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Food Insecurity and Older Adults: An Analysis of Food Insecurity among Elderly Households in the US During the COVID-19 Pandemic

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DURING THE COVID-19 PANDEMIC

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FOOD INSECURITY AND OLDER ADULTS: AN ANALYSIS ON FOOD INSECURITY

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by

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Chapter 1: Introduction

The coronavirus (COVID-19) pandemic has impacted millions of lives across the globe. The COVID-19 outbreak was declared a pandemic by the World Health Organization (WHO) on March 11, 2020 (WHO 2020). Since then, social distancing measures to help stop the spread of the virus have impacted supply chains and led to high unemployment rates across the US (United Nations 2020). The impacted supply chains and the economic recession that was onset by the mass layoffs have resulted in a significant increase in food insecurity in the US (Smith 2020; Ziliak 2021).

Food insecurity is defined as limited or uncertain access to "nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways" (Anderson 1990). Research regarding food insecurity among the elderly is limited but has shown that older adults have lower rates of food insecurity in comparison to the general population (Coleman-Jensen et al. 2019; Nord et al. 2009). Nonetheless, a rise in food insecurity among the elderly has been reported during the pandemic. A recent study by Ziliak (2021) found that there has been a significant increase in food insecurity among seniors, with Blacks and Hispanics being disproportionately affected. The rise of food insecurity can partially be attributed to the disruption of the global and local food supply chains which has resulted in an increase in food prices, making food accessibility more difficult for many, especially for those who were already food insecure or who live under the poverty line (United Nations 2020).

It has been established that older adults who are food insecure are more likely to suffer from lower physical and cognitive health, depression, and a lower health-related quality of life (Khilström et al. 2019; Portela-Parra & Leung 2019; Goldberg & Mawn 2015; Chung et al. 2012; Bhattacharya et al. 2004; Lee & Frongillo 2001), all which can lead to more severe effects

from COVID-19. In fact, data indicates that the elderly and those with underlying medical conditions are more susceptible to developing serious illnesses as a result of the COVID-19 virus (WHO 2021). Regarding older adults, those over 85 years of age are the most vulnerable to severe illness because of COVID-19 (CDC 2020). Moreover, it has been found that 8 of 10 COVID-19 deaths in the US are adults over the age of 65 (CDC 2020).

Although large amounts of research have focused on the health impacts that COVID-19 has on the elderly, food insecurity among older adults has not been widely explored. The lack of research pertaining to food insecurity among seniors could be tied to the fact that the elderly appear to be protected from food insecurity as compared to the general population. However, it could be argued that the pandemic offers new challenges in food accessibility for older adults. For instance, many elderly individuals may not have the technology skills necessary to use food delivery applications, they may face barriers due to reduced transportation, or they may avoid going to the grocery store out of fear of contracting the virus.

The COVID-19 pandemic and the rise in food insecurity among the elderly create a critical gap in the literature that needs to be addressed. This paper contributes to the growing number of studies regarding food insecurity during the pandemic; however, it is the first, to the best of my knowledge, to specifically address food insecurity among elderly households in the US during the COVID-19 pandemic. Evidence from the Household Pulse Survey (HPS) was analyzed to address this gap. For this paper, an elderly person is defined as someone over the age of 62, given that that is the age that U.S. citizens can begin receiving Social Security benefits (Social Security n.d.) Younger seniors are defined as those who are 62 – 74 years of age, while older seniors are those who are 75 and older. To analyze the impact of the pandemic, data on food insecurity, demographics, and SES were examined to determine disparities and the severity

of the effects that the pandemic has had among the older adult population. Moreover, the following question will be explored: What are the protective and risk factors for food insecurity during the COVID-19 pandemic? This research question will be analyzed using evidence from phase three, week 25 of the HPS.

Chapter 2: Literature Review

Food Insecurity

In 2018, it was estimated that 11.1% of households in the US were food insecure, with 7.5% of households with elderly persons and 8.9% of households with elderly persons living alone being food insecure (Coleman Jensen et al. 2019). Additionally, it was estimated that among food insecure households, 21% of them contained elderly adults (Coleman Jensen et al. 2019). Food insecurity rates were also lower for the elderly (7.5%) in comparison to other households (14.7%) during the 2008 economic recession, a time when a significant percentage of the US struggled to make ends meet (Nord et al. 2009).

Research shows that there are multiple predictors among elderly food insecure households. In particular, neighborhood characteristics such as perceived safety, social cohesion, and walkability/mobility have an effect on food insecurity rates among the elderly (Chung et al. 2012; Gundersen et al. 2011; Warren et al. 2020; Thirakul 2019). Other studies have found that low- income, receiving food stamp benefits, low educational attainment, isolation, and geographic location are predictors of food insecurity among seniors (Lee & Frongillo 2001; Chung et al. 2012; Bhattacharya et al. 2004; Thirakul 2019; Goldberg & Mawn 2015). Meanwhile, research has shown that retirement is a protective factor for food insecurity among seniors (Ziliak & Gundersen 2020).

Moreover, demographics such as age and race/ethnicity have been found to affect food insecurity among the elderly. For instance, a study by Ziliak & Gundersen (2016) found that younger seniors were more likely to be food insecure in comparison to older seniors. It has been hypothesized that differences in food insecurity between younger and older seniors occur

because younger food insecure seniors may not reach old age (Ziliak & Gundersen 2016; Ziliak et al. 2008).

Furthermore, several studies have found that race/ethnicity are significant predictors of food insecurity among seniors, with seniors who are racial/ethnic minorities being at an increased risk of being food insecure (Brewer et al. 2010; Ziliak et al. 2008; Goldberg & Mawn 2015). In fact, a study by Ziliak & Gundersen (2020) reported that Blacks were more than twice as likely as Whites to be food insecure, while Hispanics were almost twice as likely to be food insecure in comparison to their White counterparts. Other studies have found that Asians, Hispanics, and Blacks are all more likely to be food insecure in comparison to Whites (Chung et al. 2012). Conversely, a study by Goldberg & Mawn (2015) found that Blacks were not significantly more likely to be food insecure in comparison to Whites.

Similarly, household composition can also be linked to food insecurity. According to a study, seniors who live with a grandchild are 50% more likely to suffer from food insecurity (Ziliak et al. 2008). Conversely, marriage and homeownership offer protection against food insecurity for seniors, with renters and those who are divorced/separated at an increased risk of food insecurity (Ziliak et al. 2008).

In addition, studies have associated food insecurity among seniors to lower mental, physical, and cognitive health status. Elderly individuals who are food insecure tend to have poorer nutrient and dietary intakes (Bhattacharya et al. 2004; Lee & Frongillo 2001), which can contribute to health issues. More broadly, food insecurity among seniors has been attributed to poor/fair health, lung disease, diabetes, chronic diseases, obesity, and an increased probability of utilizing health services for adverse health events (Ziliak et al. 2008; Seligman et al. 2010; Vaccaro & Huffman 2017; Spitzer et al. 2020). Moreover, food insecure seniors have been found

to suffer from lower cognitive functioning, functional impairments, depression, and report having a lower health-related quality of life (Portela-Parra & Leung 2019; Lee & Frongillo 2001; Chung et al. 2012; Goldberg & Mawn 2015; Khilström et al. 2019). Finally, food insecurity among seniors has been linked to having limitations in activities of daily living (ADL) (Ziliak et al. 2008).

Food Insecurity and COVID-19

The COVID-19 pandemic is a fairly recent event, hence the small but growing amount of literature surrounding the issue. Research specifically pertaining to the effects of the coronavirus among the elderly is limited yet points to relevant trends. Recent studies have shown that food insecurity rates among seniors have significantly increased during the pandemic (Schanzenbach 2020; Ziliak 2021). Determinants associated with food insecurity among the elderly during the pandemic are the female gender, low income, low educational attainment, renting a home, unemployment, being unmarried, and being part of a racial/ethnic minority, specifically Black and Hispanic (Schanzenbach 2020). To illustrate, one in five Black adults are considered to be food insufficient during the pandemic (Ziliak 2021). Based on these findings, it was hypothesized that being a woman, being a minority, being a younger senior, being unmarried, having a mortgage or paying rent, being low income or poor, having less than a bachelor's degree, having poor mental health, and living with children would be risk factors for food insecurity among the elderly. Meanwhile, being a male, being White, being an older senior, being married, owning a home free and clear, living in an above low-income household, having a bachelor's degree or higher, and receiving SNAP benefits would serve as protective factors for food insecurity.

Furthermore, the pandemic has created new barriers in food accessibility for many, especially seniors. For instance, many elderly individuals may be too afraid to leave their homes to get groceries, while food delivery services may pose technology and cost barriers for many (Mazzella 2020). It is important to note that older adults are more likely to receive free food from charities or food pantries (Ziliak 2021). However, food pantries have been negatively affected by the pandemic due to a decrease in donations due to the economic recession, a decrease in volunteers, and an increase in demand making food accessibility more challenging for seniors who would frequent these facilities (Mazzella 2020).

In sum, based on past literature, this research will focus on food insecurity among the elderly while controlling for socioeconomic status (SES), demographics, government benefits, household composition, and health of older adults. These areas were selected based on past research that shows that these are predictors for food insecurity (Ziliak & Gundersen 2016; Goldberg & Mawn 2015; Chung et al. 2012; Ziliak et al. 2008; Lee & Frongillo 2001). Lastly, this research will contribute to the literature on food insecurity during the COVID-19 pandemic by centering on the experiences of the elderly, who are considered to be particularly compromised.

Chapter 3: Methods

Data Overview

This research is a secondary analysis of cross-sectional data using measures from the HPS. The HPS was developed by the U.S. Census Bureau in conjunction with the Bureau of Labor Statistics, the National Center for Health Statistics, the United States Department of Agriculture's Economic Research Service, the National Center for Education Statistics, and the Department of Housing and Urban Development to address the emergent social and economic data needs of the pandemic (Fields et al. 2020). More broadly, the survey measures American household's experiences regarding "employment status, food security, housing, physical and mental health, access to healthcare, and education disruption" (United States Census Bureau 2021).

To select a large nationally representative sample, the HPS utilizes the Census Bureau's Master Address File (MAF), which is considered to be the gold standard frame for U.S. statistics (Fields et al. 2020). Data collection for Phase I of the survey began on April 23, 2020, using an internet questionnaire, which was sent via email to a single email address per household with a total of 1,867,126 emails being sent out resulting in 74,413 responses (Fields et al. 2020).

Data from phase III of the HPS was utilized for this study. Data collection for Phase III of the HPS began on October 28, 2020, and continued until March 1, 2021 (United States Census Bureau 2021). Households were contacted by email and text if both forms of contact were on the MAF. Phase III of the HPS differs from previous phases as it includes questions on the usage of stimulus payments and the intention of individuals receiving the COVID-19 vaccine, in addition to the previous questions regarding education disruptions, spending patterns, food insecurity, and availability of financial resources (United States Census Bureau 2021).

For this study, HPS microdata from week 25 was utilized, which collected data from February 17, 2021, to March 1, 2021. In total, the week 25 sample includes 77,788 households across the 50 states and the District of Colombia. Specifically, households with at least one elderly person were selected bringing the sample size to 29,779 households. The recommended sampling weight was utilized for this study to adjust for differential probabilities of selection for each household, which permits us to generalize the results to all households in the US (Fields et al. 2020).

Data Limitations

As previously mentioned, the HPS utilizes the MAF as the source to select a very large sample (Fields et al. 2020). This sample is supposed to be representative of US households (Fields et al. 2020). Nevertheless, there are two primary limitations regarding the HPS data. Firstly, because this is a cross-sectional analysis, the findings do not allow us to infer causality. Finally, the HPS asks respondents about the composition of their household; however, the data collected from the surveys are based on the primary respondent and not the other members of the household (Hest 2020).

Dependent Variable

To measure food insecurity, question 24 from the HPS was utilized. This question asks participants to describe the food eaten situation in their household in the past seven days. A binary variable was created and is coded as 0 = food secure and 1 = food insecure.

Independent Variables

Demographic Characteristics The sex variable on the HPS was utilized, females are coded as 1 and males as 0, males being the reference group. Race/ethnicity will also be included in the analysis and the HPS provided variable will be utilized and coded into five binary variables, 0 =

yes, 1= no (1 = White, 2 = Black, 3 = Hispanic, 4 = Asian, 5 = other race/ethnicity). Whites will be the reference group in the analysis. Respondents' age will be utilized in this study and calculated using the reported birth year. Age was recoded into two new variables, one for younger seniors (ages 62-74) and older seniors (ages 75 and older). A binary variable was created for retirement using question number 13 of the HPS, which asks participants their reason for not working (0 = other; 1 = retired). Lastly, the HPS variable for marital status will also be analyzed (0 = now married; 1 = widowed, divorced, separated, never married).

Socioeconomic status (SES) For housing tenure, four binary variables are coded as 0 = yes, 1 = no (1 = respondent owns the house/apartment without mortgage or loan; 2 = respondent owns the house with a mortgage or a loan; 3 = rented; 4 = occupied without payment of rent). Respondents who own their home/apartments without mortgage/loan will be used as a reference group for the analysis. Total household income before taxes is provided by the HPS and will be included in the analysis. Three variables were created, above low-income, low income, and poor. Above-low-income households were used as the reference group in the analysis. Additionally, the HPS variable for educational attainment was included (0 = Bachelor's degree or higher; 1 = less than a Bachelor's degree), with those who have a Bachelor's degree or higher being the reference group.

Household Structure The HPS provides data on the total number of people living in each household, including adults and children. The variables reporting the number of people and children that live in the household were used.

Health The HPS includes a number of questions to assess the mental health (MH) of Participants. Specifically, two questions are asked regarding anxiety: "how often have you been bothered by the following problems…Feeling nervous, anxious, or on edge?" (0 = not at all; 1 =

several days; 2 = more than half the days; 3 = nearly every day) and "over the last seven days, how often have you been bothered by the following problems…Not being able to stop or control worrying?" (0 = not at all; 1 = several days; 2 = more than half the days; 3 = nearly every day). Similarly, there are two questions that are associated with depression: "Over the last seven days, how often have you felt bothered by… Having little interest or pleasure in doing things?" (0 = not at all; 1 = several days; 2 = more than half the days; 3 = nearly every day) and "over the last seven days, how often have you felt bothered by… feeling down, depressed, or hopeless?" (0 = not at all; 1 = several days; 2 = more than half the days; 3 = nearly every day). As suggested by the CDC (2021), to score a participant's response, the two responses for each of the scales will be added together. A score of three will be associated with major depressive disorder or generalized anxiety disorder (CDC 2021).

Furthermore, a binary variable on whether participants had COVID-19 was created (0 = no; 1 = yes).

Benefits For receipt of the stimulus payment, a binary variable was created (0 = no; 1 = yes). Additionally, a binary variable was created regarding whether participants received SNAP benefits (0 = no; 1 = yes).

Statistical Analysis

Generalized estimating equations (GEEs) were utilized to address the research question. GEEs are appropriate because all respondents and households used in this study are clustered within 50 states and the District of Columbia. Indeed, GEEs are often used for analyzing data with a clustered structure as the method relaxes the assumptions of traditional regression models (Diggle et al. 2002; Liang and Zeger 1986; Zeger and Liang 1986). Specifically, a GEE model was estimated to address the research question and predict food insecurity (Model 1). To select

the best fitting GEE models, normal, gamma, inverse Gaussian, and binomial distributions with

logarithmic (log) and identity link functions were tested under different specifications of the

intracluster dependency correlation matrix (i.e., independent, exchangeable, unstructured)

(Garson 2012; Liang & Zeger 1986; Zeger & Liang 1986). The best-fitting model was selected

based upon the lowest quasi-likelihood under the independence model criterion (QIC) values.

The statistical software, IBM SPSS (version 26), was used for all analyses.

Chapter 4: Results

Descriptive Results

Based on a nationally representative sample of elderly US households, it was found that an estimated 22% of households over the age of 62 self-reported being food insecure. As shown in Table 1, the sample consisted of 29,779 elderly US households. Regarding demographics, 55% of respondents were female, 45% were male, 83% were White, 6% were Black, 5% were Hispanic, 3% were Asian, and 2% identified as other race. Elderly individuals were divided into two groups; younger seniors (62-73) who made up 69% of the sample and older seniors who made up the remaining 31% of the sample. Sixty-one percent of respondents were married at the time of the survey.

Pertaining to housing tenure, 47% of respondents owned their home free and clear, 40% had a mortgage, 12% rented, and 1% lived in occupied housing. Furthermore, 68% of participants reported having above poverty household incomes, 9% reported being low-income, while 1% reported being poor. Additionally, 54% of respondents reported having a bachelor's degree or higher. Likewise, 4% of households reported receiving SNAP benefits, while 34% had received their stimulus payment in the last week. Regarding mental health, 19% of participants reported having anxiety and 15% had depression. Moreover, 8% of respondents contracted COVID-19 during the pandemic. Lastly, the mean number of adults living in a household was two and most households did not house children.

Table 1: Descriptive statistics for analytical variables (*n = 29,779*)

Variables	Frequency	% Missing	Mean	SD
Dependent Variable:				
Food Insecurity	6094	8.6		
Independent Variables:				
Demographic Characteristics				
Sex				

Female	16,524	0.0		
Male	13,255			
Race/ethnicity				
White	24,788			
Black	1,775			
Hispanic/Latino	1,623	0.0		
Asian	921			
Other racial/ethnic groups	672			
Younger seniors (62 – 73)	20,498	0.0		
Older seniors (74 – 88)	9,281			
Married	18,012	1.3		
Unmarried	11,385			
SES				
Retired	16,854			
Above Poverty	20,425			
Low income	2,756	0.0		
Poor	277			
Housing Tenure				
Owned	11,733			
Mortgage or loan	9,905	16.4		
Rented	2,982			
Bachelor's degree or higher	15,972	0.0%		
Less than a bachelor's degree	13, 807			
Health				
Anxiety disorder	4,805	14.3		
Depressive disorder	3,958	14.5		
Had COVID-19	2,246	0.8		
Household structure				
Number of adults in the house		0.0	1.95	.865
Number of children in the house		0.0	.14	.517
Benefits				
Received SNAP benefits	1,203	9.8		
Received stimulus payment	9,854	3.7		

GEE Results

Table 2 demonstrates the results from Model 1, which predicts the odds of being food insecure among elderly US households during the COVID-19 pandemic. Regarding demographics, sex was not a significant predictor ($p = 0.205$). When analyzing race/ethnicity, elderly households headed by Hispanics, Asians, or other race/ethnicity were significantly more likely to be food insecure than elderly White households ($p < 0.005$). However, there was no

significant difference between elderly Black versus White households ($p = 0.395$). Furthermore, younger seniors were not significantly more food insecure than older seniors ($p = 0.241$). Retirement served as a protective factor for food insecurity among the elderly, as those who were retired were significantly less likely to be food insecure than those who were not retired ($p < 0.0001$). Lastly, married individuals were less likely than their unmarried counterparts to suffer from food insecurity ($p = 0.001$).

Regarding SES, those who had a mortgage or paid rent were more likely to suffer from food insecurity compared to those who owned their home free and clear ($p < 0.0001$). However, elderly individuals who lived in occupied housing were not significantly more likely to suffer from food insecurity as compared to those who owned their homes free and clear ($p = 0.625$). Furthermore, those who were low-income, or poor were significantly more likely to be food insecure compared to those households that were above low-income ($p < 0.0001$). Pertaining to educational attainment, elderly individuals with less than a bachelor's degree were significantly more likely to be food insecure in comparison to elderly individuals with higher levels of education ($p < 0.0001$).

Moreover, the relationship between mental health and food insecurity was predicted. Model 1 demonstrated that having an anxiety disorder and/or depressive disorder was a significant predictor of food insecurity ($p < 0.0001$). Meanwhile, having tested positive for COVID-19 during the pandemic was not significantly associated with food insecurity ($p = 0.297$). Regarding the household structure of participants, the number of adults living in the household and the number of children living in the household were not significant predictors of food insecurity ($p > 0.05$). Likewise, SNAP benefits and the stimulus were not found to be significant predictors for food insecurity among elderly households ($p > 0.05$).

Table 2: Results of GEE model predicting food insecurity among retired elderly households during the COVID-19 pandemic.

Results presented in Table 2 were weighted based on the HPS recommended sampling weights.

Variables	Model 1			
	B	**SE**	**CI**	*p*
Intercept	-1.234	.1637	(-1.555; -.913)	0.000
Demographic characteristics:				
Female	-.123	.0973	(-.314; .067)	0.205
Race/ethnicity				
White	*ref*	*ref*	*ref*	*ref*
Black	.125	.1463	(-.162; .411)	0.395
Hispanic	.393	.1321	(.134; .652)	0.003
Asian	1.044	.3291	(.399; 1.689)	0.002
Other	.722	.2000	(.330; 1.114)	0.000
Older seniors (74-88)	*ref*	*ref*	*ref*	*ref*
Younger seniors (62-73)	-.149	.1272	(-.398; .100)	0.241
Retired	-.658	.0658	(-.787; -.529)	0.000
Marital status	-.277	.0837	(-.441; -.113)	0.001
SES:				
Housing tenure				
Owned	*ref*	*ref*	*ref*	*ref*
Mortgage	.455	.0727	(.313; .598)	0.000
Rent	.547	.1398	(.273; .821)	0.000
Occupied housing	-.204	.4178	(-1.023; .615)	0.625
Above-low-income household	*ref*	*ref*	*ref*	*ref*
Low income	.788	.0909	(.610; .966)	0.000
Poor	1.402	.2593	(.894; 1.910)	0.000
Educational attainment	.376	.0835	(.212; .540)	0.000
Health:				
Anxiety disorder	.786	.1079	(.575; .998)	.000
Depressive disorder	.678	.1235	(.436; .920)	.000
Had COVID-19	.119	.1142	(-.105; .343)	.297
Household structure:				
Number of adults in household	-.103	.0596	(-.220; .014)	.083
Number of children in household	.049	.1104	(-.167; .266)	.656
Benefits:				
SNAP receipt	.250	.1509	(-.046; .545)	.098
Stimulus	.114	.0847	(-.052; .280)	.178

Bivariate Results

In order to further analyze the relationship between race and food insecurity, crosstabulations and the chi-square test were conducted. Table 3 demonstrates the reasons for being food insecure among the elderly by race. It was found that that 31% of White households, 42% of Black households, 39% of Hispanic households, 30% of Asian households, and 39% of households who identified as other race were food insecure because they were not able to afford to buy more food. Based on the results of the chi-square test, those results were statistically significant ($p < 0.05$). Furthermore, 17% of White households, 16% of Black households, 18% of Hispanic households, 13% of Asian households, and 18% other race households were food insecure because they stated that they could not get out to buy food; however, the results were insignificant for all racial groups ($p > 0.05$). The analyses also demonstrated that 46% of Hispanics and 58% of Asians ($p < 0.05$) reported being too afraid or did not want to go out to buy food, while 40% of Whites and 34% of those from other race stated the same ($p < 0.05$). Likewise, 38% of elderly Black households reported being too afraid or not wanting to go out to buy food; however, these findings were insignificant ($p > 0.05$). Moreover, 4-6% of elderly White, Black, Hispanic, and Asian households reported being food insecure because they could not get groceries or meals delivered to them. These findings were insignificant. On the other hand, 8% of elderly households who identified as other race stated that they could not get groceries or meals delivered to them and these findings were found to be significant ($p < 0.05$). Lastly, the analysis revealed that 30% of White households, 22% of Black households, 23% of Hispanic households, and 17% of Asian households were food insecure because the stores did not have the food they wanted ($p < 0.05$). Meanwhile, 28% of households who identified as other

race described that the stores did not have the food they wanted; however, these findings were

not significant ($p > 0.05$).

Table 3: Crosstabulation between race and reasons for being food insecure.

| Variables	Race				
Why did you not have enough to eat?	**White**	**Black**	**Hispanic**	**Asian**	**Other Race**
Could not afford to buy more food.	31.1%	41.8%	38.7%	29.5%	39%
Could not get out to buy food.	17.3%	16%	18.3%	12.6%	17.8%
Too afraid or did not want to go out to buy food.	39.9%	37.5%	46%	57.5%	34%
Could not get groceries or meals delivered to me.	4.5%	4.6%	5.9%	3.8%	7.5%
The stores did not have the food I wanted.	30.2%	22.2%	23.4%	17.2%	27.8%

Racial/ethnic differences in reduced transportation because of the pandemic were also

explored. Regarding whether participants had taken fewer trips than normal in the last seven

days by bus, rail, or ride-sharing services, it was found that 31% of Whites reported that they

took fewer rides, 39% of Blacks had taken fewer trips, 42% of Hispanics reported that they had

taken fewer trips than normal in the last seven days, and 45% of Asians stated that they had

taken fewer trips than normal, the highest rate of any ethnic group. Those results were significant

($p < 0.05$).

Table 4: Crosstabulation between race and reduced transportation due to COVID-19 pandemic.

Variables	Race				
In the last 7 days, have you taken fewer trips than you normally would have by bus, rail, or ride-sharing services because of the pandemic?	**White**	**Black**	**Hispanic**	**Asian**	**Other Race**
No.	7.6%	1.1%	12.3%	12.8%	8.4%
Yes.	30.9%	38.9%	42.1%	45.3%	35.6%
Did not use before.	61.5%	49.2%	45.6%	41.9%	56.1%
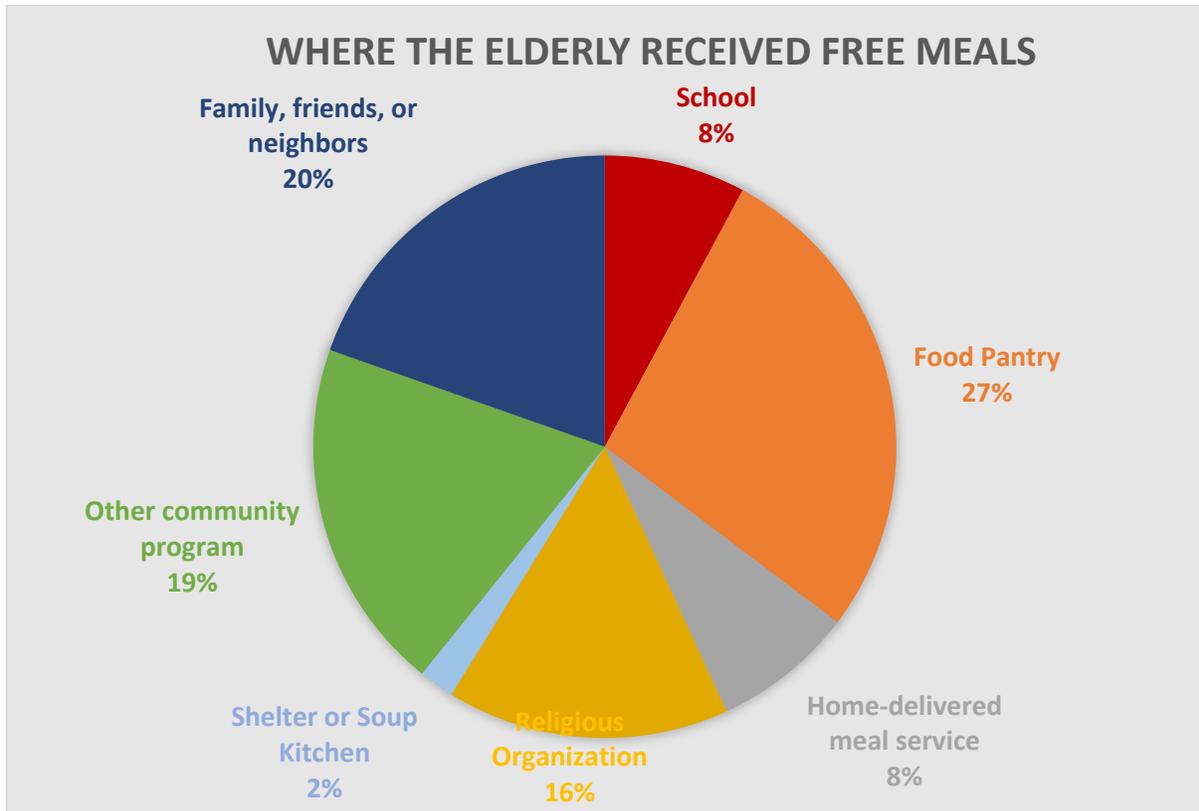
Figure 1: Where the elderly received free meals.
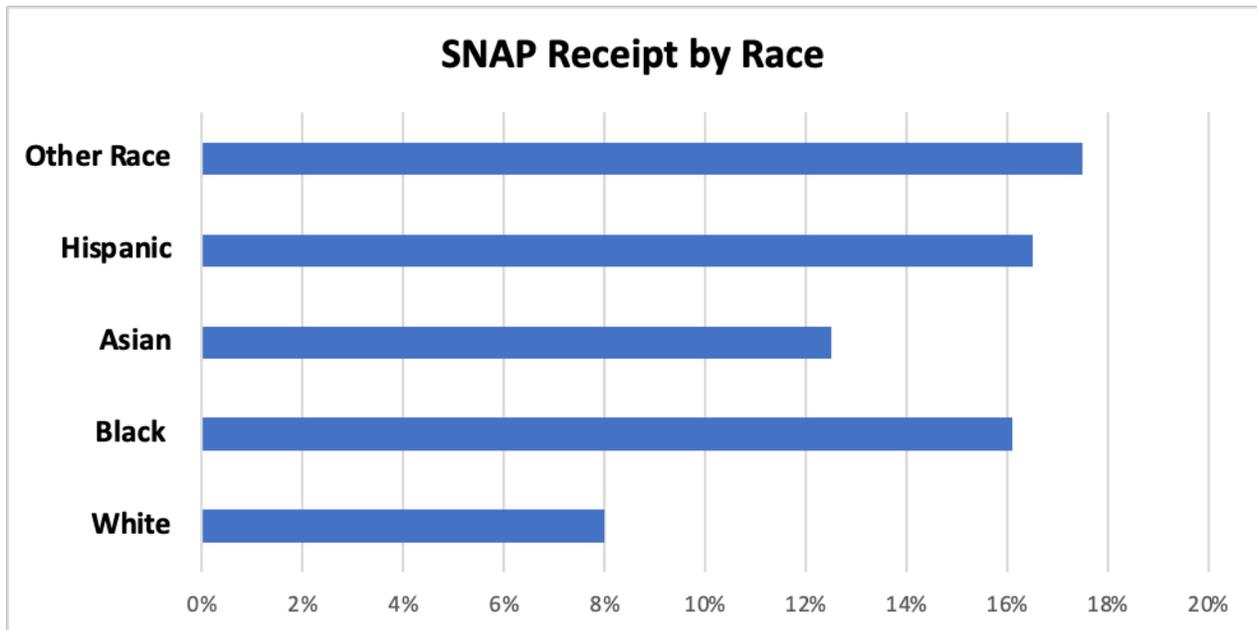
Figure 2: SNAP Receipt by Race

Chapter 5: Discussion

Food insecurity among elderly households in the US is an understudied topic. This may be because seniors tend to have lower rates of food insecurity in comparison to the general population (Coleman Jensen et al. 2019; Nord et al. 2009). However, research shows that the effects of the COVID-19 pandemic have significantly increased food insecurity rates among the elderly (Schanzenbach 2020; Ziliak 2021). The lack of research on food insecurity among the elderly and the increase in food insecurity rates due to the effects of COVID-19 create a critical gap in the literature that needs to be filled. This research contributes to the growing number of studies that focus on food insecurity during the COVID-19 pandemic (Morales et al. 2020; Schanzenbach 2020; Wolfson & Leung 2020; Ziliak 2021) while being the first to exclusively focus on elderly US households and racial/ethnic disparities.

To explore this gap, one GEE model was created to test the hypothesis along with bivariate analyses to further explore the relationship between food insecurity and the racial/ethnic disparities. The most novel findings of this research pertain to the differences in food insecurity among the elderly between racial/ethnic groups. The hypothesis was partially supported regarding the relationship between food insecurity and race/ethnicity among the elderly. The model established that older Hispanics, Asians, and those who identify as other ethnicity or race were significantly more likely than Whites to be food insecure; however, the difference was not significant between Blacks and Whites.

The differences between racial/ethnic groups and food insecurity can be attributed to several reasons. For example, it could be theorized that Hispanics and Asians have higher rates of food insecurity in comparison to Whites and Blacks because Hispanics and Asians make up the two largest groups of foreign-born older adults (Park & Kim 2019). Hence, many foreign-

born elderly Hispanics and Asians may face language or immigration barriers that prohibit them from accessing resources available to the general elderly population. In fact, a study conducted by the Asian American Federation (2016) found that many Asians living in New York city had migrated later in life and spoke limited English. Similarly, it was reported by the National Hispanic Council on Aging (n.d.) that many jobs held by Hispanics do not have living wages and lack retirement funds, putting them at risk of poverty later in life. Furthermore, those who are foreign-born and migrate later in life may not have a retirement account or be eligible for Social Security benefits (AARP 2014). Thus, many of these individuals may not have the ability to work due to older age and lack the fixed income that many Whites and Blacks have and therefore are at an increased risk for food insecurity. Indeed, this study along with several others has found retirement to be a protective factor for food insecurity among the elderly population (Bergmans & Wegryn-Jones 2020; Coleman-Jensen 2020; Ziliak & Gundersen 2020).

Furthermore, upon analyzing the racial disparities among food insecure households, it was found that Hispanics and Asians were significantly more likely to report that they were too afraid or that they did not want to go out to buy food in comparison to other racial/ethnic groups. At the time of data analysis, vaccines were yet to be widespread, therefore it is likely that many elderly individuals who had not been vaccinated continued to be fearful of COVID-19. Nevertheless, there is evidence that points to several reasons as to why Hispanics and Asians were more likely to be afraid or did not want to go out and buy food.

We can conclude that institutional racism, which disproportionately targets minorities, played a role as to why Hispanic seniors were food insecure because they were too afraid or did not want to go out and buy food. For example, Hispanics experienced disproportionately higher rates of COVID-19 contraction, hospitalizations, and deaths (CDC 2021b). In fact, a report by

the CDC (2021b) found that Hispanics were twice as likely to contract and die from COVID-19, as well as almost three times as likely to be hospitalized because of the virus in comparison to their White counterparts. Furthermore, Hispanics are also being vaccinated at a much lower rate than their White counterparts (Weis 2021) despite data showing that they are disproportionately affected by the virus (CDC 2021b).

Additionally, a report by the US Department of Health and Human Services (HHS 2021) states that in comparison to other racial/ethnic groups, Hispanics are the least likely to have private or public health coverage such as Medicare. The report by the HHS (2021) further stated that Hispanics are significantly affected by obesity, asthma, HIV/AIDS, liver disease, and chronic obstructive pulmonary disease, all of which can lead to a higher likelihood of developing a serious illness because of COVID-19 (CDC 2021c).

Due to the aforementioned evidence, and the fact that age plays a factor in the severity of COVID-19, it can be concluded that contracting COVID-19 comes at a high cost for many elderly Hispanics. Not only are they more susceptible to contracting the virus due to age and ethnic background, the increased likelihood of having pre-existing conditions, but they also have the additional stressor of being less likely to be medically insured. The fear of contracting the virus then pushes many elderly Hispanics into food insecurity due to institutional barriers and a lack of culturally appropriate resources to help them navigate issues arising from the pandemic.

Asians were also more likely to report that they were too afraid or did not want to go out and buy groceries. Data on food insecurity among Asians, especially older Asians, is limited even though Asian seniors represent the second-fastest-growing racial/ethnic group among people over 50 in the US (AARP 2014) and the fact that they do not have the same financial resources as younger Asians (Weller & Thompson 2016). The lack of research on food insecurity

among Asians can be attributed to the model minority myth, which argues that Asians are well-educated, have high incomes, and are law-abiding citizens, and are therefore too privileged to be considered a disadvantaged minority (Cheng 1997).

Nevertheless, the findings of this paper reveal Asians were more likely to be food insecure in comparison to their White counterparts, one of the main reasons being that Asians were too afraid or did not want to go out to get food. Indeed, it can be hypothesized that the fear many Asians feel can be attributed to the rise of racist attacks because of the xenophobic rhetoric surrounding the COVID-19 virus. In the year 2020, at the height of the pandemic, former President Trump frequently referred to COVID-19 as the "Chinese virus" or the "Kung-flu". In fact, one study found that there was a significant increase in anti-Asian hashtags after former President Trump used the term "Chinese virus" on Twitter (Hswen 2021).

Unfortunately, anti-Asian sentiment is not solely reserved for social media. A study conducted by the Center for the Study of Hate & Extremism (2021) found that in 2020, anti-Asian hate crimes had risen by 149% in America's sixteen largest cities. One national report found that the three most common types of reported discrimination against Asians were verbal harassment (65%), shunning (18%), and physical assault (13%) (Jeung et al. 2021). Moreover, individuals of Chinese descent reported higher incidents of hate crimes (43%) in comparison to other Asian ethnic groups, while 7% of hate incidents were against seniors (Jeung et al. 2021).

One report states that elderly individuals are more likely to be physically assaulted in comparison to their younger counterparts (Stop AAPI Hate 2021). In fact, there was a spree of violent attacks against elderly Asians in California in early 2021 (Stop AAPI Hate 2021). Some of these incidents include the murder of an 84-year-old Asian man and the stabbing of two elderly Asian women at a bus stop (Lim 2021; Lee 2021). Therefore, it is logical to conclude that

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a significant percentage of elderly Asians are food insecure due to feeling too afraid or not wanting to go out for food because of the violent xenophobic attacks that are being reported around the country.

Furthermore, the higher rates of food insecurity among Asians and Hispanics can also be explained by the bivariate analysis showing that Hispanics and Asians were impacted at higher rates by reduced transportation by bus, rail, or ride-sharing services. Several studies have found that reduced access to public transportation can be linked to food insecurity (Baek 2016; Oemichen & Smith 2016; Green-LaPierre et al. 2012; Bartfeld & Wang 2006). COVID-19 reduced the already limited transportation system in many areas in the US. A report by EBP US (2021) found that ridership in the US dropped by 79% in 2020 due to social distancing measures, which reduced capacity limits on buses. Additionally, loss in revenue and rider fear also had an impact on reduced bus routes (Groover 2020).

Reduced transportation could have increased food insecurity among Hispanics and Asians in two ways; first, many Hispanics and Asians who relied on public transportation to go to the grocery store could have seen their usual routes being impacted. Second, fear of contracting the virus on public transportation could have influenced their decision to forgo these forms of transportation as it has been reported that passengers do not always wear face coverings and some drivers ignore the capacity limits (De La Garza 2020). Additionally, as previously stated, there have been xenophobic attacks against Asians at bus stops, therefore making many feel unsafe (Lee 2021). This could also help explain why these two groups experienced higher rates of fear and not wanting to go out to buy food as their reason for being food insecure. However, further research is needed to explain these findings.

The bivariate results also revealed that Blacks, Hispanics, and those who were of other race were more likely to report that they did not have enough money to buy food. Research has found that over half of elderly Blacks and Hispanics are economically insecure and many utilize a significant portion of their income on housing (Meschede et al. 2011), while others have found that Blacks and Hispanics were more likely to face economic insecurity during the pandemic (Schanzenbach 2020). These findings are important as past research has shown that to make ends meet, economically insecure seniors will often cut back on medication and food purchases (Bengle et al. 2010).

Furthermore, the data also shows that food insecure Whites were more likely to report being food insecure in comparison to their non-White counterparts because the stores did not have the food they wanted. This finding has also been reported amongst the general population (Morales et al. 2020). Although food shortages were common at the beginning of the pandemic due to panic buying, there have now been reports that the trucker shortage can lead to shortages in some food items (Gooden 2021). One solution to this could be to encourage and fund the production and buying of locally sourced food items to avoid relying on the globalized food system, which can be impacted by labor shortages.

Regarding those who were food insecure and identified as other race, it was reported that their reasons for being food insecure were not being able to afford to buy more food and being too afraid to go out to buy food, although they were the least likely to report being too afraid. Interestingly, those who are of other race were the only racial/ethnic group who was significantly likely to be food insecure because they could not get food or groceries delivered to them. Perhaps some of these participants lived in rural areas where food or grocery delivery services

are not widely available (Gomez Sarmiento 2019). However, further geographic studies that include GIS analysis should be conducted to analyze this hypothesis further.

COVID-19 specific variables such as having contracted the virus and receiving the COVID-19 relief payment were found to be insignificant in predicting food insecurity. It is not clear as to why that is since this is a new area of study. Only 8% of participants in the study had contracted COVID-19, perhaps a study of a larger COVID-19 positive sample is needed. Furthermore, although there was not a significant relationship between food insecurity and the stimulus payments, the data did reveal that minorities, especially Asians, were significantly more likely to spend their stimulus payment on food.

Furthermore, the GEE model revealed that sex was not a significant predictor for food insecurity, meaning that among the elderly population, there was no gender difference in food insecurity. These findings are in line with previous findings which find no significant differences in food insecurity between sexes (Ziliak 2021; Morales et al. 2020; Oldewage-Theron 2018). However, this finding contradicts a study conducted by Schanzenbach (2020), which found that elderly women were more likely to be food insecure in comparison to their male counterparts during the COVID-19 pandemic.

The findings of this paper were also in line with previous studies that have found low-income and low educational attainment to be predictors for food insecurity (Thirakul 2019; Goldberg & Mawn 2015; Bhattacharya et al. 2004; Lee & Frongillo 2001), meaning that those who are low-income or poor and those who have less than a bachelor's degree are more likely to suffer from food insecurity given that they may face financial restraints that make food accessibility more difficult. Similarly, this study also helps establish previous findings that state that those who own a home free and clear along with those who are married are less likely to

suffer from food insecurity (Ziliak et al. 2008). However, the findings of the present study contradict previous studies, which found that younger seniors were more likely to be food insecure in comparison to their older counterparts (Ziliak & Gundersen 2016; Ziliak et al. 2008). This study found that there were no differences in food insecurity between older and younger seniors. Furthermore, this study did not find that household structure had an impact on food insecurity, which also contradicts previous findings (Ziliak et al. 2008) This may be because most households in this study only housed two people and a significant portion of the households did not house children, perhaps a more diverse sample would have led to different results. Additionally, these differences in findings may also be attributed to the pandemic. Future studies should aim to explore these differences further.

Like previous studies (Khilström et al. 2019; Portela-Parra & Leung 2019; Goldberg & Mawn 2015; Chung et al. 2012; Lee & Frongillo 2001), the analysis revealed that mental health is a predictor for food insecurity. Individuals with anxiety or depressive disorder were significantly more likely to report being food insecure. Although this finding supported the hypothesis, it is troublesome given that data from June 2020 revealed that 56% of older adults repeated feeling isolated sometimes or often when the rate was only 27% in 2018 (Gavin 2020). Other studies have found that the mental and physical health of elderly individuals has declined because of social distancing measures, increasing individual's levels of depression, anxiety, stress, and decreasing sleep quality and motivation (Banerjee 2020; Meng et al. 2020; Rosen 2020; Sepulveda-Loyola et al. 2020). Therefore, the mental health effects of the pandemic further put elderly individuals at risk for food insecurity.

Furthermore, the model revealed that there was not a significant relationship between food insecurity and SNAP, which contradicts previous research (Schanzenbach 2020; Oldewage-

Theron et al. 2018; Gundersen & Ziliak 2015; Bartfeld & Wang 2006). The bivariate analysis reveals that only a small fraction of this sample is part of the SNAP program, a trend that has been reported by previous research (Cawthorne 2008). Although the rates were small, minorities were more likely to receive SNAP in comparison to Whites. A report by American Progress (Cawthorne 2008) found that among the general population, 65% of those who are eligible for SNAP benefits receive the benefits; however, regarding the elderly population, only 30 to 40 percent of those who qualify receive food stamps. Low SNAP participation among elderly individuals has been linked to the negative stigma attributed to the program or because individuals are not aware that they qualify for benefits (Oemichen & Smith 2016). Further research should focus on whether there was enough outreach to get elderly individuals enrolled in the SNAP program during the pandemic.

Limitations

There are several limitations regarding this study. Firstly, the survey is only available in English and Spanish excluding those who may not speak these two languages. Secondly, specific group breakdown among racial/ethnic minorities is not available, making it difficult to investigate the differences between groups (i.e., Chinese, Japanese, Vietnamese, Mexican, Cuban). Finally, this study utilized cross-sectional data, meaning that this data was collected from many individuals at one point in time. Therefore, cross-sectional data will not allow us to analyze changes over time; thus, these findings cannot truly infer causality. Longitudinal studies are necessary to further analyze the relationship between food insecurity and the elderly in the era of COVID-19.

Conclusion

In sum, this paper fills a critical gap in the literature regarding food insecurity among the elderly. Most importantly, the findings shed light on the racial/ethnic disparities in food insecurity among seniors revealing the protective and risk factors. Qualitative studies are necessary to analyze the disparities at a more individual level and to find culturally appropriate solutions to food insecurity, especially among those who immigrated later in life or those who do not speak English. In other words, there is less need for studies that focus on acculturation and the increased privileges that it entails, instead, it is necessary for us to study how we can accommodate resources for people of all backgrounds. Furthermore, studies that offer a breakdown between ethnic groups (i.e., Chinese, Vietnamese, Thai, Japanese) are needed, especially among Asians, who are often treated as a monolith, though there are large economic disparities within Asian subgroups (United States Department of Labor 2014). Lastly, this paper also highlights the institutional racism that inadvertently influences food insecurity whether it be through healthcare inequity, economic disparities, or xenophobic attacks. This paper aims to contribute to the discussion around food insecurity and to highlight the importance of studying populations that are otherwise deemed "safe" from food insecurity and other social issues.

Therefore, policymakers must develop strategies that help decrease food insecurity and are tailored toward the elderly community, especially minorities. They should work to create a campaign that destigmatizes SNAP among the elderly and work to register more individuals into the program. Furthermore, they should also ensure that information about the SNAP program is widespread among the elderly community by promoting the program and working with local leaders on how to target this community best. It is also crucial that policymakers create legislation that helps prevent the spread of xenophobic violence against the Asian community so

that they feel safe enough to access food. Furthermore, the disparities in COVID-19 contraction, hospitalization, deaths, and vaccination must also be addressed so that the Hispanic community feels safe enough to go out and buy food. Lastly, programs that provide income support for Blacks, Hispanics, and those who identify as other race should be created as these groups were more likely to report that they could not afford to buy food. The COVID-19 pandemic has created challenges and highlighted important disparities in our society; however, community outreach and solutions must be created so that the effects of the pandemic do not create larger disparities than those that already existed.

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Vita

Stephanie Alexandra Morales was born and raised in El Paso, TX. She attended the University of Texas at El Paso where she received a Bachelor of Arts in Psychology in 2018. She then continued at the University of Texas at El Paso where she pursued a Master of Arts degree in Sociology. Stephanie has accepted an offer at the University of Michigan where she will begin her doctoral studies in Survey and Data Science in Fall 2021.

Stephanie was employed as a graduate teaching assistant for the first year of her graduate studies. She assisted in undergraduate sociology and anthropology courses by grading, offering tutoring, and assisting professors with the presentation and organization of courses. For the second half of her graduate degree, Stephanie went on to work as a graduate research assistant for Dr. Danielle X. Morales. During this time Stephanie engaged in qualitative research relating to increasing the number of underrepresented students who pursue graduate degrees in engineering. She also engaged in quantitative research pertaining to food insecurity and vaccine hesitancy during the coronavirus pandemic.

During her time as a research assistant, Stephanie was part of a research team that published two articles: "Racial/ethnic Disparities in Household Food Insecurity during the COVID-19 Pandemic: A Nationally-representative Study" and "Food Insecurity Among Households with Children amid the COVID-19 Pandemic: Evidence from the Household Pulse Survey". Stephanie also co-authored a qualitative study titled "Surviving la "lucha" in Ciudad Juárez. An Anthropological reflection on the Cuban community in Ciudad Juárez, México".

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