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A Comparison of Food Insecurity Prevalence among Students Attending Minority Serving Versus Predominantly White Institutions in Pre, Earlier, and Later Phases of the COVID-19 Pandemic

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A B S T R A C T

Background: College students have a high prevalence of food insecurity, and descriptive reports suggest even higher rates at minority-serving institutions than those at predominantly White institutions. These institutional inequities in food insecurity among college students based on minority designation may have shifted owing to the COVID-19 pandemic.

Objectives: We aimed to compare the prevalence of food insecurity between students at minority serving and predominantly White institutions during 3 phases: prepandemic [Fall 2019–Spring 2020 (February 2020)], earlier pandemic (Fall 2020–Spring 2021), and later pandemic (Fall 2021–Spring 2022).

Methods: Our study included repeated cross-sectional samples from the American College Health Association–National College Health Assessment III ($N = 287{,}221$ students, 354 institutions). We performed multivariable Poisson regression with cluster-robust SEs to estimate associations between institutional minority designation and food insecurity, with 1 model for each pandemic phase.

Results: Students attending minority serving compared with predominantly White institutions had a higher prevalence of food insecurity overall (42% compared with 37%) and within each pandemic phase. After adjusting for sociodemographic and institutional characteristics, students at minority serving institutions had 23% higher food insecurity prevalence during the prepandemic phase than students at predominantly White institutions (95% confidence interval: 1.14, 1.32). Associations were null for earlier and later pandemic phases.

Conclusions: Lower institutional inequities in food insecurity after the onset of the pandemic may reflect more students returning home as well as an increase in social safety net programs. Regardless of cause, the high prevalence of food insecurity among students, especially at minority serving institutions, underscores the importance of addressing food insecurity at postsecondary campuses.

Keywords: health disparities, food security, college health, minority serving institutions, predominantly White institutions

Introduction

College students are at a high risk of food insecurity—defined as an "economic and social condition of limited or uncertain access to adequate foods" [1]. A 2022 review including 47 studies published between 2016 and 2021 estimates an average prevalence of food insecurity among college students of 32.2% across reports (range: 9.9%–72.9%) [2], which greatly exceeds the 10% prevalence of food insecurity among the general United States population in 2021 [3]. Enrollment in undergraduate and graduate programs has become more common in the past 50 y, leading to more low-income, first-generation, and racially and ethnically minoritized students enrolling in postsecondary institutions [4]. The financial burden of college attendance has simultaneously worsened, with the average tuition more than tripling since 1975, after accounting for inflation [5]. These trends may be contributing to the relatively high food insecurity rates among college students. Regardless of cause, addressing food insecurity among college students is important given its links with poor nutritional outcomes, worse physical and mental

Abbreviations: aPR, adjusted prevalence ratio; MSI, minority serving institution; PR, prevalence ratio; PWI, predominantly White institution; HBCU, Historically Black College or University; ACHA-NCHA, American College Health Association–National College Health Assessment.

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health, and negative academic outcomes [6,7]. A better understanding of institutional determinants of food insecurity would inform which colleges or universities would benefit most from future policies and public health initiatives aimed at promoting food security among college students.

Minority designation status of a postsecondary institution may be a determinant of food insecurity among college students. Minority serving institutions (MSIs) are higher education institutions that serve minority populations—defined either through historical legislation [e.g., Historically Black Colleges and Universities (HBCUs), designated under the Higher Education Act of 1965] or by enrolling a minimum threshold percentage of racially/ethnically minoritized groups (e.g., Hispanic-serving institutions, defined as enrolling ≥25% Hispanic students) [8]. Drawing from the racialization of organizations framework, non-White institutions are systematically marginalized and MSIs often do not receive their fair share of resources compared with predominantly White institutions (PWIs) [9,10]. MSIs also enroll a greater proportion of racial/ethnic minority, lower income, and first-generation students than PWIs [11]. Despite serving less privileged students and receiving fewer resources, MSIs have demonstrated an ability to "do more with less," providing positive academic environments for students of color and promoting upward social mobility; the rate of students moving from the bottom 2 income quintiles to the top 2 income quintiles is twice as high at HBCUs than that at PWIs [10,11]. Better outcomes for students at MSIs have been attributed to these institutions' commitment to affordable education as well as the relatively affirming environments for people of color compared with those at PWIs [9,10]. Still, recent reports suggest food insecurity rates at MSIs are relatively high, ranging from 46% to 78% at HBCUs and 19% to 56% at Hispanic-serving institutions [12–15]. According to a report from the Hope Center for Community, College, and Justice, the prevalence of food insecurity at HBCUs was 67% compared with 53% for non-HBCUs in Fall 2020 [16]. No studies, to our knowledge, have compared food insecurity among MSIs and PWIs with adjustment for sociodemographic characteristics.

The COVID-19 pandemic may have impacted food insecurity among college students through disruptions to campus life as well as economic disruptions that may have widened basic needs inequities [17–19]. According to the USDA, the prevalence of food insecurity increased for Black households and decreased for White households from 2019 to 2020 [19]. Some studies have examined food insecurity among college students at MSIs or PWIs before compared with during the COVID-19 pandemic with mixed results. One study of students enrolled at a Hispanic-serving institution suggests that low food security declined from 24% in 2019 to 22% in 2020 and very low food security—the most severe form of food insecurity—declined from 32% in October 2019 to 23% in November 2020 [14]. A cross-sectional study measuring retrospective reports of changes in food insecurity following the onset of the COVID-19 pandemic among students at a PWI found that 22.6% of students reported becoming more food insecure while 15% reported becoming less food insecure [20]. No peer-reviewed study has investigated whether food insecurity before and during COVID-19 differed for students at MSIs compared with those at PWIs.

To address this gap, we aimed to compare prevalence estimates of food insecurity among students at MSIs and PWIs during 3 phases related to the COVID-19 pandemic: prepandemic (Fall 2019–Spring 2020), earlier pandemic (Fall 2020–Spring 2021), and later pandemic (Fall 2021–Spring 2022). Examining minority designation status as a potential determinant of food insecurity is an important step in understanding how institutional inequities may have contributed to food insecurity throughout the pandemic.

Methods

Study design and sample

We conducted a secondary data analysis of the American College Health Association–National College Health Assessment III (ACHA-NCHA III). The ACHA-NCHA III is a cross-sectional, online survey that samples students from colleges and universities in the United States and Canada, which request to participate in the survey and agree to pay survey administration fees [21]. Schools administered the ACHA-NCHA III survey to enrolled students in accordance with their institutional policies. United States institutions that invited either all students or a random sample of students to participate were included in this study. Our analysis included surveys administered each Fall and Spring semester from Fall 2019 to Spring 2022. Overall response rates ranged from 12.8% in Spring 2021 to 14.1% in Spring 2020, comparable with other national college health surveys [22].

We grouped participants by academic year to examine 3 time frames in relation to the COVID-19 pandemic: the prepandemic phase [Fall 2019–Spring 2020 (February 2020)]; the earlier pandemic phase (Fall 2020–Spring 2021), when most students were taking online or hybrid classes; and the later pandemic phase (Fall 2021–Spring 2022), when most students were taking in-person or hybrid classes (Table 1). Only data collected before March 2020 were included in the Spring 2020 survey.

Of the 301,183 eligible respondents, we excluded students with missing food security questions (n = 8141) and students from 2-y institutions (n = 8338) given few or zero 2-y MSIs participated in the survey within each pandemic phase. The number of schools and students included in each phase are as follows—prepandemic phase: 124 schools, n = 81,926 students; earlier pandemic phase: 151 schools, n = 106,101 students; and later pandemic phase: 164 schools, n = 99,194 students, for a sample of 354 schools, including 70 MSIs and 287,221 students. Because ACHA-NCHA III data are deidentified, this study was deemed nonhuman subject research and did not need Institutional Review Board (IRB) approval. All institutions were required to obtain IRB approval to participate in ACHA-NCHA III.

Measures

Institutional minority designation

The exposure of interest was the minority status of the institution at which participants were enrolled. Students were categorized as attending an MSI if they attended any of the following: HBCU, Hispanic-serving institution, high-Hispanic enrollment institution (≥5% enrollment of Hispanic undergraduates), Asian American and Native American Pacific Islander–serving institution (≥10% enrollment of Asian American and Native American Pacific Islander undergraduates), Alaska Native–serving

TABLE 1
Characteristics of the study sample, by pandemic phase and institutional minority designation: United States, 2019–2022

Characteristics	All students	Minority serving institution			Predominantly White institution		
	N = 287,221 students, 354 schools	Prepandemic Phase[1] (Fall 2019–Spring 2020; n = 11,509 students, 22 schools)	Earlier pandemic phase (Fall 2020–Spring 2021; n = 33,057 students, 42 schools)	Later pandemic phase (Fall 2021–Spring 2022; n = 12,171 students, 26 schools)	Prepandemic phase[1] (Fall 2019–Spring 2020; n = 70,417 students, 102 schools)	Earlier pandemic phase (Fall 2020–Spring 2021; n = 73,044 students, 109 schools)	Later pandemic phase (Fall 2021–Spring 2022; n = 87,023 students, 138 schools)
Food security							
Food security[2]	177,145 (62%)	5316 (46%)	20,895 (63%)	6483 (53%)	42,201 (60%)	49,682 (68%)	52,568 (60%)
Food insecurity	110,076 (38)	6193 (54%)	12,162 (37%)	5688 (47%)	28,216 (40%)	23,362 (32%)	34,455 (40%)
Age (y)							
Mean (SD)	23.0 (6.4)	23.3 (7.4)	23.8 (7.1)	24.7 (8.5)	22.2 (5.6)	23.5 (6.6)	22.6 (6.2)
Sex at birth							
Female	194,316 (68%)	7642 (66%)	24,227 (73%)	7823 (64%)	46,596 (66%)	49,877 (68%)	58,151 (67%)
Male	91,420 (32%)	3812 (33%)	8701 (26%)	4266 (35%)	23,522 (33%)	22,842 (31%)	28,277 (33%)
Gender identity and sexual orientation							
Cis/Het	217,141 (76)	9323 (81%)	24,672 (75%)	8991 (74%)	55,461 (79%)	55,812 (76%)	62,882 (72%)
LGBTQ+	67,761 (24%)	2094 (18%)	8137 (25%)	3070 (25%)	14,501 (21%)	16,713 (23%)	23,246 (27%)
Parental education[3]							
High school or less	49,572 (17%)	2818 (25%)	10,259 (31%)	2897 (24%)	10,001 (14%)	9999 (14%)	13,598 (16%)
Some college	46,955 (16%)	2540 (22%)	7240 (22%)	2380 (20%)	10,921 (16%)	10,863 (15%)	13,011 (15%)
Bachelor degree or higher	185,669 (65%)	5920 (51%)	14,664 (44%)	6624 (54%)	48,553 (69%)	51,155 (70%)	58,753 (68%)
Race/ethnicity							
Hispanic/Latinx	28,001 (10%)	2670 (23%)	9179 (28%)	2649 (22%)	3930 (6%)	4178 (6%)	5395 (6%)
Multiracial	32,154 (11%)	1583 (14%)	4888 (15%)	1838 (15%)	6962 (10%)	7756 (11%)	9127 (11%)
NH Asian	39,827 (14%)	966 (8%)	6578 (20%)	1340 (11%)	9076 (13%)	9864 (14%)	12,003 (14%)
NH Black	13,986 (5)	1994 (17%)	1051 (3%)	707 (6%)	3167 (5%)	2964 (4%)	4103 (5%)
NH White	163,570 (57%)	3797 (33%)	9875 (30%)	5063 (42%)	45,297 (64%)	45,982 (63%)	53,556 (62%)
Other[4]	7220 (3%)	424 (4%)	1250 (4%)	470 (4%)	1,452 (2%)	1,688 (2%)	1936 (2%)
Housing situation							
Campus	95,948 (33%)	3216 (28%)	3135 (10%)	3041 (25%)	30,226 (43%)	19,696 (27%)	36,634 (42%)
Family member home	54,362 (19%)	3185 (28%)	17,386 (53%)	2870 (24%)	6344 (9%)	14,312 (20%)	10,265 (12%)
Off-campus nonuniversity	127,222 (44%)	4785 (42%)	11,413 (35%)	5831 (48%)	31,297 (44%)	36,563 (50%)	37,333 (43%)
Other[5]	8255 (3%)	271 (2%)	982 (3%)	345 (3%)	2246 (3%)	2166 (3%)	2245 (3%)
Undergraduate vs. graduate							
Undergraduate	215,744 (75%)	9153 (80%)	27,202 (82%)	9216 (76%)	54,466 (77%)	48,966 (67%)	66,741 (77%)
Graduate	66,783 (23%)	2190 (19%)	5198 (16%)	2711 (22%)	14,987 (21%)	22,744 (31%)	18,953 (22%)
Disability status							
No	229,415 (80%)	9281 (81%)	27,079 (82%)	9214 (76%)	57,971 (82%)	58,919 (81%)	66,951 (77%)
Yes	50,786 (18%)	1902 (17%)	5284 (16%)	2630 (22%)	10,695 (15%)	12,606 (17%)	17,669 (20%)
Class mode[6]							
In-person	55,164 (19%)	—	209 (<1%)	3634 (30%)	—	4083 (6%)	47,238 (54%)
Online	73,973 (26%)	—	29,686 (90%)	2214 (18%)	—	34,890 (48%)	7183 (8%)
Hybrid	74,553 (26%)	—	3011 (9%)	6234 (51%)	—	33,554 (46%)	31,754 (37%)
Institutional characteristics							
Public vs. private							
Public	90,318 (31%)	3541 (31%)	1121 (3%)	1041 (9%)	25,515 (36%)	24,764 (34%)	34,336 (40%)
Private	196,903 (69%)	7968 (69%)	31,936 (97%)	11,130 (91%)	44,902 (64%)	48,280 (66%)	52,687 (61%)
United States region							
Northeast, Midwest	130,464 (45%)	1181 (10%)	425 (1%)	141 (1%)	40,766 (58%)	39,922 (55%)	48,029 (55%)
South	80,483 (28%)	9291 (81%)	1455 (4%)	8607 (71%)	21,272 (30%)	13,055 (18%)	26,803 (31%)
West	76,274 (27%)	1037 (9%)	31,177 (94%)	3423 (28%)	8379 (12%)	20,067 (28%)	12,191 (14%)

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TABLE 1 (*continued*)

Characteristics	All students	Minority serving institution			Predominantly White institution		
	N = 287,221 students, 354 schools	Prepandemic Phase[1] (Fall 2019–Spring 2020; n = 11,509 students, 22 schools)	Earlier pandemic phase (Fall 2020–Spring 2021; n = 33,057 students, 42 schools)	Later pandemic phase (Fall 2021–Spring 2022; n = 12,171 students, 26 schools)	Prepandemic phase[1] (Fall 2019–Spring 2020; n = 70,417 students, 102 schools)	Earlier pandemic phase (Fall 2020–Spring 2021; n = 73,044 students, 109 schools)	Later pandemic phase (Fall 2021–Spring 2022; n = 87,023 students, 138 schools)
Carnegie classification							
Other	85,628 (30%)	1866 (16%)	19,014 (58%)	3583 (29%)	21,517 (31%)	19,334 (27%)	20,314 (23%)
Research	201,593(70%)	9643 (84%)	14,043 (43%)	8588 (71%)	48,900 (69%)	53,710 (74%)	66,709 (77%)

Abbreviations: LQBTQ+, Lesbian, gay, bisexual, transgender, questioning plus other noncisgender and/or nonheterosexual identities; cis/het, cisgender and heterosexual; NH, non-Hispanic; SD, standard deviation.

[1] Surveys were administered as late as February 2020 in the prepandemic phase.

[2] Food insecurity is defined as the economic and social condition of lack of access to adequate foods and operationalized in this study as a score of >1 on the USDA Household Food Security Module 6-item short form (HFSSM-6).

[3] Parental education is defined as the highest level of education completed by either of the participant's parents or guardians.

[4] "Other" race/ethnicity includes American Indian or Native Alaskan, Middle Eastern/North African or Arab Origin, Native Hawaiian or other Pacific Islander Native, and participants who self-reported "other."

[5] Category includes "I don't currently have a place to live," "temporarily staying with a relative, friend, or 'couch surfing' until I find housing," and "Sorority/Fraternity housing."

[6] Question was not administered in Fall 2019–Spring 2020 and was not included in statistical analyses.

institution (≥20% enrollment of Alaska Native undergraduates), Tribal Colleges and Universities (defined in Higher Education Act as being controlled and operated by federally recognized Native American Tribes), Native American–serving nontribal institution (≥10% enrollment of Native American undergraduates), or predominantly Black institutions (≥40% enrollment of Black undergraduates) [8]. Remaining students were recorded as attending a PWI.

Food security

The ACHA-NCHA III included the USDA Household Food Security Module 6-item short form (HFSSM-6) to assess food security in the 30 d preceding the survey [23]. The HFSSM-6 has demonstrated validity and reliability in previous studies compared with the full 18-item HFSSM [24]. Based on the number of affirmative responses to HFSSM-6, respondents with scores of 0–1, 2–4, and 5–6 are categorized as having high/-marginal food security, low food security, or very low food security, respectively. Following standard procedures, we dichotomized respondents as having food security (score of 0–1) or food insecurity (score of ≥2) [24].

Covariates

We included the following individual covariates in our main model (model 1): age (years), sex (male, female), gender identity and sexual orientation (cisgender/heterosexual, noncisgender or nonheterosexual), parental education (high school or less, some college, Bachelor degree or higher), housing (campus, family member home, off-campus nonuniversity, other), graduate compared with undergraduate, and disability status (yes, no). We selected these covariates because they are strong predictors of food insecurity and they vary by institutional minority designation [2,11]. We included private compared with public school and Carnegie classification (research or other) as institutional covariates to account for potential confounding by institutional funding mechanisms, which may impact student food insecurity. Finally, we included institutional region (West, Midwest or Northeast, South) to account for geographic variability in food insecurity across United States regions [3].

Original measures and response categories are available on the ACHA-NCHA III website [25]. Individual covariates were self-reported by the participants. Institutional characteristics were recorded based on anonymized indices of institutional characteristics provided by ACHA-NCHA III. The following responses were included in the "other" housing category owing to small numbers: "I don't currently have a place to live, " "temporarily staying with a relative, friend, or couch surfing until I find housing," and "sorority/fraternity housing." The "Midwest" and "Northeast" region categories were combined owing to small numbers and given similar levels of food insecurity levels across the 2 regions in the general population [3].

We excluded race/ethnicity from main models because many MSIs are defined according to the proportion of its students that are of a particular race/ethnicity and controlling for this would lead to overadjustment. To better understand the extent to which institutional minority designation is associated with food insecurity, independent of the sociodemographic characteristics of its students, we also present models adjusted for race/ethnicity—which is a well-documented predictor of food security owing to structural racism and unequal access to resources [26]. Students selected their race and ethnicity in a "select all that apply" format. We categorized responses as follows: Hispanic/Latinx, Multiracial, non-Hispanic Asian, non-Hispanic Black, non-Hispanic White, and other. The following groups were combined into the other category owing to small numbers: American Indian or Alaskan Native (n = 1422); Middle Eastern/North African or Arab Origin (n = 2907); and Native Hawaiian or Other Pacific Islander Native (n = 463).

Analytic strategy

We described sociodemographic and institutional characteristics of participants by institutional minority designation (MSI, PWI) and pandemic phase. We used multivariable Poisson regression with cluster-robust adjusted SEs to estimate associations between institutional minority designation and food insecurity while accounting for clustering within institutions. Poisson regression was chosen because it yields prevalence ratios (PRs), which are more interpretable for non-specialists than odds ratios obtained from logistic regression. Poisson regression performs similarly to logistic regression in analyses with binary outcomes and is preferred for estimating PRs when the outcome is common, as odds ratios overestimate PRs in this setting [27]. We estimated adjusted prevalence ratios (aPRs) and 95% confidence intervals (CIs) for each phase by computing 3 models, each restricted to participants from the given pandemic phase. Model 1 was adjusted for covariates listed earlier, and model 2 included model 1 covariates plus race/-ethnicity. Given there were low proportions of participants with missing data for individual covariates (range of 0%–1.7% missingness for each covariate), analyses used listwise deletion. To test whether the association between institutional minority designation and food insecurity varied over time, we used analysis of variance with a likelihood ratio test to compare a model with interaction terms for institution type with each phase to a nested model with no interaction terms.

Given the age range of respondents included in the sample (18–98 y), we conducted a sensitivity analysis restricted to participants aged 45 y or younger to address the possibility that older students differ from younger students and some respondents may have reported inaccurate answers to survey questions. To examine how results change when institutions included in each pandemic phase are independent, we repeated analyses after excluding repeated institutional participation. We excluded repeated institutional participation by including the data for a given institution's first participating survey and excluding their subsequent surveys ($n = 58,609$ students from 80 institutions). Statistical significance was considered at a P value of <0.05. However, given the large sample size, interpretations focus on the magnitude and direction of estimates rather than statistical significance thresholds. Analyses were conducted in RStudio, version 4.3.2.

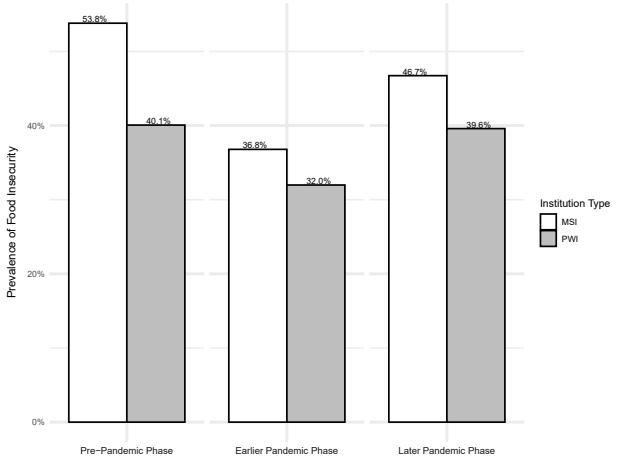

FIGURE 1. Prevalence of food insecurity, by pandemic phase and institution type. MSI, minority serving institution; PWI, predominantly white institution.

Results

There were 56,737 students from MSIs (19.8%) and 230,484 students from PWIs (80.2%) (Table 1). In general, students from MSIs (compared with PWIs) were older; had parents with lower education; were Hispanic/Latinx, Black, or Multiracial; lived with a family member; were undergraduate students; attended a public institution; and attended an institution in the Southern or Western United States. Many MSIs had >1 designation, with the most common designation being Hispanic-serving institutions ($n = 51$, 56.7%), followed by Asian American and Native American Pacific Islander–serving institutions ($n = 31$, 34.4%), Native American–serving nontribal institutions ($n = 4$, 4.4%), HBCUs ($n = 3$, 3.3%), Alaskan Native–serving and Native Hawaiian–serving institutions ($n = 1$, 1.1%), Tribal Colleges and Universities ($n = 1$, 1.1%), and predominantly Black institutions ($n = 1$, 1.1%; data not shown).

The pooled prevalence of food insecurity in the previous 30 d was 38% (Table 1). Students attending MSIs had a higher prevalence of food insecurity (42%) than students from PWIs (37%), and this trend was consistent across phases (Figure 1). The overall prevalence of food insecurity as well as the inequity in food insecurity prevalence (defined as a ratio of MSI prevalence-to-PWI prevalence that is >1) between MSI and PWI students were lowest in the earlier pandemic phase. For example, in the prepandemic phase, 53.8% of MSI students were food insecure compared with 40.1% for PWI students, for a ratio of 1.34. In the earlier pandemic phase, this difference narrowed to 36.8% and 32.0% for MSI and PWI students, respectively, for a ratio of 1.15 (Figure 1).

In unadjusted analyses, students attending MSIs (compared with PWIs) had 34% and 14% higher prevalence of food insecurity in the prepandemic (PR: 1.34; 95% CI: 1.29, 1.43) and

TABLE 2
Prevalence ratio of food insecurity associated with attending minority serving institutions vs. predominantly White Institutions, by pandemic phase[1]

Academic year	Crude PR (95% CI)	Model 1 PR (95% CI)[2]	Model 2 PR (95% CI)[3]
Prepandemic phase: Fall 2019–Spring 2020	1.34 (1.29, 1.43)[4]	1.23 (1.14, 1.32)[4]	1.15 (1.08, 1.22)[4]
Earlier pandemic phase: Fall 2020–Spring 2021	1.14 (1.03, 1.27)[4]	1.00 (0.91, 1.08)	0.94 (0.85, 1.03)
Later pandemic phase: Fall 2021–Spring 2022	1.08 (0.96, 1.21)	1.04 (0.95, 1.14)	1.01 (0.92, 1.09)

Abbreviations: CI, confidence interval; PR, prevalence ratio.

[1] The total sample size for this analysis was $N = 287,221$, with samples of $n = 81,926$ for the prepandemic phase, $n = 106,101$ for the earlier pandemic phase, and $n = 99,194$ for the later pandemic phase.

[2] Adjusted for age, sex, gender identity/sexual orientation, parental education, housing situation, graduate/undergraduate status, disability status, public vs. private institution, institution region, and Carnegie classification. The P value for interaction between pandemic phase and MSI/PWI designation was <0.001 for this model.

[3] Adjusted for model 1 covariates plus race/ethnicity.

[4] Significant at the $P < 0.05$ level.

earlier pandemic phases (PR: 1.14; 95% CI: 1.04, 1.24), respectively (Table 2). The same comparison for the later pandemic phase was null. In adjusted models 1 and 2 for the prepandemic phase, students at MSIs (compared with PWIs) had 23% and 15% higher prevalence of experiencing food insecurity, respectively (model 1 aPR: 1.23; 95% CI: 1.14, 1.32; model 2 aPR: 1.15; 95% CI: 1.05, 1.27) (Table 2). Associations were null and close to 1.0 (i.e., no association) in the earlier and later pandemic phases in both adjusted models. There was evidence for interaction between institution type and pandemic phase. MSI (compared with PWI) designation was associated with a 23% higher prevalence of food insecurity in the prepandemic phase (aPR: 1.23; 95% CI: 1.14, 1.32) but no substantial differences in food insecurity prevalence in the earlier-pandemic (aPR: 1.00; 95% CI: 0.91, 1.08) or later-pandemic phase (aPR: 1.04; 95% CI: 0.95, 1.14). Results in both sensitivity analyses (restricting to ages 45 y or younger and including repeated institutional participation) were similar to those observed in main analyses (Supplemental Tables 1 and 2).

Discussion

This study includes the first comparison of food insecurity between students at MSIs and those at PWIs before and during the COVID-19 pandemic. The prevalence of food insecurity was higher among students at MSIs than that among PWIs across all time frames examined. The prevalence of food insecurity was lowest during the earlier-pandemic phase among students from both institutions, with the most dramatic differences observed for students at MSIs, leading to a lower inequity in prevalence by institution type during this phase. Attending an MSI was associated with a higher prevalence of food insecurity during the prepandemic phase, with no statistically significant differences observed during the earlier or later phases after covariate adjustment. The statistical interaction between minority designation status and pandemic phase further suggests the prevalence of food insecurity among students at MSIs compared with PWIs varied over time.

Our observation of a lower prevalence of food insecurity in the earlier pandemic phase is supported by Wagler et al. [14], who found that very low food security declined from 32% to 24% between October 2019 and November 2020 at a Hispanic serving institution. Contrary to our findings, 2 studies using retrospective reports of food insecurity suggest that food insecurity worsened among college students at PWIs after the onset of the COVID-19 pandemic [20,28]. However, these studies examined post–COVID-19 food insecurity measures during Spring 2020, whereas our first postpandemic estimates were measured in Fall 2020, by which point many students may have adjusted to some initial pandemic-related disruptions. Moreover, they were based on retrospective reports over the whole period, whereas the data used in this study were collected contemporaneously in each period.

The lower overall prevalence of food insecurity in the earlier pandemic phase may relate to a greater proportion of college students living with their families, thus allowing students to forego some individual living costs and benefit from their families' receipt of social safety net programs. Starting in April 2020, federal social safety net programs expanded with unprecedented investments in food, unemployment, and childcare assistance [18]. Many studies examining food insecurity trends during the pandemic suggest that food insecurity increased during the first month of the pandemic, a period for which we have no data, and subsequently declined [17,29]. According to a nationally representative, longitudinal series of surveys of United States adults, the prevalence of food insecurity declined from a high of 20.4% in April 2020 to 13.1% in May 2020, followed by steady declines in food insecurity to 8.9% in March 2021 [29]. Shafer et al. [30] specifically linked advanced payments from the Child Tax Credit beginning in July 2021 with a 26% reduction in food insufficiency among households with children. The subsequently higher prevalence of food insecurity during the later pandemic phase (Fall 2021–Spring 2022) may be related to more students returning to campus, as well as the expiration of several social safety net programs during this time [31]. Examinations of food insecurity throughout the pandemic are not entirely consistent, however, with some studies suggesting the prevalence of food insecurity did not substantially change in the United States from 2019 to 2021 and that fluctuations were only observable in specific sociodemographic groups [3,19].

The positive relationship between MSI compared with PWI attendance and food insecurity during the prepandemic phase compared with the null relationships during the earlier and later pandemic phases in adjusted models may be explained by a higher proportion of students at MSIs returning to their family home compared with students at PWIs. During the earlier pandemic phase, 55% of students at MSIs in our study reported living at home, compared with 20% of students at PWIs. It is possible that the relative underfunding of MSIs compared with that of PWIs is more likely to affect MSI students during "normal" times while they are on campus. This interpretation is speculative in the context of this study—which does not examine the underlying mechanisms of MSI attendance and food insecurity—but aligns with the work of scholars who examine resource disparities across institutions. Ray's racialization of organizations framework conceptualizes organizations as central to perpetuating racial inequity [9]. White organizations are considered to be normative and implicitly legitimized, which marginalizes non-White organizations—as evidenced, for example, by 4-y PWIs receiving twice as much federal funding per student compared with 4-y MSIs [9,10,32]. Financial inequities may be exacerbated by local campus environments. Kornbluh et al. [33] demonstrated that HBCUs are more likely to be located in low food access census tracts than PWIs, even after adjustment for population density and neighborhood socioeconomic status [33]. Different associations for food insecurity in MSIs compared with PWIs across pandemic phases may also be driven by examination of 3 independent samples of students for each phase, with different compositions of individual and institutional characteristics within each time frame. Sensitivity analyses including repeated institutions, and thus, more comparable samples across pandemic phases, yielded similar results to main analyses. However, the characteristics of the 3 samples still varied even after reintroducing repeated institutional participation, so comparisons over time should be interpreted cautiously.

This study was subject to additional limitations. The ACHA-NCHA III has a low response rate, which may lead to some selection bias. However, the response rate is comparable with

other national college health surveys of similar scope [22]. Although low response rates have not been associated with nonresponse bias in other college health surveys, this possibility has not been examined for studies of food insecurity [34]. Second, most MSIs in our sample were Hispanic-serving institutions, which may impact the generalizability of our findings to MSI designations that were not as common in our sample (e.g., HBCUs). MSI status is not a uniform designation, and each institution type has unique contexts. Future studies should examine differences in food insecurity by MSI designations. In following ACHA policies to protect anonymity of participants, we were unable to conduct such analyses. Third, results may be partially driven by incomplete adjustment. The ACHA-NCHA III does not measure student nor familial income, so we used parental educational attainment as a proxy for socioeconomic status. On average, MSIs are more likely to enroll lower income students than PWIs [11]. Without complete adjustment, analyses of differences between MSIs and PWIs may be driven by differences in the student population. We believe the study findings are important even if they are driven to some extent by student differences, as they highlight worse food insecurity at MSIs compared with PWIs and, thus, a need to promote greater resources at these institutions.

This study is strengthened by examining a larger number of institutions than other studies of food insecurity among college students, the majority of which examine a single institution or a few institutions within the same university system. Similar to other work examining food insecurity in college students, we observed a high prevalence of food insecurity (38%). Policymakers should follow expert recommendations to reduce the burden of food insecurity among college students [35]. Bergdahl et al. [36], for example, suggests improving accessibility of the Supplemental Nutrition Assistance Program for college students by automatically qualifying and enrolling college students who received free or reduced lunch as a K-12 student or who receive Pell Grants. We also present novel examination of food insecurity in MSIs compared with that in PWIs before and during the COVID-19 pandemic. This is an important step in shifting the research focus on food insecurity among college students from examining individual-level determinants to institutional determinants that may reflect broader mechanisms of systemic racism and other structural issues. Such work examining institutional determinants of food insecurity may also elucidate which institutions should be prioritized in efforts to promote food security on postsecondary campuses moving forward.

In conclusion, students attending MSIs had a higher prevalence of food insecurity than students attending PWIs during the prepandemic phase, but this relationship did not hold during the earlier or later pandemic phases (Fall 2020–Spring 2022). To the extent that results are not driven by differences in student composition across survey years, these trends may be related to inequities in institutional resources for students at MSIs compared with those at PWIs, which are most likely to impact students during normal operations. Moreover, the lower prevalence of food insecurity during the earlier pandemic phase may be attributed to more students living at home as well as the expansion of social safety net programs during this time. Regardless of cause, our findings underscore the urgency of extending resources to address food insecurity among college students, especially at MSIs.

Author contributions

The authors' responsibilities were as follows – AML, DR, MPC: designed the research study; SLF: analyzed data and wrote the article; MPC: had primary responsibility for final content; and all authors: provided feedback on methodology and contributed to manuscript revisions and read and approved the final manuscript.

Conflict of interest

The authors report no conflicts of interest.

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Data availability

Data described in the manuscript and a code book can be requested from the American College Health Association.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tjnut.2024.06.009.

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