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Food Insecurity Among American Indians and Alaska Natives: A National Profile Using the Current Population Survey–Food Security Supplement

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ABSTRACT

Food insecurity increases the risk for obesity, diabetes, hypertension, and cancer—conditions highly prevalent among American Indians and Alaska Natives (AI/ANs). Using the Current Population Survey Food Security Supplement, we analyzed the food insecurity trends of AI/ANs compared to other racial and ethnic groups in the United States from 2000 to 2010. From 2000 to 2010, 25% of AI/ANs remained consistently food insecure and AI/ANs were twice as likely to be food insecure compared to whites. Urban AI/ANs were more likely to experience food insecurity than rural AI/ANs. Our findings highlight the need for national and tribal policies that expand food assistance programs; promote and support increased access to healthy foods and community food security, in both rural and urban areas; and reduce the burden of diet-related disparities on low-income and racial/ethnic minority populations.



KEYWORDS

American Indian; Alaska native; food security; current population survey; obesity; food environments

Introduction

Food insecurity, defined as the limited and uncertain availability of healthy foods,¹ has increased in the last decade: 10% of the population of the United States was food insecure in 2001 compared to 14% in 2010.² The high cost of healthy, nutrient-dense foods, coupled with limited availability and selection in low-income communities, contributes to food insecurity by constraining consumers' abilities to make healthy choices. Fluctuations in funding for food assistance and social programs have also been linked with food insecurity.^{3,4}

Food insecurity is strongly correlated with malnutrition and underweight as well as obesity and type 2 diabetes (hereafter referred to as diabetes), reducing

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the efficacy of obesity prevention and diabetes management efforts.^{3,5–8} Data from the National Health and Nutrition Examination Survey found that food insecure participants were twice as likely as food secure participants to be obese and more likely to have diabetes, even after adjusting for body mass index.^{7,8} Food insecure adults were also more likely to have poorly controlled diabetes compared to their food secure counterparts (70% vs. 46%).⁷ Vegetable and fruit intake declines significantly as food insecurity increases, also contributing to excess cancer and cardiovascular risk.^{9,10}

Little is known about the food environments and food insecurity among American Indians and Alaska Natives (AI/ANs) living in reservation communities. A report issued by the US Department of Agriculture (USDA) found that only 25.6% of the population in tribal reservations resided 1 mile or less from a supermarket, compared to 58.8% of the US population.¹¹ Further, nearly half of all residents in tribal areas had incomes at or below 200 percent of the federal poverty level. Of those, 27.8% lived in walking distance from a supermarket, compared to 63.6% of low-income individuals nationwide.¹¹

Our analysis of the California Health Interview Survey found that 38.7% of AIs with incomes below 200% of the federal poverty level were food insecure.¹² Similarly, our pilot study examining food insecurity among AIs in Oklahoma found that 1 in 4 AIs were food insecure.¹³ In Montana these rates were even higher, with a reservation sample of 187 households revealing that 43% were food insecure.¹⁴

Though these statistics suggest significant disparities among AI/ANs across different regions, no recent studies have examined the prevalence of food insecurity among AI/ANs nationally. Using the Current Population Survey Food Security Supplement¹⁵—a national survey conducted since 1995 to obtain information about food insecurity and associated variables (e.g., household food expenditures, participation in supplemental food programs)—we analyzed the food insecurity trends of AI/ANs compared to other racial and ethnic groups in the United States.

Methods

Setting and sample

We examined data from the Current Population Survey–Food Security Supplement (CPS-FSS), a nationally representative survey of approximately 50 000 households across the United States.¹⁵ The CPS-FSS is administered to all interviewed households that are 185% of poverty and lower. Households over 185% of poverty were eligible for the full CPS-FSS only if their answers to selected questions identified them as food insecure. We analyzed CPS-FSS from years 2000–2010 and found comparable results

across all years. Thus, we present CPS-FSS pooled years 2009–2010 results to increase our sample size of AI/ANs.

Measures

Food insecurity

We examined the self-reported survey responses from the Household Food Security Scale (12-month reference period) administered as part of the CPS-FSS. We collapsed the 3 categories of food security (food secure, low food security, and very low food security) into a dichotomous insecure. This collapsing procedure is typically applied to most food security statistics in the USDA's annual food security report series.¹⁶

Sociodemographic characteristics

We examined respondents' demographic and socioeconomic profiles, specifically age, sex, race, Hispanic ethnicity, educational attainment, marital status, geographic location, income, and food stamp use as covariates. Age was limited to respondents aged 18 years through 64 years. For continuity across years 2000–2010, we examined those who self-identified as a single race: white, black, Asian, and AI/AN. Hispanic ethnicity was measured separately from race and thus we treated Hispanic ethnicity as a separate variable. Educational attainment was examined across 2 categories (less than high school graduate and high school graduate or higher). We used a dichotomous variable for marital status (single or not). We examined data across 6 regions based on the Indian Health Service (IHS) regions, a commonly used way to categorize and examine AI/AN population data across the United States.^{17,18} These 6 regions are (1) East (Alabama, Arkansas, Connecticut, Delaware, Washington, D.C., Florida, Georgia, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, and West Virginia); (2) Northern Plains (Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, South Dakota, Wisconsin, and Wyoming); (3) Southern Plains (Kansas, Oklahoma, and Texas); (4) Southwest (Arizona, Colorado, Nevada, New Mexico, and Utah); (5) Pacific Coast (California, Hawaii, Idaho, Oregon, and Washington); and (6) Alaska. Finally, we examined whether or not the individual reported having received food stamps (via self-report dichotomous variable yes or no) within the last 12 months.

Statistical analysis

The CPS-FSS data were weighted to be representative of the US population. The descriptive analyses incorporated the weights to account for the complex survey design and provide valid standard errors but were not used in the logistic regression models. Stata version 12 MP (StataCorp, College Station, TX) was used to conduct all analyses. Statistical significance was based on a type I error rate of 0.05. Categorical variables were summarized by percentages with SEs and continuous variables were represented by means with SEs. Prevalence was estimated with 95% confidence intervals (CIs) and associations were expressed as odds ratios (ORs) with 95% CIs. For background analysis, we analyzed the food insecurity trends of AI/ANs compared to other racial and ethnic groups in the United States from 2000 to 2010 and used a series of cross-sectional logistic regressions to examine the likelihood of experiencing food insecurity by race and ethnicity for each year of the survey. We found comparable results across all years and present pooled logistic regression results to increase our sample size of AI/ANs. We analyzed pooled years 2009–2010 from the CPS-FSS to present cross-sectional logistic regressions to examine the likelihood of experiencing food insecurity and produce odds ratio estimates by race and ethnicity. Using logistic regression, we subsequently tested whether the odds of food insecurity differed significantly by race, after adjusting for sociodemographic characteristics.

Results

Respondent characteristics

Our total sample size included 137 372 individuals, 1513 of whom self-identified as AI/AN. Selected demographic comparisons across racial groups are shown in [Table 1](#).

Compared to other races, AI/ANs were less likely to have graduated from high school and were more likely to have experienced poverty (below the 185% poverty level). AI/ANs reported Hispanic ethnicity at a much higher frequency (31%) than other races and were also more likely to reside in rural/non metropolitan areas (37%) compared to their racial counterparts (16% or less for other races).

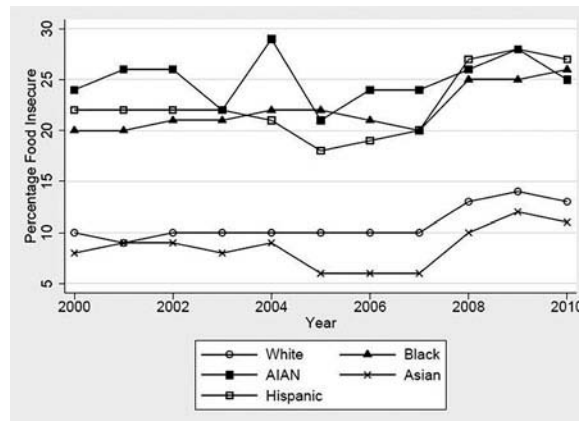
Differences in prevalence of food insecurity by race

The 10-year annual cross-sectional analysis of food insecurity prevalence by race and ethnicity is shown in [Figure 1](#).

Over this period, all racial groups' food insecurity levels have increased. Whites and Asians consistently reported the lowest levels across these years, though there are visible increases to 10%–15% after 2008. AI/ANs, blacks,

Table 1. Characteristics of American Indians/Alaska Natives (AI/ANs) and other races in the Current Population Survey–Food Security Supplement.

	White % (SE)	Black % (SE)	AI/AN % (SE)	Asian % (SE)
Educational attainment				
Less than high school graduate	12 (0.2)	15 (0.5)	26 (2.2)	8 (0.5)
High school graduate or higher	88 (0.2)	85 (0.5)	74 (2.2)	92 (0.5)
Female	50 (0.2)	55 (0.7)	50 (2.4)	51 (1.0)
Hispanic	18 (0.2)	4 (0.3)	31 (2.4)	2 (0.4)
Married	58 (0.2)	37 (0.7)	44 (2.4)	64 (1.0)
Income				
Above 185% of poverty level	73 (1.2)	58 (0.7)	45 (2.4)	75 (0.9)
Below 185% of poverty level	27 (0.2)	42 (0.7)	55 (2.4)	25 (0.8)
Reported receiving food stamps	8 (0.1)	19 (0.5)	22 (1.9)	3 (0.3)
Metropolitan residence	84 (0.2)	89 (0.4)	63 (2.3)	97 (0.3)
	Mean (SE)	Mean (SE)	Mean (SE)	Mean (SE)
Age	41 (0.1)	39 (0.2)	39 (0.6)	40 (0.3)
Total sample (<i>N</i> = 137 372)	115 156	13 772	1513	6931

**Figure 1.** Prevalence of food insecurity by race and ethnicity, 2000–2010.

and Hispanics report higher food insecurity across all years, with rates consistently ranging from 20% to 30%. However, the relative differences between groups were slightly narrowed after 2008 because food insecurity among whites and Asians has increased with recession years, whereas the others remained consistently higher.

Racial and ethnic odds ratios revealed stark differences in food insecurity (Table 2). AI/ANs had 20% greater odds of food insecurity relative to their white counterparts ($OR = 1.2, p < 0.05$), and blacks had 50% greater odds of food insecurity relative to whites ($OR = 1.5, p < 0.05$). Individuals who report Hispanic ethnicity were also more likely to experience food insecurity relative to whites ($OR = 1.5, p < 0.05$). Finally, among our national sample, we found

Table 2. Adjusted logistic regression predicting food insecurity in the United States.^a

	OR (95% CI)	<i>p</i>
White (reference)	—	—
Black	1.5 (1.4, 1.6)	0.000
AI/AN	1.2 (1.0, 1.3)	0.011
Asian	0.9 (0.8, 1.0)	0.040
Hispanic	1.5 (1.4, 1.5)	0.000
Female	1.0 (1.0, 1.1)	0.017
Less than high school	1.4 (1.4, 1.5)	0.000
Below 185% of poverty level	3.8 (3.7, 3.9)	0.000
Single	1.4 (1.4, 1.5)	0.000
Age	1.0 (1.0, 1.0)	0.002
Reported receiving food stamps	3.6 (3.4, 3.8)	0.000
Metropolitan	1.1 (1.0, 1.1)	0.000
East (reference)	—	—
Northern Plains	0.9 (0.8, .09)	0.000
Southern Plains	1.1 (1.0, 1.2)	0.001
Southwest	1.0 (0.9, 1.1)	0.498
Pacific	1.1 (1.0, 1.2)	0.000
Alaska	1.3 (1.1, 1.4)	0.002

^aOR indicates odds ratio; CI, confidence interval; AI/AN, American Indian/Alaska Native.

that those experiencing poverty were 3.8 times more likely to experience food insecurity compared to those not experiencing poverty ($p < 0.05$). Self-report of receipt of food stamps also increased the likelihood of being food insecure (OR for food stamps = 3.6, $p < 0.05$). Other variables associated with food insecurity included being single compared to those who were not single and having a high school education compared to those without a high school education (OR for single = 1.4, $p < 0.05$; OR for education = 1.4, $p < 0.05$).

Characteristics among AI/ANs

Upon stratifying the logistic regression model specifically to AI/ANs, education (high school completion), Hispanic ethnicity, and marital status became nonsignificant ($p > 0.05$; Table 3).

However, the positive association of poverty and receiving food stamps with food insecurity remained in the stratified analysis (OR for poverty = 2.9,

Table 3. Adjusted logistic regression predicting food insecurity among AI/ANs.^a

	OR (95% CI)	<i>p</i>
Female	1.1 (0.9, 1.4)	0.478
Less than high school	1.1 (0.8, 1.5)	0.389
Hispanic	1.2 (0.9, 1.7)	0.219
Below 185% of poverty level	2.9 (2.2, 4.0)	0.000
Single	1.0 (0.8, 1.4)	0.734
Age	1.0 (0.9, 1.0)	0.379
Reported receiving food stamps	2.7 (2.1, 3.6)	0.000
Metropolitan	2.4 (1.8, 3.2)	0.000

^aAI/AN indicates American Indian/Alaska Native; OR, odds ratio; CI, confidence interval. ORs are also adjusted for Indian Health Service region.

$p < 0.05$; OR for food stamps = 2.7, $p < 0.05$). Additionally, AI/ANs living in urban areas were 1.4 times more likely to be food insecure than those in nonmetropolitan areas ($p < 0.05$; Table 3). Food insecurity for AI/ANs also significantly varied by IHS region. Those in the Pacific states had the highest prevalence of food insecurity (greater than 40%), with the Southern Plains and Alaska at over 30%. The East region experienced the lowest levels among IHS regions, with 22% reporting food insecurity. The Southwest and Northern Plains were slightly higher at 26% and 28%, respectively.

Discussion

Food insecurity has increased across all racial and ethnic groups nationally, with the strongest increases among low-income whites. The overall increases correspond with the Great Recession, the height of which occurred between December 2007 and June 2009.¹⁶ During this time period, food insecurity significantly increased among all racial/ethnic groups. AI/ANs were more likely to experience food insecurity compared to whites, though the odds of being food insecure for AI/ANs decreased slightly over the 10-year period in relationship to the increase of food insecurity among whites. Nevertheless, even after controlling for sociodemographic characteristics, AI/ANs remained significantly more likely to be food insecure compared to whites.

Our findings highlight the vulnerable position of AI/ANs, a population not regularly included in the USDA's Food Security Data Analysis and Reporting, despite the disproportionate burden of nutrition-related disparities among AI/ANs.¹⁹ Our findings are consistent with other studies reporting high rates of food insecurity among AI/ANs in various regions.^{12–14}

We did, however, find lower rates of food insecurity in the Northern Plains region (28%), in contrast with previous studies that reported food insecurity among AI/ANs in this region at 44%.^{14,17} One possible explanation for these differences could be that those studies specifically sampled reservation-based populations, and the CPS-FSS data do not explicitly sample reservation-dwelling AI/ANs. In addition, the Northern Plains regions include multiple states and communities, prohibiting close examination of those differences within specific community settings.

As expected, our study found that AI/ANs were considerably more likely to reside in rural areas compared to all other races; though rural areas are not the same as federally designated reservations, most reservations are located in rural areas. Surprisingly, we found that AI/ANs living in urban areas were more likely to experience food insecurity than AI/ANs living in rural areas, which differs significantly from all other racial/ethnic groups. Residing in an urban area is typically associated with less food insecurity for all other racial/ethnic groups.^{18,20,21}

Though great variation exists across the more than 550 tribal nations, AI/ANs living on reservations may have access to tribally provided food and health care resources and services that may not be accessible to AI/ANs living in urban areas.²² Urban AI/ANs represent a relatively small proportion of the population in large cities, are geographically dispersed and often socially isolated, and experience high rates of poverty coupled with very limited access to culturally appropriate health and social services.²² The cultural and social resources that exist in rural and reservation-based communities, including extensive food sharing that happens in these communities, may be a factor in the higher food insecurity rates among urban AI/ANs.

There are limitations to this study. The cross-sectional multivariate analysis limits our ability to draw conclusions about the temporal relationships among the variables. In addition, we were not able to explore other important contextual determinates of food insecurity that may be related to the diverse experiences of AI/ANs living in rural and urban areas. Nonetheless, our study is one of the only to examine and compare the differences in the urban versus rural experience of AI/ANs. Further, we controlled for geographic IHS regions, which document important differences in AI/AN health outcomes.¹⁹ Because the CPS-FSS does not assess participation in the USDA's Food Distribution Program on Indian Reservations—a commodity food program for rural reservation areas²³—or access to food stores or healthy foods, we were unable to examine these important factors.

Indeed, further studies must closely examine the role of AI/AN food environments across urban, rural, and reservation communities. Our study of the food environment in a California-based reservation found structural and environmental barriers to vegetable and fruit consumption²⁴ and historical reliance upon the Food Distribution Program on Indian Reservations, which has been criticized for its role in creating unhealthy food practices and preferences across generations of AI/ANs.²⁵ Our survey of reservation food environments in Washington state found the reservations not only had extremely limited availability of fresh vegetables and fruit, but these foods also cost more than in nonreservation communities.²⁶ Further, reservation-based Supplemental Nutrition Program for Women, Infants, and Children clinics in Washington state had significantly lower cash value voucher redemption rates compared to non-reservation-based clinics regardless of whether the reservations had supermarkets.²⁷ Thus, future research must examine in greater detail the geographic, physical, political, and social factors contributing to the nutrition-related disparities pervasive among AI/ANs in these various urban, rural, and reservation settings.

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