

Short Communication

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Food insecurity is associated with poor mental health outcomes among a diverse sample of young adults

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Abstract

Objective: Young adulthood is a transitional period between childhood and adulthood characterised by unique stressors that increase the risk of food insecurity and poor mental health. This study examined the association between food insecurity and mental health outcomes among U.S. young adults aged 18–25. **Design:** A cross-sectional survey was completed by young adults between the ages of 18 and 25 years between January and April 2022. Key measures included food insecurity, perceived stress, anxiety, depressive symptoms and insomnia. Descriptive statistics and linear regression analyses were used to determine the prevalence of and associations between food insecurity and mental health outcomes, controlling for key demographic and social factors. **Setting:** Online survey. **Participants:** 1630 U.S. young adults. **Results:** Among the analytic sample of 1041 young adults, nearly 70 % of participants identified as being food insecure in the last year. Participants reported moderate to high levels of perceived stress, anxiety, depressive symptoms and insomnia. Food insecurity was positively associated with each mental health outcome including perceived stress ($\beta = 2.28$, $P < 0.01$), anxiety ($\beta = 2.84$, $P < 0.01$), depressive symptoms ($\beta = 2.74$, $P < 0.01$) and insomnia ($\beta = 1.28$, $P < 0.01$) after controlling for all other factors. **Conclusion:** Food insecurity is associated with mental health problems among young adults. Future efforts should explore the directionality of this relationship to determine if food insecurity initiates or exacerbates poor mental health outcomes or if poor mental health contributes to food insecurity. Interventions to improve food security status may also help support mental health among young adults.

Young adulthood, age 18–25 years, represents a transitional life stage often characterised by unique stressors⁽¹⁾, such as moving out of a childhood home, finding permanent employment, starting a family or enrolling in post-secondary education. These changes are often coupled with developmental, biological, neurocognitive and/or social changes and have the potential to establish a positive or negative trajectory of health across adulthood⁽²⁾. Because of the pivotal life changes that occur during this period, research focused on understanding the factors impacting the health status of young adults has increased over the last 20 years.

Recent studies emphasise the high prevalence of stress, anxiety, depression and sleep problems among young adults^(3–5). For example, one study of almost 15 000 college undergraduate students found that 17.1 % reported high levels of perceived stress⁽³⁾. When considering anxiety and depression, another study of over 14 000 college students found that 17.3 % reported depressive symptoms and 9.8 % reported anxiety symptoms⁽⁴⁾. Additional work with college students found that 36 % of participants screened positive for a major sleep disorder⁽⁵⁾, including insomnia. The high prevalence of mental health challenges among young adults is problematic, as this life stage often sets the trajectory of health outcomes into adulthood.

Food insecurity, defined as inconsistent access to nutritious foods to maintain an active and healthy lifestyle⁽⁶⁾, is a social determinant of health associated with poor health outcomes across multiple populations⁽⁷⁾. Within the USA, it is estimated that approximately 10 % of the population experiences food insecurity⁽⁸⁾, yet among young adults, the prevalence of food insecurity ranges between 11 and 28 %^(9,10) for non-student young adults and 32–42 % for college and university students⁽¹¹⁾. These findings strongly suggest that existing research may be overlooking this unique group that is highly impacted by food insecurity.

Emerging evidence suggests a relationship between food insecurity and mental health. For example, a recent study among young adults aged 24–32 years found that food insecurity was associated with a depression diagnosis, anxiety or panic disorder, suicidal ideation and poor sleep outcomes⁽¹²⁾. While this finding provides important early insight, exploration of other groups, particularly young adults aged 18–25 years, is needed to understand the relationship between food insecurity and mental health, as these individuals are transitioning between

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adolescence and adulthood. Therefore, this study aims to determine the association between food insecurity and mental health outcomes, among a diverse sample of young adults, controlling for social and demographic factors.

Methods

Data for the present study were drawn from the Promoting Young Adult Health cross-sectional online survey^(13,14). Young adults aged 18–25 years were recruited using the Qualtrics panel from January–April 2022⁽¹⁵⁾. Qualtrics members were recruited through various methods (e.g. social media, targeted email, Qualtrics website) and validated through a third-party verification system. Qualtrics automatically dropped participants who finished in less than half the median survey completion time and/or had missing, incomplete or straight-line data. Additional participants were recruited until sufficient data were reached⁽¹⁵⁾. For this study, participants were recruited from anywhere in the USA and were oversampled by racial/ethnic identity to ensure at least 30 % Hispanic/Latinx or Spanish origin and 30 % Black or African American identifying participants. All study methods and protocols were approved by the Institutional Review Board at The University of Texas at Austin. A total of 1630 young adults completed the survey. Participants missing any responses to questions included in the survey were excluded from the analytic sample for the present study ($n = 589$), resulting in an analytic sample of 1041 (Table 1). Independent sample t tests and chi-square tests were performed to examine differences between those who were in the analytic sample ($n = 1041$) and those who were in the original sample ($n = 1630$). There were no differences on stress, anxiety, depression, insomnia, non-Hispanic black, non-Hispanic Asian, non-Hispanic Pacific Islander, non-Hispanic American Indian and non-Hispanic other. Significant differences were found in social status, parent status, student status, sexual or gender minority status, each measure of financial responsibility including rent, credit card, insurance and cell phone bill and participants that identified as non-Hispanic white or Hispanic.

Measures

Food insecurity

Food insecurity was measured using the two-item screening tool, Hunger Vital Signs⁽¹⁶⁾. The two items included, 'In the past 12 months, I was worried whether my food would run out before I got money to buy more,' and 'In the past 12 months, the food that I bought just didn't last and I didn't have money to get more.' Response options included often true, sometimes true, never true, or don't know. Responses were coded according to recommended practice from Hager *et al.*, 2010⁽¹⁶⁾ and Gundersen *et al.*, 2017⁽¹⁷⁾, where responding often true or sometimes true to either question was considered food insecure (1) and never true or don't know to each question was food secure (0).

Mental health

Perceived stress was measured with the 10-item Perceived Stress Scale⁽¹⁸⁾. Anxiety was measured with the 7-item Generalised Anxiety Disorder scale⁽¹⁹⁾. Depressive symptoms were measured with the 10-item Center for Epidemiology Studies Depression Scale (CESD-10)⁽²⁰⁾. Insomnia was measured with three questions adapted from the insomnia severity index⁽²¹⁾.

Table 1. Descriptive statistics for socio-demographic factors of young adults in the USA ($n = 1041$)

	<i>n</i> /Mean	Percent/ <i>SD</i>
Food insecurity, <i>n</i> (%)	–	–
Not food insecure	320	30.7
Food insecure	721	69.3
Mental health outcomes, mean (<i>SD</i>)	–	–
Perceived stress	20.4	5.3
Generalised anxiety	9.7	5.6
Depressive symptoms	13.1	5.7
Insomnia symptoms	4.7	3.0
Age, mean (<i>SD</i>)	21.7	2.3
Racial/ethnic identity, <i>n</i> (%)	–	–
White	391	37.4
Hispanic	322	31.0
Black	256	24.6
AAPI	72	6.9
Sex, <i>n</i> (%)	–	–
Male	517	49.6
Female	526	50.4
Sexual/gender minority (SGM), <i>n</i> (%)	–	–
Not SGM	758	72.7
SGM	285	27.3
Parent, <i>n</i> (%)	–	–
Not parent	668	64.0
Parent	375	36.0
Student, <i>n</i> (%)	–	–
Not student	578	55.4
Student	465	44.6
Perceived social status, mean (<i>SD</i>)	5.9	2.3
Financial responsibility, <i>n</i> (%)	–	–
Credit card	720	69.0
Cell phone	768	73.6
Health insurance	642	61.6
Rent or mortgage	580	55.6

AAPI, Asian American Pacific Islander.

Socio-demographics

Socio-demographic variables included age (range = 18–25), racial/ethnic identity (Hispanic or non-Hispanic; American Indian, Asian, Black, Pacific Islander and White), sex (female and male), sexual/gender minority identity (Male, Female, Transgender, Gender Nonbinary or Other; Heterosexual or straight, Gay or Lesbian, Bisexual, Queer, Asexual or Other), parent status (yes/no), student status (full-time/part-time, non-student) and perceived social status (range = 1 (bottom) to 10 top)⁽²²⁾. Financial responsibility was determined with four questions that asked if the participant was financially responsible for: rent/mortgage,

Table 2. Difference in socio-demographic characteristics and mental health outcomes by food security status among young adults in the USA (*n* 1041)

	Food secure <i>n</i> 320		Food insecure <i>n</i> 721		<i>t</i> / χ^2	<i>P</i> -value
	Mean	SD	Mean	SD		
Age, mean (SD)*	21.5	2.3	21.8	2.2	−2.25	0.03
	Freq.	Percent	Freq.	Percent		
Racial/ethnic identity†					26.15	< 0.01
White	147	37.4	244	62.4		
Hispanic	87	27.0	235	73.0		
Black	55	21.5	201	78.5		
AAPI	31	43.1	41	56.9		
Sex†					1.92	0.17
Male	148	28.7	367	71.3		
Female	172	32.7	354	67.3		
Sexual/gender minority†					0.48	0.49
Not sexual/gender minority	237	31.4	519	68.6		
Sexual/gender minority	83	29.1	202	70.9		
Parent†					22.61	< 0.01
Not parent	239	35.8	428	64.2		
Parent	81	21.7	293	78.3		
Student†					1.38	0.24
Not student	169	29.2	409	70.8		
Student	151	32.6	312	67.4		
	Mean	SD	Mean	SD		
Perceived social status, mean (SD)*	5.8	2.0	6.1	2.4	−2.17	0.03
Financial responsibility, mean (SD)*	2.1	1.5	2.8	1.3	−8.11	< 0.01
Credit card†	202	28.1	516	71.9	7.38	< 0.01
Cell phone†	179	23.4	587	76.6	74.00	< 0.01
Health insurance†	153	23.9	487	76.1	36.44	< 0.01
Rent or mortgage†	134	23.1	445	76.9	35.36	< 0.01
Perceived stress, mean (SD)*	19.4	5.9	20.9	4.9	−4.28	< 0.01
Anxiety, mean (SD)*	7.8	6.0	10.6	5.2	−7.53	< 0.01
Depressive symptoms, mean (SD)*	11.3	6.0	13.8	5.3	−6.72	< 0.01
Insomnia, mean (SD)*	3.7	3.0	5.2	2.9	−7.41	< 0.01

AAPI, Asian American Pacific Islander.

**t* test.

†Chi-Square test, significant values indicated in bold.

health insurance, cellular phone bill and/or credit card bill (yes = 1, no = 0, range = 0–4).

identity, sex, SGM identity, parent status, student status, perceived social status and financial responsibility.

Data analysis

All data were downloaded from Qualtrics and imported into STATA SE 18 for analysis. Descriptive statistics were used to determine the prevalence and distribution of each variable. Chi-square and *t* test were used to examine differences in socio-demographic factors according to food security status. Multiple linear regression models were used to determine the association between food insecurity and each mental health outcome, controlling for age, racial/ethnic

Results

Food insecurity was high among participants, with 69.3 % of the sample identifying as food insecure (Table 1). Participants reported moderate to high levels of perceived stress, anxiety, depressive symptoms and insomnia. The mean age of participants was 21.7 years old, and 37.4 % identified as white, 31.0 % as Hispanic, 24.6 % as Black and 6.9 % as Asian American Pacific Islander. Slightly

Table 3. Linear regression analyses of perceived stress, anxiety, depression and insomnia with food insecurity and covariates among young adults in the USA (*n* 1041)

	Stress*			Anxiety†			Depression‡			Insomnia§		
	Coef.	se	P-value	Coef.	se	P-value	Coef.	se	P-value	Coef.	se	P-value
Food insecure	1.85	0.35	< 0.01	2.65	0.37	< 0.01	2.52	0.38	< 0.01	1.24	0.20	< 0.01
Age	0.08	0.08	0.32	0.05	0.08	0.55	−0.04	0.08	0.62	0.08	0.04	0.06
Racial ethnic identity (white ref)												
Hispanic	−0.22	0.39	0.57	0.09	0.41	0.82	0.21	0.41	0.61	0.21	0.22	0.34
Black	−0.59	0.41	0.16	−0.09	0.44	0.82	0.64	0.44	0.15	0.34	0.24	0.15
AAPI	−1.06	0.65	0.12	−0.92	0.69	0.18	−0.82	0.70	0.24	0.10	0.37	0.80
Female	0.90	0.33	< 0.01	0.63	0.35	0.07	0.51	0.36	0.16	0.05	0.19	0.80
Sexual/gender minority	1.50	0.47	< 0.01	1.73	0.39	< 0.01	2.02	0.40	< 0.01	0.70	0.21	< 0.01
Parent	0.31	0.34	0.40	0.89	0.38	< 0.05	0.55	0.38	0.16	0.42	0.20	< 0.05
Student	0.33	0.33	0.33	0.86	0.35	< 0.05	0.54	0.35	0.13	0.32	0.19	0.09
Perceived social status	−0.37	0.07	< 0.01	−0.20	0.07	< 0.01	−0.27	0.08	< 0.01	−0.05	0.04	0.19
Financial responsibility	−0.32	0.13	< 0.05	0.04	0.14	0.79	−0.15	0.14	0.27	0.13	0.07	0.08
Constant	20.95	0.70	< 0.01	7.34	0.74	< 0.01	12.11	0.75	< 0.01	2.80	0.40	< 0.01

AAPI, Asian American Pacific Islander.

Bold values indicate significant test results.

*Model 1: Dependent variable total perceived stress.

†Model 2: Dependent variable total generalised anxiety.

‡Model 3: Dependent variable total depressive symptoms.

§Model 4: Dependent variable total insomnia sleep problems.

over half identified as female (50.4 %). Over a quarter identified as a sexual or gender minoritised individual (27.3 %). When considering additional demographic and lifestyle factors, 36.0 % were parents and 44.6 % of participants were enrolled as students (full-time/part-time). The mean perceived social status score was 5.9. Most participants reported financial responsibility for credit card payments (69.0 %), a cell phone bill (73.6 %), insurance (61.6 %) and rent or mortgage (55.6 %).

When considering food security status, differences were found among socio-demographic factors, including age, racial/ethnic identity, parent status, social status, overall financial responsibility, as well as individual components, including responsibility for a credit card, cell phone, health insurance and rent or mortgage (Table 2). Mental health outcomes, including stress, anxiety, depressive symptoms and insomnia, also differed according to food security status.

Food insecurity was significantly associated with each mental health outcome, including perceived stress, anxiety, depressive symptoms and insomnia, after controlling for age, racial/ethnic identity, sex, SGM status, parent status, student status, perceived social status and financial responsibility (Table 3). Co-variables associated with mental health outcomes included SGM status, sex, parent status, student status, social status and financial responsibility.

Discussion

Food insecurity was significantly associated with perceived stress, depressive symptoms, anxiety and insomnia among our sample of diverse USA 18–25-year-olds, after controlling for all other factors. Our findings align with previous research identifying associations between food insecurity and mental health outcomes among young adults attending college or university⁽²³⁾ and adults aged 24–32⁽¹²⁾.

Our findings add to the growing literature highlighting the interconnectedness of food insecurity and mental health outcomes, particularly among young adults, a population at high risk of both food insecurity and poor mental health outcomes.

The mechanisms by which food insecurity is associated with mental health have not been fully elucidated; however, it is hypothesised that experiencing food insecurity may put individuals at risk for micronutrient deficiencies that are associated with increased risk of mental health conditions. For example, evidence exists that dietary deficiencies in folate, thiamin or Fe are associated with depression, apathy and altered mood⁽²⁴⁾, while nutritional insufficiency is associated with poor stress management⁽²⁵⁾. More recently, research suggests that dietary interventions can improve symptoms of mental health disorders, including depression, anxiety and attention deficit and hyperactivity disorder (ADHD), through reductions in inflammation and oxidative stress⁽²⁶⁾. Given that individuals experiencing food insecurity often have reduced food access, limited dietary choices and experience multiple stressors simultaneously, research should explore how macronutrient and micronutrient intake among populations experiencing food insecurity contributes to the body's ability to manage mental health conditions.

Previous research suggests the prevalence of food insecurity among young adults may range between 11 % and 42 %⁽¹¹⁾; however, the present study found almost 70 % of participants were food insecure in the past year. There may be a few reasons for this difference. First, data were collected during the later phases of the COVID-19 pandemic, when many populations saw increased food insufficiency⁽²⁷⁾. Second, this study intentionally oversampled Hispanic and Black populations, which are often at higher risk for food insecurity⁽²⁸⁾ but are underrepresented in research. Finally, this study used the Hunger Vital Signs tool⁽¹⁶⁾, a two-item

screening measure to determine food insecurity, instead of the eighteen-item US Household Food Security Module⁽²⁹⁾. Collectively, these factors may have contributed to the higher estimate of food insecurity seen in this study when compared to other published studies. Nevertheless, this sample provides a unique opportunity to examine the association between food insecurity and mental health outcomes among a sample of diverse young adults.

While this study highlights associations between food insecurity and mental health among an understudied population, limitations should be acknowledged. First, this study was completed during later phases of the COVID-19 pandemic, which may have influenced both food insecurity prevalence and mental health due to disrupted food systems and social isolation recommendations. This study was completed using self-reported, cross-sectional data, which limits the ability to determine the directionality of the relationship between food security and mental health. Future research among young adults should aim to follow participants over time to determine the directionality of this relationship, particularly as new life stages and challenges occur. Research should also consider more sensitive measures of food security, as food security may be transitional or temporary for young adults due to their rapidly changing lifestyles. Finally, our sample of young adults was taken from an online panel, which although provides access to a diverse sample of young adults, is not nationally representative which may limit generalisability of the findings. However, given the limited research with young adults and the importance of including diverse samples in research, these findings provide important information about food insecurity and mental health.

The prevalence of mental health challenges among young adults has grown substantially in recent years,^(3–5) and it is important to determine what may be contributing to this increase. Experiencing food insecurity is one such factor associated with mental health, according to study results. Therefore, it may be plausible that efforts toward improving food security among young adults have the potential to improve mental health among this population. While research still needs to determine the precise impacts of food security programmes on mental health, we believe that public health practitioners, medical professionals, social service agencies and community organisations who interact with young adults should consider screening for food insecurity among their young adult clients and establishing quality referral systems to food access programmes. Although the impact is still unknown, programmes focused on alleviating food insecurity may serve as a potential mechanism for improving the mental health of young adults.

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