Food Insecurity and NSAP Use Among Sexual Minority People: Analysis of a Population-Based Sample From National Health Interview Survey, 2017

Jennifer M. Jabson Tree (jabstree@utk.edu)
University of Tennessee at Knoxville

Jennifer Russomanno
University of Tennessee at Knoxville

Marissa Bartmess
University of Tennessee at Knoxville

Joel Anderson
University of Tennessee at Knoxville

Research Article

Keywords: Food insecurity, public health, sexual minorities, food assistance, homosexuality

Posted Date: December 28th, 2021

DOI: https://doi.org/10.21203/rs.3.rs-1167067/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License
Abstract

Background

Food insecurity is a pressing public health problem. Lesbian, gay, and bisexual (LGB) people are at risk for food insecurity, yet this issue remains grossly understudied among this population. The purpose of this study was to add to the existing literature surrounding food insecurity and the use of Federal food assistance programs (SNAP) among LGB people.

Methods

This study used publicly available, de-identified data from the 2017 National Health Interview Survey (NHIS). Primary variables were sexual orientation, food security status, and receipt of SNAP. Food security was assessed using the 10-item USDA Family Food Security measure.

Results

In our sample, people who identified as bisexual had the highest rates of food insecurity (23.8%, n = 76). Female sexual minorities were 52% more likely to experience food insecurity (aOR = 1.518, 95% CI 1.105–2.087, p = .01) and 44% more likely to report household SNAP assistance than their heterosexual counterparts (aOR = 1.441, 95% CI 1.025-2.028, p = .03). SNAP partially mediated the association between sexual orientation and food insecurity for LGB females.

Conclusions

Our findings add to the growing empirical evidence documenting food insecurities among sexual minority adults. Our results reiterate the need for sexual orientation to be included in nationally representative federal food security measures.

Background

Food insecurity is defined by the United States Department of Agriculture (USDA) as a “lack of access to enough food necessary for each member of a household to lead an active, healthy lifestyle” (1). In 2019, approximately 10.5% of U.S. households (35.2 million people) were classified as food insecure (1). Food insecurity has been linked to a number of adverse health conditions including anemia, asthma, diabetes, cancer, chronic obstructive pulmonary disease (COPD), and heart disease, among others (2).

The risk for and experience of food insecurity is not equally experienced by all demographic groups, and some are more likely to be food insecure than others. For example, people with incomes below 185% of the Federal Poverty Level (FPL) are at greater risk for food insecurity, and low-income households headed
by single women have higher rates of food insecurity than two-parent households (40.8% versus 34.8%, respectively) Groups that face social bias and structural oppression, such as—but not limited to—heterosexism, are at risk of experiencing food insecurity.

Lesbian, gay, and bisexual (LGB) people are a group that face minority stressors in the form of social bias and structural oppression and discrimination that may contribute to their risk for food insecurity (3, 4). Yet, to our knowledge, there are currently very few empirical, peer-reviewed publications that report on the experiences of LGB people regarding food insecurity; we identified three such publications. Testa and colleagues (2020) and Gibbs and colleagues (2021) reported that relative to heterosexual individuals, bisexual individuals had significantly higher rates of mild and moderate-to-severe food insecurity compared to heterosexual individuals. Similarly, in their population based study using data from the National Health and Nutrition Examination Survey (NHANES), Patterson and colleagues (4) found that lesbian women were 52% more likely to experience food insecurity than their heterosexual counterparts (aOR= 1.52, 95% CI 1.05–2.20, p < .001), and bisexual women were 34% more likely to experience food insecurity than the referent heterosexual group (aOR = 1.34, 95% CI 1.05–1.70, p < .001). Gibbs and colleagues (2021) also reported that lesbian/gay individuals experienced higher rates of severe food insecurity (13.14%, 95% CI 10.07, 16.97) than heterosexual individuals.

To quell the number of food insecure households, the U.S. implements several safeguards against food insecurity, the largest of which is the Supplemental Nutrition Assistance Program (SNAP), formerly known as food stamps. In 2018, SNAP served approximately 40 million households with an annual expenditure of $68 billion. SNAP provides monthly, income-based monetary benefits to assist households with securing needed food supplies. To be eligible for SNAP, households must meet several requirements related to household resources, economic means, and incomes. In general, a household may qualify for SNAP if its gross monthly income does not exceed 130% of the FPL for a household's size (5).

There is very limited peer-reviewed, empirical evidence concerning SNAP usage by LGB people. The only peer-reviewed publication, to our knowledge, that reported on SNAP utilization used data from NHANES to investigate differences in SNAP usage among lesbian and bisexual women and did not report on SNAP usage among gay and bisexual men (Patterson et al., 2020). In their publication, Patterson and colleagues (4) did not find any differences in SNAP usage by lesbian and bisexual women as compared to heterosexual women. Additionally, although SNAP was designed and implemented to reduce food insecurity, it is not yet empirically documented by the peer-reviewed literature if this is true for the LGB population. Evidence from research with the general population suggests there may be a nuanced relationship between SNAP and the alleviation of food insecurity for all populations (Gregory et al., 2019), but this idea has not been investigated and documented.

The purpose of the current study is to add to the existing literature concerning food insecurity and SNAP usage among LGB people using data from the 2017 National Health Interview Survey (NHIS). NHIS is one of the few population-based surveys that measures sexual orientation, SNAP usage, and food insecurity. Based on preliminary evidence, we hypothesize that food insecurity and SNAP usage varies by sexual
orientation with LGB people reporting greater odds for food insecurity and receiving SNAP than heterosexual people. We also hypothesize that SNAP usage will reduce food insecurity.

**Methods**

This study involved secondary analyses of publicly available, de-identified data and did not require human subjects review. The analytic protocol was performed in accordance with the relevant guidelines and regulations.

**Survey Description.**

Data for this study were from the 2017 NHIS. The NHIS is a national, representative, probability, cross-sectional interview survey of U.S. households. The survey assesses basic health and demographic information for all household members. Detailed information concerning the NHIS sampling frame and study design is described elsewhere (6).

**Sample.**

Casewise deletion was used for missing data related to variables of interest (described below), with a final unweighted sample size of $N=23,459$: $n=201$ (lesbian), $n=253$ (gay), $n=320$ (bisexual), and $n=22,685$ (heterosexual).

**Measures.**

**Food Security.** Food security was assessed with the 10-item USDA Family Food Security measure (1) addressing adult 30-day food security. The content of the questions includes, but is not limited to, items that evaluate being worried food will not last, eating less than one should, being hungry but not eating, and cutting or skipping meals within the previous 30 days. Responses range from 0–10 with higher scores indicating lower food security. A dichotomous food security variable (0= food secure, 1= food insecure) was created from raw food security scores from the 10 questions on the Family Food Security Supplement (FFS section) of the NHIS. Continuous food security raw scores were categorized as food secure (raw scores of 0–2), low food security (raw scores of 3–5), and very low food security (raw scores of 6–10), which were then combined to create the final dichotomous variable of food security (raw scores of 0-2 coded as “0= food secure” and raw scores of 3-10 coded as “1= food insecure”).

**Receipt of SNAP.** Receipt of SNAP was assessed with one question and responses were binary: “Have you or anyone in your family received SNAP assistance in the past 12 months?” Respondents affirming that they or another household member received food stamps/SNAP benefits in the previous 12 months were coded as receiving SNAP (1) versus those who did not receive previous 12-month SNAP benefits (0).

**Sexual Orientation.** Sexual orientation was assessed with a single sexual orientation identity question (7) for men and women: “Which of the following best represents how you think of yourself?” Response options included gay, straight, bisexual, something else, or I do not know. Women who self-identified as
gay were labeled ‘lesbian’. Respondents who selected ‘something else’ or ‘I do not know’ were excluded from analyses. Heterosexual sexual orientation was the referent category.

**Demographic Characteristics.** Demographic characteristics used to describe the sample included sex (female or male), age, race/ethnicity, marital status, employment status, income, chronic disease (having at least one or none), current smoking status (smoker or non-smoker), and general health status where respondents were asked to compare their health as “better” (0), “worse” (1) or “about the same” (2) as 12 months ago. Demographic covariates used to adjust multiple-variable models were selected based on theoretical and empirical evidence. Covariates included race/ethnicity, marital status, age, employment status, chronic disease (having at least one or none), current smoking status (smoker or non-smoker), and general health status. Description of assessment of demographic characteristics is provided by NHIS (6).

**Statistical Analyses.**

Categorical variables are presented in terms of frequencies and percentages. Chi-squared tests were conducted to examine associations between the categorical variables. Using NHIS survey sample weights, binary logistic regression models were used to determine if there were predictive relationships between sociodemographic variables, food security, and SNAP status. To assess differences in food security and SNAP status among the sample better, the regression models were stratified by sex; \( n=10,707 \) for male only regression models and \( n=12,752 \) for female only regression models. To test how SNAP related to food insecurity, mediation analyses were conducted. This included testing associations between sexual orientation and food insecurity, sexual orientation and SNAP utilization, and the change in association between sexual orientation and food insecurity in the presence of the SNAP variable (8). Weighted regression analysis results are presented in terms of odds ratios. All analyses were completed using IBM SPSS statistics (Version 26).

**Results**

**Participants.**

Study sample demographic characteristics are outlined in Table 1. Most NHIS respondents (96.7%, \( n = 22,685 \)) identified as heterosexual, with 3.3% (\( n = 774 \)) identifying as a sexual minority. Of those who identified as a sexual minority, 26% (\( n = 201 \)) identified as lesbian, 32.7% (\( n = 253 \)) identified as gay, and 41.3% (\( n = 320 \)) identified as bisexual. Overall, NHIS respondents were represented across all age ranges; however, most respondents who identified as bisexual were aged 18–34 (59%, \( n = 189 \)). A majority of respondents, regardless of sexual orientation, identified as white (80.6%, \( n = 18,909 \)), with smaller percentages identifying as a racial minority, including Asian (5.2%, \( n = 1,209 \)), American Indian or Native American (AINAN) (1.1%, \( n = 264 \)), Black (10.9%, \( n = 2,550 \)), or multiple races (2.1%, \( n = 483 \)).

**Food security.**
Unadjusted, bivariate analyses showed that respondents who identified as a sexual minority had higher rates of food insecurity than those who identified as heterosexual (11.7%, \( n = 2,646 \); Table 1). Among sexual minorities, people who identified as bisexual had the highest rates of food insecurity (23.8%, \( n = 76 \)), followed by people who identified as gay (18.9%, \( n = 38 \)) and lesbian (12.3%, \( n = 31 \)).

Multivariable models were stratified by sex and adjusted for race, age, marital status, employment status, chronic disease, smoking status, and general health status (Table 2). In adjusted models, lesbian and bisexual women were 52% more likely to experience food insecurity than heterosexual women (aOR = 1.518, 95% CI = 1.105–2.087, \( p = .01 \)). Food insecurity did not vary by sexual orientation among males.

**Receipt of SNAP.**

When asked, “have you or anyone in your family received SNAP assistance in the past 12 months,” respondents who identified as gay (9.1%, \( n = 23 \); Table 1) reported the lowest rates of SNAP assistance. The highest receipt of SNAP was seen among respondents who identified as bisexual (22.8%, \( n = 73 \)), followed by respondents who identified as lesbian (17.4%, \( n = 35 \)) and those who identified as heterosexual (11.8%, \( n = 2,684 \)).

Multivariable models were stratified by sex and adjusted for race, age, marital status, employment status, chronic disease, smoking status, and general health status (Table 2). Lesbian and bisexual women were 44% more likely to report household SNAP assistance than heterosexual women (aOR = 1.441, 95% CI = 1.025–2.028, \( p = .03 \)). Receipt of SNAP did not vary by sexual orientation for males.

**Reduction of Food Insecurity by Receipt of SNAP.**

For lesbian and bisexual females, we found evidence of partial mediation of the association between sexual orientation and food insecurity when SNAP receipt was entered into the model (Table 3). Among lesbian and bisexual females, the aOR for food insecurity (aOR 1.518, 95% CI = 1.105–2.087, \( p = .01 \)) was reduced 9% with receipt of SNAP (aOR 1.388 95% CI = .98–1.95, \( p = .06 \)). For gay and bisexual males, there was no association between sexual orientation and food insecurity (aOR 1.21, 95% CI = .78–1.86; \( p = .38 \)), nor sexual orientation and receipt of SNAP (aOR 1.119, 95% CI = .697–1.794; \( p = .64 \)); therefore, the mediation analysis was terminated.

**Discussion**

The Theory of Minority Stress states that due to heterosexist social norms and structures, LGB adults experience chronic stressors related to their sexual orientation in addition to the daily life hassles and stressful life events all individuals experience. Minority stressors include, but are not limited to, the chronic risk for and experience of interpersonal, employment, educational, and health care discrimination and, in many states, a complete lack of legal protection from multiple forms of discrimination, hate crimes, and violence. These stressors influence LGB people’s employment, education, and other factors that contribute to economic stability and, subsequently, food insecurity. Therefore, we anticipated that
food insecurity and SNAP usage would vary by sexual orientation, where LGB people would report greater odds for food insecurity and receiving SNAP than heterosexual people. We also aimed to investigate the relationship between SNAP and food insecurity among LGB individuals. The purpose of this project was to add to the field by describing food insecurity, receipt of SNAP, and the influence SNAP had on food insecurity among LGB adults responding to a population-based health surveillance program.

Our analyses revealed evidence of disparities in food insecurity and SNAP use by sexual orientation. Lesbian and bisexual females had 52% greater odds of food insecurity and 44% greater odds of receiving SNAP than heterosexual females. Our findings are consonant with the extant literature, which shows food insecurity and receipt of SNAP vary by sexual orientation and sex. Patterson, Russomanno, and Jabson (4) evidenced with their analysis of data from NHANES that lesbian and bisexual females also had 34–52% greater odds of food insecurity than heterosexual females. However, they did not show evidence that SNAP use varied by sexual orientation. Testa and Jackson (9) reported similar findings. In their study of adults participating in the New York City community health survey, bisexual adults were 71% more likely to experience mild and 85% more likely to experience moderate-to-severe food insecurity compared to heterosexual people.

By design, if a household receives monthly SNAP benefits to assist with food supplies, it should indicate relief of food insecurity. Our analyses support this idea; receipt of SNAP partially reduced food insecurity for lesbian and bisexual females. However, this finding may be more nuanced. In their study assessing the benefits of SNAP on food security, Gregory and Smith (2019) determined that responses to surveys that utilize a 30-day food security assessment (including NHIS) are skewed by the date when SNAP benefits are received by beneficiaries. They uncovered that the probability of being classified as food insecure increased by 11% near the end of or at the very beginning of a benefit month (10). Therefore, it is possible that respondents who were classified as food insecure in our study could have been unjustly placed in that category based solely on when their last SNAP benefit allocation was received. Additionally, other studies that utilized a 12-month food security assessment showed no differences in SNAP receipt and use by sexual orientation (4, 11).

Disparities in food insecurity by sexual orientation are concerning because food insecurity is a leading predictor of chronic disease (2, 12) and may be contributing to the documented disparities in chronic conditions among LGB people (13), including cardiovascular disease (14) and certain types of cancer (15). Food insecurity may contribute to chronic disease through multiple channels including stress caused by the need to secure food. This idea is supported by preliminary evidence. Using population-based data, Henderson and colleagues (16) investigated if stress associated with not having enough money to buy food varied by sexual orientation and found that LGB adults were 49% more likely to report stress associated with securing food than heterosexual adults (OR 1.49; 95% CI = 1.08–2.07, p <.05). Such stress may be compounded for LGB adults given the documented levels of minority stress experienced by this population (17) and the impact of this stress on mental health disparities experienced by sexual minorities (18). This may be particularly true for bisexual adults, who reported the highest
levels of food insecurity in this sample, given the stigmatization associated with bi-erasure and biphobia (19).

**Limitations**

Limitations of the current study relate to the data elements collected. Given the small sample of sexual minority adults ($n = 201$ lesbian, $n = 253$ gay, $n = 320$ bisexual), we were unable to disaggregate and analyze the data by sexual minority status. All persons who identified as lesbian, gay, or bisexual were listed under a combined “LGB” variable ($n = 774$) for data analysis. Additionally, there were no questions concerning transgender-inclusive gender identity. Indeed, the underrepresentation of sexual and gender minorities is prominent in U.S. government data collection and oversampling within these populations can be beneficial for future data collection (20, 21). Although NHIS survey sample weights were used, the data are from 2017 and may not be as representative of the population as the 2020 NHIS survey data. Additionally, omitted variable bias could limit the internal validity of results. Only individuals who applied for and received SNAP were classified as having receiving SNAP benefits. It is possible our findings are limited by the fact that not all respondents in need of SNAP applied for or received SNAP benefits. Finally, our analyses were not capable of addressing intersectional marginalized identities that may elevate risk for food insecurity among LGB people who hold multiple marginalized identities (11, 22).

**Strengths**

Despite the limitations described, our findings add to the growing empirical evidence that documents food insecurities among sexual minority adults, an understudied population. The population-based methods are rigorous and adhere to the best practices for investigating patterns in health using health surveillance data sources. In addition, we were able to describe food security among sexual minority adults using the gold standard, multi-item USDA module. Finally, our results further reiterate a need for sexual orientation to be included in nationally representative, 12-month federal food security measures so that public health professionals can have a more robust representation of long-term food insecurity issues among sexual minority populations.

**Conclusion**

Food insecurity is predicted to afflict over 50 million people in the U.S. as a result of the Covid-19 pandemic (23). As food insecurity continues to affect more households in the U.S., understanding the differential impact of food insecurity and programs designed to lessen its toll (e.g., SNAP) on minoritized populations such as sexual minorities is key to alleviating these potential disparities. Our findings provide critical information to guide and support the development of services and interventions to address food insecurity experienced by sexual minorities as well as the development of policies to aid this population.

**List Of Abbreviations**

FPL: Federal Poverty Level
Declarations

Ethics approval and consent to participate: NHIS is approved by the Research Ethics Review Board of the National Center for Health Statistics and the U.S. Office of Management and Budget. All NHIS respondents provided oral consent prior to participation ([https://www.cdc.gov/niosh/topics/nhis/method.html](https://www.cdc.gov/niosh/topics/nhis/method.html)). No IRB review was required for secondary analysis of this project; the authors had no access to individual participant identifiers or contact information. Consent for secondary analysis was not required.

Consent for Publication: not applicable

Availability of data and materials: The datasets analyzed during the current study are available in the Center’s for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey repository, [https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm](https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm).

Competing interests: The authors declare that they have no competing interests.

Authors contributions: JR, JJT, MB, and JA conceptualized the project. MB and JA analyzed the data. JJT, JR interpreted findings and suggested additional analyses. JR and JJT were major contributors in writing the manuscript. All authors contributed to reviewing, revising, and approving the final manuscript.

Funding: not applicable

Acknowledgements: not applicable

References

1. United States Department of Agriculture. Food Security in the U.S. 2021 [Available from: https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/measurement/].

2. Gregory CA, Coleman-Jensen A. Food insecurity, chronic disease, and health among working-age adults. 2017.
3. Brown T, Romero A, Gates G. Food insecurity and SNAP participation in the LGBT community. 2016.
   2019.
4. Patterson JG, Russomanno J, Tree JM J. Sexual orientation disparities in food insecurity and food
   assistance use in US adult women: National Health and Nutrition Examination Survey, 2005–2014.
   BMC public health. 2020;20(1):1–11.
5. United States Department of Agriculture. SNAP Eligibility 2021 [Available from:
   https://www.fns.usda.gov/snap/recipient/eligibility.
6. National Health Interview Survey 2017 [Internet]. 2017. Available from:
   https://www.cdc.gov/nchs/nhis/nhis_2017_data_release.htm.
7. Badgett M. Best practices for asking questions about sexual orientation on surveys. 2009.
8. Fairchild AJ, MacKinnon DP. A general model for testing mediation and moderation effects.
   Prevention science: the official journal of the Society for Prevention Research. 2009;10(2):87–99.
9. Testa A, Jackson DB. Sexual Orientation and Food Insecurity: Findings from the New York City
   Community Health Survey. Public Health Nutrition. 2020;1–18.
10. Gregory CA, Smith TA. Salience, food security, and SNAP receipt. Journal of Policy Analysis and
    Management. 2019;38(1):124–54.
11. Patterson JG, Russomanno AA, Teferra AA, Tree JM J. Disparities in food insecurity at the intersection
    of race and sexual orientation: A population-based study of adult women in the United States. SSM-
    population health. 2020;12:100655.
12. Seligman HK, Laraia B, Kushel MB. Food insecurity is associated with chronic disease among low-
    income NHANES participants. The Journal of nutrition. 2010;140(2):304–10.
13. Patterson JG, Jabson JM. Sexual orientation measurement and chronic disease disparities: National
    Health and Nutrition Examination Survey, 2009–2014. Annals of epidemiology. 2018;28(2):72–85.
14. Caceres BA, Brody A, Luscombe RE, Primiano JE, Marusca P, Sitts EM, et al. A systematic review of
    cardiovascular disease in sexual minorities. American Journal of Public Health. 2017;107(4):e13-
    e21.
15. Quinn GP, Sanchez JA, Sutton SK, Vadaparampil ST, Nguyen GT, Green BL, et al. Cancer and lesbian,
    gay, bisexual, transgender/transsexual, and queer/questioning (LGBTQ) populations. CA: a cancer
    journal for clinicians. 2015;65(5):384–400.
16. Henderson ER, Jabson J, Russomanno J, Paglisotti T, Blosnich JR. Housing and food stress among
    transgender adults in the United States. Annals of epidemiology. 2019;38:42–7.
17. Meyer IH. Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations:
    conceptual issues and research evidence. Psychological bulletin. 2003;129(5):674.
18. Potter EC, Patterson CJ. Health-Related Quality of Life Among Lesbian, Gay, and Bisexual Adults: The
    Burden of Health Disparities in 2016 Behavioral Risk Factor Surveillance System Data. LGBT health.
    2019;6(7):357–69.
19. Klesse C. Shady characters, untrustworthy partners, and promiscuous sluts: Creating bisexual intimacies in the face of heteronormativity and biphobia. Journal of Bisexuality. 2011;11(2-3):227–44.

20. Sell RL. Challenges and solutions to collecting sexual orientation and gender identity data. American Public Health Association; 2017.

21. Patterson JG, Jabson JM, Bowen DJ. Measuring sexual and gender minority populations in health surveillance. LGBT health. 2017;4(2):82–105.

22. Bowleg L. The problem with the phrase women and minorities: intersectionality—an important theoretical framework for public health. American journal of public health. 2012;102(7):1267–73.

23. Feeding America. The Impact of Coronavirus on Food Insecurity 2020 [Available from: https://www.feedingamerica.org/research/coronavirus-hunger-research.

Tables

Due to technical limitations, table 1,2 is only available as a download in the Supplemental Files section.
Table 3
Demographic characteristics associated with food insecurity after controlling for SNAP receipt stratified by sex

| Food Insecurity | 95% Confidence Interval | 95% Confidence Interval |
|-----------------|-------------------------|-------------------------|
|                 | aOR LL UP p             | aOR LL UP p             |
| Males           | Females                 |
| Sexual Orientation |                       |                         |
| Heterosexual    | ref                     | ref                     |
| LGB             | 1.173 0.776 1.773 0.448 | 1.388 0.989 1.949 0.058 |
| Age             | 0.972 0.966 0.979 <.001 | 0.978 0.972 0.984 <.001 |
| Race            |                         |                         |
| White           | ref                     | ref                     |
| Asian           | 0.475 0.291 0.778 0.003 | 1.403 0.980 2.007 0.064 |
| Black           | 1.969 1.538 2.522 <.001 | 1.769 1.453 2.155 <.001 |
| AINAN           | 1.488 0.779 2.843 0.229 | 1.620 0.915 2.867 0.098 |
| Multiple Race   | 1.82 1.153 2.872 0.01  | 1.457 1.010 2.100 0.044 |
| Marital status  |                         |                         |
| Partnered/Married | ref                   | ref                   |
| Never married   | 1.053 0.826 1.342 0.676 | 1.309 1.072 1.599 0.008 |
| Divorced/Separated | 1.963 1.576 2.445 <.001 | 2.483 2.062 2.989 <.001 |
| Widowed         | 1.348 0.849 2.141 0.205 | 1.473 1.138 1.906 0.003 |
| Employment      |                         |                         |
| Employed        | ref                     | ref                     |
| Unemployed      | 1.869 1.526 2.289 <.001 | 1.639 1.395 1.925 <.001 |
| Chronic disease |                         |                         |
| None            | ref                     | ref                     |
| At least one    | 1.798 1.464 2.208 <.001 | 1.714 1.443 2.035 <.001 |
| Current smoker  |                         |                         |
## Food Insecurity

|                      | Smoker | ref | Non-Smoker | ref | General health status | ref | SNAP receipt | No | ref | ref | Yes | ref | ref |<.001 |
|----------------------|--------|-----|------------|-----|-----------------------|-----|--------------|----|-----|-----|-----|-----|-----|<.001 |
| Smoker               | 0.514  | 0.423 | 0.624      |     | <.001                |     | 0.477        | 0.398 | 0.57 |<.001 |
| General health status| 0.946  | 0.851 | 1.051      |     | 0.299                |     | 0.958        | 0.876 | 1.047 | 0.346 |
| SNAP receipt         |        |      |            |     |                      |     |              |     |      |     |     |     |     |<.001 |
| No                   | 0.213  | 0.17  | 0.268      |     | <.001                |     | 0.245        | 0.208 | 0.288 |<.001 |

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Onlinefloatimage1.png
- Onlinefloatimage2.png