some of the challenges to food access during the pandemic include relocating from on-campus housing due to school closures,²¹ perceived threat posed by the Covid-19 virus²³, and job loss.^{21,23}

To our knowledge there is currently no research that examines the impacts of the pandemic on the food security status of married students. Accordingly, the objectives of this study were to 1) measure the food security status of married students from households with and without children attending a university in Appalachia during the spring, 2021 semester, 2) compare food secure and insecure households on dietary, food access, health, school-related, and sociodemographic variables before and during the pandemic, and 3) identify predictor variables for food insecurity. Throughout this paper, the Covid-19 pandemic is referred to as the pandemic.

METHODS

Participants and Recruitment

Recruitment letters were emailed to all 691 married students using addresses provided by the university. Data collection began the first week in March with reminder emails sent one and two weeks later.²⁶ Inclusion criteria were: married status, any gender identity, 18 years of age or older, any race or ethnic affiliation, undergraduate or graduate status. The students clicked a link in the recruitment email that directed them to a screen displaying the elements of informed consent. Those wishing to participate clicked on a "yes" button that displayed the questionnaire. Participants could also enter a drawing for a \$50 gift card from Amazon.com by clicking a link to a detached questionnaire where they entered their email address. This study was exempt by the office of Research Protections at the university (study number 21-0083).

Questionnaire

An anonymous questionnaire consisting of 38 close-ended items and one open-ended item that took from 25 to 30 minutes to complete was administered through Qualtrics survey software (Qualtrics, Provo, UT, March, 2021). Content and face validity were ascertained by three nutrition professors familiar with the college student food security literature and experienced at questionnaire design. The questionnaire was pilot tested with four married graduate students who did not participate in the final study. No problems were identified with functionality of buttons, wording of items, or spacing of screen displays. However, feedback resulted in the exclusion of eight entries in the checklist of food access strategies because they were "never" used.

The students initially answered a "yes/no" question asking whether they were married to determine eligibility for participation. Food security status was measured using the HFSS.² Students without children in their households answered only the first ten questions while those with children completed the entire 18-item HFSS. These questions were preceded by the instruction: "Please answer the following questions based on your household's access to food during the pandemic." Household consumption of foods, snacks, and beverages during compared

to before the pandemic were assessed using a table that listed 16 items with examples of the varieties available for purchase (e.g., vegetables: fresh, canned, frozen, etc.) followed by six answer choices: "never consumed," "much less," "a little less," "about the same," "a little more," and "a lot more." The students were then asked to write in the foods, snacks, and beverages their household would have consumed more frequently during the pandemic given greater access.

Next the students rated their household's general access to food, and the mental health, physical health, and academic performance of household members during compared to before the pandemic by selecting either "much worse," "worse," "about the same," "better," or "much better." They also rated the general healthfulness of meals, snacks, and beverages consumed by their household during compared to before the pandemic by selecting either "much less healthy," "less healthy," "about the same," "healthier," or "much healthier." The students also identified the challenges that made it difficult to get food for their household during compared to before the pandemic by selecting one or more of the following challenges: "unemployment or reduced employment," "anxiety or worry about becoming infected with the Covid-19 virus by shopping for food in person," "we had increased medical costs related to Covid-19," or "none of these were challenges for our household."

The sources of social support that the students found most helpful for accessing food for their household during the pandemic were identified by selecting from the following checklist: my spouse, other relatives, friends or neighbors, coworkers, our church, free food from hospitals and clinics, food pantries, free food from local businesses, free food from my employer, free meals provided by local schools, government food assistance programs (i.e. Supplemental Nutrition Assistance Program (SNAP), Special Supplemental Nutrition Program for Woman, Infants, and Children (WIC), etc.), free food from local farms or farmers markets, having a part

time or full time job, and taking on an additional job. This checklist was followed by a question asking how much help for accessing food the household could have used during the pandemic by selecting either: "a lot of help," "some help," "a little help," or "we did not need help getting food." The students next wrote in the sources of food assistance they would have used during the pandemic if these sources had been available to them. They also indicated how often they used 38 food access strategies during compared to before the pandemic by selecting either "much more often," "more often," "about the same," "less often," or "never have used" (Table 3). The lists of challenges for food access, sources of social support, and food access strategies were compiled with guidance from the literature about college student food insecurity.^{2,3,10,11,12,14,16} All questions that included checklists provided an "other" option so students could identify an additional item.

The final items asked for sociodemographic information about the students who completed the questionnaire and their households. Questions pertaining to the students concerned gender, age, year in school, employment status during the pandemic, applying for unemployment benefits, and applying for federal or state food assistance during the pandemic. Questions concerning the households pertained to race or ethnic affiliation, domestic or international household based on where the parents were born and raised, change in employment status of household members during the pandemic and type of change, and maintenance or change in monthly household income during the pandemic.

Statistical Analyses

Data were analyzed using SPSS statistical software (SPSS version 27.0, IBM Corp, Armonk, NY, 2020). The unit of analysis was the household. The food security status of households without children was determined based on the number of affirmative responses to the

first ten questions on the HFSS, such that 0 (zero) responses reflected high, 1-2 marginal, 3-5 low, and 6-10 very low food security. The status of households with children was based on the number of affirmative answers to the entire 18-item HFSS, such that 0 (zero) responses reflected high, 1-2 marginal, 3-7 low, and 8-18 very low food security.³ Descriptive statistics were calculated for all variables, and chi-square analyses compared proportions of food secure and food insecure households with and without children on dietary, health, academic, social support, food access, and sociodemographic variables. Linear regression identified predictors for food insecurity during the pandemic, controlling for race, employment status, number of children, and whether the student's spouse was also enrolled at the university. Statistical significance was p<0.05.

RESULTS

Questionnaires were submitted by 182 of the 691 recruited students (26.3%), of which 13 were discarded due to missing data about marital status or AFSS responses, yielding 169 complete questionnaires and a return rate of 24.5%.

Overall Profiles of Students and Households

Table 1 reports sociodemographic characteristics for the overall sample and compares food secure and insecure households with and without children on these characteristics. About two-thirds of the students were female, more than 80% were non-Hispanic white, about half were graduate students, about 90% were domestic rather than international students, and about half the students were from households with children. The mean number of children for the overall sample was 1.7 with a range of 1 to 4. The mean age of the sample was 34.3 ± 9.7 years. Data concerning student enrollment at the time this study was conducted indicated that the sample overrepresented females and non-Hispanic whites. Socioeconomic findings indicated that about 85% of the students were employed and about half of the students reported a change in employment during the pandemic. About half the students reported a decrease in their household's monthly income during compared to before the pandemic, 10% reported an increase, and 40% reported no change. Additionally, 65.2% of students rated the mental health, 44.9% the physical health, and 36.9% the academic performance of household members as "worse" or "much worse" during compared to before the pandemic.

Food Security Status

A total of 119 (70.4%) students were food secure and 50 (29.6%) were food insecure. Among the food secure households, 51.5% were high and 18.9% were marginally food secure, while among the food insecure households 17.8% were low and 11.8% were very low food secure. Although not statistically significant, households with children had a higher rate of food insecurity than those without children (32.9% vs 26.4%). A regression model indicated that, among the households with children, those headed by graduate students were 82% more likely to be food secure compared to households headed by undergraduates (p=0.004) when controlling for race, employment status, number of children, and whether the student's spouse was also enrolled at the university. Among the entire sample, 32 students (20.3%) reported that their household's access to food was "worse" or "much worse" during compared to before the pandemic.

Sociodemographic Characteristics of Food Secure and Food Insecure Households

Findings revealed that, among those with children, significantly greater proportions of food insecure students were unemployed during the pandemic compared to food secure students (26.1% vs 8.2%, p=0.04). Additionally, the food secure students with children were significantly

less likely to report a change in their employment status compared to the food insecure students with children (32.1% vs 72.4%, p = 0.014). Consistent results were found among the group without children (42.9% vs 73.9%, p=0.002).

The reason selected most often for the change in the employment status of the food insecure households with children (22.2%), of the food insecure households without children (53.3%), and of the food secure households without children (33.3%) was job loss. The reason most frequently written in by the food secure students with children was "temporary unemployment" followed by descriptors of their job, including "teacher," "hair stylist," and "wedding planner." Additionally, a significantly smaller proportion of food insecure students from households with children (52.2%) applied for unemployment benefits during the pandemic compared to the food secure students with children (22.4%) (p = 0.012).

Regarding need for food assistance, 12.2% of the food secure students from households with children, 30.4% of the food insecure students with children, and 9.5% of the food insecure students without children had applied to federal food assistance programs. One food secure and two food insecure students were receiving federal food assistance before the pandemic, all of whom had children. Lastly, among those with children, the food insecure students were significantly more likely to report a decrease in their household's monthly income during the pandemic (p<0.001). Consistent results were found among those without children (p=0.001).

Health Characteristics of Food Secure and Food Insecure Households

Health data indicated that over half of the overall sample reported that the mental health of household members was "worse" or "much worse" during the pandemic compared to before. This response was selected by 88% of the food insecure students with children, 54.7% of food secure students with children, 72.7% of food insecure students without children, and 62.1% of

food secure students without children. A similar trend was reported for declines in the physical health of household members during compared to before the pandemic.

About half of food insecure students with children reported that the physical health of household members was "worse" or "much worse." These responses were selected by 43.4% of food secure students with children, 50% of food insecure students without children, and 44.8% of food secure students without children. Findings concerning academic performance indicated that the food insecure students with children (60%) were significantly more likely than the food secure students with children (28%) to report that the academic performance of household members was "worse" or "much worse" during compared to before the pandemic (p=0.03).

Dietary Patterns of Food Secure and Food Insecure Households

Table 2 shows, in descending order, the foods, snacks, and beverages that were consumed "less often" or "much less often" by food secure and food insecure households with and without children during compared to before the pandemic. In summary, red meats showed the largest change in frequency of consumption. This food group was consumed "less often" or "much less often" by 31.4% of food secure students from households with children, 25% of food secure students without children, and 29% of food insecure students with children. Among the food insecure students from households with children. Among the food secure students with children (33.3%) and food insecure students without children (55.6%) vegetables were listed as the food group choice that household members would have eaten more of if they had access. Food secure students without children chose fruits (31.3%) and food insecure with children (63.6%) chose red meat as the food group they would have consumed more with greater access.

Among those with children, significantly greater proportions of food secure students report that their meals were "about the same" in terms of healthfulness during the pandemic compared to before (62.3% vs 24%, p<0.001). This trend was consistent for those without children (65.5% vs 18.2%, p=0.001).

Food Access Among Food Secure and Insecure Households

A significantly greater proportion of the food insecure students from households with children reported that their household's access to food during the pandemic was "worse" or "much worse" compared to food secure students with children (40% vs 9.4%, p<0.001). The same was found among those without children (59.1% vs 6.9%, p=0.006).

Findings concerning how much help the students needed to access food for their household during the pandemic revealed that, among the food secure students without children, 82.8% selected the "no help needed" response compared to 9.5% of the food insecure students without children. The most frequent answer choice selected by the food insecure students without children was "a little help" (42.9%). The response selected most often by the food secure students with children was "no help needed" (76.5%), while that selected most often by the food insecure students with children was "some help" (41.7%). About half of the food secure students with children (47.1%) and 56.1% of those without children indicated that none of the three challenges listed for accessing food during compared to before the pandemic applied to their households. However, when prompted to write in challenges, the food secure students without children wrote "medical costs," "chronic illnesses," "grocery shortages," "rising prices," and "less income" as challenges that had impacted their household's food access. The most frequently selected challenge by the food insecure students with children (75%) was "anxiety or worry about becoming infected with the Covid-19 virus by shopping for food in person" while that for the food insecure students without children (39%) was "unemployment or reduced employment." Additionally, food secure students with and without children wrote in "grocery store inventories" and "shortages of food."

Support for Food Access

Regarding sources of support for food access during the pandemic, students from the four household categories selected "my spouse" as the most helpful source. This source was selected by 78% of the food secure students with children, 71% of the food insecure students with children, 79% of the food secure students without children, and 82% of the food insecure students without children. "Having a part time or full-time job" was the second most helpful source of support for the food secure students with children (48%), food secure students without children (58%), and food insecure students without children (46%). The second most helpful source for the food insecure students with children was "free meals provided by local schools" (4%). Four students from food secure households with children identified SNAP or Electronic Benefit Transfer (EBT) cards as sources. One of these students wrote "We applied for SNAP but were denied because we made too much money but were making significantly less than before the pandemic." The source of food assistance written in most often by the food insecure students with children was "SNAP" (n=4), and the next most frequently identified source was "food delivery services" (n=2). Two students from this group indicated that "any" source of assistance would have been used if available. The most frequently written in source from the food insecure group without children was "food pantries" (n=4). Other responses from this group included "community gardens" and "government food sources."

Strategies for Food Access Among Food Secure and Insecure Households

Table 3 shows the ten food access strategies, in descending order, that were used "more often" and "much more often" during compared to before the pandemic by food secure and food insecure households with and without children. In summary, both food secure students without children (47.3%) and food insecure students without children (85.7%) chose "prepared food and beverages at home to save money" most frequently out of all the strategies for food access. The most frequently identified strategy among the food secure group with children was "shopped for food online" (53.1%) and that the number one strategy among the food insecure students with children was "purchased and ate cheap, processed food so we could eat more food" (91.3%).

DISCUSSION

The present study found a high rate of food insecurity among married college students during the pandemic, as evidenced by the finding that about 20% of the overall sample reported that their household's access to food was "worse" or "much worse" during than before the pandemic. Undergraduate student status was a predictor variable of food insecurity among students with children. Additionally, the presence of children in the household appeared to unfavorably impact the food security status of the family, given that those students from households with children experienced higher rates of food insecurity than those without children. In households with children, unemployment or reduced employment was associated with unemployment which supports the work of Soldavini, et al.²² who measured food insecurity correlates among college students attending a large Southeastern University. Furthermore, the number of students who applied for or were already receiving federal food assistance benefits was higher among the households with children. This may be partly because many food

assistance programs are focused on families with children, such as the School Breakfast Program or the National School Lunch Program.^{24,25} This finding could help explain the frequent selection of "free meals provided by local schools" and "government food assistance programs" as sources of support for food access by the food insecure students with children.

Regarding sources of support for food access, the majority of all married students identified their spouse as most helpful during the pandemic, which may be partly attributable to an additional source of income. However, changes in employment were experienced by about 47.7% of households, and 38% of those identified that change as "unemployment." Having a spouse may contribute to other sources of support such as having another person available to utilize assistance programs or transportation to grocery stores or food banks.

Over half the students from food secure and insecure households indicated that the mental health of household members was "worse" or "much worse" during compared to before the pandemic. Our findings support those of Hagedorn et al.,²⁶ who reported that food insecure students attending 22 universities had more reported days of poor physical and mental health compared to their food secure peers. Moreover, greater percentages of students from food insecure households chose these ratings to describe the change in the academic performance of household members during compared to before the pandemic. A decline in academic performance an lead to students paying to repeat classes, which can lead to greater financial burden and worsening food security.

The most frequently used food access strategies by the food insecure students in the present study were "purchasing cheap, process foods" and "stretching food to make it last longer," which were identified in previous research at the study site.¹⁶ These behaviors, if practiced over a four-year college career, could compromise the nutritional status and health of

household members.¹⁰ Some of the other strategies were "preparing food and beverages at home," "spending less on hobbies to afford food," "using coupons," and "buying food on sale." These strategies are positive because they instill financially responsible behavior patterns and can contribute to healthier eating. These strategies could be a good topic of discussion for educational classes among this population offered by universities to help students understand how to shop for healthy foods on a budget.

Among the students with and without children, the food insecure students were more likely to indicate that the healthfulness of the meals, snacks, and beverages consumed by their households was "less healthy" or "much less healthy" during compared to before the pandemic, and about 30% of students from all four household categories selected vegetables as the type of food their families would have consumed more often during the pandemic if given greater access. Since canned and frozen vegetables, such as broccoli, carrots, corn, etc., are typically more affordable than fresh vegetables, these students might benefit from educational interventions that teach how to purchase nutrient-dense foods on a restricted income. Additional classes could demonstrate how to cook with ingredients that may be unfamiliar to this population, show how to find affordable, healthy food options with grocery store tours, and how to stretch a grocery budget with coupons. West et al,²⁸ found interventions such as group cooking classes, grocery tours, and small group discussions to be helpful in improving food security status, nutrition knowledge, and vegetable consumption.

This research has study limitations that prevent the generalizability of the findings to married college students in the Appalachian region and nationally, including a small sample size, collection of data on a single campus, overrepresentation of white students and females, and the self-reporting of all data. These limitations prompt the need for future studies that assess the

effects of the pandemic on the food security status of married students from diverse sociodemographic backgrounds living in different regions of the US to obtain a more generalizable measurement of the scope of the problem and contributing causes. Nevertheless, our findings enhance the college student food insecurity literature by examining the impacts of the pandemic on dietary, health, academic, food access, social support, and sociodemographic variables among food secure and insecure married students living in households with and without children.

IMPLICATIONS FOR RESEARCH AND PRACTICE

The impacts of the pandemic on the food security status and on associated correlates among the married students in this study underscores the need for continued expansion of existing policies and programs and for the design and evaluation of novel efforts at all levels of governance to increase food access by married students and their families. Such assistance should reflect readiness to provide adequate food to this vulnerable population during periods of stable economic conditions and during times of crisis that disrupt food access due to increased unemployment and food prices and decreased access to such resources as food banks and pantries and school feeding programs.

Future studies should examine the same variables from the present study with larger, more ethnically diverse samples of married college students living in various regions of the country. Other areas of future research for this topic include studying the effectiveness of current university food assistance programs, such as food pantries, during periods of crisis or unstable economic conditions to determine if they are being utilized by the married student population who may not be as connected on campus as a traditional, single student. Furthermore, future

studies could examine the stigma that surrounds participation in assistance programs to help students feel comfortable with accepting temporary assistance.

The findings from this research offer opportunities for nutrition practitioners and other nutrition advocates to implement food assistance programs and help bring awareness to policies that are already in place for the college student population. One suggestion for a new program is to design and implement free educational classes led by faculty or other students, including shopping on budget, cooking demonstrations, or informational sessions on federal assistance programs, offered at flexible times to fit the schedule of students with a family. These classes could also incorporate activities for children such as nutrition education, taste tests, or farmer's market tours to involve the entire family.

Community based interventions could include discounts for students with dependent children at farmer's markets or local restaurants. Universities could also allocate funds through unused dining dollars or meal swipes for students who are struggling to provide food for themselves and their families by offering "family nights" that allow student's dependent children to eat for free. Policies to help this population improve food access and nutritional status can in turn improve student's health and academic performance, which should be a concern of all university administrators.
| | Whol | e Sample | Food | Secure with hildren | Fo | od Secure without Children | Food | l Insecure with hildren | Foo | d Insecure ut Children |
|----------------------------------|------|------------|------|------------------------|-----|----------------------------------|------|-------------------------------|-----|---------------------------|
| Characteristic | n | % | n | % | n | % | n | % | n | % |
| Gender | | | | | | | | | | |
| Male | 36 | 21.3 | 10 | 21.7 | 13 | 22.8 | 6 | 26.1 | 7 | 33.3 |
| Female | 110 | 65.1 | 36 | 78.3 | 44 | 77.2 | 17 | 73.9 | 13 | 61.9 |
| Non-Binary | 1 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4.8 |
| Prefer Not to Say | 22 | 13 | 9 | | 7 | | 4 | | 2 | |
| Age | | | | | | | | | | |
| Mean±SD | 34.3 | 1±9.73 | 36. | .71±7.55 | 32. | 93±11.52 | 34 | .3±6.09 | 32. | 38±11.52 |
| Race | | | | | | | | | | |
| Caucasian/White | 122 | 81.9 | 42 | 85.7 | 45 | 80.4 | 18 | 78.2 | 17 | 81 |
| Black/African American | 7 | 4.7 | 4 | 8.2 | 1 | 1.8 | 0 | 0 | 2 | 9.4 |
| Hispanic/Latino | 7 | 4.7 | 1 | 2 | 5 | 8.9 | 1 | 4.4 | 0 | 0 |
| Two or More Races | 8 | 5.4 | 2 | 4.1 | 2 | 3.6 | 3 | 13 | 1 | 4.8 |
| American Indian | 1 | 0.7 | 0 | 0 | 0 | 0 | 1 | 4.4 | 0 | 0 |
| Asian | 2 | 1.3 | 0 | Õ | 1 | 1.8 | 0 | 0 | 1 | 4.8 |
| Other | 2 | 1.3 | 0 | Õ | 2 | 3.6 | 0 | Õ | 0 | 0 |
| Missing | 20 | 110 | 6 | 0 | 8 | 510 | 4 | 0 | 2 | Ū |
| Year in School | 20 | | Ŭ | | Ũ | | • | | - | |
| Freshman/Sophomore | 9 | 6.1 | 1 | 2.1 | 5 | 8.9 | 1 | 4.4 | 2 | 10 |
| Junior/Senior | 61 | 41.5 | 14 | 29.2 | 29 | 37.5 | 15 | 65.2 | 11 | 55 |
| Graduate Student | 77 | 52.4 | 33 | 68.8 | 30 | 53.6 | 7 | 30.4 | 7 | 35 |
| Missing | 22 | 52.4 | 7 | 00.0 | 8 | 55.0 | 4 | 50.4 | 3 | 55 |
| International Student | | | , | | 0 | | | | 5 | |
| Yes | 12 | 8.1 | 3 | 6.1 | 8 | 14.3 | 0 | 0 | 1 | 4.8 |
| No | 137 | 91.9 | 46 | 93.9 | 48 | 85.7 | 23 | 100 | 20 | 95.2 |
| Missing | 20 | | 6 | , | 8 | | 4 | | 2 | |
| Years Married | | | | | | | • | | | |
| Mean±SD | 9.1 | 2 ± 7.98 | 11. | .37±7.66 | 7. | 97±8.37 | 8.1 | 5±4.79 | 8. | 17±9.82 |
| Spouse is an AppState Student | | | | | | | | | | |
| Yes | 18 | 10.7 | 2 | 3.6 | 8 | 12.5 | 2 | 7.4 | 6 | 26.1 |
| No | 151 | 89.3 | 53 | 96.4 | 56 | 87.5 | 25 | 92.6 | 17 | 73.9 |
| Presence of Children | | | | | | | | | | |
| No | 87 | 51.5 | - | - | - | - | - | - | - | - |
| Yes | 82 | 48.5 | - | - | - | - | - | - | - | - |
| Employment Status | | | | | | | | | | |
| Unemployed | 23 | 15.4 | 4 | 8.2 | 8 | 14.3 | 6 | 26.1 | 5 | 23.8 |
| Employed | 126 | 84.6 | 45 | 91.8 | 48 | 85.7 | 17 | 73.9 | 16 | 76.2 |
| Missing | 20 | | 6 | | 8 | | 4 | | 2 | |
| Employment Change | | | | | | | | | | |
| Yes | 71 | 47.7 | 21 | 42.9 | 18 | 32.1 | 17 | 73.9 | 15 | 71.4 |
| No | 78 | 52.3 | 28 | 57.1 | 38 | 67.9 | 6 | 26.1 | 6 | 28.6 |
| Missing | 20 | | 6 | | 8 | | 4 | | 2 | |
| Income Change | | | | | | | | | | |
| Decreased | 72 | 48.3 | 16 | 32.7 | 20 | 35.7 | 18 | 78.3 | 18 | 85.7 |
| Increased | 15 | 10.1 | 5 | 10.2 | 9 | 16.1 | 0 | 0 | 1 | 4.8 |
| Stayed the Same | 62 | 41.6 | 28 | 57.1 | 27 | 48.2 | 5 | 21.7 | 2 | 9.5 |
| Missing | 20 | | 6 | | 8 | | 4 | | 2 | |

Table 1. Sociodemographic Characteristics of Participants and Comparisons of Food Secure and Food Insecure households with and without Children

Table 2. Frequency of Food and Beverage Consumption Ranked in Descending Order of Food Groups Consumed "Less" or "much Less" During Compared to Before the Pandemic by Food Secure and Food Insecure Households With and Without Children

| Food Secure without | n | % | Food Insecure without | n | % |
|---|---|--|---|---|---|
| Children (n=64) | | | Children (n=23) | | |
| Red Meat | 14 | 22 | Fruit** | 15 | 65 |
| Alcohol | 13 | 20 | Fruit Juice** | 14 | 61 |
| Snacks/Sweets | 12 | 19 | Beverages** | 14 | 61 |
| Processed Meat | 9 | 14 | Snacks/Sweets* | 12 | 52 |
| Fish | 8 | 13 | Red Meat* | 11 | 48 |
| Dairy | 8 | 13 | Fish** | 11 | 48 |
| Fruit Juice | 7 | 11 | Nut/Seeds** | 10 | 43 |
| Beverages | 7 | 11 | Dairy* | 9 | 39 |
| Nuts/Seeds | 5 | 8 | Vegetable** | 9 | 39 |
| Fruit | 5 | 8 | Vegetable Juice** | 7 | 30 |
| Vegetable Juice | 3 | 5 | Poultry** | 7 | 30 |
| Eggs | 3 | 5 | Alcohol* | 6 | 26 |
| Grains | 3 | 5 | Grains* | 5 | 22 |
| Poultry | 2 | 3 | Eggs | 3 | 13 |
| Beans/Peas | 2 | 3 | Processed Meat* | 2 | 9 |
| Vegetable | 1 | 2 | Beans/Peas | 2 | 9 |
| | | | | | |
| Food Secure with Children | n | % | Food Insecure with Children | n | % |
| Food Secure with Children (n=55) | n | % | Food Insecure with Children (n=27) | n | % |
| Food Secure with Children (n=55) Red Meat | n 16 | % 29 | Food Insecure with Children (n=27) Red Meat* | n 17 | % 63 |
| Food Secure with Children (n=55) Red Meat Fish | n 16 13 | % 29 24 | Food Insecure with Children (n=27) Red Meat* Beverages** | n 17 15 | % 63 56 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice | n 16 13 9 | % 29 24 16 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** | n 17 15 14 | % 63 56 52 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat | n 16 13 9 9 | % 29 24 16 16 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* | n 17 15 14 13 | % 63 56 52 48 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol | n 16 13 9 9 9 | % 29 24 16 16 16 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* | n 17 15 14 13 12 | % 63 56 52 48 44 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol Nut/Seeds | n 16 13 9 9 9 9 8 | % 29 24 16 16 16 16 15 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* Fruit* | n 17 15 14 13 12 12 | % 63 56 52 48 44 44 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol Nut/Seeds Poultry | n 16 13 9 9 9 9 8 7 | % 29 24 16 16 16 15 13 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* Fruit* Vegetable Juice* | n 17 15 14 13 12 12 12 11 | % 63 56 52 48 44 44 44 41 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol Nut/Seeds Poultry Dairy | n 16 13 9 9 9 8 7 6 | % 29 24 16 16 16 15 13 11 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* Fruit* Vegetable Juice* Poultry* | n 17 15 14 13 12 12 11 11 | % 63 56 52 48 44 44 41 41 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol Nut/Seeds Poultry Dairy Fruit | n 16 13 9 9 9 8 7 6 6 | % 29 24 16 16 16 15 13 11 11 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* Fruit* Vegetable Juice* Poultry* Fruit Juice* | n 17 15 14 13 12 12 12 11 11 11 10 | % 63 56 52 48 44 44 41 41 37 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol Nut/Seeds Poultry Dairy Fruit Vegetable | n 16 13 9 9 9 8 7 6 6 6 6 | % 29 24 16 16 16 15 13 11 11 11 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* Fruit* Vegetable Juice* Poultry* Fruit Juice* Nut/Seeds* | n 17 15 14 13 12 12 12 11 11 11 10 10 | % 63 56 52 48 44 44 41 41 37 37 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol Nut/Seeds Poultry Dairy Fruit Vegetable Beverages | n 16 13 9 9 9 8 7 6 6 6 6 6 | % 29 24 16 16 16 15 13 11 11 11 11 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* Fruit* Vegetable Juice* Poultry* Fruit Juice* Nut/Seeds* Alcohol* | n 17 15 14 13 12 12 12 11 11 10 10 9 | % 63 56 52 48 44 44 41 41 37 37 33 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol Nut/Seeds Poultry Dairy Fruit Vegetable Beverages Vegetable Juice | n 16 13 9 9 9 8 7 6 6 6 6 6 5 | % 29 24 16 16 16 15 13 11 11 11 11 11 9 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* Fruit* Vegetable Juice* Poultry* Fruit Juice* Nut/Seeds* Alcohol* Beans/Peas* | n 17 15 14 13 12 12 11 11 10 10 9 7 | % 63 56 52 48 44 44 41 41 37 37 33 26 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol Nut/Seeds Poultry Dairy Fruit Vegetable Beverages Vegetable Juice Grains | n 16 13 9 9 9 8 7 6 6 6 6 6 6 5 5 | % 29 24 16 16 16 15 13 11 11 11 11 11 9 9 9 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* Fruit* Vegetable Juice* Poultry* Fruit Juice* Nut/Seeds* Alcohol* Beans/Peas* Processed Meat* | n 17 15 14 13 12 12 12 11 11 10 10 9 7 7 7 | % 63 56 52 48 44 44 41 41 37 37 33 26 26 26 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol Nut/Seeds Poultry Dairy Fruit Vegetable Beverages Vegetable Juice Grains Snacks/Sweets | n 16 13 9 9 9 8 7 6 6 6 6 6 6 5 5 4 | % 29 24 16 16 16 15 13 11 11 11 11 9 9 7 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* Fruit* Vegetable Juice* Poultry* Fruit Juice* Nut/Seeds* Alcohol* Beans/Peas* Processed Meat* Eggs* | n 17 15 14 13 12 12 12 11 11 10 10 9 7 7 6 | % 63 56 52 48 44 44 41 41 37 37 33 26 26 22 |
| Food Secure with Children (n=55) Red Meat Fish Fruit Juice Processed Meat Alcohol Nut/Seeds Poultry Dairy Fruit Vegetable Beverages Vegetable Juice Grains Snacks/Sweets Beans/Peas | n 16 13 9 9 9 8 7 6 6 6 6 6 6 6 5 5 4 3 | % 29 24 16 16 16 15 13 11 11 11 11 9 9 7 5 | Food Insecure with Children (n=27) Red Meat* Beverages** Snacks/Sweets** Fish* Vegetable* Fruit* Vegetable Juice* Poultry* Fruit Juice* Nut/Seeds* Alcohol* Beans/Peas* Processed Meat* Eggs* Dairy | n 17 15 14 13 12 12 12 11 11 10 10 9 7 7 6 6 6 | % 63 56 52 48 44 44 41 41 37 37 33 26 26 22 22 |

* Shows a significant difference (p <0.05) between food secure and food insecure answers

** Shows a significant difference (p < 0.001) between food secure and food insecure answers

Table 3. Frequency of Use of Food Access Strategies in Descending Order among Food Secure and Food Insecure Households With and Without Children

| Food Secure without children | n | % | Food Insecure without Children | n | % |
|--|--|---|---|---|---|
| Prepared food and beverages at home to save money | 26 | 47.3 | Prepared food and beverages at home to save money* | 18 | 85.7 |
| Shopped for food online | 24 | 42.1 | Spent less on hobbies or entertainment to have more money for food** | 17 | 80.9 |
| Saved a supply of food in our home in case we couldn't get access to food | 23 | 40.4 | Looked for sales or food coupons | 16 | 76.1 |
| Prepared a grocery list before food shopping to save money on food | 18 | 32.1 | Took money out of our savings account to buy food** | 16 | 76.1 |
| Looked for sales or food coupons | 17 | 29.8 | Stretched food to make it last longer (i.e., mixing leftovers with other foods)** | 16 | 76.1 |
| Prepared a weekly or monthly grocery budget | 12 | 21.1 | Took food home after visiting family or friends** | 15 | 71.4 |
| Spent less on hobbies or entertainment to have more money for food | 12 | 21.1 | Shopped for food at a dollar store or other discount store** | 15 | 71.4 |
| Purchased and ate cheap, processed food so we could eat more food | 12 | 21.1 | Purchased and ate cheap, processed food so we could eat more food** | 15 | 71.4 |
| Used a credit card to buy food | 10 | 17.5 | Prepared a grocery list before food shopping to save money on food** | 15 | 71.4 |
| Spent less on personal care items to have more money for food | 9 | 15.8 | Used less utilities (e.g. electricity, water) to have more money for food** | 14 | 66.7 |
| | | 0/ | | | 0/ |
| Food Secure with Children | n | %0 | Food Insecure with Children | n | 70 |
| Food Secure with Children Shopped for food online | n 26 | % 53.1 | Purchased and ate cheap, processed food so we could eat more food** | 21 | 91.3 |
| Food Secure with Children Shopped for food online Prepared food and beverages at home to save money | 26 26 | 53.1 53.1 | Purchased and ate cheap, processed food so we could eat more food** Spent less on personal care items to have more money for food** | 11 21 18 | 91.3 78.3 |
| Food Secure with Children Shopped for food online Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food | 1 26 26 16 | 53.1 53.1 32.7 | Pood Insecure with Children Purchased and ate cheap, processed food so we could eat more food** Spent less on personal care items to have more money for food** Prepared food and beverages at home to save money | 11 21 18 18 | 91.3 78.3 78.3 |
| Food Secure with Children Shopped for food online Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food Saved a supply of food in our home in case we couldn't get access to food | n 26 26 16 | % 53.1 53.1 32.7 32.7 | Pood Insecure with Children Purchased and ate cheap, processed food so we could eat more food** Spent less on personal care items to have more money for food** Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food* | n 21 18 18 18 | 91.3 78.3 78.3 78.3 |
| Food Secure with Children Shopped for food online Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food Saved a supply of food in our home in case we couldn't get access to food Prepared a grocery list before food shopping to save money on food | 1 26 26 16 16 16 | % 53.1 53.1 32.7 32.7 32.7 | Purchased and ate cheap, processed food so we could eat more food** Spent less on personal care items to have more money for food** Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food* Looked for sales or food coupons** | 11 21 18 18 18 18 17 | 91.3 78.3 78.3 78.3 78.3 78.3 73.9 |
| Food Secure with Children Shopped for food online Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food Saved a supply of food in our home in case we couldn't get access to food Prepared a grocery list before food shopping to save money on food Prepared a weekly or monthly grocery budget | n 26 26 16 16 16 12 | % 53.1 53.1 32.7 32.7 32.7 32.7 24.5 | Pood Insecure with Children Purchased and ate cheap, processed food so we could eat more food** Spent less on personal care items to have more money for food** Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food* Looked for sales or food coupons** Stretched food to make it last longer (i.e., mixing leftovers with other foods)* | 1 21 18 18 18 17 17 | 91.3 78.3 78.3 78.3 78.3 73.9 |
| Food Secure with Children Shopped for food online Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food Saved a supply of food in our home in case we couldn't get access to food Prepared a grocery list before food shopping to save money on food Prepared a weekly or monthly grocery budget Looked for sales or food coupons | n 26 26 16 16 16 12 12 | % 53.1 53.1 32.7 32.7 32.7 24.5 24.5 | Purchased and ate cheap, processed food so we could eat more food** Spent less on personal care items to have more money for food** Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food* Looked for sales or food coupons** Stretched food to make it last longer (i.e., mixing leftovers with other foods)* Prepared a grocery list before food shopping to save money on food** | 1 21 18 18 18 18 17 17 17 | 91.3 78.3 78.3 78.3 73.9 73.9 73.9 73.9 |
| Food Secure with ChildrenShopped for food onlinePrepared food and beverages at home to save moneySpent less on hobbies or entertainment to have more money for foodSaved a supply of food in our home in case we couldn't get access to foodPrepared a grocery list before food shopping to save money on foodPrepared a weekly or monthly grocery budgetLooked for sales or food couponsPurchased and ate cheap, processed food so we could eat more food | n 26 26 16 16 16 12 12 12 | % 53.1 53.1 53.1 32.7 32.7 32.7 24.5 24.5 20.4 | Purchased and ate cheap, processed food so we could eat more food** Spent less on personal care items to have more money for food** Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food* Looked for sales or food coupons** Stretched food to make it last longer (i.e., mixing leftovers with other foods)* Prepared a grocery list before food shopping to save money on food** Took money out of our savings account to buy food** | n 21 18 18 18 17 17 17 16 | 26 91.3 91.3 78.3 78.3 78.3 78.3 78.3 78.3 73.9 73.9 69.6 |
| Food Secure with ChildrenShopped for food onlinePrepared food and beverages at home to save moneySpent less on hobbies or entertainment to have more money for foodSaved a supply of food in our home in case we couldn't get access to foodPrepared a grocery list before food shopping to save money on foodPrepared a weekly or monthly grocery budgetLooked for sales or food couponsPurchased and ate cheap, processed food so we could eat more foodGrew some food for our household | n 26 26 16 16 16 12 12 12 10 9 | % 53.1 53.1 53.1 32.7 32.7 32.7 24.5 24.5 20.4 18.4 | Pood Insecure with Children Purchased and ate cheap, processed food so we could eat more food** Spent less on personal care items to have more money for food** Prepared food and beverages at home to save money Spent less on hobbies or entertainment to have more money for food* Looked for sales or food coupons** Stretched food to make it last longer (i.e., mixing leftovers with other foods)* Prepared a grocery list before food shopping to save money on food** Took money out of our savings account to buy food** Saved a supply of food in our home in case we couldn't get access to food* | n 21 18 18 18 17 17 17 17 16 15 | 26 91.3 91.3 78.3 78.3 78.3 78.3 78.3 73.9 73.9 69.6 65.2 |

* Shows a significant difference (p <0.05) between food secure and food insecure answers

** Shows a significant difference (p < 0.001) between food secure and food insecure answers

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Appendix A: Initial Recruitment Invitation Email

Hello AppState married students! Welcome to the spring semester! We would greatly appreciate your participation in a research study about your household's food access before and during the COVID-19 pandemic. We ask that only one member per household complete this survey. Your participation will help us to inform University administrators so programs and policies tailored to the needs of AppState married students can be implemented. This study is being conducted by two graduate students and three professors from the nutrition program at AppState. If you agree to participate, we will ask for about 15 minutes of your time to complete an online questionnaire. This questionnaire is directed toward married students; therefore, if you are not married please do NOT fill out the survey. Please understand that no academic credit is being offered for your participation, but you may enter a drawing to win one of six \$50 Amazon gift cards at the conclusion of the survey!

Your participation in this study is strictly voluntary and you are free to stop answering questions at any time. We do not anticipate that you will experience any inconvenience form completing this questionnaire other than the time it takes to answer the questions. We assure you that the answers you give will not be connected to you email address and that only group answers, not individual answers, will be used to get our findings. By continuing the questionnaire, you acknowledge that you are at least 18 years old, have read the above information, and agree to participate.

Follow this link to the Survey:

\${1://SurveyLink?d=Take the Survey}

If you have any questions about this study, please contact any of the people listed below.

Respectfully,

Darcy Dean, Graduate Student Department of Nutrition and Health Care Management, Appalachian State University Email: deandl@appstate.edu

Morgan Adkisson, Graduate Student Department of Nutrition and Health Care Management, Appalachian State University Email: adkissonms@appstate.edu

Laura McArthur, PhD, RDN, Associate Professor Department of Nutrition and Health Care Management, Appalachian State University Telephone: (828) 262-2971; Email: mcarthurlh@appstate.edu

Melissa Gutschall PhD, RDN, LDN, Associate Professor Department of Nutrition and Health Care Management, Appalachian State University Telephone: (828) 262-2698; Email: <u>gutschallmd@appstate.edu</u>

Alisha Faris PhD, RDN Department of Nutrition and Health Care Management, Appalachian State University Telephone: (828) 262-7863; Email: farrisar@appstate.edu

Questions regarding the protection of human subjects may be addressed to the IRB Administrator, Research Protections, Appalachian State University, Boone, NC 28608 (828) 262-2692, irb@appstate.edu

Appendix B: Letter of Informed Consent

Hello AppState married students!

Welcome to the spring semester! We would greatly appreciate your participation in a research study about your household's food access before and during the COVID-19 pandemic. **We ask that only one member per household complete this survey.** Your participation will help us to inform University administrators so programs and policies tailored to the needs of AppState married students can be implemented. This study is being conducted by two graduate students and three professors from the nutrition program at AppState. If you agree to participate, we will ask for about 15 minutes of your time to complete an online questionnaire. This questionnaire is directed toward married students; therefore, if you are not married please do NOT fill out the survey. **Please understand that no academic credit is being offered for your participation, but you may enter a drawing to win one of six \$50 Amazon gift cards at the conclusion of the survey!**

Your participation in this study is strictly voluntary, and you are free to stop answering questions at any time. We do not anticipate that you will experience any inconvenience from completing this questionnaire other than the time it takes to answer the questions. We assure you that the answers you give will not be connected to your email address and that only group answers, not individual answers, will be used to get our findings. By continuing to the questionnaire, you acknowledge that you are at least 18 years old, have read the above information, and agree to participate.

If you have any questions about this study, please contact any of the people listed below. Respectfully,

Darcy Dean, Graduate Student Department of Nutrition and Health Care Management, Appalachian State University Email: deandl@appstate.edu Morgan Adkisson, Graduate Student Department of Nutrition and Health Care Management, Appalachian State University Email: adkissonms@appstate.edu Laura McArthur, PhD, RDN, Associate Professor Department of Nutrition and Health Care Management, Appalachian State University Telephone: (828) 262-2971; Email: mcarthurlh@appstate.edu Melissa Gutschall, PhD, RDN, LDN, Associate Professor Department of Nutrition and Health Care Management, Appalachian State University Telephone: (828) 262-2971; Email: mcarthurlh@appstate.edu Melissa Gutschall, PhD, RDN, LDN, Associate Professor Department of Nutrition and Health Care Management, Appalachian State University Telephone: (828) 262-2698; Email: gutschallmd@appstate.edu Alisha Faris PhD, RDN

Department of Nutrition and Health Care Management, Appalachian State University Telephone: (828) 262-7863; Email: farrisar@appstate.edu Questions regarding the protection of human subjects may be addressed to the IRB Administrator, Research Protections, Appalachian State University, Boone, NC 28608 (828) 262-2692, irb@appstate.edu

Appendix C: Questionnaire

your participation in a research study about your household's food access before and during the

Start of Block: Intro married questions

| I am married |
|--|
| ○ Yes (1) |
| O No (2) |
| Skip To: End of Survey If I am married = No |
| |
| My spouse is also an AppState student |
| ○ Yes (1) |
| O No (2) |
| |
| How many years have you been married? (Round to the nearest year) |
| End of Block: Intro married questions |
| Start of Block: USDA Questions |
| Heading Please answer the following questions based on your household's access to food during the Covid-19 pandemic. |
| Q1 We worried whether our food would run out before we got money to buy more. |
| Often (1) |
| ◯ Sometimes (2) |
| O Never (3) |

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Q2 The food that we bought just didn't last, and we didn't have money to get more.

| | Often (1) |
|----|---|
| | O Sometimes (2) |
| | O Never (3) |
| | |
| Q3 | We couldn't afford to eat balanced meals. |
| | Often (1) |
| | O Sometimes (2) |
| | O Never (3) |

Q4 Did your household ever cut the size of your meals or skip meals because there wasn't enough money for food?

○ Yes (1)

○ No (2)

| Skip To: | Q6 If Die | d your l | nouseho | ld ever | cut the | ə size | e of yc | our me | eals o | r skip | me | als b | eca | ause | e th | ere | wa | sn't | |
|----------|-----------|----------|---------|---------|---------|--------|---------|--------|--------|--------|----|-------|-----|------|------|-----|----|------|------|
| enough n | none = | = No | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | |

Q5 How often did this happen?

O Almost every month (1)

 \bigcirc Some months but not every month (2)

Only 1 or 2 months (3)

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Q6 Did anyone in your household ever eat less than you felt they should because there wasn't enough money for food?

○ Yes (1)

🔾 No (2)

Q7 Was anyone in your household ever hungry but didn't eat because there wasn't enough money for food?

| | ○ Yes (1) |
|----|--|
| | O No (2) |
| | |
| Q8 | B Did anyone in your household lose weight because there wasn't enough money for food? |
| | ○ Yes (1) |
| | O No (2) |

Q9 Did anyone in your household not eat for a whole day because there wasn't enough money for food?

Yes (1)No (2)

| Skip To money | o: Q11 for fo | lf Di d? = | d an : No | iyoi | ne i | in y | our | ho | use | ehc | old | no | ot e | at | for | wh | ole | da | ay | be | ca | use | e th | ier | e١ | va | sn' | 't e | noi | ug | h | | |
|------------------|------------------|---------------|--------------|------|------|------|-----|----|-----|-----|-----|----|------|----|-----|----|-----|----|----|----|----|-----|------|-----|----|----|-----|------|-----|----|---|--|--|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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Q10 How often did this happen?

| ○ Almost every month (1) | |
|--|--|
| \bigcirc Some months but not every month (2) | |
| Only 1 or 2 months (3) | |
| | |

Q11 During the Covid-19 pandemic, did you have any children, under the age of 18, living in your household?

| 0 | Yes | ; (1) |
|---|-----|-------|
| 0 | No | (2) |

Skip To: End of Block If During the Covid-19 pandemic, did you have any children, under the age of 18, living in your hous... = No

Q12 If you answered yes, how many children were living in your household?

Page Break

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Heading These next questions are specifically about your access to food for your child/children during the Covid-19 pandemic.

Q13 We relied on only a few kinds of low-cost food to feed our child/children because we were running out of money to buy food.

Often (1)
Sometimes (2)
Never (3)

Q14 We couldn't feed our child/children a balanced meal, because we couldn't afford that.

- Often (1)
- O Sometimes (2)
- O Never (3)

Q15 Our child/children was/were not eating enough because we just couldn't afford enough food.

- Often (1)
- O Sometimes (2)
- O Never (3)

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Q16 Did you ever cut the size of your child's/children's meals because there wasn't enough money for food?

| ○ Yes (1) |
|--|
| O No (2) |
| |
| Q17 Did any of your children ever skip meals because there wasn't enough money for food? |
| ○ Yes (1) |
| O No (2) |
| Skip To: Q19 If Did any of your children ever skip meals because there wasn't enough money for food? = No |
| Q18 How often did this happen? |
| ◯ Almost every month (1) |
| \bigcirc Some months but not every month (2) |
| Only 1 or 2 months (3) |
| |
| |

Q19 Was/were your child/children ever hungry but you just couldn't afford more food?

- O Yes (1)
- O No (2)

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Q20 Did your child/children ever not eat for a whole day because there wasn't enough money for food?

○ Yes (1)

O No (2)

End of Block: USDA Questions

Start of Block: Food Group Matrix

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| | Never Consumed (1) | Much Less (2) | A Little Less (3) | About the Same (4) | A Little More (5) | A Lot More (6) |
|--|--------------------------|------------------|----------------------|-----------------------|----------------------|-------------------|
| Vegetables: fresh, canned, frozen, dried (1) | 0 | 0 | 0 | 0 | 0 | 0 |
| Vegetable Juices (2) | \bigcirc | \bigcirc | \bigcirc | \bigcirc | \bigcirc | \bigcirc |
| Fruits: fresh, canned, frozen, dried (3) | 0 | 0 | 0 | 0 | 0 | 0 |
| Fruit juices (4) | \bigcirc | 0 | \bigcirc | \bigcirc | \bigcirc | 0 |
| Red meats (e.g. beef, pork, lamb, etc.) (5) | 0 | \bigcirc | 0 | 0 | \bigcirc | \bigcirc |
| Processed meats (e.g. hot dogs, bacon, luncheon meats, etc.) (6) | 0 | 0 | 0 | 0 | 0 | 0 |
| Poultry (e.g. chicken, turkey, etc.) (7) | 0 | \bigcirc | 0 | 0 | \bigcirc | 0 |
| Fish and shellfish: fresh, frozen, canned (8) | 0 | 0 | 0 | 0 | \bigcirc | 0 |
| Eggs (9) | 0 | \bigcirc | 0 | \bigcirc | \bigcirc | 0 |

Q21 Please indicate how often your household consumed foods from the following food groups *during* the COVID-19 pandemic *compared to before* the pandemic by checking the button that best applies.

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| Nuts, seeds, nut butters (e.g., peanut butter, almonds, sunflower seeds etc.) (10) | 0 | 0 | 0 | 0 | 0 | 0 |
|--|---|---|---|---|---|---|
| Beans, peas, soybeans (e.g., black beans, chickpeas, lentils, tofu etc.) (11) | 0 | 0 | 0 | 0 | 0 | 0 |
| Dairy or dairy alternative foods (e.g., yoghurt, cheese, milk, almond milk, etc.) (12) | 0 | 0 | 0 | 0 | 0 | 0 |
| Grains and cereals (e.g., bread, pasta, rice, breakfast cereals etc.) (13) | 0 | 0 | 0 | 0 | 0 | 0 |
| Snacks or sweets (e.g., crackers, muffins, chips, cookies, candy, baked goods, ice cream etc.) (14) | 0 | 0 | 0 | 0 | 0 | 0 |

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Q22 Which food group(s) would your household have eaten more from during the Covid-19 pandemic if you had greater access?

End of Block: Food Group Matrix

Start of Block: Health Questions

Q23 How would you rate each of the following *during* the COVID-19 pandemic *compared to before* the COVID-19 pandemic?

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Q23a Your household's general access to food?

O Much worse (1)

 \bigcirc Worse (2)

- \bigcirc About the same (3)
- O Better (4)
- O Much better (5)

Q23b The general mental health of the people in your household?

| O Much worse (1) | |
|--------------------|--|
| O Worse (2) | |
| About the same (3) | |
| O Better (4) | |
| O Much better (5) | |
| | |

Q23c The general **physical** health of the people in your household?

| \bigcirc Much worse (1) |
|----------------------------|
| O Worse (2) |
| O About the same (3) |
| O Better (4) |
| \bigcirc Much better (5) |
| |

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Q23d The general academic performance of the people in your household?

| O Much worse (1) | |
|-------------------------------|--|
| O Worse (2) | |
| \bigcirc About the same (3) | |
| O Better (4) | |
| O Much better (5) | |
| | |

Q23e Generally, how healthy were the meals, snacks, and beverages consumed by your household?

| \bigcirc Much less healthy (1) |
|----------------------------------|
| \bigcirc Less healthy (2) |
| O About the same (3) |
| O Healthier (4) |
| O Much healthier (5) |
| |
| age Break |

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Q24 Check the challenge(s) that made it most difficult to get food for your household *during* the Covid-19 pandemic *compared to before* the COVID-19 pandemic. Check all that apply.

| | Unemployment or reduced employment (1) |
|------------|---|
| for food i | Anxiety or worry about becoming infected with the COVID-19 virus by shopping n person (2) |
| | We had increased medical costs related to COVID-19 (3) |
| | None of these were challenges for our household during 2020 (4) |
| | Other: (5) |
| | |

These next questions are about different types of food assistance and the ways households got access to food during the COVID-19 pandemic.

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Q25 Identify the sources that were most helpful for getting food for your household during the COVID-19 pandemic. *Check all that apply.*

| My spouse (1) |
|---|
| Other relatives (2) |
| Friends or Neighbors (3) |
| Coworkers (4) |
| Our church (5) |
| Free food from hospitals and clinics (6) |
| Food pantries (7) |
| Free food from local businesses (8) |
| Free food from my employer (9) |
| Free meals provided by local schools (10) |
| Government food assistance programs (eg. SNAP, WIC, etc) (11) |
| Free food from local farms or farmers markets (12) |
| Having a part time or full time job (13) |
| Taking on an additional job (14) |
| Other: (15) |
| |

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Q26 How much help for getting food could your household have used during the COVID-19 pandemic?

- \bigcirc A lot of help (1)
- \bigcirc Some help (2)
- \bigcirc A little help (3)
- \bigcirc We did not need help getting food (4)

Q27 Please identify the sources of food assistance that your household would have used during the COVID-19 pandemic if they had been available to you.

End of Block: Health Questions

Start of Block: Food Access (Long List)

Q28 Below is a list of ways that households use to get food. Please indicate how often your household used each way to get food *during* the COVID-19 pandemic *compared to before* the COVID-19 pandemic.

28-1 Shopped in person at a grocery store

- O Much More Often (1)
- O More Often (2)
- O About the Same (3)
- C Less Often (4)
- O Never Have Used (5)

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28-2 Skipped medical appointments to have more money for food

- \bigcirc Much More Often (1)
- O More Often (2)
- \bigcirc About the Same (3)
- O Less Often (4)
- O Never Have Used (5)

28-3 Left a restaurant without paying our bill

| O Much More Often (1) |
|-----------------------|
| O More Often (2) |
| O About the Same (3) |
| C Less Often (4) |
| O Never Have Used (5) |
| |

28-4 Ate at places where you can pay what you can (e.g. FARM Café) and paid less than the full cost of a meal

Much More Often (1)
More Often (2)
About the Same (3)
Less Often (4)
Never Have Used (5)

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28-5 Looked for sales or food coupons to save money on food

- \bigcirc Much More Often (1)
- O More Often (2)
- \bigcirc About the Same (3)
- O Less Often (4)
- O Never Have Used (5)

28-6 Hunted animals or fished to have more food

| O Much More Often (1) |
|-----------------------|
| O More Often (2) |
| O About the Same (3) |
| C Less Often (4) |
| O Never Have Used (5) |

28-7 Shopped for food at a dollar store or other discount store

- \bigcirc Much More Often (1)
- O More Often (2)
- O About the Same (3)
- O Less Often (4)
- O Never Have Used (5)

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28-8 Got food from a dumpster or trash

- \bigcirc Much More Often (1)
- O More Often (2)
- \bigcirc About the Same (3)
- C Less Often (4)
- O Never Have Used (5)

28-9 Created homemade items to sell to get food (e.g. jewelry, masks, crafts, art, etc.)

| O Much More Often (1) |
|---|
| O More Often (2) |
| O About the Same (3) |
| C Less Often (4) |
| O Never Have Used (5) |
| More Often (2) About the Same (3) Less Often (4) Never Have Used (5) |

28-10 Purchased food from vending machines or convenience stores

- \bigcirc Much More Often (1)
- O More Often (2)
- O About the Same (3)
- O Less Often (4)
- O Never Have Used (5)

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28-11 Sold blood/plasma to get money for food

- \bigcirc Much More Often (1)
- O More Often (2)
- \bigcirc About the Same (3)
- C Less Often (4)
- O Never Have Used (5)

28-12 Stretched food to make it last longer (i.e. mixing leftovers with other foods)

| O Much More Often | (1) |
|-----------------------------|-----|
| O More Often (2) | |
| \bigcirc About the Same (| 3) |

O Less Often (4)

O Never Have Used (5)

28-13 Took food home after visiting family or friends

- \bigcirc Much More Often (1)
- O More Often (2)
- O About the Same (3)
- C Less Often (4)
- O Never Have Used (5)

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28-14 Participated in a research study to get money to buy food

- \bigcirc Much More Often (1)
- O More Often (2)
- \bigcirc About the Same (3)
- C Less Often (4)
- O Never Have Used (5)

28-15 Used less medications to have more money for food

| O Much More Often (1) |
|--------------------------------|
| O More Often (2) |
| O About the Same (3) |
| C Less Often (4) |
| \bigcirc Never Have Used (5) |
| |

28-16 Skipped scanning some of our food at the self-check out when grocery shopping

- \bigcirc Much More Often (1)
- O More Often (2)
- O About the Same (3)
- O Less Often (4)
- O Never Have Used (5)

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28-17 Saved a supply of food in our home in case we couldn't get access to food

- O Much More Often (1)
- O More Often (2)
- O About the Same (3)
- C Less Often (4)
- O Never Have Used (5)

28-18 Shopped for food online

- \bigcirc Much More Often (1)
- O More Often (2)
- \bigcirc About the Same (3)
- O Less Often (4)

O Never Have Used (5)

28-19 Used a credit card to buy food

- \bigcirc Much More Often (1)
- O More Often (2)
- O About the Same (3)
- C Less Often (4)
- O Never Have Used (5)

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28-20 Prepared a weekly or monthly grocery budget

- \bigcirc Much More Often (1)
- O More Often (2)
- \bigcirc About the Same (3)
- O Less Often (4)
- O Never Have Used (5)

28-21 Got food from a campus or community food pantry

| O Much More Often (1) |
|-------------------------------|
| O More Often (2) |
| \bigcirc About the Same (3) |
| |

C Less Often (4)

O Never Have Used (5)

28-22 Grew some food for our household

- \bigcirc Much More Often (1)
- O More Often (2)
- O About the Same (3)
- C Less Often (4)
- O Never Have Used (5)

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28-23 Took money out of our savings account to buy food

- O Much More Often (1)
- O More Often (2)
- \bigcirc About the Same (3)
- C Less Often (4)
- O Never Have Used (5)

28-24 Shared the cost of groceries or meals with people who do not live with us

| O More Often (2) |
|--------------------------------|
| \bigcirc About the Same (3) |
| C Less Often (4) |
| \bigcirc Never Have Used (5) |

28-25 Spent less on hobbies or entertainment to have more money for food

- \bigcirc Much More Often (1)
- O More Often (2)
- O About the Same (3)
- C Less Often (4)
- O Never Have Used (5)

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28-26 Used unemployment benefits to buy food

- \bigcirc Much More Often (1)
- O More Often (2)
- \bigcirc About the Same (3)
- O Less Often (4)
- O Never Have Used (5)

28-27 Prepared a grocery list before food shopping to save money on food

| O Much More Often (1) |
|--------------------------------|
| O More Often (2) |
| \bigcirc About the Same (3) |
| C Less Often (4) |
| \bigcirc Never Have Used (5) |
| |

28-28 Used less utilities (e.g. electricity, water) to have more money for food

- \bigcirc Much More Often (1)
- O More Often (2)
- O About the Same (3)
- O Less Often (4)
- O Never Have Used (5)

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28-29 Prepared food and beverages at home to save money

- \bigcirc Much More Often (1)
- O More Often (2)
- \bigcirc About the Same (3)
- O Less Often (4)
- O Never Have Used (5)

28-30 Stole money to provide more food for the household

| O Much More Often (1) |
|--------------------------------|
| O More Often (2) |
| \bigcirc About the Same (3) |
| C Less Often (4) |
| \bigcirc Never Have Used (5) |
| |

28-31 Received food assistance from a federal or state food assistance program (e.g. SNAP, WIC, etc.)

O Much More Often (1)

- O More Often (2)
- O About the Same (3)
- O Less Often (4)
- O Never Have Used (5)

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28-32 Made a change in our living arrangement to save on rent so we would have more money for food (e.g., took in a roommate, moved in with family, etc)

Much More Often (1)More Often (2)

O About the Same (3)

O Less Often (4)

O Never Have Used (5)

28-33 Provided services to get money for food (e.g. babysitting for food, giving haircuts for food, etc.)

○ Click to write Choice 1Much More Often (1)

O More Often (2)

O About the Same (3)

C Less Often (4)

O Never Have Used (5)

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28-34 Spent less on personal care items to have more money for food (e.g. haircuts, clothing, hygiene products, etc)

Much More Often (1)
More Often (2)
About the Same (3)
Less Often (4)
Never Have Used (5)

28-35 Sold personal possessions (e.g. textbooks, clothing, jewelry, sporting equipment, furniture, car, bike, etc) to get money for food

| O Much More Often (1) |
|---|
| O More Often (2) |
| About the Same (3) |
| C Less Often (4) |
| O Never Have Used (5) |
| |
| 28-36 Borrowed money that we used to buy food |
| |

O Much More Often (1)

O More Often (2)

O About the Same (3)

C Less Often (4)

O Never Have Used (5)

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28-37 Purchased and ate cheap, processed food (e.g. ramen noodles, frozen pizza, candy, etc.) so we could eat more food

Much More Often (1)
More Often (2)
About the Same (3)
Less Often (4)
Never Have Used (5)

28-38 Worked at a co-op or community garden in exchange for food

Much More Often (1)
More Often (2)
About the Same (3)
Less Often (4)
Never Have Used (5)

28-39 Other, please identify.

End of Block: Food Access (Long List)

Start of Block: Demographics

These final questions ask for information about you or your household. All of your answers will be kept confidential. Only group answers and no individual answers will be reported in any manuscript or presentation based on this research. Please check the answers that best apply.

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Q29 The gender I identify with is

| ○ Male (1) |
|---|
| O Female (2) |
| O Non-binary (3) |
| O Prefer not to say (4) |
| \bigcirc I prefer to self-describe as (5) |
| |
| Q30 My age in years is |
| |
| Q31 My current year in school is: |
| ◯ Freshman (1) |
| O Sophmore (2) |
| O Junior (3) |
| ◯ Senior (4) |
| ◯ Graduate Student (5) |
| Other (6) |

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Q32 The race/ethnic background of our household is:

| ◯ American Indian/Alaska Native (1) | | | |
|--|--|--|--|
| O Asian (2) | | | |
| ◯ Black/African American (3) | | | |
| Caucasian/White (9) | | | |
| ◯ Hispanic/Latino (4) | | | |
| ◯ Native Hawaiian/Pacific Islander (5) | | | |
| \bigcirc Two or more races (7) | | | |
| Other: (8) | | | |
| | | | |
| Q33 Based on the country where we were born and raised, we consider ourselves an international household | | | |
| ○ Yes (1) | | | |
| O No (2) | | | |
| | | | |
| Q34 My current employment status is: | | | |
| \bigcirc Unemployed (1) | | | |

- \bigcirc One or more part time jobs (2)
- One full time job (3)
- Other (4)_____

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Q35 Did the employment status of anyone in your household change during the COVID-19 pandemic because of the pandemic?

| 0 | Yes | (1) |
|------------|-----|-----|
| \bigcirc | No | (2) |

Skip To: Q37 If Did the employment status of anyone in your household change during the COVID-19 pandemic because... = No

Q36 Which best describes the employment change(s) made in your household because of the COVID-19 pandemic?

| \bigcirc Lost their job (1) |
|--|
| \bigcirc Switched from full-time to a part-time job (2) |
| \bigcirc Switched from part-time to full-time job (3) |
| \bigcirc Took on second part-time or full-time job (4) |
| \bigcirc Quit job to take care of children or sick family members (5) |
| Other: (6) |
| |
| Q37 During the COVID-19 pandemic our household's monthly income because of the pandemic. |
| O Decreased (1) |
| O Increased (2) |
| \bigcirc Stayed about the same (3) |
| |

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Q38 Did you apply for unemployment benefits during the COVID-19 pandemic?

Yes (1)
No (2)
I was already receiving unemployment benefits (4)

Q39 Did you apply for federal or state food assistance programs during the COVID-19 pandemic (e.g SNAP, WIC, etc.) ?

Yes (1)
No (2)
I was already receiving these benefits (3)

End of Block: Demographics

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Vita

Sarah "Morgan" Adkisson was born and raised in Nashville, Tennessee. She is the daughter of Phil and Melissa Adkisson. She graduated from The University of Tennessee, Knoxville in May 2020 with a Bachelor of Science in Health and Human Sciences and a minor in Public Health. She continued her education at Appalachian State University where she is pursuing a Master of Science in Nutrition. After graduation, Morgan hopes to pursue a career as a Registered Dietitian Nutritionist to address food insecurity among underserved populations.