Cumulative Risk Factors Associated with Food Insecurity among Adults who Experience Homelessness

Daphne C. Hernandez, PhD, MSEd,
The University of Houston, Department of Health, & Health Performance, and The University of Houston, HEALTH Research Institute

Sajeevika S. Daundasekara, PhD,
The University of Houston, Department of Health, & Health Performance

Katherine R. Arlinghaus, MS, RD,
The University of Houston, Department of Health, & Health Performance

Nubia Tobar,
The University of Houston, Department of Health, & Health Performance

Lorraine R. Reitzel, PhD,
The University of Houston, HEALTH Research Institute, and The University of Houston, Department of Psychological, Health, & Learning Sciences

Darla E. Kendzor, PhD,
The University of Oklahoma Health Sciences Center, Department of Family and Preventive Medicine and The University of Oklahoma Health Sciences Center, Stephenson Cancer Center, Oklahoma Tobacco Research Center

Michael S. Businelle, PhD
The University of Oklahoma Health Sciences Center, Department of Family and Preventive Medicine and The University of Oklahoma Health Sciences Center, Stephenson Cancer Center, Oklahoma Tobacco Research Center,

Abstract

Introduction: There is a dearth of research on the determinants of food insecurity among adults who experience homelessness. According to cumulative risk theory, it is the accumulation of risk factors that places individuals in jeopardy for negative health consequences. Building on the cumulative risk theory, domain specific indices were created to examine the relationship between four cumulative risk factors and food insecurity among adults who experience homelessness.

Methods: Adult participants were recruited from six-area shelters in Oklahoma City (N = 565) during July – August 2016. Participants who affirmatively responded to two-six items of the six-item USDA Food Security Scale-Short form were categorized as food insecure. Four indices of cumulative risk were created based on affirmative survey responses: poor health & risky health

Corresponding author information: Daphne C. Hernandez, PhD, MSEd, Department of Health, & Health Performance, 3875 Holman Street, Garrison Gymnasium, Room 104, Houston, TX 77204-6015 USA; dhernandez26@uh.edu; Phone: 713-743-9058; Fax: 713-743-9860.

behaviors index, personal and sexual victimization index, household disruption, and financial strain. Covariate-adjusted logistic regression models predicted the odds of adults experiencing food insecurity.

Results: Seventy-eight percent of the sample experienced food insecurity. Higher scores for the poor health and risky health behaviors index predicted higher odds of experiencing food insecurity (OR = 1.80, CI: 1.51 – 2.14). Higher scores for the personal and sexual victimization index predicted higher odds of experiencing food insecurity (OR = 1.57, CI: 1.20 – 2.04).

Conclusion: To facilitate food security among adults experiencing homelessness, shelters and community-based programs need to consider homelessness and food insecurity to be multi-faceted public health problems that are inter-related.

Introduction

Homelessness is a rising condition in the United States. Of the total homeless population in 2017, this affected39%(215,709) of adult females and61% (335,038) of adult males (Henry, Watt, Rosenthal, & Shivji, 2017).A correlate of experiencing homelessness is food insecurity. Food insecurity ischaracterized as a householdexperiencingrestrictions on adequate food access due toinsufficientmoney andother resources for food (Coleman-Jensen, Rabbitt, Gregory, & Singh, 2018).Among domiciled adults 11.8%experience food insecurity (Coleman-Jensen et al., 2018). While there is no national prevalencerate for food insecurity among homeless populations, estimates range from 25% to 59.5%; thus, suggesting that the prevalence rate is much higher than the domiciled adults (Kim, Flentje, Tsoh, & Riley, 2017; Weiser, Bangsberg, et al., 2009; Weiser, Frongillo, et al., 2009).

The majority of the current knowledge on the determinants of food insecurity is based on low-income mothers with children (Hernandez, 2015), with a dearth of information among adults who experience homelessness (Gundersen, Weinreb, Wehler, & Hosmer, 2003).Togain a better understanding of the factors that contribute to food insecurity among adults experiencing homelessness, an investigation of highly prevalent correlates pertaining to this population, such as health, victimization, household disruption, and financial strain must occur. However, focusing on one correlate or risk factor may not be sufficient to determine potential precursors to experiencing food insecurity among adults who experience homelessness. The cumulative risk theory postulates that multiple risk factors, rather than any one particularriskfactor, influences an outcome (Rutter, 1979; Sameroff, 1998; Sameroff, Seifer, Baldwin, & Baldwin, 1993). Creating an aggregate score based on the summation of risk factors provides the opportunity to measure aparticular domain (i.e. a group of behaviors/risk characteristics rather than an individual risk character). A domain specific aggregate score is a stronger correlate of outcomes compared to a single risk factor (MacFadyen, MacFadyen, & Prince, 1996). Aggregate scores provide the opportunity for domain specific (e.g. health domain, household disruption domain, financial strain domain) risk factors to be compared, which then provides the prospect to create more comprehensive interventions based on the domains.

Poor health and risky health behaviors

A significant proportion of adults who experience homelessness live with poor physical and emotional health status (Fazel, Geddes, & Kushel, 2014; Lebrun-Harris et al., 2013; Sun, Irestig, Burstrom, Beijer, & Burstrom, 2012), and poor health has been associated with an increased risk of experiencing food insecurity (Hernandez, Reesor, & Murillo, 2017; Venci & Lee, 2018; Wang et al., 2015). The residential instability of individuals experiencing homelessness may be perceived as failure to accomplish basic social expectations, which could contribute to the high rates of depression seen among this population (DeForge, Belcher, O'Rourke, & Lindsey, 2008). Likewise, Post-Traumatic Stress Disorder (PTSD), a psychiatricdisorder that can occur after a person has enduredor witnesseda traumatic event, is highly common among the individuals experiencing homelessness (Whitbeck, Armenta, & Gentzler, 2015). Poor physical or mental health may make it difficult to practice lifestyle health behaviors such as organizing and planning meals. The managerial capacity required for planning and prepping meals is further hampered if these individuals experiencing homelessness are dependent on shared kitchen space. Shared cooking facilities are typically small and have limited or lack food storage (Richards & Smith, 2006; Wicks, Trevena, & Quine, 2006). The combination of both poor mental health conditions and logistical constraints from not having a home could place individuals experiencing homelessness at risk for food insecurity (Parpouchi, Moniruzzaman, Russolillo, & Somers, 2016; Tong et al., 2018).

Further, numerous adults who experience homelessness also experience high rates of alcohol use disorders, including a 29% to 63% lifetime presence of alcohol use disorders (Baggett et al., 2015).In the United States, about three quarters of the adult population who experience homelessness are cigarette smokers (Baggett, Tobey, & Rigotti, 2013). Evidence suggests homelessness may impact cigarette smoking and the quantity of cigarette consumption. Many smokers experiencing homelessness view tobacco use as a method of coping with "all the pressures of being homeless" or asa reward for withstandingthe hardships of homelessness(Baggett et al., 2013). Thus, alcohol and tobacco purchases could divert financial resources dedicated to food to supporting highly addictive behaviors, and consequently contribute to food insecurity experiences (Hernandez, Reesor, Reitzel, et al., 2017).

Personal and sexual victimization

Sexual and physical abuse is often an experience among women and men experiencing homelessness. When compared to poor domiciled women or mothers, women experiencing homelessnessreport rape or physical abuse more frequently (Kushel, Evans, Perry, Robertson, & Moss, 2003; Meinbresse et al., 2014). In addition to a high level of victimization, homelessness is also associated with a higher possibility of witnessing violence (Fitzpatrick, LaGory, & Ritchey, 1999). Ninety percent of mothers experiencing homelessness have experienced or witnessed severe physical and/or sexual abuse at some point in their lives (United States Department of Housing and Urban Development, 2015). Lack of legal and consistent residence or tight living quarters could explain the higher exposure to violence among homeless populations. Further, young adults without education or work experience are repeatedly faced with the obligation of providing for themselves for

survival. This can sometimes mean turning to trading sex for goods such as food, shelter, money or drugs (Santa Maria, Narendorf, Ha, & Bezette-Flores, 2015; Tyler & Johnson, 2006).

Household disruption

Family risk factors such as family disruption and conflict are also connected to increased experiences with food insecurity. Adverse experiences during childhood, including household and housing instability, have been associated with food insecurity experiences in adulthood (Chilton, Knowles, Rabinowich, & Arnold, 2015). Foster care placement is also considered to increase the risk of experiencing homelessness as an adult (Bassuk et al., 1997; Fowler, Toro, & Miles, 2009; Roman & Wolfe, 1995). Youth aging out of foster care are at increased risk of poverty and disproportionately impacted by food insecurity as well (Courtney & Dworsky, 2006; Lockwood, Friedman, & Christian, 2015; Meisenheimer, 2018). Another correlation to homelessness is jail or incarceration. Family disruption due to incarceration has also been linked with an increase in food insecurity (Cox & Wallace, 2013). Due to limited employment opportunity, earnings, and economic mobility, the connection between family disruption from a family member being incarcerated and food hardship can continue even afterthe incarcerated parentre-enters into society (Geller, Garfinkel, & Western, 2011; The Pew Charitable Trusts, 2010; Visher, Debus, & Yahner, 2008).

Financialstrain

Financial strain refers to a person's subjective appraisal of income inadequacy (Szanton, Thorpe, & Whitfield, 2010). Lack of employment is one of the indicators of financial strain. Previous studies suggest that various events of unemploymentcan inflict additional risk of food insecurity (Huang, Kim, & Birkenmaier, 2016). For example, unemployment can create additional distress and negatively impact family relationships and interactions (Frasquilho et al., 2016). This places individuals who areexperiencing multiple employment lossesat higher risk forfood insecurity (Huang et al., 2016).In addition, homelessness and residential mobility during early life could lead to poor school performance, repeating grades, dropping out, and lower rates of high school graduation (Bassuk, 2010; Buckner, 2008). Adults who have not completed high school are at higher risk for food insecurity compared to adults have obtained a high school degree (Hernandez, Marshall, & Mineo, 2014).

Current Study

Most of the literature described above has come from research conducted with domicile populations. Adults who experience homelessness may have unique sets of barriers to accessing food. Thus, there is a need to understand how domain specific (e.g., health, household disruption etc.) risk factors are related to food insecurity among adults who experience homelessness. The purpose of this article is to examine the association of four cumulative risk indices – poor health and risky health behaviors, personal and sexual victimization, household disruption, and financial strain – in relation to food insecurity among adults experiencing homelessness. Such examination may provide insight into how programs and policies could potentially be restructured to meet the needs of this population.

Methods

Data and Sample

The participants for the current study were recruited through flyers posted at six homeless shelters in Oklahoma City, OK July – August 2016. Participants were eligible to enroll in the study if they were at least 18 years of age, receiving services (e.g., shelter, counseling) at the targeted shelters, and had a minimum 7th grade English literacy level based on a score of 4 or higher on the Rapid Estimate of Adult Literacy in Medicine-Short Form (Davis et al., 1993; Murphy, Davis, Long, Jackson, & Decker, 1993). While 648 participants were screened for the study, thirty-eight interested participants were excluded during screening due to lower literacy level. After the screening and informed consent process, participants completed questionnaires that were administered via a tablet computer whereby survey items were visible on the screen and read aloud to the participant via headphones. Participants were compensated with a $20 department store gift card. The Institutional Review Boards at the (omitted for review) and the (omitted for review) approved this study.

A total of 610 eligible adults were enrolled in the study. Those who did not meet the criteria of being homeless (i.e. an individual that does not have a personal residence or other permanent location to sleep) were excluded (29 excluded). Participants were further excluded if they were missing data on the food security measure (4 excluded), if they were missing data on any of the risk indices (three excluded), or if they had any missing covariate data (nine excluded). The final analytic sample consisted of 565 adults who were experiencing homelessness.

Measures

Food Insecurity.—Food security was measured using a six-item Food Security Scale developed by the National Center for Health Statistics in collaboration with Abt Associates Inc. The scale assesses both the quality and quantity of a person's food over the past 12 months, along with whether they were able to afford the food they needed. If participants responded affirmatively to zero or one of the six items, they were categorized as food secure. Individuals who responded affirmatively between two and six of the six items were categorized as food insecure (Blumberg, Bialostosky, Hamilton, & Briefel, 1999).

Cumulative Risk Indices.—The independent variables are comprised of four indices of cumulative risk factors that may be associated with food insecurity. The process of developing risk factor indices was adapted from previous research that combined risk factor experiences to develop cumulative family risk factor indices (Garasky, Stewart, Gundersen, Lohman, & Eisenmann, 2009; Gundersen, Lohman, Garasky, Stewart, & Eisenmann, 2008; Hernandez, 2015; Hernandez & Pressler, 2015). Each of the four indices was created by aggregating various risky behavioral experiences thought to contribute to food insecurity (Chilton et al., 2015; Huang et al., 2016; Jackson, Lynch, Helton, & Vaughn, 2018; Venci & Lee, 2018). This process is described briefly for each of the indices.

Poor Health and Risky Health Behaviors Index.—The poor health and risky health behaviors index was composed of five variables: Poor health status, depression symptoms,

PTSD symptoms, alcohol abuse/dependence, and smoking status. With the first measure participants were asked to rate their health status on a 1 = *Excellent* to 5 = *Poor* scale from the Behavioral Risk Factor Surveillance Survey (Center for Disease Control and Prevention, 2009). Those who rated their overall health status as "poor" or "fair" were given a score of one. Depression symptoms were assessed using the eight-item Patient Health Questionnaire (PHQ) (Spitzer, Kroenke, Williams, & Patient Health Questionnaire Primary Care Study Group, 1999). Participants that scored 10 points or higher (possible range of score 0– 24) were categorized as currently experiencing depression symptoms and given a score of one (Kroenke et al., 2009). The third measure, symptoms of PTSD, was assessed using the four-item Primary Care Post-Traumatic Stress Disorder (PC-PTSD) screener. The response options for each item was "yes/no". Those who responded "yes" to three or more items were described as experiencing PTSD symptoms and given a score of one (Prins et al., 2003). Alcohol abuse/dependence, the fourth measure in the index, was based on seven items from the Patient Health Questionnaire (Spitzer et al., 1999). Two or more affirmative answers resulted in the participant receiving a score of one, suggesting probable alcohol abuse or dependence (Spitzer et al., 1999). For the fifth measurement, participants who responded affirmatively to both smoking at least 100 cigarettes in a lifetime and smoking in the past 30 days were classified as current smokers and given a score of one (Businelle et al., 2015) The scores for each of the five variables were summed to create a cumulative score for the poor health and risky health behaviors index, a possible range of zero to five.

Personal and Sexual Victimization Index.—The personal and sexual victimization index was based on one item regarding personal victimization and two items regarding sexual victimization. Participants were asked if anyone had used violence, such as mugging, fight, or sexual assault against them (Sampson, Raudenbush, & Earls, 1997). Sexual victimization items were adapted from the 2014–2015 National Health and Nutrition Examination Survey. Participants were asked if they had ever been forced to have sexual intercourse of any kind (vaginal, anal, or oral); participants were also asked if they had ever exchanged sex (vaginal, anal, or oral) for money, drugs, a place to stay, food/meals, or anything else. The response options for each item was "yes/no". Affirmative responses were provided a score of one and summed up to create the personal and sexual victimization index, a possible range of zero to three.

Household Disruption.—The three items that comprised the household disruption index were based on items that measure family separation and are considered to be disruptive to individual and family well-being (Fawley-King, Trask, Zhang, & Aarons, 2017; Haskett, Armstrong, & Tisdale, 2016; Turney & Goodsell, 2018). Two items were derived from the 18-item Brief Homelessness Questionnaire created for the purposes of the study (Businelle & Kendzor, 2016). The questionnaire included an item where participants responded the age at which the first time they became homeless. Participants who responded 17 years or younger where categorized as having experienced homelessness as a child. The questionnaire also included an item where participants responded whether they had been incarcerated (jail or prison) in the past 5 years. This item included a "yes/no" response option. The final item was derived from a 4-item questionnaire that was developed by researchers and child welfare stakeholders to assess involvement in the foster care system.

Participants responded whether or not they had ever been in foster care. This item included a "yes/no" response option. For each of these measurements, affirmative responses were scored as a one and not having had the experience was scored a zero. The cumulative household disruption index was determined as the sum of all three variables' scores, possible range of zero to three.

Financial Strain Index.—The financial strain index included three items of financial risk: unemployment or disability that limits employment, having no sources of income, and having less than high school education. Each affirmative response to the three items were scored as a one. Those whose employment, income, and education experiences did not match these characteristics scored as zero. The three variables were summed to create a financial strain index, with a possible range from zero to three.

Covariates

A number of control variables were included as covariates in the models as they may influence individuals' experiences with various risk factors and could be related to individuals' food security. Continuous covariates included age and the total number of years the individual has been homeless. The remaining covariates were all treated as dichotomous variables: gender (one = female; zero = male), race/ethnicity (one = white/non-minority; zero = minority), marital status (one = married; zero = not married), and health insurance (one = insured to any extent; zero = uninsured).

Analytic Plan

Descriptive analyses and multivariate logistic regression models were conducted using STATA version 14.0 statistical software (StataCorp LP, College Station, Texas). Bivariate analyses comparing the individual risk factors, cumulative risk indices, and covariates by food security status were conducted using one-way analysis of variance tests for continuous variables and chi-square tests for dichotomous variables. The multivariate logistic regression models consisted of food insecurity being regressed onto the cumulative family risk indices and covariates. In all regression models the standard errors were adjusted to account for the lack of independence as some participants were clustered by data collection site.

Results

The descriptive statistics for the study variables for the entire analytic sample and for food secure and food insecure adults are demonstrated in Table 1. Twenty-two percent of the sample was food secure, and 78% were food insecure. Overall, food insecure adults were significantly more likely to have a higher score (indicating a worsen state) on the poor health and risky health behaviors index, personal and sexual victimization index, and household disruption index compared to their food secure counterparts. More specifically, food insecure adults were significantly more likely to report poor health, depression symptoms, PTSD symptoms, alcohol abuse/dependence, experienced violence, having been forced to have sex, and first experienced homelessness as a child compared to food secure adults. Eighty-nine percent of the sample was unemployed/disability limits their employment, 53% had no source of income and 26% had less than high school education. On average,

participants were about 44 years of age, 64% male, 56% white, 88% not married, 70% lacked insurance, and the majority had been homeless for over three years. Food insecure adults were significantly more likely to have health insurance than food secure adults.

The results of the multivariate logistic regression model are displayed in Table 2. Adults experiencing homelessness with a higher score for the poor health and risky health behaviors index (indicating greater risk) had higher odds of experiencing food insecurity (OR = 1.80, p < 0.001). Similarly, adults experiencing homelessness with a higher score for the personal and sexual victimization index (indicating greater risk) had higher odds of experiencing food insecurity (OR = 1.57, p < 0.05). None of the covariates significantly predicted risk of food insecurity among adults experiencing homelessness.

Sensitivity Models

Additional models were conducted that recalculated the four cumulative risk indices using principal components factor analysis. Each index was derived by providing each individual risk with a weight based on its respective factor loading obtained from principal components analysis to explore whether individual risks may accumulate differentially to each other. These results did not differ from the results presented in Table 2.

Discussion

The purpose of the current study was to investigate the cumulative nature of risk factors associated with food insecurity among adults experiencing homelessness. Thus, it is important to describe the food insecurity prevalence rate in the current sample. While the participants in the current study were from homeless shelters where food is provided on a daily basis, 78% of the current study sample reported experiencing food insecurity. Even though study participants are provided food as homeless shelter residents, these adults may still feel anxiety as to where they will access their next meal or how they will access food if they are not in shelter at the time of meal service. It is not clear from the data the duration or frequency by which these individuals have been experiencing food insecurity. However, research on domicile populations suggests that duration of food insecurity experiences are typically short, but can be cyclical (Coleman-Jensen et al., 2018). The additional barriers associated with housing instability and homelessness possibly magnify the duration and frequency of experiencing food insecurity; thus, amplifying the anxiety surrounding accessing food.

Moreover, study results indicate that among the four cumulative risk domains investigated in relation to food insecurity, two of them significantly predicted food insecurity among adults experiencing homelessness: 1) poor health and risk health behaviors and 2) personal and sexual victimization. This supports that the aggregate score of individual risk factors, as suggested by the cumulative risk theory, can be used as determinants of food insecurity among adults experiencing homelessness. The adults who experienced food insecurity reported more frequently experiencing poor health, depression, PTSD symptoms, and alcohol dependence. This indicates that physical health, mental health, and risky health related behaviors are associated with food insecurity among adults who experience homelessness similar to previous findings with domicile adults (Hernandez, 2015). Current

findings also show that the food insecure adults who experience homelessness are more likely to report experiencing violence and sexual victimization compared to food secure adults who experience homelessness. These results coincide with research among domicile populations that has found intimate partner violence to be associated with food insecurity (Hernandez et al., 2014; Melchior et al., 2009).

While individual indicators of household disruption and financial strains such as childhood homelessness, foster care, unemployment, or lower level of education are associated with higher incidence of food insecurity (Cox & Wallace, 2013; Gundersen et al., 2003; Hernandez et al., 2014; Huang et al., 2016), the cumulative indices of household disruption and financial strain were not predictive of food insecurity among adults who experience homelessness. While a greater proportion of adults who had experienced homelessness as a child also experienced food insecurity, bivariate statistics indicate that the prevalence rates of food insecurity/food security did not differ among the other risk factors associated with household disruption (e.g., jail time) and those associated with financial strain (e.g., unemployment). The lack of variability in the food security status among these risk factors, along with the highly prevalent, or universal characteristics, of experiencing financial stress among adults who experience homelessness, could be reasons why these two cumulative indices – household disruption and financial strain - were not as salient in determining who experiences food insecurity.

The current study sample included only the individuals who were in or obtaining services from homeless shelters in Oklahoma City, OK. Therefore, one of the limitations of this study is that these results might not be generalized to all adults experiencing homelessness in United States. Due to the cross sectional study design, this study assumes that the cumulative risk factors measured in the study placed individuals at risk of food insecurity. However, the poor health, victimization, financial strains, and household disruption could be consequences of food insecurity. Therefore, longitudinal studies are required to understand the directionality of the associations between food insecurity, poor physical/mental health, exposure to violence and victimization, household disruption, and financial strain.

Implications for Programs

At the present moment, shelters and community-based programs address food insecurity by providing food to clients. However, the current results suggest that the precursors to food insecurity among individuals who experience homelessness are multifaceted. Thus providing food, which takes care of the immediate cause, does not address the correlates that predict individuals being at risk for food insecurity. This adds to the growing literature that suggests that food insecurity should no longer be treated as an isolated manner that can be resolved by solely focusing on the immediate need for food assistance (Chilton et al., 2015; Hernandez, 2015; Hernandez et al., 2014). In other words, the correlates of food insecurity (e.g., health, victimization, housing instability) may need to be addressed in conjunction with providing food assistance to have an impactful reduction in the prevalence of food insecurity. Thus, programmatic approaches to addressing food insecurity need to be multifaceted. To do this, shelters are encouraged to continue to screen for depression, PTSD, alcohol abuse, personal violence, and sexual victimization as part of an intake process that

can help social service providers identify their clients' needs the best. In doing so, it will be important to consider how mental health, personal violence, and sexual victimization could contribute to food insecurity and vice versa. It is not until domain specific risk factors (e.g., health, household disruption etc.) are considered in relation to food insecurity can meaningful interventions be created to lower food insecurity concerns among this vulnerable population.

Acknowledgements.

REFERENCES

Baggett TP, Chang Y, Singer DE, Porneala BC, Gaeta JM, O'Connell JJ, & Rigotti NA (2015). Tobacco-, alcohol-, and drug-attributable deaths and their contribution to mortality disparities in a cohort of homeless adults in Boston. American Journal of Public Health, 105(6), 1189–1197. 10.2105/ajph.2014.302248 [PubMed: 25521869]

Baggett TP, Tobey ML, & Rigotti NA (2013). Tobacco use among homeless people--addressing the neglected addiction. The New England Journal of Medicine, 369(3), 201–204. 10.1056/NEJMp1301935 [PubMed: 23863048]

Bassuk EL (2010). Ending child homelessness in America. The American Journal of Orthopsychiatry, 80(4), 496–504. 10.1111/j.1939-0025.2010.01052.x [PubMed: 20950290]

Bassuk EL, Buckner JC, Weinreb LF, Browne A, Bassuk SS, Dawson R, & Perloff JN (1997). Homelessness in female-headed families: Childhood and adult risk and protective factors. American Journal of Public Health, 87(2), 241–248. [PubMed: 9103104]

Blumberg SJ, Bialostosky K, Hamilton WL, & Briefel RR (1999). The effectiveness of a short form of the Household Food Security Scale. American Journal of Public Health, 89(8), 1231–1234. [PubMed: 10432912]

Buckner JC (2008). Understanding the impact of homelessness on children:Challenges and future research directions. American Behavioral Scientist, 51(6), 721–736. 10.1177/0002764207311984

Businelle MS, & Kendzor DE (2016). Advance Understanding of Health in Homeless Shelter Patrons. IRB protocol. Retrieved from

Businelle MS, Poonawalla IB, Kendzor DE, Rios DM, Cuate EL, Savoy EJ, … Reitzel LR (2015). Smoking policy change at a homeless shelter: Attitudes and effects. Addictive Behaviors, 40, 51–56. 10.1016/j.addbeh.2014.08.013 [PubMed: 25222848]

Center for Disease Control and Prevention. (2009). Behavioral Risk Factor Surveillance System Survey Data Retrieved from Atlanta, Georgia:

Chilton M, Knowles M, Rabinowich J, & Arnold KT (2015). The relationship between childhood adversity and food insecurity: 'It's like a bird nesting in your head'. Public Health Nutrition, 18(14), 2643–2653. 10.1017/S1368980014003036 [PubMed: 25611561]

Coleman-Jensen A, Rabbitt MP, Gregory CA, & Singh A (2018). Household food security in the United States in 2017, ERR-256 Retrieved from Washington, DC: https://www.ers.usda.gov/webdocs/publications/90023/err-256.pdf?v=0

Courtney ME, & Dworsky A (2006). Early outcomes for young adults transitioning from out-of-home care in the USA. Child and Family Social Work, 11(3), 209–219. 10.1111/j.1365-2206.2006.00433.x

Cox R, & Wallace S (2013). The impact of incarceration on food insecurity among households with children. Andrew Young School of Policy Studies Research Paper Series No. 13–05 10.2139/ssrn. 2212909

Davis TC, Long SW, Jackson RH, Mayeaux E, George RB, Murphy PW, & Crouch MA (1993). Rapid estimate of adult literacy in medicine: A shortened screening instrument. Family Medicine, 25(6), 391–395. [PubMed: 8349060]

DeForge BR, Belcher JR, O'Rourke M, & Lindsey MA (2008). Personal resources and homelessness in early life: Predictors of depression in consumers of homeless multiservice centers. Journal of Loss and Trauma, 13(2–3), 222–242. 10.1080/15325020701769105

Fawley-King K, Trask EV, Zhang J, & Aarons GA (2017). The impact of changing neighborhoods, switching schools, and experiencing relationship disruption on children's adjustment to a new placement in foster care. Child Abuse & Neglect, 63, 141–150. 10.1016/j.chiabu.2016.11.016 [PubMed: 27919001]

Fazel S, Geddes JR, & Kushel M (2014). The health of homeless people in high-income countries: Descriptive epidemiology, health consequences, and clinical and policy recommendations. The Lancet, 384(9953), 1529–1540. 10.1016/S0140-6736(14)61132-6

Fitzpatrick KM, LaGory ME, & Ritchey FJ (1999). Dangerous places: Exposure to violence and its mental health consequences for the homeless. American Journal of Orthopsychiatry, 69(4), 438–447. 10.1037/h0080392 [PubMed: 10553455]

Fowler PJ, Toro PA, & Miles BW (2009). Pathways to and from homelessness and associated psychosocial outcomes among adolescents leaving the foster care system. American Journal of Public Health, 99(8), 1453–1458. 10.2105/ajph.2008.142547 [PubMed: 19542038]

Frasquilho D, de Matos MG, Marques A, Neville FG, Gaspar T, & Caldas-de-Almeida JM (2016). Unemployment, parental distress and youth emotional well-being: The moderation roles of parent–youth relationship and financial deprivation. Child Psychiatry & Human Development, 47(5), 751–758. 10.1007/s10578-015-0610-7 [PubMed: 26646144]

Garasky S, Stewart SD, Gundersen C, Lohman BJ, & Eisenmann JC (2009). Family stressors and child obesity. Social Science Research, 38(4), 755–766. 10.1016/j.ssresearch.2009.06.002 [PubMed: 20645439]

Geller A, Garfinkel I, & Western B (2011). Paternal incarceration and support for children in Fragile Families. Demography, 48(1), 25–47. 10.1007/s13524-010-0009-9 [PubMed: 21318455]

Gundersen C, Lohman BJ, Garasky S, Stewart SD, & Eisenmann J (2008). Food security, maternal stressors, and overweight among low-income US children: Results from the National Health and Nutrition Examination Survey (1999–2002). Pediatrics, 122(3), e529–e540. 10.1542/peds. 2008-0556 [PubMed: 18762488]

Gundersen C, Weinreb L, Wehler C, & Hosmer D (2003). Homelessness and food insecurity. Journal of Housing Economics, 12(3), 250–272. 10.1016/S1051-1377(03)00032-9

Haskett ME, Armstrong JM, & Tisdale J (2016). Developmental status and social–emotional functioning of young children experiencing homelessness. Early Childhood Education Journal, 44(2), 119–125. 10.1007/s10643-015-0691-8

Henry M, Watt R, Rosenthal L, & Shivji A (2017). The 2017 annual homeless assessment report (AHAR) to congress. Part 1: Point-in-time estimates of homelessness Retrieved from Washington DC: https://www.hudexchange.info/resources/documents/2017-AHAR-Part-1.pdf

Hernandez DC (2015). The impact of cumulative family risks on various levels of food insecurity. Social Science Research, 50, 292–302. 10.1016/j.ssresearch.2014.12.007 [PubMed: 25592937]

Hernandez DC, Marshall A, & Mineo C (2014). Maternal depression mediates the association between intimate partner violence and food insecurity. Journal of Women's Health, 23(1), 29–37. 10.1089/jwh.2012.4224

Hernandez DC, & Pressler E (2015). Gender disparities among the association between cumulative family-level stress & adolescent weight status. Preventive Medicine, 73, 60–66. 10.1016/j.ypmed. 2015.01.013 [PubMed: 25622888]

Hernandez DC, Reesor L, & Murillo R (2017). Food insecurity and adult overweight/obesity: Gender and race/ethnic disparities. Appetite, 117, 373–378. 10.1016/j.appet.2017.07.010 [PubMed: 28739148]

Hernandez DC, Reesor L, Reitzel LR, Businelle MS, Wetter DW, & Kendzor DE (2017). Smoking, financial strain, and food insecurity. Health Behavior & Policy Review, 4(2), 182–188. 10.14485/HBPR.4.2.9

Huang J, Kim Y, & Birkenmaier J (2016). Unemployment and household food hardship in the economic recession. Public Health Nutr, 19(3), 511–519. 10.1017/s1368980015001603 [PubMed: 26028335]

Jackson DB, Lynch KR, Helton JJ, & Vaughn MG (2018). Food insecurity and violence in the home: Investigating exposure to violence and victimization among preschool-aged children. Health Education & Behavior, 45(5), 756–763 10.1177/1090198118760683 [PubMed: 29532691]

Kim JE, Flentje A, Tsoh JY, & Riley ED (2017). Cigarette smoking among women who are homeless or unstably housed: Examining the role of food insecurity. Journal of Urban Health, 94(4), 514–524. 10.1007/s11524-017-0166-x [PubMed: 28589340]

Kroenke K, Strine TW, Spitzer RL, Williams JB, Berry JT, & Mokdad AH (2009). The PHQ-8 as a measure of current depression in the general population. J Affect Disord, 114(1–3), 163–173. 10.1016/j.jad.2008.06.026 [PubMed: 18752852]

Kushel MB, Evans JL, Perry S, Robertson MJ, & Moss AR (2003). No door to lock: Victimization among homeless and marginally housed persons. Archives of Internal Medicine, 163(20), 2492–24999. 10.1001/archinte.163.20.2492 [PubMed: 14609786]

Lebrun-Harris LA, Baggett TP, Jenkins DM, Sripipatana A, Sharma R, Hayashi AS, … Ngo-Metzger Q (2013). Health status and health care experiences among homeless patients in federally supported health centers: Findings from the 2009 patient survey. Health services research, 48(3), 992–1017. 10.1111/1475-6773.12009 [PubMed: 23134588]

Lockwood KK, Friedman S, & Christian CW (2015). Permanency and the foster care system. Current Problems in Pediatric and Adolescent Health Care, 45(10), 306–315. 10.1016/j.cppeds. 2015.08.005 [PubMed: 26403649]

MacFadyen AJ, MacFadyen HW, & Prince NJ (1996). Economic stress and psychological well-being: An economic psychology framework. Journal of Economic Psychology, 17(3), 291–311.

Meinbresse M, Brinkley-Rubinstein L, Grassette A, Benson J, Hamilton R, Malott M, & Jenkins D (2014). Exploring the experiences of violence among individuals who are homeless using a consumer-led approach. Violence and victims, 29(1), 122–136. 10.1891/0886-6708.VV-D-12-00069 [PubMed: 24672998]

Meisenheimer M (2018). Supporting youth aging out of foster care through SNAP Retrieved from https://www.cssp.org/publications/child-welfare/document/supporting-youth-aging-out-of-foster-care-through-SNAP.pdf

Melchior M, Caspi A, Howard LM, Ambler AP, Bolton H, Mountain N, & Moffitt TE (2009). Mental health context of food insecurity: A representative cohort of families with young children. Pediatrics, 124(4), e564–e572. 10.1542/peds.2009-0583 [PubMed: 19786424]

Murphy PW, Davis TC, Long SW, Jackson RH, & Decker BC (1993). Rapid estimate of adult literacy in medicine (REALM): A quick reading test for patients. Journal of Reading, 37(2), 124–130. 10.2307/40033408

Parpouchi M, Moniruzzaman A, Russolillo A, & Somers JM (2016). Food insecurity among homeless adults with mental illness. PloS One, 11(7), e0159334 10.1371/journal.pone.0159334 [PubMed: 27437937]

Prins A, Ouimette P, Kimerling R, Cameron RP, Hugelshofer DS, Shaw-Hegwer J, … Sheikh JI (2003). The primary care PTSD screen (PC-PTSD): Development and operating characteristics. Primary Care Psychiatry, 9(1), 9–14. 10.1185/135525703125002360

Richards R, & Smith C (2006). The impact of homeless shelters on food access and choice among homeless families in Minnesota. Journal of Nutrition Education and Behavior, 38(2), 96–105. 10.1016/j.jneb.2005.11.031 [PubMed: 16595288]

Roman NP, & Wolfe P (1995). Web of failure: The relationship between foster care and homelessness Retrieved from Washington, DC:

Rutter M (1979). Protective factors in children's responses to stress and disadvantage. In Kent WM Rolf JE (Eds.), Primary prevention of psychopathology: Social competence in children (Vol. 3, pp. 49–74). Hanover, NH: University Press of New England.

Sameroff AJ (1998). Environmental risk factors in infancy. Pediatrics, 102(Supplement E1), 1287–1292. [PubMed: 9794971]

Sameroff AJ, Seifer R, Baldwin A, & Baldwin C (1993). Stability of intelligence from preschool to adolescence: The influence of social and family risk factors. Child Development, 64(1), 80–97. 10.1111/j.1467-8624.1993.tb02896.x [PubMed: 8436039]

Sampson RJ, Raudenbush SW, & Earls F (1997). Neighborhoods and violent crime: A multilevel study of collective efficacy. Science, 277(5328), 918–924. 10.1126/science.277.5328.918 [PubMed: 9252316]

Santa Maria D, Narendorf SC, Ha Y, & Bezette-Flores N (2015). Exploring contextual factors of youth homelessness and sexual risk behaviors: A qualitative study. Perspectives on Sexual and Reproductive Health, 47(4), 195–201. 10.1363/47e6715 [PubMed: 26575948]

Spitzer RL, Kroenke K, Williams JBW, & Patient Health Questionnaire Primary Care Study Group. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. JAMA, 282(18), 1737–1744. 10.1001/jama.282.18.1737 [PubMed: 10568646]

Sun S, Irestig R, Burstrom B, Beijer U, & Burstrom K (2012). Health-related quality of life (EQ-5D) among homeless persons compared to a general population sample in Stockholm County, 2006. Scand J Public Health, 40(2), 115–125. 10.1177/1403494811435493 [PubMed: 22327187]

Szanton SL, Thorpe RJ, & Whitfield KE (2010). Life-course financial strain and health in African-Americans. Social Science & Medicine (1982), 71(2), 259–265. 10.1016/j.socscimed.2010.04.001 [PubMed: 20452712]

The Pew Charitable Trusts. (2010). Collateral costs: Incarceration's effect on economic mobility Retrieved from Washington, DC: https://www.pewtrusts.org/-/media/legacy/uploadedfiles/pcs_assets/2010/collateralcosts1pdf.pdf

Tong M, Tieu L, Lee CT, Ponath C, Guzman D, & Kushel M (2018). Factors associated with food insecurity among older homeless adults: results from the HOPE HOME study. J Public Health (Oxf) 10.1093/pubmed/fdy063

Turney K, & Goodsell R (2018). Parental incarceration and children's wellbeing. Future of Children, 28(1), 147–164.

Tyler KA, & Johnson KA (2006). Trading sex: Voluntary or coerced? The experiences of homeless youth. Journal of Sex Research, 43(3), 208–216. 10.1080/00224490609552319 [PubMed: 17599243]

United States Department of Housing and Urban Development. (2015). The 2015 annual homeless assessment report (AHAR) Part 1: Point-in-time estimates of homelessness Retrieved from www.hudexchange.info/resources/documents/2015-AHAR-Part-1.pdf

Venci BJ, & Lee S-Y (2018). Functional limitation and chronic diseases are associated with food insecurity among U.S. adults. Annals of Epidemiology, 28(3), 182–188. 10.1016/j.annepidem.2018.01.005 [PubMed: 29482742]

Visher C, Debus S, & Yahner J (2008). Employment after prison: A longitudinal study of releasees in three states Retrieved from Washington, DC: https://www.urban.org/sites/default/files/publication/32106/411778-Employment-after-Prison-A-Longitudinal-Study-of-Releasees-in-Three-States.PDF

Wang EA, McGinnis KA, Goulet J, Bryant K, Gibert C, Leaf DA, … for the Veterans Aging Cohort Study Project, T. (2015). Food insecurity and health: Data from the veterans aging cohort study. Public Health Reports, 130(3), 261–268. 10.1177/003335491513000313 [PubMed: 25931630]

Weiser SD, Bangsberg DR, Kegeles S, Ragland K, Kushel MB, & Frongillo EA (2009). Food insecurity among homeless and marginally housed individuals living with HIV/AIDS in San Francisco. AIDS and Behavior, 13(5), 841–848. 10.1007/s10461-009-9597-z [PubMed: 19644748]

Weiser SD, Frongillo EA, Ragland K, Hogg RS, Riley ED, & Bangsberg DR (2009). Food insecurity is associated with incomplete HIV RNA suppression among homeless and marginally housed HIV-infected individuals in San Francisco. Journal of General Internal Medicine, 24(1), 14–20. 10.1007/s11606-008-0824-5 [PubMed: 18953617]

Whitbeck LB, Armenta BE, & Gentzler KC (2015). Homelessness-related traumatic events and PTSD among women experiencing episodes of homelessness in three U.S. cities. Journal of Traumatic Stress, 28(4), 355–360. 10.1002/jts.22024 [PubMed: 26184885]

Author Manuscript

Wicks R, Trevena LJ, & Quine S (2006). Experiences of food insecurity among urban soup kitchen consumers: insights for improving nutrition and well-being. J Am Diet Assoc, 106(6), 921–924. 10.1016/j.jada.2006.03.006 [PubMed: 16720134]

Discussion Questions

1. What are ways that programs and social service providers can reduce food insecurity among adults experiencing homelessness?

2. What are ways that programs and social service providers can reduce poor health, risky health behaviors, and the trauma associated with experiencing personal or sexual victimization among adults experiencing homelessness?

Table 1.

Descriptive Statistics for Study Variables [M (SD) or %] (n = 565).

	Analytic Sample (n = 565)	Food Secure (n =126)	Food Insecure (n = 439)
Characteristics			
Food security status (Dependent Variable)			
Food secure (0 or 1 items affirmed)	22%	100%	-
Food insecure (2 – 6 items affirmed)	78%	-	100%
Cumulative risk indices (Independent Variables)			
Poor health & risky health behaviors index [0 – 5]	2.05 (1.29)	1.39 (1.00)	2.25 (1.31) ***
Poor health	37 %	22%	41% ***
Depression symptoms	31%	11%	36% ***
PTSD symptoms	33%	17%	37% ***
Alcohol abuse/dependence	27%	15%	31% ***
Smoker	78%	73%	80%
Personal & sexual victimization [0 – 3]	0.64 (0.70)	0.43 (0.59)	0.71 (0.72) ***
Experienced violence	40%	29%	43% **
Forced to have sex	24%	13%	27% **
Trade sex	1%	1%	0.5%
Household disruption[0 – 3]	0.78 (0.72)	0.67 (0.63)	0.81 (0.74) *
First experiences being homeless was as a child	13%	5%	15% **
Jail or incarceration	52%	47%	53%
Foster care	13%	15%	13%
Financial strain index [0 – 3]	1.42 (0.67)	1.47 (0.65)	1.41 (0.67)
Unemployment/ Disability limits employment	89%	91%	88%
No sources of income	53%	56%	53%
Less than high school education	26%	20%	28%
Control variables			
Age	43.62 (11.97)	43.77 (12.52)	43.58 (11.82)
Gender			
Female	36%	34%	37%
Male	64%	66%	63%
Race/Ethnicity			
White/non-minority	56%	56%	56%
Minority	44%	44%	44%
Marital status			
Not married	88%	88%	88%
Married	12%	12%	12%
Health insurance			
No insurance	70%	73%	69%

	Analytic Sample (n = 565)	Food Secure (n =126)	Food Insecure (n = 439)
Characteristics			
Any insurance	30%	27%	31% ***
Total number of years being homeless	3.18 (4.31)	2.85 (3.94)	3.27 (4.41)

Note: Food insecure and secure groups were compared using one-way analysis of variance tests for continuous variables and chi-square tests for dichotomous variables.

*
 p < .05.

**
 p < .01.

***
 p < .001.

Table 2.

Logistic Regressions Predicting the Association between Cumulative Risk Indices and Food Insecurity

Cumulative risk indices	OR	95% CI
Poor health & risky health behaviors index	1.80[***]	(1.47 – 2.21)
Personal & sexual victimization index	1.57[*]	(1.11– 2.21)
Household disruption index	1.13	(0.81 – 1.56)
Financial strain index	1.04	(0.79 – 1.37)
Control variables		
Age	0.99	(0.98 – 1.01)
Gender		
Female	0.93	(0.58 – 1.48)
Male	1.00	--
Race/Ethnicity		
White/non-minority	0.81	(0.53 – 1.25)
Minority	1.00	--
Marital status		
Not married	1.00	--
Married	1.17	(0.61 – 2.23)
Health insurance		
No insurance	1.00	--
Any insurance	1.20	(0.74 – 1.97)
Total number of years being homeless	1.01	(0.95 – 1.07)

[*]
$p < .05$.

[**]
$p < .01$.

[***]
$p < .001$.