

# Letters

## RESEARCH LETTER

### Association Between Food Insecurity and Migraine Among US Young Adults

Food insecurity, defined as limited or intermittent access to nutritionally adequate and safe foods, accessed in socially acceptable ways, is associated with numerous adverse physical and mental health outcomes.<sup>1</sup> One in 6 individuals are affected by migraine, which is inversely associated with household income<sup>2</sup>; however, little is known about the association between food insecurity and migraine, particularly in the United States and among young adults. Young adulthood represents an important period distinct from adolescence and older adulthood, when economic and educational transitions may increase risk for food insecurity. The objective of this study was to determine the association between food insecurity and migraine in a nationally representative sample of US young adults.

**Methods** | Cross-sectional, nationally representative data of US young adults ages 24 to 32 years from wave IV (2008) of the National Longitudinal Study of Adolescent to Adult Health were analyzed in 2018. The University of North Carolina institutional review board approved the study, and written informed consent was obtained. Food insecurity was based on

self-report of the interview question, “in the past 12 months, was there a time when (you/your household were/was) worried whether food would run out before you would get money to buy more?” This item has a 93% sensitivity and 85% specificity for detecting food insecurity as measured by the gold-standard 18-item US Household Food Security Scale and is considered the most inclusive question of the scale.<sup>1</sup> Migraine diagnosis was based on an affirmative response to the interview question, “has a doctor, nurse, or other health care professional ever told you that you have or had migraine headaches?” Previous research has demonstrated that 98% of those given a clinician diagnosis of migraine meet International Headache Society criteria for migraine (87%) or probable migraine (11%) based on prospective headache diary keeping.<sup>3</sup> Logistic regression analysis was conducted using Stata, version 15.0 (StataCorp), with food insecurity as the independent variable and migraine as the dependent variable, adjusting for race/ethnicity, age, sex, education, income, household size, public assistance, smoking, and alcohol, using sample weighting to account for the unequal probability of certain subpopulations being sampled to yield nationally representative estimates.<sup>4</sup> The baseline adolescent sample used systematic sampling methods and implicit stratification to ensure that the high schools (n = 80) and paired middle schools selected were representative of US schools with respect to region of the coun-

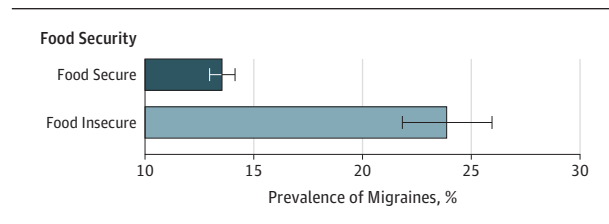
Table. Demographic and Health Characteristics of 14 786 Young Adult Participants in the National Longitudinal Study of Adolescent Health, Stratified by Food Security Status<sup>a</sup>

Characteristic	Food, % <sup>a</sup>		P Value
	Secure	Insecure	
No.	13 139	1647	
Age, mean (SE), y	28.3 (0.1)	28.4 (0.2)	.40
Sex			
Male	51.8	42.4	<.001
Female	48.2	57.6	
Race/ethnicity, self-report <sup>b</sup>			
White (non-Hispanic)	66.7	58.0	<.001
Black/African American (non-Hispanic)	14.8	25.3	
Hispanic/Latino	12.2	10.6	
Asian/Pacific Islander (non-Hispanic)	3.6	1.5	
American Indian/Native American	1.8	3.5	
Other	1.0	1.0	
Education			
≤High school	25.0	42.0	<.001
>High school	75.0	58.0	
Household income, mean (SE), \$	63 473 (999)	34 859 (1216)	<.001
Household size, mean (SE)	2.1 (0.0)	2.5 (0.1)	<.001
Recent public assistance	20.7	53.5	<.001
Smoker	28.1	46.3	<.001
Alcohol use	30.1	22.0	<.001

<sup>a</sup> All means and percentages are calculated with weighted data to reflect the representative proportion in the target US population.

<sup>b</sup> Race/ethnicity was based on self-report using categories defined by the National Longitudinal Study of Adolescent Health survey.

**Figure. Prevalence of Migraine in US Young Adults by Food Security Status**



try, urbanicity, size, type, and ethnicity. The National Longitudinal Study of Adolescent Health study design used a clustered sample in which the clusters were sampled with unequal probability; certain populations, such as racial/ethnic minorities, persons with disability, and sibling pairs, were over-sampled. Survey sample weights account for the unequal likelihood of certain subpopulations being sampled to yield nationally representative estimates. Of the baseline sample, 75.7% were retained at wave IV and 0.1% of data were missing for exposure or outcome. The *P* value level of significance was .05, and all *P* values were 2-sided.

**Results** | The sample consisted of 14 786 young adults, with mean (SE) age 28.1 (0.1) years, 49.3% female sex, and 65.6% non-Hispanic white race/ethnicity (Table; all means and percentages were calculated with weighted data to reflect the representative proportion in the target US population). Overall, 11% of young adults were food insecure. The prevalence of migraine was higher among food-insecure vs food-secure young adults (23.9% vs 13.6%; *P* < .001; Figure). Food-insecure young adults had greater odds of migraine in unadjusted (odds ratio, 2.00; 95% CI, 1.68-2.38; *P* < .001) and adjusted (adjusted odds ratio, 1.58; 95% CI, 1.30-1.95; *P* < .001) models.

**Discussion** | We found that food insecurity was associated with migraine in young adulthood. Few studies have examined the association between food insecurity and neurologic outcomes. To our knowledge, prior research on food insecurity and migraine is limited to 1 cross-sectional study representative of the Canadian population 12 years or older, which found a positive association.<sup>2</sup> We confirm this finding in a nationally representative sample of young adults from the United States. Food insecurity may lead directly to missed meals and indirectly to psychological stress, depression, and poor sleep, which are common precipitants of migraine.<sup>5</sup> Conversely, frequent, chronic migraine may contribute to food insecurity by preventing attendance at work, lower productivity, and/or lost employment<sup>6</sup> and may also result in a reduced ability to perform household activities such as shopping and cooking.<sup>2</sup> Limitations include data from 2008 and inability to discern episodic vs chronic migraine. Health care clinicians caring for persons who experience migraine should consider screening for food insecurity as a potential contributor to migraine exacerbations and provide referrals to programs such as the

Supplemental Nutrition Assistance Program (formerly the Food Stamp Program) when appropriate.

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**Drafting of the manuscript:** Nagata, Weiser.

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