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Food Insecurity, Challenges, and Strategies among New Mexicans Experiencing Job Disruptions during COVID-19: A Cross-sectional Study

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Abstract

Background: The COVID-19 pandemic affected health, the economy, and the food system across the United States (U.S.)**.** This cross-sectional study examined the impacts of household income and job loss on food insecurity and food-related challenges among a sample of New Mexico residents during the COVID-19 pandemic.

Methods: The study was conducted by fielding an online survey from May through June 2020. Study participants were recruited via convenience sampling to complete a survey that included questions assessing job and/or household income loss, food insecurity, food-related challenges and worries, and strategies for acquiring food during COVID-19. The analysis included a series of multivariable logistic regressions that estimated the impact of household income and job loss on food insecurity, food-related worry and challenges, and strategies used to acquire enough food and food sources. Nine hundred and fifty-four respondents were included in the analysis.

Results: Compared to no job disruption, job loss increased the odds of experiencing food insecurity, two out of three food-related challenges, food-related worry, participation in SNAP, and use of most (six out of eight) strategies to obtain enough food. Compared to no job disruption, a reduction in household income significantly increased the odds of experiencing food insecurity, all three food-related challenges, food-related worry, utilization of group meal services, growing their own food, and use of most (six out of eight) strategies to obtain enough food.

Conclusion: Future research should continue to examine the economic impacts of COVID-19 on food access. Lessons learned during the pandemic can inform policy responses to future public health emergencies.

Keywords: COVID-19, Employment and Working Conditions, Health Services, Income and Social Status, Job Loss

Introduction

The COVID-19 pandemic negatively impacted health, employment, and the food system in the United States (U.S.). Aside from the direct impacts of the pandemic on health through contraction of the virus, the pandemic produced anxiety and fear among Americans due to uncertainties surrounding contraction and containment of the virus itself, job loss and disruption, and food system disruptions caused by stockpiling that were compounded by supply chain issues. Shortly after the first COVID-19 cases were reported in the U.S., the Secretary of Health and Human Services declared a public health emergency and states, territories, and tribes across the nation began mandating those non-essential businesses close and individual quarantine at home (U.S Department of Health and Human Services, 2021). Business closures resulted in reduction of employee hours, layoffs, and furloughs, particularly for individuals employed in low wage industries (Center on Budget and Policy Priorities, 2021).

Early in the pandemic, unemployment rates increased to levels not seen since the Great Depression, with unemployment reaching a peak of 14.7% in April 2020 compared to 3.5% in February 2020 (U.S Bureau of Labor Statistics, 2020). Although unemployment rates have since decreased, expanded unemployment benefits during the pandemic ended on September 6, 2021, with 31% of claims being covered under the expanded benefits (Center on Budget and Policy Priorities, 2021). In New Mexico, the unemployment rate was 7.6% in June-August 2021 compared to 5.5% nationally (Center on Budget and Policy Priorities, 2021). Unemployment impacts household income, which impacts the ability of households to purchase food and basic necessities and pay housing costs. Almost one quarter of New Mexicans reported not being caught up on rent in September and October 2021 compared to almost 17% of all Americans, and 9% of households in New Mexico reported that their household did not have enough to eat, which was in line with the national rate (Center on Budget and Policy Priorities, 2021).

Evidence suggests the COVID-19 pandemic severely impacted food insecurity and food-related challenges across the U.S (Niles et al., 2021). Importantly, newly food insecure families reported more challenges and worries related to food, including utilizing coping strategies like eating less to stretch food (Niles et al., 2020). In a survey of New Mexican adults conducted in May-June 2020, 30% of respondents were food insecure with 16% experiencing very low food security (Rogus et al., 2021). New Mexicans also reported a high degree of worry about food, challenges related to procuring food, and use of coping strategies related to procuring food, particularly those experiencing food insecurity. Food insecurity was already a pronounced public health issue in New Mexico, which consistently ranks among the top states in the U.S. for household food insecurity and childhood hunger (Coleman-Jensen et al., 2019).

Many individual and household factors are tied to food security status; however, food insecurity has been strongly linked to job loss and changes in income during the COVID-19 pandemic. Across the U.S., adults reporting a negative job change due to the pandemic experienced a higher prevalence of food insecurity (Niles et al., 2021; Niles et al., 2020; Niles et al., 2021). Nearly 25% of adults in New Mexico reported a job loss, disruption, or loss of income in the early stages of the pandemic (Rogus et al., 2022).

Although previous research has examined the relationship between job disruption and food insecurity during COVID-19, there is a lack of evidence examining how job disruptions affected food-related challenges, worry, and strategies for accessing food. Moreover, evidence is lacking on the relationship between job disruptions and food insecurity and food-related outcomes in New Mexico. The impacts of job disruptions on food insecurity and food-related challenges are critical to inform policies related to unemployment benefits and food assistance programs, especially in a state like New Mexico that struggled with food access long before COVID-19. The purpose of this study was to conduct a preliminary examination of the independent impacts of job disruption and household income loss on food insecurity, food sources and strategies for acquiring food, and food access challenges and worry among residents of New Mexico during the COVID-19 pandemic. We hypothesized that job disruption and income loss would be associated with higher food insecurity, greater food-related challenges

and worry, and increased use of various strategies – including food sources such as group meals and government food assistance programs – to acquire enough food for the household.

Methods

Study design and population

This cross-sectional study was conducted by fielding an online survey from May 21, 2020 to June 25, 2020. Survey participants were recruited via convenience sampling through social media promotion, non-profit organization and state agency listservs and websites, press releases, and media coverage. Inclusion criteria for the study included being a resident of New Mexico and aged 18 or older. Study approval was received by the {omitted for review} Office of Research Integrity and Ethics.

The survey was available in English and Spanish and included validated questions ($\alpha = 0.70$) from a survey developed by the National Food Access and COVID Research Team (NFACT) (Niles et al., 2021; NFACT., 2021; Harvard Dataverse., 2020). Questions asked participants about their food sources, strategies, and challenges around acquiring enough food during COVID-19 (beginning on March 11, 2020). It also asked about whether the participant had experienced a loss of household income or job loss since the pandemic began and included the USDA's 6-item short form food security survey module to gather information on food insecurity during the pandemic. The series of questions were scored according to USDA's guidelines and respondents were categorized as food secure (0-1 affirmative responses) or food insecure (2 or more affirmative responses) (U.S Department of Agriculture Economic Research Service., 2012). Additionally, the survey asked for socioeconomic and demographic factors, including participants' race/ethnicity, age, gender, highest level of education, and household size (including the number of household members under 18) and income. The survey asked participants for their ZIP Code, which was used to categorize participants into urban and rural categories. Rural-urban commuting area codes created by USDA's Economic Research Service (ERS) (U.S Department of Agriculture Economic Research Service., 2020) were further categorized into 4 categories based on the University of Washington WWAMI Rural Health Research Center's classification (University of Washington WWAMI Rural Health Research Center., 2021) (U.S Census Bureau., 2023).

The survey took approximately 20 minutes to complete. Participants consented to the study by continuing past the first screen and were able to opt out at any time. An option was selected in the survey software that placed a cookie on participants' browsers that prevented them from taking the survey more than once. A total of 2,156 individuals consented to the study. Respondents with ZIP Codes outside of New Mexico (n=160) and respondents who did not respond to any questions (n=509) were removed from the sample. A post-hoc sample size calculation for the adult population (1,620,991)[15] using a 95% confidence interval and +/- 5% margin of error indicated that a sample size of 385 was necessary, which was exceeded in this study.

Statistical analysis

Descriptive statistics were calculated for the study sample. Frequencies were calculated for categorical variables and means were calculated for continuous variables. 'Missing' was included as a separate category in each of the demographic characteristics. Most of the missingness was due to the same individuals missing values across all of the demographic characteristics.

The independent variable of interest was household income or job loss. Participants were asked if they had experienced a loss of income or job since the COVID-19 outbreak and could indicate that they did not have changes in their employment that reduced their income, had a reduction in work hours, had been furloughed, or lost their job. Those who experienced a reduction in work hours or who were furloughed were collapsed into a "household income loss" group (1=no job disruption or income loss, 2=household income loss, 3=job loss).

The dependent variables of interest were those that reflected food sources and food-related challenges, worry, and strategies that were expected to be impacted by household income or job loss (Table 1). These included some of the food-related challenges and reported food sources from the survey (i.e., challenges related to exposure to COVID-19 when getting food and food sources such as grocery stores, restaurants, and meal kit delivery were excluded) and all of the questions related to worry and strategies for acquiring enough food. A scale was created for responses to the worry questions, similar to a related study (Clay & Rogus, 2021). A binary response was generated for each question; responses of 1-3 were considered not worried and were assigned a 0 and responses of 4-6 were considered worried and assigned a 1. Binary responses for each question were summed for each respondent, creating a scale of 0-6. A final classification of "low worry" or "high worry" was determined if the scale value for each respondent fell at or below or above the average, respectively. The average score was 2, so responses of 1 and 2 were considered "low worry" and responses of 3-6 were considered "high worry" (0=low worry, 1=high worry).

Table 1.
Outcome variables, descriptions, and measures used in the analysis (variable name)

Variable	Description	Measure
Food insecure	Coded as food secure or insecure based on the 6-item USDA module questions. Scores of 0-1 were categorized as food secure and scores of 2-6 were categorized as food insecure (FI)	0 = food secure; 1 = food insecure
Challenges	Could not afford the amount or kind of food my household wanted (afford) Had challenges knowing where to find help for getting food (find help) Had to go to more places than usual in order to find the food my household wanted (more places)	0 = never or sometimes; 1 = usually or always
Worry	Food will become more expensive for my household Food will become unsafe My household will lose access to programs that provide free food or money for food My household will have a decrease in income and won't be able to afford enough food My household won't have enough food if we have to stay at home and can't go out at all There will not be enough food in the store	scale of 1-6: 1 = not worried at all, 6 = extremely worried
Food source	SNAP use since COVID-19 (SNAP) WIC use since COVID-19 (WIC) Utilized meals served in a group setting, like a senior center, church, or synagogue since COVID-19 (group meals) Grow own food since COVID-19 (grow own food)	0 = no; 1 = yes
Strategies	Accept food from friends or family (accept) Borrow money from friends or family (borrow) Buy different, cheaper foods (cheaper) Buy food on credit (credit) Buy foods that don't go bad quickly (like pasta, beans, rice, canned foods) (go bad) Get food from a food pantry or soup kitchen (pantry) Sign up for or continue participation in a government program such as SNAP or WIC or National School Lunch Program (programs) Stretch the food that I have by eating less (eat less)	0 = no; 1 = yes

Using a complete case analysis, binary logistic regressions were estimated to determine which dependent variables to include in subsequent multivariable logistic regressions for the binary outcome variables. Variables that were significant ($p<0.05$) were retained for the multivariable regressions. Demographic and socioeconomic variables including respondent age (continuous), race/ethnicity (categorical), gender (categorical), education level (categorical), rural/urban residence (categorical), household income (categorical) and size (continuous), and whether the household had children under 18 (binary) were included as covariates to understand the impact of job disruption independent of other characteristics on the outcomes of interest. Statistical significance was determined by p-values below 0.05. STATA version 15.1 was used to complete the analysis (STATA, 2021).

Results

Study Sample

One thousand four hundred and eighty-seven people provided consent and started the survey; however, 533 (35.8%) were excluded for incomplete responses, leaving 954 participants (64.2%) in this sample. The sample was not representative of New Mexico's population (Table 2). The majority of participants were non-Hispanic White (n=485, 50.8%) or Hispanic (n=297, 31.1%) and were located in an urban area in the state of New Mexico (n=658, 68.9%). The majority of participants were 30-64 years old (73.5%) and most were female (n=754, 79%). Most participants had a bachelor's degree or postgraduate degree and reported an income of $25,000-$49,999 (n=187, 19.6%) or $50,000-$74,999 (n=229, 24%). The majority of participants reported two or three to four household members total and the majority of participants had no children under 18 in their household. In the full sample, 626 (65.6%) experienced no change in employment or income due to the COVID-19 pandemic, while 252 (26.4%) reported a reduction in household income and 76 (8%) reported a job loss. The bivariate logistic regression results indicated that there was a relationship between household income or job loss and each of the dependent variables of interest, so all were retained for the multivariable logistic regressions (Supplementary tables 1-3).

Impacts of Job Disruption on Food Insecurity and Food-Related Challenges, Strategies, and Worry

Table 3 presents results of multivariable logistic regression, adjusting for age, gender, race/ethnicity, rural/urban designation, education level, household income, and household size. Compared to no job disruption, experiencing a reduction in household income significantly increased the odds of experiencing food insecurity (aOR=3.13, 95% CI=2.10-4.66), challenges affording food (aOR=2.45, 95% CI=1.43-4.21), challenges finding help with food (aOR=3.52, 95% CI=1.61-7.69), challenges in going to more places to purchase food (aOR=1.72, 95% CI=1.20-2.46), and food-related worry (aOR=1.56, 95% CI=1.09-2.23). Experiencing a job loss also significantly increased odds of experiencing food insecurity (aOR=3.70, 95% CI=2.00-6.85), challenges affording food (aOR=3.16, 95% CI=1.51-6.63), challenges finding help with food (aOR=3.79, 95% CI=1.40-10.26), and food-related worry (aOR=1.96, 95% CI=1.06-3.62).

Shown in Table 4, experiencing a household income loss was associated with higher odds of utilizing group meal services such as at senior centers (aOR=2.59, 95% CI=1.15-5.83), while experiencing a job loss was associated with higher odds of utilizing SNAP (aOR=3.69, 95% CI=1.77-7.68). Experiencing a household income loss was also associated with higher odds of participants growing their own food (aOR=1.48, 95% CI=1.06-2.07). Job disruptions due to the pandemic were not associated with WIC use.

Table 2.
Sample descriptive characteristics and comparison with the state (n = 954)

Characteristic	Levels	n (%)	NM population (%)	Income/job loss (n (%))
Race/Ethnicity	Non-Hispanic White	485 (50.8)*	36.6	150 (30.9)
	American Indian	54 (5.6)*	11.0	18 (33.3)
	Hispanic	297 (31.1)*	49.0	114 (38.3)
	Other non-Hispanic	68 (7.1)*	14.1	25 (36.7)
	Missing	50 (5.2)		21 (42)
Rural/urban classification+	Urban	658 (68.9)		221 (33.6)
	Large rural	130 (13.6)		49 (37.7)
	Small rural	61 (6.4)		16 (26.2)
	Isolated	59 (6.1)		24 (40.6)
	Missing	46 (4.8)		18 (39.1)
Gender	Male	142 (14.8)*	49.5	41 (28.8)
	Female	754 (79) *	50.5	260 (34.4)
	Other	12 (1.2)		8 (66.6)
	Missing	46 (4.8)		19 (41.3)
Age	18-29	94 (9.8)*	16.3	44 (41.5)
	30-44	258 (27.0)*	18.7	89 (36.1)
	45-64	444 (46.5)*	24.4	144 (32.4)
	65+	108 (11.3)*	17.4	30 (27.7)
	Missing	50 (5.2)		21 (42)
Education	High school or less	60 (6.3)*	40.8	37 (61.6)
	Some college	225 (23.5)*	33.6	93 (41.3)
	Bachelor degree	319 (33.4)*	14.6	100 (31.3)
	Post-degree	301 (31.5)*	9.0	77 (25.5)
	Missing	49 (5.1)		21 (42.8)
Income	under $13,000	62 (6.5)*		37 (59.6)
	$13,000 to under $25,000	94 (9.8)*	25.3	61 (64.9)
	$25,000 to under $50,000	187 (19.6)*	23.5	59 (31.5)
	$50,000 to under $75,000	229 (24)*	17.8	68 (29.7)
	$75,000 to under $100,000	129 (13.5)*	11.7	32 (24.8)
	$100,000 or more	186 (19.5)	21.6	44 (23.6)
	Missing	67 (7)		27 (40.3)
Household size^	1	126 (13.2)		36 (28.5)
	2	295 (31)		81 (27.4)
	3-4	338 (35.4)		122 (36.1)
	More than 4	145 (15.2)		69 (47.6)
	Missing	50 (5.2)		20 (40)
Children under 18	Households with no children under 18	546 (57.2)*	75.0	161 (29.5)
	Households with children under 18	354 (37.1)*	25.0	145 (40.9)
	Missing	54 (5.6)		22 (40.7)

* Indicates sample characteristic percentages that were significantly different from those for the New Mexico population.[17] A one sample test of proportion was conducted with statistical significance determined by p-values at or below 0.05. The lowest two household income categories were combined in the analysis due to differences in option cutoffs between the survey and US Census data.

+Rural/urban classification was not included in the state comparison because rural/urban classifications used in the analysis differ from U.S. Census classifications.

^For household size, a t-test was conducted to determine whether the mean household size of the sample (3) was statistically different from the mean household size in New Mexico (2.59), with statistical significance determined by a p-value at or below 0.05. The two values were significantly different.

Table 3.
Logistic regression analysis examining food insecurity and food-related challenges and worry among respondents experiencing income or job loss since COVID-19

	FI (n=869)	Challenge: Afford (n=828)	Challenge: Find help (n=663)	Challenge: More places (n=833)	Worry (n=870)
			aOR		
Job disruption					
No job disruption	Reference				
Household income loss	3.131***	2.456***	3.526**	1.719**	1.563*
Job loss	3.702***	3.165**	3.792**	1.056	1.963*
Intercept	0.166**	0.043***	0.022***	0.593	0.605

Shown in Table 4, experiencing a household income loss was associated with higher odds of utilizing group meal services such as at senior centers (aOR=2.59, 95% CI=1.15-5.83), while experiencing a job loss was associated with higher odds of utilizing SNAP (aOR=3.69, 95% CI=1.77-7.68). Experiencing a household income loss was also associated with higher odds of participants growing their own food (aOR=1.48, 95% CI=1.06-2.07). Job disruptions due to the pandemic were not associated with WIC use.

Shown in Table 5, experiencing household income loss was significantly associated with six of the eight strategies utilized by respondents to obtain food (accepting food from friends or family, borrowing money from friends or family, buying cheaper foods, purchasing food on credit, buying foods that do not go bad quickly, and stretching food by eating less). Experiencing a job loss was associated with six of the eight strategies (all of the above except purchasing food on credit and including signing up or continuing to participate in government programs like SNAP or WIC). Neither job disruption increased odds of reporting getting food from a food pantry or soup kitchen. The strongest associations were found between household income loss and job loss and borrowing money from friends or family (aOR=2.29, 95% CI=1.28-4.11 and aOR=5.35, 95% CI=2.59-11.08, respectively). Importantly, experiencing household income loss and experiencing a job loss significantly increased odds of reporting stretching food by eating less (aOR=2.17, 95% CI=1.50-3.13 and aOR=1.90, 95% CI=1.07-3.38, respectively).

Table 4. Logistic regression analysis examining food sources utilized by respondents experiencing household income or job loss since COVID-19

	SNAP (n=870)	WIC (n=803)	Group meals (i.e. senior center) (n=860)	Grow own food (n=870)
			aOR	
Job disruption				
No job disruption	Reference			
Household income loss	1.603	1.596	2.589*	1.483*
Job loss	3.694***	2.312	2.130	1.209
Intercept	0.077**	0.002***	0.021*	0.197**

Notes: Covariates included in the analysis: race/ethnicity, rural/urban residence, gender, education, income, household size, age, and households with children under 18
*p≤0.05, **p≤0.01, ***p≤0.001

Table 5.
Logistic regression analysis examining current strategies utilized by respondents experiencing income or job loss since COVID-19 (n=870)

	Accept	Borrow	Cheaper	Credit	Go bad	Pantry	Programs	Eat less
	aOR							
Job disruption								
No job disruption	Reference							
Household income loss	1.936***	2.297**	2.172***	1.979**	2.237***	1.433	1.515	2.170***
Job loss	1.949*	5.357***	2.387**	2.055	2.201**	1.702	3.605***	1.903*
Intercept	0.293	0.365	1.383	0.052***	0.516	0.114**	0.150*	0.315

Notes: Covariates included in the analysis: race/ethnicity, rural/urban residence, gender, education, income, household size, age, and households with children under 18
*p≤0.05, **p≤0.01, ***p≤0.001

Discussion

Nearly 35% of this sample of adults in New Mexico experienced a job disruption due to the COVID-19 pandemic by June 2020. Most of those who reported a disruption experienced a loss of household income (26.4%). Adults who experienced a disruption, either a reduction in household income or the loss of a job, had higher odds of food insecurity and higher odds of experiencing most food-related challenges and worries compared to those who experienced no job disruption. These individuals were also more likely to report utilizing a variety of strategies related to obtaining food, including borrowing money, purchasing foods that do not go bad as quickly, and eating less to stretch food. Adults who lost jobs were also more likely to utilize SNAP while adults who experienced a household income loss were more likely to utilize group meals or grow their own food.

Results of this study are consistent with recent evidence suggesting job disruptions are associated with food insecurity during COVID-19. In Vermont, adults who experienced job disruptions also had higher odds of food insecurity, particularly those who experienced a job loss due to the pandemic (Niles et al., 2020). In other studies of low-income Americans, those who lost jobs early in the pandemic had the highest degree of food insecurity (Fang et. al., 2021) as did those who were newly unemployed (Figueroa., 2022). Similarly, among a national sample of young adults, those expecting a job loss were more likely to be food insecure (Daniels & Morton., 2023). In Florida, job loss in families was associated with not only food insecurity, but also reduced likelihood of having enough food and poor child nutrition (Milovanska, 2021). This particular study found the association between job loss and food insecurity was driven by Hispanic individuals with lower education levels. Other studies also suggest disproportionate employment changes and food insecurity by race and ethnicity due to the pandemic, particularly among Black women.[23] In the present study, race/ethnicity and education levels were included as covariates in models, suggesting that in this sample of adults in New Mexico, the association between job disruption and food insecurity persists regardless of these sociodemographic characteristics.

Fewer studies have examined relationships between job disruptions and food-related worries, challenges, and coping strategies. A small study of adults using a Texas food pantry found households with COVID-19-related job disruptions had seven times the odds of food insecurity and reported concern about a number of food-related experiences including food becoming too expensive to afford, losing access to food assistance programs, and new food access barriers due to and post-pandemic (Chen et al., 2023). A study of adults who lost work during the COVID-19 pandemic suggests receiving unemployment insurance of $600 per week decreased food insecurity and eating less (Raifman et al., 2021). While increases in SNAP benefits likely also provided a safety net for families experiencing financial struggles due to the pandemic, adults in New Mexico in this sample reported the use of many other strategies to procure food. Concerningly, strategies included stretching food by eating less. Federal and state government may consider extending COVID-19-related expansion of SNAP, WIC, school lunch program, and other federal benefits to ensure families have enough nutritious food to eat since food insecurity continues to plague New Mexico. According to the U.S. Census Bureau Household Pulse Survey (2022), in New

Mexico, the percentage of adults in households where there was either sometimes or often not enough food to eat in the last seven days has increased from 9.7% during the week of April 23-May 5, 2020 at the very beginning of the pandemic, to 12% during the week of March 3-15, 2021, to 16% during the week of March 30-April 11, 2022.[26] Federal assistance programs must continue to support families and be marketed to adults who have lost jobs or income during the pandemic, particularly because a nationwide study suggested those who lost jobs reported low utilization of food assistance programs during the early phases of the pandemic (Fang et al., 2021). These individuals and families may not realize they are eligible for food-related assistance and support. Moreover, community programs should help families apply for food assistance programs, particularly in states like New Mexico, where many families speak languages other than English and may not know about resources available.

Food insecurity is associated with mental and physical health consequences; however, food-related challenges, worries, and coping strategies may also be linked to poor health. For example, food worries during the pandemic have been tied to increased odds of feeling anxious or worried and even suicidal thoughts and feelings (McAuliffe., 2021). Among low-income adults across the U.S. during the pandemic, food insecurity and job loss significantly increased the risk for anxiety and depression.[28] Additional research is needed to examine the long-term effects of food-related worries and coping strategies, like skipping meals, that resulted from job disruptions during the pandemic on health and wellness. Moreover, it is important to continue offering safety nets nationally, such as expanded SNAP benefits, to prevent health consequences of food insecurity as families with changes in employment and income may seek new work opportunities.

This study has several limitations that were mostly due to the necessity to conduct the survey quickly and remotely. A convenience sampling method was used, which means the results cannot be generalized to the population of New Mexico and should instead be interpreted as reflecting the survey sample of predominantly non-Hispanic White, female, middle-aged adults of higher socioeconomic status with children. Participant recruitment and the survey were conducted online, so residents without internet access were systematically excluded from participation. Therefore, both the sampling method and online survey delivery may have precluded those most at-risk of experiencing job disruptions and food insecurity from completing the survey. However, in New Mexico, 74% of individuals live in households with internet use.[29] The cross-sectional nature of this research means that conclusions cannot be drawn about causality. This study was not longitudinal, so it could not capture the direction of associations between job disruptions and food insecurity, challenges, worry, and strategies. Additional confounding variables that may have influenced relationships between job disruption or income loss and food-related outcomes were not captured in the survey so the results should be interpreted with caution. Finally, this study did not examine the theoretical relationships between the food-related outcomes. Testing such a theoretical model should be the focus of future research.

Participants also could have provided inaccurate or dishonest responses (Teitcher et al., 2015). This is difficult to control in online survey-based studies; however, must be considered in interpreting results. Moreover, response bias may have been present, where those that responded to the survey had a particular interest in the pandemic and its impacts on food insecurity, or have experienced a job disruption, providing more time to complete the survey and skewing the results. Despite limitations, strengths of the study include its early administration and validated survey instrument that included multiple components of food insecurity, and food-related challenges, worry, and coping strategies that are particularly important during a disaster (i.e., physical access to food, access to appropriate foods, and disaster-related uncertainty and fear).

Conclusion

This study highlights the early impacts of job disruptions during the COVID-19 pandemic on food insecurity, food sources and strategies for acquiring food, and food access challenges among a sample of residents of New Mexico. Reduction in household income or job loss among survey respondents was associated with higher odds of experiencing food insecurity and most food-related worries, challenges, and strategies. Respondents

reporting a job disruption utilized multiple strategies to cope with loss of household income, with the exception of food pantries.

Future research should continue to examine the economic impacts of COVID-19 and food access with a focus on rural communities, given that these communities are more vulnerable to disruption in household income and risk for food insecurity. Lessons learned about food access during COVID-19 have important policy implications for states like New Mexico where there was a high prevalence of food insecurity prior to the pandemic and households continue to experience financial hardship.

References

Chen, O., Badillo, C., Wristers, D., Ali, F. (2023). An investigation of the impact of COVID-19 on food access and security in Bexar County: A mixed methods approach. *J Prim Care Community Health*, 14, 21501319221147253.

Clay, L. & Rogus, S. (2021). Food access worries, food assistance use, purchasing behavior, and food insecurity among New Yorkers during COVID-19. *Front Nutr*. 2021,8.

Coleman-Jensen, A., Rabbitt, M., Gregory, C., Singh A. (2020). Household food security in the United States in 2019.United States Department of Agriculture. https://www.ers.usda.gov/webdocs/publications/99282/err-275.pdf?v=310.7.

Computer and Internet Access in the United States. U.S. Census Bureau. (2012). https://www.census.gov/data/tables/2012/demo/computer-internet/computer-use-2012.html.

Daniels, G., & Morton M. COVID-19 recession: Young adult food insecurity, racial disparities, and correlates. *J Adolesc Health*, 72(2), 237-245.

Examining Food Access and Food Security During COVID-19. (2020). National Food Access and COVID Research Team (NFACT). https://www.nfactresearch.org/.

Fang, D., Thomsen, M., Nayga, R. (2021). The association between food insecurity and mental health during the COVID-19 pandemic. *BMC Public Health*, 21, 607.

Fang, D., Thomsen, M., Nayga, R., Yang, W. (2021). Food insecurity during the COVID-19 pandemic: evidence from a survey of low-income Americans. *Food Secur.*, 14(1), 165-183.

Food Access and Security During Coronavirus Survey – Version 1.0 – Food Access and Security During Coronavirus. Harvard Dataverse. (2020). https://dataverse.harvard.edu/dataset.xhtml?persistentId=doi:10.7910/DVN/RQ6NMG.

Figueroa, J., Tosin-Oni, M., Phelan, J., Orav, E., Epstein, A. (2022). Changes in employment status and access to care during COVID-19 pandemic among low-income adults in 4 southern states. *J Gen Intern Med*, 37(11), 2795-2802.

Household Pulse Survey. U.S. Census Bureau. (2022). Household Pulse Survey. United States Census Bureau. https://www.census.gov/data-tools/demo/hhp/#/.

Map Classifications, Four Category Classification, Census Division. University of Washington WWAMI Rural Health Research Center. (2021, November). http://depts.washington.edu/uwruca/ruca-maps.php.

McAuliffe, C., Daly, Z., Black, J., Pumarino, J., Gadermann, A., Selmon, A., Thomson, K., Richardson, C., Jenkins, E. (2021). Examining the associations between food worry and mental health during the early months of the COVID-19 pandemic in Canada. *Can J Public Health*, 112(5), 843-852.

Milovanska-Farrington S. (2021, April). Job loss and food insecurity during the COVID-19 pandemic. Institute of Labor Economics. https://docs.iza.org/dp14273.pdf.

Niles, M., Beavers, A., & Clay L., Dougan, M., Pignotti, G., Rogus, S., Savoie-Roskos, M., Schattman, R., Zack, R., Acciai, F., Allegro, D., Belarmino, E., Bertman, F., Biehl, E., Birck, N., Bishop-Royse, J., Bozlak, C., Bradley, B., Brenton, B…Yerxa, K. (2021). A multi-site analysis of the prevalence of food security in the United States, before and during the COVID-19 pandemic. *Curr Dev Nutr*. 1(5), 12.

Niles, M., Bertmann, F., Belarmino E., Wentworth, T., Biehl, E., Neff, R. (2020). The early impacts of COVID-19. *Nutrients*, 12(7), 2096.

Niles, M., Wirkkala, K., Belarmino, E., Bertmann, F. (2012). Home food procurement impacts food security and diet quality during COVID-19. *BMC Public Health*. 202, 21(945).

Population estimates by age (18+): July 1, 2019. U.S. Census Bureau. (2021). https://www.census.gov/data/tables/time-series/demo/popest/2010s-state-detail.html**.**

Public Health Ecomergency Declarations. U.S. Department of Health and Human Services (2021, November). https://www.phe.gov/emergency/news/healthactions/phe/Pages/default.aspx.

Raifman, J., Bor, J., Venkataramani, A. (2021). Association between receipt of unemployment insurance and food insecurity among people who lost employment during the COVID-19 pandemic in the United States. *JAMA Netw Open*, 4(1), e2035884.

Rogus, S., Coakley K., Gonzales-Pacheco D., Martin S. (2021). Food access challenges, worry, and food insecurity during COVID-19 in New Mexico. *J Acad Nutr Diet*, 121(9).

Rogus, S., Coakley, K., Gonzales-Pacheco, D., Martin, S., Sroka, C. (2022). Food security, access, and challenges in New Mexico during COVID-19. *Curr Dev Nutr*. 13(6), 1.

Rural-Urban Community Area Codes. U.S. Department of Agriculture Economic Research Service. (2020, November). https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes.aspx.

StataCorp. (2021). *Stata Statistical Software: Release 17*. College Station, TX: StataCorp LLC. https://www.stata.com.

Tables: New Mexico. U.S. Census Bureau. (2020). https://data.census.gov/cedsci/table?q=new%20mexico.

Teitcher , J., Bockting, W., Bauemeister, J., Hoefer, C., Miner, M., Kiltzman, R. (2015). Detecting, preventing, and responding to "fraudsters" in internet research: ethics and tradeoffs. *J Law Med Ethics*, 43(1), 116-133.

Tracking the COVID-19 Economy's Effects on Food, Housing, and Employment Hardships. Center on Budget and Policy Priorities (2021). https://www.cbpp.org/research/poverty-and-inequality/tracking-the-covid-19-economys-effects-on-food-housing-and.

Unemployment Rate Rises to Record High 14.7 Percent in April 2020. U.S. Bureau of Labor Statistics. (2020). https://www.bls.gov/opub/ted/2020/unemployment-rate-rises-to-record-high-14-point-7-percent-in-april-2020.htm.

U.S. Household Food Security Survey Module. Six-Item Short Form. U.S. Department of Agriculture Economic Research Service. (2012). https://www.ers.usda.gov/media/8282/short2012.pdf.