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Analysis of food security, SNAP benefit duration, income level and the relationship with depression in households with children in Omaha.

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Final Paper

FOOD SECURITY, SNAP BENEFIT DURATION, INCOME LEVEL AND THE RELATIONSHIP WITH DEPRESSION IN HOUSEHOLDS WITH CHILDREN

Tatiana Tchouankam, MS | Fall 2017 | 11/28/17

Project Title: Analysis of food security, SNAP benefit duration, income level and the relationship with depression in households with children in Omaha.

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Abstract

Food insecurity is defined as a lack of access to "sufficient, safe, and nutritious food that meets individuals' dietary needs and preferences for an active and healthy life." From 2015 to 2016, the number of people undernourished increased from 777 million to 815 million worldwide. Food insecurity affected 12.3 % of Nebraskans and 13.8% of the residents in Douglas County during the same year. There is evidence of associations between food insecurity, income level, and several adverse health outcomes, specifically with regards to mental health. The objective of this study was to examine food security, SNAP benefit duration (i.e., how long SNAP benefits last each month), income level and the relationship with depression in households with children and create a geographical representation of the challenges associated with food insecurity in Omaha (food insecurity, food desert, and zip-codes of survey participants). For this study, we used the data collected by 'Feeding America" on food insecurity rate in Douglas County as well as USDA data on food desert in Douglas County. We also used the data collected as part of a baseline evaluation of a community-based initiative to address hunger and food insecurity in Omaha in 2014 by the Gretchen Swanson Center for Nutrition. The GIS mapping was done using ArcGIS, and SPSS 25 was utilized to conduct statistical analysis: Chi-square test and a binary logistics regression to analyze the association between the food security, SNAP benefit duration, income levels, and depression. It was revealed that the eastern region of Douglas county was the most affected by food desert and food insecurity, especially North Omaha. In addition, the unadjusted odds of experiencing medium to high depression were 3 times higher for participants living in low and very low food secure households compared with those living in high food secure households (OR=2.9 CI=1.5-5.1 $p<0.001$). Participants reporting a SNAP benefit duration of 3 weeks or less were also 3 times more likely to experience medium

to high depression when compared with those who had a SNAP benefit duration of more than 3 weeks (OR=2.8 CI=1.2-6.5 p<0.01). The adjusted model showed that the odds ratios for food security status and SNAP benefit duration were respectively 2.6 (CI=1.4-4.8 p=0.004) and 2.9 (CI=1.2-7.5 p=0.024). This study showed that there is an association between depression and food security status and SNAP benefit duration. Therefore, it would be useful to explore the effect SNAP benefit duration has on depression in a more representative sample. This project helped to illuminate the challenge of food insecurity among families in Omaha and how it affects depression. The project can serve as a guide for organizations, policies, and programs working on reducing poverty and food insecurity in Omaha.

Key words: food insecurity, food security status, depression, SNAP benefit duration, income level, poverty, food desert.

Introduction

Placement site: The United Way of the Midlands

The United Way of the Midlands (UWM) has served the metropolitan Omaha community for 90 years by bringing together other non-profits, donors, and government organizations that have the same goals of ending the cycle of poverty, fostering education and addressing the basics needs of individuals and families. UWM provides funding to local programs serving Douglas, Sarpy, and Pottawattamie counties and through their 2.1.1 helpline, connects people living in Omaha metro-area with other health-related services.

Service learning activities

- Attend team meeting at the United Way of the Midlands
- Research and compile existing data relating to food security assets and needs
- Train for the Nutrition Environment Measures Survey (NEMS): training provided by Douglas County Health Department
- Conduct interview of pantries located in Omaha metro-area (phone interviews).
- Conduct the Nutrition Environment Measures Survey (NEMS) in Pottawattamie County (Iowa)
- Assist in the qualitative analysis: the coding of the interviews
- Conduct research on variables and metrics related to the community-strong index

Problem statement and significance

The goal of the 'Agenda 2030' (Sustainable Development Goals), adopted by world leaders during the United Nations (UN) Summit in 2015 concerning food security is to put an end to any form of malnutrition and hunger and achieve food security (United States Department of Agriculture, 2017). Despite the tremendous progress made over the past decades to achieve this goal, food insecurity remains one of the most challenging public health issues experienced in both developed and developing countries. From 2015 to 2016, the number of people undernourished increased from 777 million to 815 million worldwide (United States Department of Agriculture (USDA), 2017). Food insecurity is considered a deficit in the access of "sufficient, safe, and nutritious food that meets individuals' dietary needs and preferences for an active and healthy life" (USDA, 2017). It unevenly affects the most vulnerable groups such as children, women, and elderly (Walker, Keane, & Burke, 2010). Moreover, in the United States, disparities exist between races, gender, and regions (Elsheikh & Barhoum, 2013). In 2011, the year when food insecurity reached a peak of 14.9 % (with over 50 million of people food insecure and 17.9 million of household food insecure), Hispanics had the highest rate of food insecurity (26.5%). African-Americans followed with 25.1%, and among White non-Hispanics, 13% experienced food insecurity (United States Department of Agriculture, 2017).

The complexity of the problem of food insecurity is accentuated by its sensitivity to the environmental issues, public policies, the living conditions of the family (e.g., income levels), and many other factors that taken together contribute to exacerbating the burden of household food insecurity among the most vulnerable populations.

Literature review

Adequate nutrition is considered a right and a necessity for every human being. Unfortunately, many families are affected by food insecurity in the US. In 2016, the USDA (2017) estimated that 12.3 % of US households experienced food insecurity. The United States Department of Agriculture's (USDA) Supplemental Nutrition Assistance Program (SNAP) is considered the largest federal safety net for hunger in the US. SNAP has a broad reach, providing support for food purchasing to over 45 million people, among which approximately 44% are households with are children (Food and Nutrition Services (FNS), 2015). However, families still suffer from food shortages and reductions, which mostly occur at the end of the month when their SNAP benefits are diminished (Hamrick & Andrews, 2016), and has been qualified by some researchers as 'chronic food insecurity' (Guerrero, Walsh, Malecki, & Nieto, 2014). The members of these households' lack food quality, resources, and access and have commonly shown a disrupted eating pattern and developed strategies to cope with food insecurity (Food Research Action Center, 2016). Children were also affected by food insecurity in 3.1 million households in 2016. During the same year, 0.8 % of adults and children (298,000 households) experienced very-low food insecurity and reported a reduction in their food intake and disrupted eating patterns (United States Department of Agriculture, 2017).

In Nebraska, 12.3% of households experienced food insecurity in 2016 (USDA, 2017). The Food and Research Action Center reported that 15.9% of Nebraskans households with children and 10% without children had difficulties affording food (Food Research Action Center (FRAC), 2016). 13.8% of households in Douglas County reported being food insecure in 2016 (FRAC, 2016). Despite the existence of various nutrition assistance programs such as food pantries, and federal nutrition programs (Elsheikh & Barhoum, 2013), families still struggle to

afford food in sufficient amounts. Only 59% of food insecure households in 2016 reported that they have participated in at least one of the three most significant nutrition assistance federal programs over the last month (i.e., National School Lunch Program, Supplemental Nutrition Assistance Program, Special Supplemental Nutrition Program for Women, Infants, and Children) (FRAC, 2016).

Food insecurity and Health outcomes

Studies reported an association between food insecurity and several adverse health outcomes across the lifespan for both physical and mental health (Gundersen & Ziliak, 2015). Children living in food-insecure households often demonstrate a decrease in intellectual and emotional development which may lead to poor academic achievement (Howard, 2011), behavioral disorders, and depression/anxiety (H. Seligman, 2016; R. C. Whitaker, S. M. Phillips, & S. M. Orzol, 2006). Studies showed that children living in a household with food insecurity have two to three times higher odds of being diagnosed with anemia compare with those living in food-secure households (Eicher-Miller, Mason, Weaver, McCabe, & Boushey, 2009). These children are more likely to be in fair or poor general health compared with those living in food secure households (Cook et al., 2006). Other studies reported a higher risk of birth defects for infants born to mothers experiencing food insecurity (Carmichael, Yang, Herring, Abrams, & Shaw, 2007). Moreover, food insecurity has also been associated with childhood obesity and the development of some chronic diseases such hypertension or type 2 diabetes in later life (Kaur, Lamb, & Ogden, 2015).

In adults, food insecurity has been associated with high blood pressure, diabetes (Seligman, Bindman, Vittinghoff, Kanaya, & Kushel, 2007; Stuff et al., 2004), and some mental

health problems (McLaughlin et al., 2012). Adults experiencing food insecurity are more likely to develop depressive episodes and anxiety (Heflin, Siefert, & Williams, 2005; Hromi-Fiedler, Bermúdez-Millán, Segura-Pérez, & Pérez-Escamilla, 2011). A study conducted in women showed that women living with food insecurity are twice more likely to report one or more mental health problems than their food secure peers (Whitaker, Phillips, & Orzol, 2006).

Although the association between food insecurity and health outcomes has been identified, the mechanism by which food insecurity affects general and mental health is not well known. Some studies suggest that the inability of parents to feed their children results in depression (Robert C Whitaker et al., 2006), while others demonstrate that depression is one of the major causes of household food insecurity (Melchior et al., 2009). Thus, the direction of the relationship between food insecurity and mental health outcomes is unclear, or perhaps bidirectional. In a study conducted on 14,000 children born in 2001, the researchers found that when women are diagnosed with moderate or severe depression, children have a 50-80% more risk of being food insecure (Noonan, Corman, & Reichman, 2016).

Studies also demonstrated that people living in low-income households tend to be more depressed compared with those who have more financial resources (Klijs et al., 2016). The family level of poverty is a strong predictor of anxiety and depression, especially among adolescents (Najman et al., 2011). Furthermore, some studies reported that SNAP participation was associated with a decrease in depressive episodes of people experiencing food insecurity (Munger et al., 2016). On the other hand, food insecurity worsened the odds of depression among SNAP participants when compared with non-SNAP participants (Leung et al., 2015). Our study aim is to analyze food security, SNAP benefit duration, income level and the relationship

with depression to have a better understanding of the scope of the challenge experienced by families with children in low-income areas of Omaha, Nebraska.

Goals and objectives

Goal 1: Examine the association between depression and food insecurity, SNAP benefit duration and income level of households with children in Omaha.

Objective 1: Clean and code data from the baseline survey conducted as part of an evaluation of a community-based initiative to address hunger and food insecurity in 2014 by the Gretchen Swanson Center for Nutrition.

Activity 1: Calculate the depression and food security scores from raw survey data.

Activity 2: Conduct descriptive statistics of key variables and sociodemographic characteristics.

Activity 3: Conduct Chi-square tests to analyze the association between food security, SNAP benefit duration, income level and depression.

Activity 4: Conduct a binary logistic regression analysis to determine the association between, depression and food security, SNAP benefit duration, and income level.

Goal 2: Create a map of food insecurity rates and food desert areas in Douglas County (illustrating the study population of Omaha).

Objective 1: Create a map of food insecurity rate in Douglas County with layers including food insecurity rate, food deserts in Douglas County/ zip-codes of respondents.

Research Methods

This study aim is to determine the association between the independent variables (food security, SNAP benefit duration, and income level) and the depression in households with children in Omaha.

Study design

In this cross-sectional study, we used the data provided by the Gretchen Swanson Center for Nutrition (GSCN) to analyze how food security, SNAP benefit duration, and income level are associated with depression. The survey conducted in 2014 was a part of the baseline evaluation of a community-based initiative to address food insecurity and hunger in Omaha. The survey items of interest are socio-demographic characteristics, food security, SNAP benefit duration, and depression.

Study population/sample: 280 participants, age 19 or older living in low-income families with at least one child living in the same house for at least 50% of the time and speaking English or Spanish (Data of 2014). The respondents were recruited from public places where low-income families of Omaha spend some of their time such as public libraries and pantries.

Socio-demographics characteristics included information on: race/ethnicity (Hispanics, non-Hispanic white, African American, and other), age (18- 29; 30-39; 40-44; 45-49; 50-64; 65 and older), gender (male/female), income level (none; $5,000 or less; $5,000-$10,000; $10,001-$15,000; $15,001- $20,000; $20,001-$25,000; $25,001-$30,000; $30,001-$35,000; $35,001-$50,000), and education (no formal education; grade school; high school or equivalent; vocational, business, or trade school; 2-year junior or community college; 4-year college or university; graduate or professional school).

Depression: The survey used a modified version of the Short Depression-Happiness Scale (SDSS), which has five items scale (McCartney & Rosenthal, 2000). The depression scores were divided into three different tertiles: low, medium or high.

Household food security: the USDA household food security module with 6-items was the instrument used for this study. The scores are as follow:

0 = high food security

1 = marginal food security

2-4 = low food security

5-6 = very low food security

SNAP benefit duration: measured by the SNAP participation survey. The number of weeks the SNAP benefits last (monthly allotment received by the family).

In Nebraska, the standard to be eligible for SNAP for a family of 3 is to have an annual income of $27,159 (133% federal poverty level) or a gross monthly income of $2,213 (130% of poverty level. In a given month, for a family of 3 meeting this criterion, the maximum SNAP allotment is $504 (Refer to Appendix 1 and 2) (DHHS, 2017).

Data sources:

1. **Goals 1:** Gretchen Swanson Center for Nutrition baseline evaluation of a community-based initiative to address food insecurity and hunger in Omaha.

2. **Goal 2:** Feeding America, USDA

Statistical analysis

Chi-square tests were used to analyze the association between depression measured as a dichotomous variable and each of the independent variables (food security, SNAP benefit duration, and income level). Binary logistics regression model was used to establish the association between food security, SNAP benefit duration, income level and depression, while adjusting for covariates such as age, sex, employment, general health, number of children and marital status. We used SPSS (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) to conduct the statistical analysis and ArcGIS to draw the map of food insecurity rate/ food desert of Douglas County and Zip codes of survey participants. The dataset with census tract numbers was converted to GEOID using ACS fact finder. This GEOID was validated using map-box (1 in 10 records).

Ethics

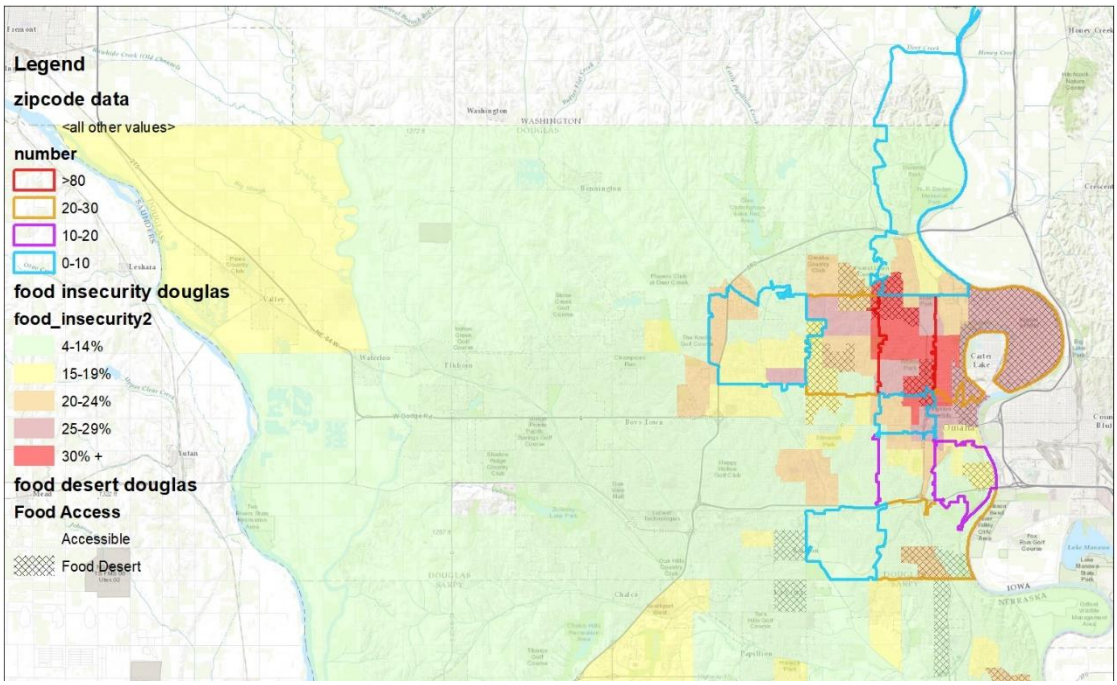
The data collected during the surveys and interviews must not be shared with any other entities without the permission of the United Way of the Midlands or the GSCN. Also, an agreement between the United Way and the stores participating in the NEMS states that the score of the store will not be share. The United Way will maintain a strict confidentiality of the results of the NEMS.

Institutional Review Board (IRB) approval: An exemption was accorded by the IRB since the study used secondary data sources with no identifier and will only be used for academic purpose.

Results

Map 1 illustrates the food insecurity, food desert in Douglas County and the Zip codes of the survey participants. A food desert is defined as, a town (rural/urban) without ready access to healthy, fresh and affordable food (USDA, 2015). The eastern region of Douglas County is the most affected by food desert and food insecurity, especially North Omaha where most of the respondents to the GSCN 2014 survey lived.

Map 1: Food insecurity rate and food desert in Douglas County/ Zip codes of respondents



Sources: Feeding America, 2017. USDA, 2017

Table 1 summarizes the sociodemographic characteristics of the participants as well as the descriptive statistics of the dependent and independents variables. The majority of the participants (75.5 %) were female aged 39 or younger (62.8%). Half of the participants were

Black or African-American (52.5%), with at least a high school education (93.2%) and had a current occupation (96.8% employed).

Most of the participants experienced medium or high depression (69%). They also faced low and very low food security (34.9% and 41%) with the SNAP benefits lasting for less than 3 weeks of the month (81.8%).

Table 1: Sociodemographic Characteristics of participants living in Omaha (n = 280)

Characteristic	**variables**	**N**	**%**
Gender	Male	68	24.5
	Female	209	75.5
Age	18-29	58	20.7
	30-39	88	31.4
	40-44	30	10.7
	45-49	39	13.9
	50-64	60	21.4
	65 and older	5	1.8
Race/Ethnicity	White non-Hispanics	63	24
	Black or African American	138	52.5
	Hispanics/Latino	41	15.6
	Multiple races or other race/ethnicity	21	8
Marital Status	Married or living with partner	109	39.4
	Divorced, widowed, single	168	60.6
Education	No formal education	5	1.8
	Grade school	13	4.7
	High school or equivalent	156	55.9
	Vocational, business, or trade school	28	10
	2-year junior or community college	11	3.9
	4-year college or university	37	13.3
	Graduate or professional school	29	10.4
Income	$5,000 or less	104	37.8

	$5,000-$10,000	34	12.4
	$10,001-$15,000	29	10.5
	$15,001-$20,000	35	12.7
	$20,001-$25,000	27	9.8
	$25,001-$30,000	22	8
	$30,001-$35,000	13	4.7
	$35,001-$50,000	11	4
Employment	Employed	268	96.8
	Not Employed	9	3.2
Depression	Low	82	31
	Medium	101	38.3
	High	81	30.7
Food Security Status	High or Marginal	67	24.1
	Low	97	34.9
	Very Low	114	41
SNAP benefit duration	3 Weeks or less	135	81.8
	More than 3 weeks	30	18.2

Table 2 shows the analysis of the relationships between depression (low and medium/high) and the demographics, as well as food security and SNAP duration. The participants who reported experiencing low or very low food security were more likely to be depressed compared with those who reported high food security. Moreover, when the SNAP benefit duration was 3 weeks or less, the participants were more likely to suffer from depression. Income, as well as age, sex, race/ethnicity, marital status, number of children, education, employment and general health, were not significantly associated with depression.

Table 2: Associations Between the Independent Variables and Depression (n = 280)

Independent variables and covariates	**Depression**					
	Low (n=82)		**Medium/High (n=182)**			
	N	**Percentage**	**N**	**Percentage**	**Chi-Square**	**P-Value**
Food Security Status						
High or marginal	31	49.2%	32	50.8%	19.323	<0.001
Low	32	34.4%	61	65.6%		
Very low	19	17.6%	89	82.4%		
Income						
$5,000 or less	26	27.1%	70	72.9%	0.841	0.359
$5,001 or more	53	32.5%	110	67.5%		
SNAP benefit duration						
3 weeks or less	34	26.4%	95	73.6%	6.059	0.014
More than 3 weeks	14	50.0%	14	50.0%		
Number of children						
3 or less	70	32.3%	147	67.7%	0.816	0.366
More than 3	12	25.5%	35	74.5%		
Gender						
Female	67	34.2%	129	65.8%	3.174	0.075
Male	14	22.2%	49	77.8%		
Age						
Between 18-39	45	32.6%	93	67.4%	0.391	0.532
40 or older	36	29.0%	88	71.0%		
Race / Ethnicity						
White non-Hispanics	17	27.9%	44	72.1%	1.768	0.622
Black or African American	37	29.4%	89	70.6%		
Hispanics/Latino	15	39.5%	23	60.5%		
Multiracial or other	7	33.3%	14	66.7%		
Education						
High school or less	46	28.4%	116	71.6%	1.663	0.197
More than high school	36	36.0%	64	64.0%		
Marital Status						
Married or living with partner	30	28.3%	76	71.7%	0.868	0.351
Divorced, widowed, single	52	33.8%	102	66.2%		
General Health						
Good or excellent	63	34.2%	121	65.8%	2.126	0.145

Fair or poor	19	25.0%	57	75.0%		
Employment						
Employed	78	30.6%	177	69.4%	0.013	0.909
Not employed	2	28.6%	5	71.4%		
Seasons						
Winter	30	27.3%	80	72.7%	1.264	0.261
Spring	52	33.8%	102	66.2%		

Table 3 shows the analysis of the relationships between food security (high or marginal and low or very low) and food security status, income, SNAP benefit duration, number of children, age, gender, race/ethnicity, education, marital status, general health, employment and seasons. People who are experiencing medium or high depression were more likely to be low or very low food secure. The same tendency was observed for people living in a household with an annual income of $5,000 or less. Having a SNAP monthly benefit duration of 3 weeks or less was also associated with low and very low food security. Moreover, the respondents who reported a fair or poor general health and with a high school level of education or less were also more likely to live in households with low or very low food security. The number of children, gender, age, race/ethnicity, marital status, employment status and the seasons were not significantly associated with food security.

Table 3: Relationships Between the independent Variables/ covariates and food security (n = 280)

Independent variables and covariates	**Food security status**					
	High or marginal (n=67)		**Low or very low (n=211)**			
	N	**Percentage**	**N**	**Percentage**	**Chi-Square**	**P-Value**
Depression						
Low	31	37.8%	51	62.2%	12.731	0.002
Medium	18	17.8%	83	82.2%		
High	14	17.3%	67	82.7%		
Income						
$5,000 or less	16	15.5%	87	84.5%	6.876	0.009
$5,001 or more	50	29.6%	119	70.4%		
SNAP benefit duration						
3 weeks or less	13	9.6%	122	90.4%	36.506	<0.001
More than 3 weeks	17	56.7%	13	43.3%		
Number of children						
3 or less	58	25.4%	170	74.6%	1.24	0.265
More than 3	9	18.0%	41	82.0%		
Gender						
Male	14	20.9%	53	79.1%	0.638	0.425
Female	53	25.7%	153	74.3%		
Age						
Between 18-39	37	25.7%	107	74.3%	0.525	0.469
40 or older	29	22.0%	103	78.0%		
Race / Ethnicity						
White non-Hispanics	13	21.0%	49	79.0%	1.39	0.708
Black or African American	36	26.5%	100	73.5%		
Hispanics/Latino	8	20.0%	32	80.0%		
Multiracial or other	4	19.0%	17	81.0%		
Education						
High school or less	31	18.1%	140	81.9%	8.266	0.004
More than high school	35	33.3%	70	66.7%		
Marital Status						
Married or living with partner	20	18.5%	88	81.5%	3.024	0.082
Divorced, widowed, single	46	27.7%	120	72.3%		
General Health						
Good or excellent	58	29.9%	136	70.1%	11.97	0.001
Fair or poor	8	10.1%	71	89.9%		

Employment						
Employed	64	24.0%	203	76.0%	0.005	0.946
Not employed	2	25.0%	6	75.0%		
Seasons						
Winter	27	23.1%	90	76.9%	0.116	0.734
Spring	40	24.8%	121	75.2%		

Table 4 gives the unadjusted and adjusted odds ratios for experiencing medium or high depression when assessing the relationship with the independent variables (food security, SNAP benefit duration and income). In the unadjusted models, income was not associated with depression (p-value=0.36). The odds of experiencing medium to high depression were 3 times higher for participants living in low and very low food secure household compared with those living in high food security (OR=2.9 CI=1.5-5.1 p<0.001). Participants with a SNAP benefit duration of 3 weeks or less also had 3 times the odds of experiencing medium to high depression when compared with those who had a SNAP benefit duration of more than 3 weeks (OR=2.8 CI=1.2-6.5 p=0.016).

The adjusted model shows that food security status and SNAP benefit duration are significantly associated with depression after adjusting for covariates (age, sex, education, employment, number of children, general health and marital status). The odds of experiencing medium and high depression were 2.6 times higher for participants living in low and very low food secure household compared with those living in high food security (CI=1.4-4.8 p=0.004). Also, the odds of experiencing medium and high depression were 2.9 times higher for participants with a SNAP benefit duration of 3 weeks or less compared with those reporting a SNAP benefit duration of more than 3 weeks (CI=1.2-7.5 p=0.024).

Table 4: Unadjusted and Adjusted Odds Ratios of Medium or High depression compared to low depression when comparing the low or very low food security, SNAP benefit duration of 3 weeks or less and income of $5,000 or less (n = 280)

Independent variables	***Dependent variables: Medium to High depression (versus Low)***											
Food security	**Unadjusted**				**Adjusted**							
	OR	**95% CI**		**PV**	**OR[1]**	**95% CI[1]**		**PV[1]**	**OR[2]**	**95% CI[2]**		**PV[2]**
Low and very low	2.85	1.584	5.126	<0.001	2.558	1.358	4.816	0.004	2.958	1.043	8.391	0.041
High or Marginal	Ref	-	-	-	Ref	-	-	-	Ref	-	-	-
SNAP Benefit duration												
3 weeks or less	2.79	1.209	6.459	0.016	2.931	1.151	7.464	0.024	1.885	0.658	5.396	0.238
More than 3 weeks	Ref	-	-	-	Ref	-	-	-	Ref	-	-	-
Income												
$5,000 or less	1.297	0.743	2.264	0.360	1.068	0.591	1.930	0.827	1.565	0.668	3.664	0.302
More than $5,000	Ref	-	-	-	Ref	-	-	-	Ref	-	-	-

1: Controlled for covariates: age, sex, employment, general health, number of children and marital status

2: Controlled for covariates (age, sex, employment, general health, number of children, and marital status) and predictors simultaneously (food security status, SNAP benefit duration and income).

Ref = Reference category, OR=odds ratio, CI = Confidence Interval, PV=p-value

Discussion

In this study, we were able to demonstrate that there is an association between depression and the independent variables: food security status and SNAP benefit duration. The respondents were living in areas with higher density of food insecurity and food deserts in Douglas County (mostly North Omaha). Participants who were living in low or very low food security and having a SNAP benefit duration of 3 weeks or less were 3 times more likely to experience a medium or high level of depression. Even though income was not shown to be associated with depression in this particular study, previous studies demonstrated that living in a low-income environment (household and neighborhood) increases the risk of experiencing depression (Klijs et al., 2016). There is a possibility of confounding effect between food security; SNAP benefit duration and income because these three variables were strongly correlated (Table 3). On the other hand, when controlling for the covariates, SNAP benefit duration showed a stronger relationship with depression compared with food security. Therefore, it might be interesting to explore the effect SNAP benefit duration on depression on a more representative sample. A more detailed exploration of the experience of SNAP benefits not lasting the whole month may help illuminate the mechanisms underlying these relationships.

Studies reported that depression is associated with several other mental health outcomes such as negative parenting, and cognitive impairments of infants and children (Forehand et al., 2012; Parent et al., 2014). It is also associated with child behavioral problems and depression among children and adolescent (Prenoveau et al., 2017, Shaw et al., 2016). Therefore, it is important to consider addressing the problem of mental illness in low-income families especially when they experience food insecurity and SNAP benefits that are insufficient. There is a need for more programs or interventions to reduce food insecurity and a better coordination of the

existing programs. Furthermore, the holistic approach might be the most beneficial for these communities in need. Some pantries in Omaha provide clothing in addition to food; integrating mental illness screening and referral in programs focusing on food security should be considered. On the other hand, the local government should also address the issue of the shortage in mental health services, especially in minority and low-income communities. In this study, most of the respondents were African Americans. However, less than 2% of the American Psychological Association members represent this minority (American Psychological Association (APA), 2014), which can lead to stigma and judgment and therefore could prevent them from seeking help (William, 2013). The issue of disparities should likewise be considered when providing mental health services to minorities.

Most of the respondents, beneficiaries of SNAP, reported that the allotment did not last for more than three weeks. The State of Nebraska may consider expansion of the eligibility criteria of federal nutrition program like SNAP (increase the percentage of the poverty level) and the monthly allotment or coordinate programs to assist the beneficiaries to effectively use the food stamps (shopping and budgeting classes) or the food purchased with the SNAP allotments (cooking classes).

There are several limitations to this study. First, it is a cross-sectional study, which limits the possibility to establish a relation of causality between the depression and the predictors: food security and SNAP benefit duration. The small sample size, overly female, was not representative of the general population of Omaha and limits the generalizability of the results.

Conclusion

The purpose of the study was to analyze food security, SNAP benefit duration and income, and the relationship with depression. We found that food security is a strong predictor of depression and SNAP benefit duration can be considered as an important predictor as well. The association between SNAP benefit duration and depression is not well known. Therefore, it might be interesting to explore how the SNAP benefit duration affects depression among the beneficiaries of this federal nutrition program.

Service Learning/Capstone Experience Reflection

I learned how a funding agency works locally to provide assistance to the population in needs. It was fascinating to see that the United Way of the Midlands (UWM) holds annual meetings/events where they share the results of their actions through statistics, stories and these annual events allow them to be accountable to the general public, stakeholders and to all the local programs that they fund. They also have weekly meetings onsite to keep the teams on tracks with their mutual progress. The other aspect that I found necessary for public health agencies is the evaluation of programs and interventions. The UWM recently started regular evaluations of their overall action by developing maps of assets and needs of the educational and nutrition system of Omaha metro-area through interviews, focus groups and documentation of the existing programs.

I had the opportunity to conduct phone interviews with pantries offering services in Omaha metro-area and other non-profit organizations working to provide other services such as entertainment, clothing's, and utilities/rents assistance. The most significant experience was to realize how disconnected and not sustainably funded programs are in Omaha. There are many overlapping programs and a lack of communication between organizations. These are the weaknesses of non-profits that should be addressed. The lesson learned from my experience is that working as a team to accomplish the desired result requires good communication between the supervisors and the subordinates, an environment that allows creativity and innovations and a dedication to the shared goals.

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Appendices

Appendix 1: 2017 Federal Poverty Guidelines (Families USA, 2017)

Household Size	100%	133%	150%	200%	250%	300%	400%
1	$12,060	$16,040	$18,090	$24,120	$30,150	$36,180	$48,240
2	16,240	21,599	24,360	32,480	40,600	48,720	64,960
3	20,420	27,159	30,630	40,840	51,050	61,260	81,680
4	24,600	32,718	36,900	49,200	61,500	73,800	98,400
5	28,780	38,277	43,170	57,560	71,950	86,340	115,120
6	32,960	43,837	49,440	65,920	82,400	98,880	131,840
7	37,140	49,396	55,710	74,280	92,850	111,420	148,560
8	41,320	54,956	61,980	82,640	103,300	123,960	165,280

Appendix 2: SNAP eligibility and allotments in Nebraska (2017-2018) (DHHS, 2017)

Household Size, Gross Monthly Income Eligibility Standards (130% of Poverty Level)	
Household Size	Gross Monthly Income
1	$1,307
2	$1,760
3	$2,213
4	$2,665
5	$3,118
6	$3,571
7	$4,024
8	$4,477
Each Addl. Member	+453
Maximum SNAP Allotments	
Household Size	Maximum Allotment
1	$192
2	$352
3	$504
4	$640
5	$760
6	$913
7	$1,009
8	$1,154
Each Addl. Member	+144