

Food Insecurity Determinants amidst the COVID-19 Pandemic: An Insight from Huntsville, Texas

Agboola Peter Temitope*, Lawrence Art Wolfskill

Sam Houston State University, School of Agricultural Sciences Box 2088 Huntsville, Texas 77341, USA

*Corresponding author: teetop32000@gmail.com

Received June 24, 2021; Revised July 27, 2021; Accepted August 08, 2021

Abstract Food insecurity continues to affect a large number of the U.S households during the novel COVID-19 pandemic. The pandemic has indeed threatened the livelihood of people, making them vulnerable to severe hardship and has had an unanticipated impact on the U.S economy. While researchers have carried out studies in some cities in Texas to ascertain the degree of food insecurity in households, none has examined the status of food insecurity amongst the households in the city of Huntsville, following COVID-19. Thus, this study attempts to identify the food insecurity status of households and the determinant factors driving household food insecurity in Huntsville, Texas. Additionally, the research attempts to identify the mitigation measures adopted by households during the pandemic in the city. Therefore, a structured online sample survey was used to collect data, while household expenditures survey was utilized in evaluating the food security status of households. The data were subjected to a critical evaluation via descriptive statistics and logistic regression modeling. A logistic regression model was used to determine the factors responsible for food insecurity in the study area. The examination showed that COVID-19 had a practical effect on the lives and source(s) of income of majority of the respondents. However, most households in the study area were food secure, because a significant proportion were educated, and fully employed, while those who had part time jobs or unemployed were food insecure. Also, the provisions of the American Rescue Plan and economic impact payment enabled food security amongst the households in Huntsville, Texas. Overall, the research evinced that 63.13 % of households were food secure as a result of societal support from charitable organizations, while 36.87 were food insecure in the city of Huntsville, Texas.

Keywords: food insecurity, household expenditure survey, COVID-19, coping strategies, food pantry

Cite This Article: Agboola Peter Temitope, and Art Lawrence Wolfskill, "Food Insecurity Determinants amidst the COVID-19 Pandemic: An Insight from Huntsville, Texas." *Journal of Food Security*, vol. 9, no. 3 (2021): 106-114. doi: 10.12691/jfs-9-3-3.

1. Introduction

An increasing level of food insecurity is faced within the country amidst the economic fallout from the novel coronavirus COVID-19 pandemic. The pandemic has exposed many economically challenged households and families to severe hardship, leaving them with difficulties in making ends meet for their livelihood [1].

The U.S Department of Agriculture (USDA) defines food insecurity as lack of constant access to enough food for an active and healthy life [2]. The overall level of food insecurity within the country has increased rapidly over the last year due to the economic shutdown to curb the spread of the virus. Subsequently, millions of Americans have experienced increasing unemployment and reduced incomes, and a probable increase in the rate of poverty throughout the country [3].

According to Fitzpatrick, Drawve and Harris [4], the hunger rate within the state of Texas has exceeded the national average. This is a direct result of increased unemployment within the state, which has hurt the

financial viability of many families and households, and a consequent inability to afford food, shelter, and other basic needs. Besides, many charitable groups within the country are struggling to meet up with the demand in food assistance [5].

Prior to COVID-19, the recession in 2007 aggravated the level of hunger and a significant number of households could not have adequate access to quality food. The situation has now been worsened as a result of COVID-19 pandemic. In fact, Feeding America reported that because of the pandemic, up to 54 million people may experience food insecurity in 2020, including 18 million children [6]. Equally, Coleman-Jensen, Rabbitt, Gregory and Singh [7] reported that in 2018 one in nine Americans were food insecure, indicating that over 37 million Americans including 11 million children lived in a food insecure household. In its assessment, Feeding America also reported that over 4 million Texans were food insecure, with nearly 15% of the state's population not having access to quality and nutritious food for healthy living [6].

Thus, it is patent that the prevalence of food insecurity across the state of Texas, evidenced the adverse effect of COVID-19 on the food distribution system during the

2.3. Method of Data Analysis

Descriptive statistics such as percentages, frequency counts, mean values, variance, and standard deviation were used to describe household socioeconomic characteristics and Household Food Security Status. The Statistical Package for Social Sciences (SPSS) was used to analyze the Binary Logistic Regression regarding the factors influencing household food insecurity in Huntsville. The Household Food Expenditure Survey was used to determine the food security nature of the household. Following Omonona and Agoi [13], and Oduniyi and Tekana [14], the HSFI was determined by calculating the per capita food expenditure of i-th household, divided by two-thirds of the mean per capita food expenditure of all households, over a period of one month. The value obtained represents a threshold, which was used to construct the Household Food Security Index (HFSI). A household expense for food above the threshold or HFSI was regarded as food secure, while otherwise or lesser than the threshold was regarded as food insecure.

$$F_i = \frac{\left(\begin{matrix} \text{per capita food expenditure} \\ \text{for the } i\text{th household} \end{matrix} \right)}{\left(\begin{matrix} 2/3 \text{ mean per capita food} \\ \text{expenditure of all household} \end{matrix} \right)} \quad (1)$$

where F_i is the HSFI of the i th household
Mathematically, when:

$F_i \geq 1$ = the i th household is food secure

$F_i < 1$ = the i th household is food insecure

Hence, any household with a per capita monthly food expenditure above or equal to two-thirds of the mean per capita food expenditure is food secure, while otherwise is food insecure.

2.3.1. Binary Logistic Regression Model

The Logistic regression model was used to identify the

factors that determine the households' food security (proxied by the HSFI variable). In the study, a respondent is considered 1 if food secure and 0 if otherwise. The model is stated thus:

$$F_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \dots + \beta_n X_n \quad (2)$$

Where F_i is the binary variable with value 1 if respondent is food secure and 0 if otherwise, where β_0 is the intercept (constant), and $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_n are the regression coefficients of the predictor variables, $X_1, X_2, X_3, X_4, X_5, X_6, X_7$ to X_{15} and X_n . Binary logistic regression model is widely used to analyze data with dichotomous dependent variables [15,16,17,18]. Hence, it was considered a suitable model to use for this objective because the dependent variable was dichotomous in nature. In addition, it was necessary to create dummy variables to use the selected socio-economics determinants of food security status variables. The exogenous variables used in the analysis are shown below in Table 1:

- X_1 = Gender (1 = male-headed household, 0 if otherwise)
- X_2 = Race
- X_3 = Marital status
- X_4 = Employment status
- X_5 = COVID-19 affected your life
- X_6 = Household size
- X_7 = Household monthly income in \$
- X_8 = COVID-19 affected your income
- X_9 = COVID-19 affected your food consumption pattern
- X_{10} = Meals per day
- X_{11} = Support from charitable organization (1 = received support, 0 if otherwise)
- X_{12} = Received COVID-19 relief stimulus funds
- X_{13} = Coping strategies used (1 = Controlling expenses, 0 if otherwise)
- X_{14} = Age (number of years)
- X_{15} = Level of education

Table 1. Definition of explanatory variables used in the binary regression model

Independent Variables	Description
Gender	1 = male, 0 = female (Dummy)
Race	1 if African American, 0 otherwise (Dummy)
Marital status	1 if single, 0 otherwise (Dummy)
Employment status	1 if employed, 0 otherwise (Dummy)
COVID-19 affected your life	1 = if COVID-19 affected your life, 0 if otherwise (Dummy)
Household size	Number of members of household (Continuous)
Household monthly income in \$	Total value in Dollars (Continuous)
COVID-19 affected your income	1 = if COVID-19 affected your income, 0 if otherwise (Dummy)
COVID-19 affected your food consumption pattern	1 = if COVID-19 affected your daily food consumption, 0 if otherwise (Dummy)
Meals per day	Number of meal(s) eaten (Dummy)
Support from charitable organization	1 = if received support from any charitable organization, 0 if otherwise (Dummy)
Received COVID-19 relief stimulus funds	1 = if received the government relief fund, 0 if otherwise (Dummy)
Coping strategies used	1 = if used any coping strategy, 0 if otherwise (Dummy)
Age	Number in years (Continuous)
Level of education	Number in years (Continuous)

Table 2. Summary Table of the Demographic characteristics of the participants (n=179)

Household characteristics	Frequency	Percentage	Mean
Gender			
Male	57	31.8	
Female	122	68.2	
Race			
African American	39	28.1	
White	86	48	
Hispanic	50	27.9	
Others	4	2.2	
Marital status			
Single	59	33	
Married	103	57.5	
Widower	3	1.7	
Separated	14	7.8	
Age group			
18 – 35	73	40.8	
36 – 45	44	24.6	
46 – 55	33	18.4	
56 – 65	20	11.2	
Above 65	9	5.0	
Average household size			4
Educational level			
Did not graduate from high school	3	1.7	
High school, diploma or equivalent	69	38.5	
Some college credit, no degree	33	18.4	
Associates degree	18	10.1	
Bachelor's degree	41	22.9	
Master's degree	14	7.8	
PhD or similar (JD, EdD.)	1	0.6	
Employment status			
Employed full-time.	54	30.2	
Employed part-time	64	35.8	
Self-employed	13	7.3	
Unemployed	27	15.1	
Retired	17	9.5	
Independent contractor	4	2.2	

3. Result and Discussion

3.1. Demographic Profile

Table 2 illustrates the demographic characteristics of households in the study area. This was analyzed using descriptive statistics. The sample is comprised of 179 households. The study shows that 31.8% of the respondents were male, while the remaining 68.2% were female. Furthermore, the result showed that majority of the respondents (57.5%) were married, while 33% were single.

The Figure 2 below shows the marital distribution of household head in the study area. The majority (57.5%) were married, 33% were single and about 10% were widow and separated. The fact that most of the households were married evidenced a sense of responsibility and the possibility of a willing volition on the part of the household heads to support their family members.

The Figure 3 below demonstrates the age distribution of household heads in the study area. Most of the respondents, that is, 40.8% were between the ages of 18 and 35 years; 24.6% of the respondents were from 36 – 45 years, while 18.4% of the respondents were between 46 and 55 years of age. This implies that most of the household head are still active and productive in the study area.

Furthermore, 38.5% had a high school diploma, whereas 31% of the respondents had completed a bachelor's degree or higher. This could be expected, as Huntsville is the home of a regional state university. Education is very good for food insecurity, studies like Omotayo [19] and Omotayo [20] have shown that proper education enhances household's food security.

With respect to employment status, 15.1% of the respondents reported that they were unemployed, while 35.8% were on part-time employment, and 30.2% avowed that they were fully employed. The finding can probably be attributed to the fact that the city is comprised primarily of three racial groups with majority of the respondents (48%) being white, 27.9% identified themselves as Hispanic, and 21.8% as African American. These is in line with a reported population proportion of 50.2%, 18.6%, and 26.6%, respectively [21].

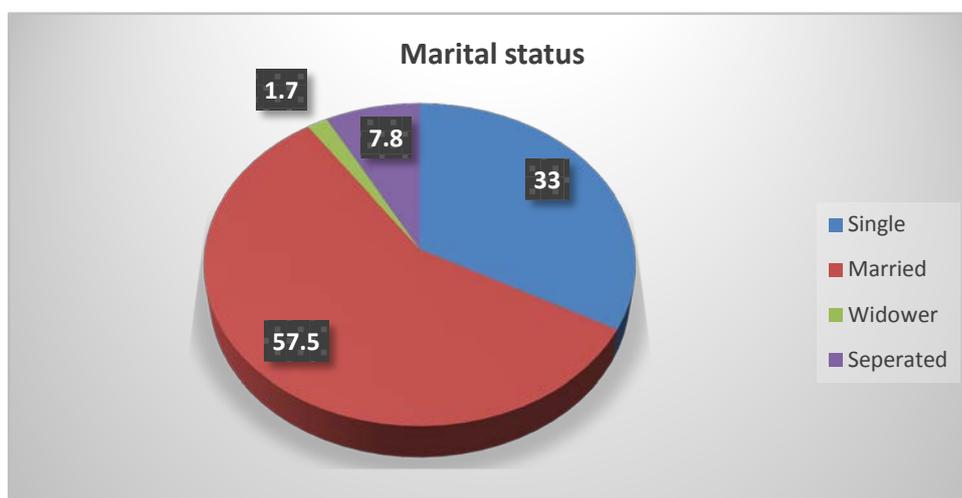


Figure 2. Distribution of marital status of respondent

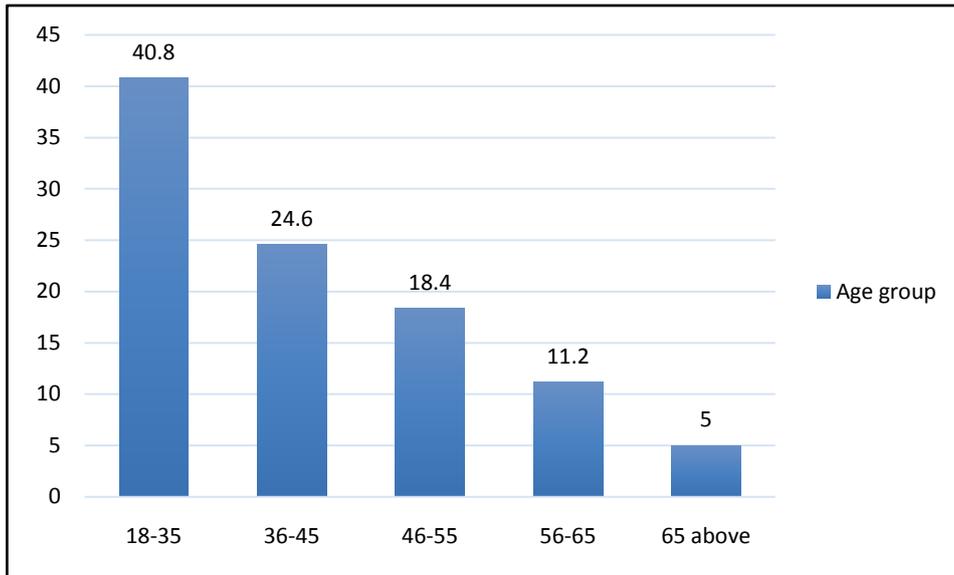


Figure 3. Distribution of household head by Age group

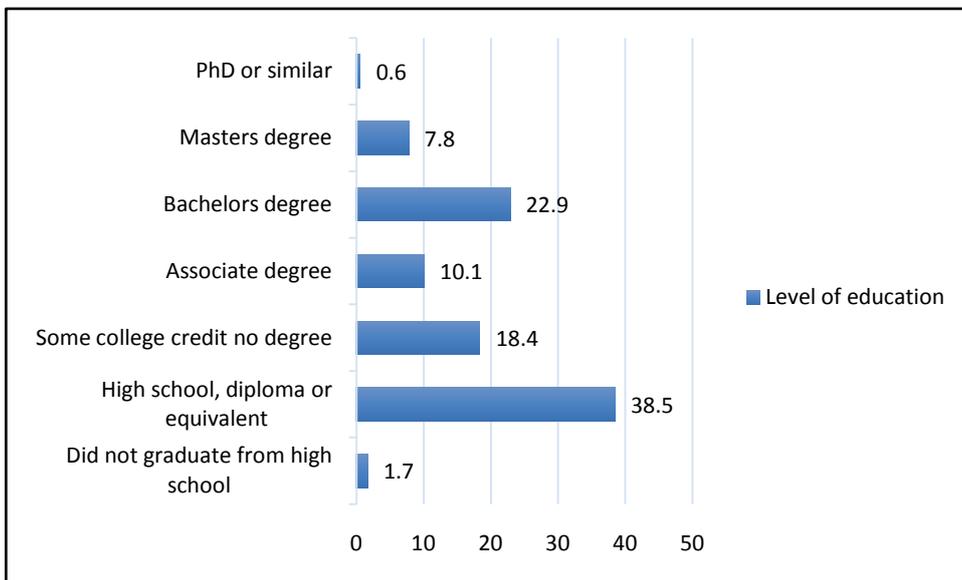


Figure 4. Educational status of respondents

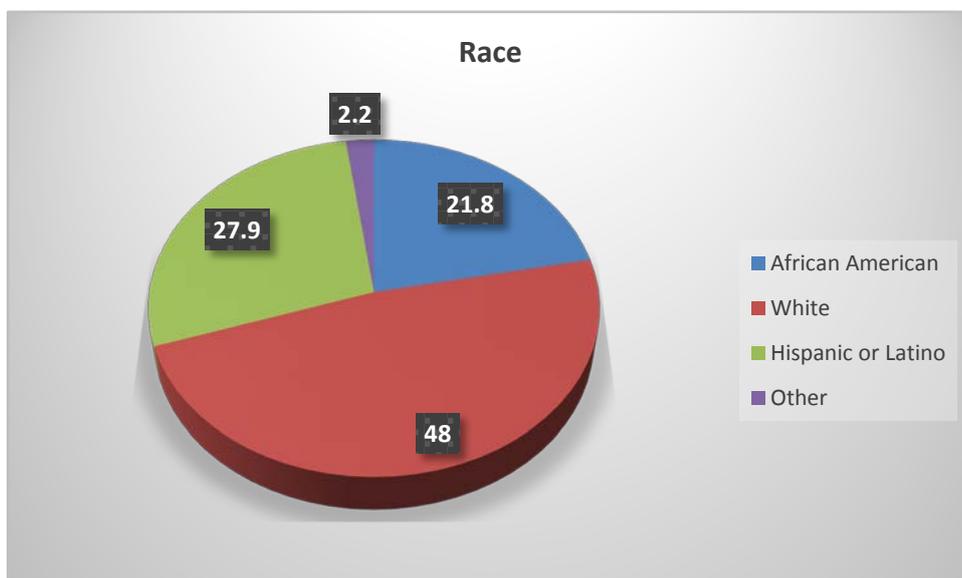


Figure 5. Racial distribution of respondent

3.2. COVID-19 Related Questions

Table 3 shows that 92.7% of the respondents indicated that COVID-19 pandemic had affected their lives, while 69.3% indicated that COVID-19 had affected their source of income, whereas 60.9% submitted that COVID-19 had affected their daily food consumption patterns. A high number of respondents in the study area (34.1%) turned to food pantries as rescue aid to augment their food expenditures, while most of the respondents reported that they were not receiving any support from charitable organizations. A small proportion, only 8.4%, indicated that they relied on government benefits such as SNAP (Supplemental Nutrition Assistance Program, aka food stamps) or WIC (program for pregnant or post-partum women, infants, and children supplemental food program).

Table 3. Distribution of respondents to selected COVID-19 questions

Variables	Category	Frequency	Percentage
Believed that COVID-19 pandemic has affected your life	Yes	166	92.7
	No	13	7.3
COVID-19 affects your income source?	Yes	124	69.3
	No	55	30.7
Received COVID-19 stimulus funds	Yes	131	73.2
	No	48	26.8
COVID-19 affected your daily food consumption pattern?	Yes	109	60.9
	No	70	39.1
Daily eating times	Once	11	6.1
	Twice	94	52.5
	Three times	69	38.5
	Four times	5	2.8
	Food pantry	61	34.1
	SNAP	8	4.5
Support from charitable organizations	WIC	7	3.9
	Assistance from church	3	1.7
	Other services	4	2.2
	None	96	53.6

3.3. Negative Feelings Experienced during the Pandemic

Table 4 presents the mixed negative feelings experienced by the respondents in the study area. About 64.8% of the respondents admitted that they were nervous during the lockdown, 72.1% indicated that they were worried, 63.1% experienced a sad feeling, 46.9% were depressed and 78.8% of the respondents indicated that they were feeling bored due to the outcome of staying indoors.

3.4. Household Food Security Status and Coping Strategies Adopted

The study used Household Food Security Index as a proxy to identify the determinants of food security status

of households. Table 5 clearly depicts that 63.13% of households in the study were food secure, while 36.87% were food insecure. This can be attributed to the fact that there was a lot of societal support from outside organizations, primarily charitable rather than governmental, during the pandemic, which thereby helped in reducing food expenses incurred by households. This is supported by the finding of Dowdell and Lesser [22], who opined that the effort to curtail the impact of the COVID-19 pandemic on households put a lot of strain on charity and non-profit organizations that provide emergency food aids to communities. In addition, the societal supports such as food pantries, SNAP, and the governmental economic relief stimulus packages played an essential humanitarian role that enabled households to have access and financial resources to purchase quality food.

As shown in Table 6, the minimum monthly household food expenditure was reported as USD 70, with USD 18.75 per capita food expenditure, while the maximum food expenditure USD 3000, with USD 900 per capita food expenditure, the low monthly household food expenditure during the pandemic also confirms the reality of the effort and support from charitable organizations during the lockdown. Moreover, Table 6 indicates that the minimum household monthly income of the respondents was USD 400, while the maximum per monthly income was USD 10,000. The average monthly income is calculated to be USD 2754; this illustrates a steady income cash flow in the study area during the pandemic. The average household size in the study area comprises of 3.3 members which translates into 4 members since we are reporting human research, with a minimum of one (1) person and a maximum of eleven (11) household members reported.

Table 4. Negative feelings experienced during the pandemic

Variables	Category	Frequency	Percentage
Nervous	Yes	116	64.8
	No	63	35.2
Worried	Yes	129	72.1
	No	50	27.9
Sad	Yes	113	63.1
	No	66	36.9
Depressed	Yes	84	46.9
	No	95	53.1
Bored	Yes	141	78.8
	No	38	21.2

Table 5. Food security status of household

Food security status	Frequencies	Percentage
Food insecure	66	36.872
Food secure	113	63.128
Total	179	100

Table 6. Selected summary statistics of respondent's food expenditure/Income

Socio-economic variables	Minimum	Maximum	Mean	Variance (n-1)	Standard deviation (n-1)
Household food expenditure (\$)	70.000	3000.000	495.615	107027.991	327.151
Per cap food expenditure (\$)	18.750	900.000	173.171	18575.166	136.291
Household monthly income (\$)	400.000	10000.000	2754.816	3847259.612	1961.443
Household size	1.000	11.000	3.318	2.218	1.489

Table 7 is a presentation of the coping strategies used by households during the pandemic to curb expenditures. Most of the respondents (64.2%) indicated that they controlled their daily expenses, 8.9% decided to reduce food consumption, 7.3% borrowed money from friends and family members, 5.6% pawned or sold assets to cover expenses, while 10.6% of the respondents indicated that the pandemic did not affect them financially.

Table 7. Coping strategies used

Variables	Frequency	Percentage
Controlling expenses	115	64.2
Borrowed money from friends and families	13	7.3
Pawned belongings	5	2.8
Sought opportunity for cash	6	3.4
Sale of assets	5	2.8
Cut down food consumption	16	8.9
The pandemic did not affect me financially	19	10.6

3.4. Determinant factors Driving Food Security in the Study Area

A Logit econometric regression model was used to identify the determinants of household food insecurity in the study area. Seventeen variables that were hypothesized to have influence on household food insecurity were included in the model. The result showed that household size and Income were significant at ($p < 0.01$). Educational status of household was also found significant at ($p < 0.05$). The remaining variables namely, gender, race, marital status, employment status, age, number of times eating daily, support from charitable organization, COVID-19 affected your life, COVID-19 affected income, received COVID-19 relief funds, COVID-19 affected food

consumption, coping strategies used were not statistically significant ($p > 0.1$). In view of the above summarized results, concise explanation for each significant variable is as follows:

The results in Table 8 shows that household size was associated and statistically significant ($p < 0.01$) to the food security status with a negative coefficient of (-0.553). Household sizes reveal a strong negative relationship with food insecurity in the study area. This implies that the food security status of households in the study area have the probability to decrease with an increase in size of households. An increase in household size by one member is associated with probability of 55.3% increase in the odds of that household being food insecure. This translate into the fact that an increase in household size might lead to additional expenses on the household head since resources are limited during the pandemic, which might put additional pressure on the household head thereby affecting their food security status.

Furthermore, the results in Table 8 show that increases in household income are likely to improve the food security status of household. The result reported a strong significant association between monthly income of the household and food insecurity ($p < 0.01$), with a positive coefficient of 0.100. This indicates that as income increases by one dollar, household food security status has the probability of increasing by 10%. This result corresponds to Wight, Kaushal, Waldfogel and Garfinkel [23] who reported that food insecurity decreases as income increases. As such, reduced income and job losses in the country during this pandemic have been mitigated by the prompt congressional response, through the provision of the American rescue plan and economic impact payments [24]. Thus, the rescue plan functioned as a needful support to struggling families and businesses during the pandemic [24].

Table 8. Socioeconomic determinants of household's food security status

Source	Coef.	Marginal effect	Wald Chi-Square	Pr > Chi ²	Odds ratio
Gender	-0.178	-0.034	0.160	0.689	0.837
Race	-0.266	-0.050	1.494	0.222	0.766
Marital status	-0.255	-0.048	0.712	0.399	0.775
Employment status	-0.163	-0.031	0.874	0.350	0.850
COVID-19 affected your life	0.942	0.178	1.239	0.266	2.565
Household size	-0.553***	-0.104	10.989	0.001	0.575
Income	0.100***	0.000	10.379	0.001	1.001
COVID-19 affected income	0.769	0.145	1.792	0.181	2.157
COVID-19 affected food consumption	-0.229	-0.043	0.173	0.677	0.795
How many times eating daily	0.174	0.033	0.200	0.655	1.190
Support from any charitable org	-0.087	-0.016	0.036	0.849	0.917
Receive COVID-19 stimulus funds	-0.373	-0.070	0.584	0.445	0.689
Coping strategies used	-1.426	-0.269	0.982	0.322	0.240
Age group	0.089	0.017	0.156	0.693	1.094
Education	0.439**	0.083	6.184	0.013	1.552
Constant	0.862		0.173	0.677	

Number of observations = 179

LR chi2(14) = 71.27

Prob > chi2 = 0.0000

Pseudo R2 = 0.3036

Log likelihood = -81.733964

Note ***Significant at 1%, ** Significant at 5%, * Significant at 10%

Finally, the educational status of household head was statistically significant ($p < 0.05$) with a positive coefficient (0.439). This implies that respondents' educational status has a strong positive probability with their food security status. In addition, the study further added that if the level of education of a household head increases by a degree, the household food security status has the probability of increasing by 44%. This is in line with the descriptive statistics finding of this study that about 31% of respondents in the study area were categorized as highly educated, having a college degree or higher. This means that households who have better education are more likely to be food secure compared to those who are less educated. Correspondingly, the finding is duplicated in Omotayo [19] and Omotayo [20].

4. Conclusion

This study assessed the current state of food insecurity in the city of Huntsville, Texas. It has also revealed the determinant factors driving food security in the study area and uncovered the coping strategies adopted by households to curb food insecurity during this unprecedented time. The finding from the research using a Household Expenditure Survey confirmed that the majority of the households (63.13%) in Huntsville are considered food secure, with the remainder (37.87%) classified as food insecure. Factors such as household size and income were found significant at ($p < 0.01$) respectively. Also, education of household head was statistically significant ($p < 0.05$). These three factors are the driving force behind the food security status of households in the study area. In a nutshell, majority of respondents disclosed that the COVID-19 pandemic has affected their lives and income. Consequently, most of the households necessarily turn to food pantries to supplement their food expenditures.

Acknowledgements

We appreciate everyone who participated in the online survey and the management of Covenant with Christ food pantry for their assistance.

Funding

The research was funded by Sam Houston State University, Huntsville, Texas.

Compliance with Ethical Standard

The authors declare that there are no conflicts of interest.

References

- [1] Kalil A, Mayer S, Shah R. SSRN Electron J. [Online].; 2020 [cited 2021 Aug 4]. Available from: https://bfi.uchicago.edu/wp-content/uploads/2020/10/BFI_WP_2020143.pdf.
- [2] US Department of Agriculture. Definitions of food security. [Online].; 2019 [cited 2021 March 7]. Available from: <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.aspx>.
- [3] Zachary P, Christopher W. Poverty and Social Policy Brief. [Online].; 2020 [cited 2021 February 7]. Available from: <https://ideas.repec.org/p/aji/briefs/2046.html>.
- [4] Fitzpatrick KM, Drawve K, Harris C. Facing new fears during the COVID-19 pandemic: The State of America's mental health. *Journal of anxiety disorders*. 2020; 75: p. 102291.
- [5] Block D. "US Food Banks Overwhelmed with Demand During Pandemic. New Alexandria; 2020 [cited 2020 May 15]. Available from: <http://www.voanews.com/covid-19-pandemic/us-food-banks-overwhelmed-demand-during-pandemic>.
- [6] Feeding America. The impact of the Coronavirus on food insecurity. [Online].; 2010 [cited 2020 November 30]. Available from: https://www.feedingamerica.org/sites/default/files/2020-04/Brief_ImpactofCovidonFoodInsecurity.pdf.
- [7] Coleman-Jensen A, Rabbitt MP, Gregory CA, Singh A. Household Food Security in the United States in 2018. Annual Report Household Food Security in the United States. United States Department of Agriculture, Economic Research Service, 2019. Report No.: ERR-270.
- [8] Kuchment O. AgriLife Today. [Online].; 2020 [cited 2021 April 7]. Available from: <https://agrilifetoday.tamu.edu/2020/10/14/covid-19-pandemic-erases-two-decades-of-fao>.
- [9] Stein-Lobovits S. Food Insecurity in the City of Austin: A GIS Analysis of Structural Indicators; 2015.
- [10] Dean WR, Sharkey JR. Food insecurity, social capital and perceived personal disparity in a predominantly rural region of Texas: an individual-level analysis. *Soc Sci Med*. 2011; 72(9).
- [11] Murimi MW, Kanyi MG, Mupfudze T, Mbogori TN, Amin MR. Prevalence of Food Insecurity in Low-Income Neighborhoods in West Texas. *Journal of Nutrition Education and Behavior*. 2016; 48(9): p. 625-630.
- [12] Dwyer C, Gerald H. Texas State Historical Association: Handbook of Texas. [Online].; 2020 [cited 2021 June 9]. Available from: <http://www.tshaonline.org/handbook/entries/huntsville-tx>.
- [13] Omonona BT, Agoi GA. An analysis of food security situation among Nigerian urban households: Evidence from Lagos State, Nigeria. *Journal of Central European Agriculture*. 2007; 8(3): p. 399-406.
- [14] Oduniyi OS, Tekana SS. Status and Socioeconomic Determinants of Farming Households' Food Security in Ngakan Modiri Molema District, South Africa. *Social Indicators Research*. 2020; 149(2): p. 719-732.
- [15] Midi H, Sarkar SK, Rana S. Collinearity diagnostics of binary logistic regression model. *Journal of Interdisciplinary Mathematics*. 2010; 13(3): p. 253-267.
- [16] Omotayo AO, Aremu AO. Evaluation of Factors Influencing the Inclusion of Indigenous Plants for Food Security among Rural Households in the North West Province of South Africa. *Sustainability* 2020; 12(22).
- [17] Hellevik O. Linear versus logistic regression when the dependent variable is a dichotomy. *Quality and Quantity*. 2009; 43(1): p. 59-74.
- [18] Omotayo AO. Parametric assessment of household's food intake, agricultural practices and health in rural South West, Nigeria. *Heliyon*. 2020; 6(11).
- [19] Omotayo AO. Farming households' environment, nutrition and health interplay in Southwest, Nigeria. *International Journal of Scientific Research in Agricultural Sciences*. 2016; 3(3): p. 84-98.
- [20] Omotayo AO. Economics of farming household's food intake and health-capital in Nigeria: a two-stage probit regression approach. *The Journal of Developing Areas*. 2017; 51(4): p. 109-125.
- [21] Huntsville, Texas Population 2021. World Population Review. [Online].; 2021 [cited 2021 January 12]. Available from: <https://worldpopulationreview.com/us-cities/huntsville-tx-population>.
- [22] Dowdel J, Lesser B. REUTERS. [Online].; 2020 [cited 2021 March 17]. Available from: <https://www.reuters.com/article/us-health-coronavirus-philanthropy-insig-idUSKCN21Y1XS>.
- [23] Wight V, Kaushal N, Waldfogel J, Garfinkel I. Understanding the Link between Poverty and Food Insecurity among Children: Does the Definition of Poverty Matter? *J Child Poverty*. 2014; 20(1): p. 1-20.

[24] Sprunt B. NPR. [Online].; 2021 [cited 2021 June 10. Available from:

<https://www.npr.org/sections/coronavirus-live-updates/2021/03/09/974841565/heres-whats-in-the-american-rescue-plan-as-it-heads-toward-final-passage>.



© The Author(s) 2021. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).