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RESEARCH ARTICLE

Assessing food insecurity at the University of Arkansas at Little Rock

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Abstract: In 2014, 567,250 (19.1%) Arkansans were classified as food insecure (Feeding America, 2016). According to Dubick, Mathews, and Cady (2016), 48% of students at community colleges and four-year colleges/universities qualified as food insecure. For this study, we implemented a non-probability convenience sample of 478 students enrolled at the University of Arkansas at Little Rock (UALR). Of the students who completed the survey: 54% identified as White; 37% Black or African American; 6% Hispanic or Latino; 3.5% Asian; 1% Native American and 62% were 19-24 years old. In terms of food security, 22.4% had enough to eat, but not always the kinds of food they wanted, 4.5% sometimes did not have enough to eat, 20.4% had to cut the size of their meals or skip meals because there was not enough money for food in the past three months, and 22.5% could not afford to eat balanced meals in the past three months. When one is always in search of their next meal, improper impulse controls can develop. Those who are food insecure or hungry, treat every meal as if it were their last. The link between food accessibility and academic performance can illustrate ways that policymakers can address the issue to help alleviate poverty and increase the chances that children can go to college and stay in college. By collaborating with students, faculty, and staff, UALR can increase its methods to address food insecurity among its college students.

Keywords: food insecurity, UALR

1 Introduction

The United States Department of Agriculture (USDA) has released several modules to assess individuals and households for food insecurity. These surveys include: the US Household Food Security Survey Module, the US Adult Food Security Survey Module, and the Six-Item Short Form of the Food Security Survey Module (USDA, 2017). Based on responses to survey questions, individuals are placed into one of four categories defining their food security status. The four categories are *high food security*, *marginal food security*, *low food insecurity*, and *very low food security*. Individuals who fall into the *low* and *very low* food security categories are classified as *food insecure* (USDA, 2018).[1,2].

In 2018, Coleman-Jensen, Rabbitt, Gregory, and Singh reported that in 2017 11.8% of households in the United States were food insecure at some point throughout the year and that 15.7% of households that had adults and children were food insecure[3]. The state of Arkansas is no different; 17.2% of households are considered food insecure in Arkansas, a rate of food insecurity higher than the national average. Pulaski County, Arkansas, the largest county in the state of Arkansas and home to the state capital Little Rock, has an even higher food insecurity rate of 19.9% (Lindsey, 2018)[4].

The nation's and state's college students are disproportionately affected by food insecurity, as previous studies have assessed food insecurity among college students. Although Lisnic (2016) measured food insecurity among college students at the University of Arkansas-Fayetteville[5], the state's flagship university, this study sought to assess food insecurity among students at the University of Arkansas at Little Rock (UALR), the state's metropolitan university. UALR opened its Trojan Food Pantry in February 2016. The purpose of our study was to examine the level of food insecurity at UALR and explore if the new food pantry had an impact of student food insecurity and hunger.

2 Literature review

Following the great recession, the topic of food insecurity among college students began to gain much attention in the scholarly literature. Studies are finding that college students are indeed at risk of being food insecure

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or are currently food insecure. One of the first studies to look at food insecurity in college students was done in Hawaii. Chaparro, Zaghloul, Holck, and Dobbs (2009) surveyed students attending the University of Hawaii using the US Adult Food Security Survey Module. A total of 441 students filled out the survey and it was found that 21% were food insecure. In 2016, Morris, Smith, Davis, and Null looked specifically at the rate of food insecurity at students who attended four-year colleges in Illinois[6]. The Household Food Security Survey Module was used to assess the rate of food insecurity in which they found that 35% of the 1,882 students surveyed were found to be food insecure. An Appalachian four-year college was surveyed using the Adult Food Security Module by Hagedorn and Olfert (2018)[7]. Of the 692 students that were sampled, it was found that 36.6% of the students were found to be food insecure. The rates of food insecurity found at these colleges were found to be higher than the national rate of food insecurity.

While some researchers have looked at food insecurity at specific colleges, others have surveyed more than one college at a time to determine food insecurity among students. Goldrick-Rab, Broton, and Eisenberg (2015) surveyed 10 different community colleges in seven different states using the USDA Six-Item Short Form[8]. A total of 4,312 students responded to the survey between the seven community colleges with 39% of the students responding that they were food insecure. The following year Dubick, Mathews, and Cady (2016) surveyed 3,765 students who attended community and four-year colleges in 12 different states throughout the US. It was found that 48% of the students who were surveyed were found to be food insecure in the past 30 days. One of the most recent studies looking at student's food insecurity surveyed 43,000 students attending community colleges and four-year colleges (Goldrick-Rab, Richardson, Schneider, Hernandez, & Cady, 2018)[9, 10]. These researchers utilized the USDA Adult Food Security Survey Module and found 42% of community college students were food insecure and 36% of four-year college students to be food insecure. Once again, the rates of food insecurity found were higher than the national average.

To get a closer look at student food insecurity in Arkansas, Lisnic (2016) conducted a study at the University of Arkansas[5], Fayetteville (U of A-Fayetteville) to determine the rate of food insecurity on the U of A-Fayetteville campus. She also explored factors that are related to food insecurity which include, food accessibility, housing, employment, financial resources, access to social networks and university services, participation in the campus community and food preparation skills and resources. Four hundred and eighteen participants responded to the USDA Food Security Survey Module and it was found that 38% of the respondents were food insecure on the U of A-Fayetteville campus. The food insecurity status of U of A-Fayetteville students is higher than the rate of food insecurity in the county in which the university is located, Washington County, Arkansas (14.3%; Feeding America, 2018)[11]. Lisnic also found that only 54% of the students surveyed knew about the food pantry on the U of A-Fayetteville campus and that of the students who knew about the food pantry only 2% of the students utilized it[5].

With so many students across America experiencing food insecurity, it is important for college administrators to find ways to help provide more food access to their students. One way to accomplish this is to implement a campus food pantry. El Zein, Mathews, House, and Shelnutt (2018) researched awareness of the food pantry among University of Florida students[12]. Through a questionnaire it was found that 32% of 635 students were food insecure and that 70% of the students surveyed knew about the food pantry, but only 15.6% of the students utilized the resource. This study shows that while many students know about the food pantry on campus, it is not widely utilized. This study also revealed that about half of the students who are food insecure are utilizing the food pantry. These findings indicate that while the food insecure student may know about the campus food pantry, there may be other factors that contribute to the student not utilizing the food pantry such as: social stigma and embarrassment, not enough information on how the program works and what determines eligibility, self-identity, or deeming themselves as unworthy to use the food pantry.

3 Purpose

This study builds on the previous studies that were discussed by identifying how many students at the University of Arkansas at Little Rock (UALR) are food insecure along with their demographic characteristics. Findings from this study will build on the knowledge of how many 4-year college students are food insecure in the state of Arkansas. Lastly, this study identifies if the students at UALR were aware and utilized the food pantry that is located on campus.

4 Methods

4.1 Sample

The sample for this study was a non-probability convenience sample of 478 students enrolled at the Univer-

sity of Arkansas at Little Rock. The survey was cross-sectional, non-experimental, administered during face to face classes and web-base to a random selection of professors across campus who taught undergraduate and graduate courses. Distance learners were not given the opportunity to complete the survey.

4.2 Measures

The UALR Food Security Survey Module (UALR FSSM) was adapted from the USDA U.S. Adult Food Security Survey Module (USDA FSSM). The UALR Module contains items related to food security and demographic variables.

The USDA FSSM contains ten items (HH2-HH4, AD1, AD1a, AD2, AD3, AD4, AD5, and AD5a) and an optional screener question (HH1). The first three USDA FSSM items are household screener items (i.e., HH2, HH3, and HH4) and the last seven are adult stage items (i.e., AD1 - AD5a). A household is classified into one of the categorical food security descriptors on the basis of its scale score on the USDA FSSM. Low scale scores represent no, or very limited, food-insecurity or hunger experiences; those households are classified as food secure. Higher scores indicate more food-insecurity or hunger experiences.

To arrive at a scale score, respondents answer the items in Table 1. All response options are dichotomized based on affirmative/not affirmative responses. Each item has designated "affirmative" response options, denoted by an asterisk in Table 1. For example, HH2 asks, "*(I/We) worried whether (my/our) food would run out before (I/we) got money to buy more in the last months*"[12]. Respondents who indicated this was "*often*" or "*sometimes*" true were considered "affirmative" and those who responded "*never*" true were not considered affirmative. If no affirmative responses were provided for either HH1 or HH2 through HH4, no other questions are presented and the scale score assigned is 0. If respondents indicate an affirmative to at least one of the screener items, they move on to Adult Stage 2, which follows a similar dichotomization scheme.

The number of affirmative responses to the ten USDA FSSM items are summed to arrive at the scale score, for a minimum possible score of zero and a maximum possible score of ten. For example, five affirmative responses would result in a scale score of five, with each item having equal weight in the scale score. The initial screener question, HH1, is not included in the scale score, but does allow respondents to move on to Adult Stage 2. Scale scores are then used to categorize respondents into one of four food security categories. Scale scores of zero indicate *high* food security on one end of the scale, and scores of six through ten indicate *very low* food security at the other end of the scale (see Table 5). More detail on the USDA FSSM is included in Bickel, Nord, Price, Hamilton, and Cook (2000).

Typically, the frame of reference for the USDA FSSM is 12 months, allowing researchers to estimate the proportion of households that experienced food insecurity in a year, accounting for seasonal variation in measurement. This study modified the 12-month period to reference a 3-month period. The National Resource Council (2006) suggests this is a viable change to the USDA FSSM. Changing the reference period may reduce the cognitive burden of recalling food insecurity and hunger events, and it also limits responses to the current academic year.

4.2.1 Educational attainment variable

Educational attainment was assessed by asking participants: What is the highest degree or level of school you have completed. Responses to select from where: some college credit-no degree; trade-technical-vocational training; associate degree; bachelor's degree; master's degree; professional degree; doctorate degree.

4.2.2 Demographic variables

Demographic questions were asked of each participant such as: age, ethnicity, marital status, employment status, and children residing in the home.

4.3 Procedure

The University of Arkansas at Little Rock's Institutional Review Board (IRB) granted permission to conduct this study. Surveys were administered face to face and through a link that connected to a *Google Forms* survey. Data were collected from December 2017 through March 2018. The face to face script and email included a description of the study and its purpose with the survey attached. The survey included an initial informed consent question requiring participants to consent to the survey. Students who completed the survey online were part of the psychology department's pilot study which gave students class credit for completing a specified number of surveys each semester. Therefore, we can verify that those who completed the survey online were indeed UALR students. In order to ensure confidentiality, the survey did not require the participants to share their names and only aggregate data are shared here. Data were collected about each participant's age, ethnicity, education status, marital status, employment status, and number of children in the home.

An adapted version of the U.S. Household Food Security Survey Module: Short Form, used by the USDA to determine food insecurity in households across the U.S., was used to determine food insecurity in this study. The

Table 1. USLR FSSM questions

Question Type	Question(s)	Response Options (Affirmative in bold)
Demographic (UALR FSSM only)	Age, race/ethnicity, educational achievement, marital status, and household children under the age of 10	Varied
Optional USDA Food Sufficiency Question/Screener: Question HH1 (asked of all households)	Which of these statements best describes the food eaten in your household in the last [3] months?	(1) Enough of the kinds of food we want to eat (2) Enough but not always the kinds of food we want (3) Sometimes not enough to eat* (4) Often not enough to eat* (5) DK or Refused
Household Stage 1: Questions HH2-HH4 (asked of all households)	HH2. (I/We) worried whether (my/our) food would run out before (I/we) got money to buy more in the last [3] months HH3. The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more in the last [3] months HH4. (I/we) couldn't afford to eat balanced meals in the last [3] months	(1) Often true* (2) Sometimes true* (3) never true
Adult Stage 2: Questions AD1-AD4 (asked of households responding affirmatively to any HH2-HH4 OR HH1).	AD1. In the last [3] months did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food? AD2. In the last [3] months, did you ever eat less than you felt you should because there wasn't enough money for food? AD3. In the last [3] months, were you every hungry but didn't eat because there wasn't enough money for food? AD4. In the last [3] months, did you lose weight because there wasn't enough money for food?	(1) Yes* (2) No (3) DK
Adult Stage 2 Follow Ups	AD1a. [IF affirmative to AD1] How often did this happen? AD5a. [IF affirmative to AD5] How often did this happen?	(1) Almost every month* (2) Some months but not every month* (3) Only 1 or 2 months (4) DK

Note: An asterisk (*) indicates an affirmative response

survey can be viewed in Appendix A.

The statistical software program SAS/STAT version 9.4 (SAS Institute Inc.) was used to score and analyze the data collected by *Google Forms* and create visual representations of the data collected.

4.4 Relationship of status with demographic information

The Chi-square statistical test of independence was used to test the relationship of Food Security Status with the demographic variables. The null for Chi-square statistical test of independence is that the two categorical variables are independent. A 5% significance level was used for all tests of independence. Lack of independence indicates that the frequency distribution of food security status is related to levels of the demographic variable.

5 Results

5.1 Survey question response distribution

5.1.1 Optional HH1

Affirmative responses to the optional screener question include *sometimes* or *often* not enough to eat. These questions are not included in the calculation of Adult Food Security Scale scores. Results are informative, however, to higher education administrators in Arkansas. Survey responses to HH1 are found in Table 2. Almost 5% of survey respondents indicated they often did not have enough to eat the last 3 months.

Table 2. HH1 response distribution

Response Category	Freq	%
Missing	2	
Enough of the kinds of food we want to eat	364	71.51
Enough but not always the kinds of food we want	114	22.40
Sometimes not enough to eat*	8	1.57
Often not enough to eat*	23	4.52

Note: * denotes an affirmative response

5.1.2 Household stage 1

Affirmative responses to the household questions include *sometimes* or *often* true, and these questions are included in the calculation of Adult Food Security Scale scores. Survey responses to the questions making up Household Stage 1 are found in Table 3.

If respondents provide at least one affirmative response to HH2, HH3, and HH4, they move on to Adult Stage 2. The other criteria for moving to the Adult Stage 2 portion is an affirmative in HH1. In the UALR sample, 210 respondents (41.10%) responded affirmatively to at least one Household Stage 1 question or an affirmative response to the optional HH1 Question. For respondents not moving on to Adult Stage 2, the Adult Food Security Scale score is zero.

Table 3. Household stage 1 response distribution

Response Category	Freq	%
Missing	2	
Enough of the kinds of food we want to eat	364	71.51
Enough but not always the kinds of food we want	114	22.40
Sometimes not enough to eat*	8	1.57
Often not enough to eat*	23	4.52

Note: * denotes an affirmative response

5.1.3 Adult stage 2

An affirmative response to the Adult Stage 2 questions is *yes*. These questions are included in the calculation of Adult Food Security Scale scores. Survey responses to the questions making up Adult Stage 2 are found in Table 4.

5.1.4 Adult stage 2 follow ups

For respondents responding affirmatively to AD1 and AD5, follow-up questions are presented. These questions ask for frequency of the behavior referred to in the preceding question. Of the 101 individuals replying affirmatively to AD1, 25 (24.75%) responded "Almost every month." Of the 26 individuals replying affirmatively to AD5, 6 (23.08%) responded "Almost every month."

5.1.5 Adult food security scale scores

For each of the ten items, responses are dichotomized based upon affirmative (1) and non-affirmative (0) responses. The sum of the dichotomous responses to the 10 questions in the FSSM is the household's raw score on the scale. Reliability of the ten dichotomous items was high (α =.901). The distribution of the raw score scale is found in Figure 1.

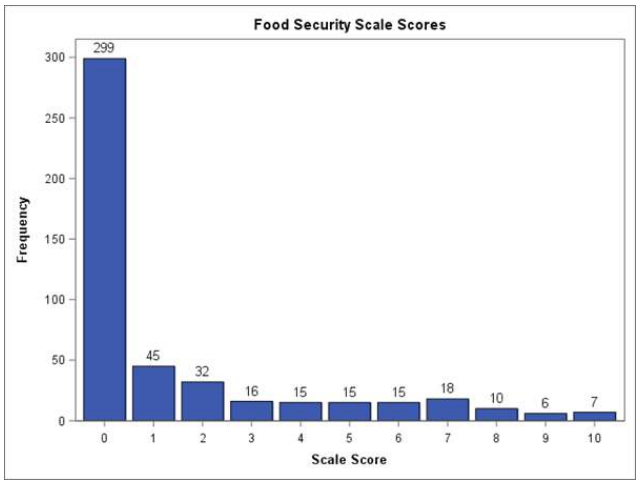

Figure 1. Food security raw score distribution

Food security status is assigned according to the rules presented in Table 5. Also shown in Table 5 is the fre-

Table 4. Adult stage 2 response distribution

	AD1		AD2		AD3		AD4		AD5	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Missing	1		1		1		2		0	
DK	8	1.57	9	1.76	3	0.59	15	2.95	11	2.15
No	401	78.63	402	78.82	420	82.35	456	89.95	474	92.76
Yes*	101	19.8	99	19.41	87	17.06	38	7.47	26	5.09

Note, * denotes an affirmative response

quency distribution of food security status for students at UALR. As shown in Table 5, 78.44% of students were classified as having high or marginal food security, considered "food secure." In contrast, 21.57% of students were classified as low (9.73%) or very low (11.94%) food security, considered "food insecure." This percentage is higher than other comparison populations. In the general population, 11.8% of American households were food insecure at least some time during the year in 2017. In Arkansas, 17.2% were considered food insecure. Within the county in which UALR is located, 19.9% of people in Little Rock and Pulaski County are considered food insecure. Thus, the UALR sample experiences food insecurity at a higher level than comparison populations.

Table 5. Food Security Status

Raw Score	Status	Freq	%
Raw Score 0	High food security among adults	295	62.37%
Raw score 1-2	Marginal food security among adults	76	16.07%
Raw score 3-5	Low food security among adults	46	9.73%
Raw score 6-10	Very low food security among adults	56	11.84%

5.2 Relationship of status with demographic information

Table 6 presents results of the Chi-square statistical test of independence for the five demographic variables with the Food Security Status variable. Results indicate race and marital status are not independent of food security status at the 5% significance level.

Table 6. Chi-square statistical test of independence

Variable	χ^2	Degrees of Freedom	*p*- value
Age	24.44	15	0.0579
Race	44.47	21	0.0020
Educational Attainment	15.51	21	0.7963
Marital Status	34.08	12	0.0007
Children Under 10 Years Old	4.74	3	0.1913

Specifically, Table 7 and Table 8 show the relationship between race and marital status with the food security status variable, respectively. Of note, as illustrated in Figure 2 for groups with more than 20 individuals, Caucasians and African Americans have similar rates of food insecurity (19% and 22%, respectively). Caucasians had lower rates of the most severe food insecurity, *very low food security*, when compared to *low food security*. However, the opposite is true for African Americans. For that subpopulation, there are higher rates of the most severe food insecurity status than for the rates of lesser food insecurity, representing an inverse of the anticipated trend.

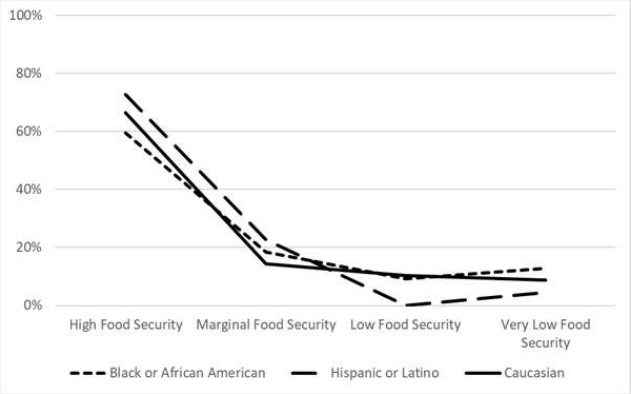

Figure 2. Food security rates by race

Divorced households had higher rates of *very low food security* than other marital status groups, and single households tended to have higher rates of *low food security.*

5.3 UALR trojan food pantry

Of the survey respondents, 296 (63.79%) had heard of the University of Arkansas at Little Rock's Trojan Food Pantry. Knowledge of the Trojan Food Pantry was independent of Food Security Status ($\chi^2\,(6) = 2.48,\ p = 0.8703$). Unfortunately, 39.3% of those considered *very low* Food Security Status were not aware of the Trojan Food Pantry.

Of those aware of the food pantry, 28 (9.43%) utilized the Trojan Food Pantry. Food pantry utilization and Food Security Status were not independent ($\chi^2\,(3) = 15.36,\ p = 0.0015$), with 43% of those utilizing the

Table 7. Race and food security status

	High Food Security	Marginal Food Security	Low Food Security	Very Low Food Security	Total
Asian / Pacific Islander	7 (46.67%)	4 (26.67%)	2 (13.33%)	2 (13.33%)	15
Black or African American	97 (59.51%)	30 (18.4%)	15 (9.2%)	21 (12.88%)	163
Hispanic or Latino	16 (72.73%)	5 (22.73%)	0 (0%)	1 (4.55%)	22
Middle eastern	1 (100%)	0 (0%)	0 (0%)	0 (0%)	1
More than one race selected	8 (61.54%)	2 (15.38%)	1 (7.69%)	2 (15.38%)	13
Native American or American Indian	0 (0%)	0 (0%)	0 (0%)	1 (100%)	1
No response provided	5 (31.25%)	0 (0%)	3 (18.75%)	8 (50%)	16
Caucasian	161 (66.53%)	35 (14.46%)	25 (10.33%)	21 (8.68%)	242
Total	295	76	46	56	473

Table 8. Marital status and food security status

	High Food Security	Marginal Food Security	Low Food Security	Very Low Food Security	Total
Divorced	16 (61.54%)	4 (15.38%)	2 (7.69%)	4 (15.38%)	26
Married or domestic partnership	68 (70.83%)	11 (11.46%)	5 (5.21%)	12 (12.5%)	96
Separated	0 (0%)	3 (42.86%)	3 (42.86%)	1 (14.29%)	7
Single, never married	209 (61.65%)	58 (17.11%)	34 (10.03%)	38 (11.21%)	339
Widowed	0 (0%)	0 (0%)	2 (66.67%)	1 (33.33%)	3
Total	293	76	46	56	471

food pantry considered *low* or *very low* Food Security Status. Of those not utilizing the food pantry, only 18% were considered *low* or *very low* Food Security Status. For those who responded to how they were made aware of the pantry, Table 9 indicates campus wide emails, posters, and word of mouth were equally prevalent, although few respondents chose to respond to the question.

Table 9. How did you hear about the Trojan Food Pantry?

Mode	Frequency	Percent
Bathroom Stall Stories	1	3.33
Campus wide email regarding it	6	25.00
Posters on campus	6	25.00
Word of mouth	6	25.00
Multiple Modes	5	16.67

6 Discussion

This study found that FI is indeed a problem at the UALR campus with 21.57% of the sampled students classified as food insecure. As stated earlier, the rate of food insecurity on the UALR campus is higher than national and local rates of FI in Pulaski County. This is a similar finding to the Lisnic et al (2016) that was conducted at the University of Arkansas – Fayetteville[5], where FI rates among students were also higher than the national and local percentages of FI in Fayetteville, Arkansas. Similar findings across these two Arkansas system schools signal the need for policy changes on campuses to address FI at Arkansas' state universities.

One method to address FI in college students has been to implement a food pantry on the college campus. This study, along with the study done on the University of Arkansas-Fayetteville campus and at the University of Florida show that while there are food pantries on campus, not many students are aware of the resource. Even fewer students utilize the pantries. These findings suggest the need for more awareness needs about the food pantries on campus. The study at the University of Florida identified some factors as to why students do not utilize the food pantry on campus. Future research is needed to explore why students at UALR and the University of Arkansas-Fayetteville campuses are not using the food pantry. That information could help university administrators identify effective ways to increase awareness and utilization of food pantries on these campuses.

This study also examined the rate of FI in regards to students' race and marital status. In 2016, UALR reported that 55.6% of the student population was White, 21.8% Black, 6.8% Hispanic/Latino, 2.2% Asian, and 8.2% two or more races. The results from this study display an accurate representation of the student body on the UALR campus even though the entire student body did not respond to the survey and the sample was one of convenience. This is an important finding in regards to

which populations of students are more at risk for being food insecure. Another important finding to this study was that single, never married students were at higher risk for FI than students who had a partner or were separated or widowed. This finding could be due to single individuals having only one income whereas students with partners have two sets of income to provide for the family. Future research should examine this finding further and explore the financial status of the individuals on campus in regards to how the student can appropriately provide for their basic needs[13].

7 Conclusion

In conclusion, this study builds on previous research, reinforcing FI as an issue on college campuses throughout the US and that college campuses have higher rates of FI than the national and local percentages. This UALR study can be used along with research from the University of Arkansas-Fayetteville campus to help address FI on college campuses in Arkansas due to their similar findings. College administrators throughout Arkansas can collaborate with one another to find the most effective way to address FI on campuses. The data on food pantries can be used so that administrators can have a place to start with raising awareness and addressing FI on college campuses.

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