



# The Early Impacts of COVID-19 on Food Security and Livelihood in Vietnam

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In April 2020, Vietnam initiated a country-wide lockdown to curb the spread of COVID-19. This secondary data analysis evaluates whether NGO-supported households ( $n = 3,431$ ) reporting to be severely impacted by the lockdowns differ from those reporting a lesser impact, regarding food availability within households and at markets and affordability. 19.2% of respondents indicated that the pandemic had severely impacted their livelihoods. In the severely impacted group, there was a higher percentage of urban residents (25.3 vs. 8.6%;  $p < 0.001$ ), households reporting decreased income (85.4 vs. 39.9%), and females (56.4 vs. 45.6%;  $p < 0.001$ ) than in the less impacted group. Both groups reported similar availabilities of staple food groups at the household-level, but the availability of green vegetables was lower in the severely affected group (Adjusted OR [aOR] = 0.62, 95% CI: 0.38, 1.00) than in the less affected group. However, local market availability of hygiene items (aOR = 1.64, 95% CI: 1.13, 2.39) and essential medicines (aOR = 1.80, 95% CI: 1.29, 2.50) were higher for the more impacted group relative to the less impacted group. While the self-reported livelihood impact of COVID-19 was associated with a loss of income, the association of indicators of food availability within households and at markets, and essential item affordability, did not frequently differ. Self-determination of a severe economic impact may represent a relative change in the household's socioeconomic status from before the pandemic.

**Keywords:** COVID-19, food security, livelihoods, food availability, food affordability, market accessibility, Vietnam

## INTRODUCTION

Lockdowns, curfews, and quarantines have been useful tools implemented by local and national governments to minimize widespread SARS-CoV-2 (COVID-19) outbreaks (Hsiang et al., 2020). After the first international cases were detected in late January, Vietnam began instituting border closures, travel suspensions, and localized lockdowns (Quach and Hoang, 2020). Then, beginning on April 1, 2020, Vietnam initiated a nationwide lockdown to suppress the spread of COVID-19 (The Prime Minister, 2020a,b). Research from other countries has shown that while lockdowns may be essential to halting the spread of the virus, there often are economic, social, and political consequences (Hamadani et al., 2020; Headey et al., 2020b; Laborde Debucquet et al., 2020; Pérez-Escamilla et al., 2020).

Moreover, the consequences of this economic decline are far-reaching and anticipated to prey on pre-existing vulnerabilities. To date, COVID-19 containment efforts have been shown to exacerbate pre-existing inequalities, particularly with regards to gender, income, and employment, necessitating a need for recovery policies and programs that are sensitive to these higher-risk demographics (Hidrobo et al., 2020; World Bank Group, 2020; International Labour Organization, 2021). Microeconomic models predicted that countries in the Asia-Pacific region are expected to be among the most severely impacted by the health and economic repercussions of the pandemic (Headey et al., 2020b; Robertson et al., 2020). Specifically, in 2020, it was estimated that COVID-19 could increase the percentage of people living in extreme poverty (below \$1.90 PPP) by 20%, or 150 million people, which would have devastating impact on global food security (Laborde et al., 2020).

After nearly a year of the global proliferation of COVID-19, these concerns are no longer theoretical. The food security and economic impacts of the pandemic are apparent. Food insecurity has risen dramatically. According to the Food and Agriculture Organization of the United Nations (FAO) ~118 million additional individuals were facing hunger in 2020, compared to just 1 year prior (AO, IFAD, UNICEF, WFP, and WHO, 2021). Similarly, 320 million additional individuals encountered inadequate access to food in 2020, raising the total number of people with inadequate food access to 2.37 billion (AO, IFAD, UNICEF, WFP, and WHO, 2021). This has happened in tandem with global economic decline; the United Nations Department of Economic and Social Affairs reported that global output dropped by 4.3% in 2020 (United Nations Department of Economic Social Affairs, 2021). While Vietnam was a slight exception to this trend, witnessing a modest economic growth rate increase in 2020, though it was still the lowest in 30 years (General Statistics Office, 2021; International Labour Organization, 2021). So, while national measures of economic productivity suggest Vietnam may have been spared from the brunt of the pandemic's economic impacts, the evidence above suggests that society's most vulnerable may still be grievously impacted by the pandemic and stresses the importance of research in this specific context.

Principal among the concerns is the anticipated impact of these socio-economic consequences on household food insecurity. Naturally, declines in household economic productivity and earnings have been shown to parallel impacts on food security and access to affordable essential medicine and daily necessities both in this region and across the globe (Martin-Prével et al., 2000; Block et al., 2004). Local food prices provide a potential glimpse into the declining nutritional diversity of households and were on a sharp rise during the initial stages of the pandemic, with rice prices in Vietnam rising by 25%, to their highest value in over seven years (Katsoras, 2020).

To combat the impacts of the pandemic, immediate and long-term social and economic mitigation strategies offer alleviation to those most affected (World Vision, 2020). However, there are great disparities in the size of fiscal support between high and low-and-middle-income countries, setting them on distinct recovery trajectories (International Monetary Fund Fiscal Affairs Department, 2021). Being able to recognize those individuals

most in need of immediate support may help guide effective pandemic responses.

To characterize the pandemic's impacts on households and to assess their recovery needs, Rapid Recovery Assessment surveys were administered by World Vision International in 14 countries in the Asia-Pacific region throughout May and June 2020. Across the region, the assessments preliminarily showed that those children and families experiencing pre-existing poverty and inequality continue to be the most vulnerable to the socio-economic impacts of the pandemic (World Vision, 2020).

In Vietnam specifically, as of the end of July 2020, the country had experienced under 459 COVID-19 cases, with no reported deaths (World Health Organization, 2020). Vietnam's uniquely successful response to the COVID-19 pandemic provides interesting insight. Their effectiveness at controlling the initial spread of COVID-19 has meant that the government issued a comparatively short initial nationwide lockdown relative to peer countries. Additionally, because the magnitude of COVID-19 infections has been minimized, the consequences reported in this study may be more attributable to the other aspects of the pandemic rather than to the direct health impacts of the virus itself. Thus, Vietnam's example allows analysis of the quasi-isolated impacts of a short lockdown on household-level food security and livelihood.

Knowing that pandemic containment strategies are not experienced uniformly, this study investigates whether households self-reporting to be most severely impacted by the pandemic differ from the households with the worst health and livelihood statuses. By understanding the degree of alignment between self-perceived impact and access to food, medicines, and other essentials, governments and civil societies may be able to better assess who is the most vulnerable to pandemics and to subsequently tailor future mitigation strategies.

## METHODS

### Data Sources

This secondary data analysis used a cross-sectional survey collected as part of a Rapid Response Assessment in communities supported by World Vision International in 14 Asia Pacific countries between May and June 2020. The survey in Vietnam was conducted face-to-face employing appropriate distancing measures. The Rapid Response Assessment consisted of both a household and a child survey. The current study used data from the responses to the household questionnaire for all 3,431 households surveyed in Vietnam (Kang et al., 2021).

### Sampling Methodology

A prior survey was conducted in the 35 NGO-supported communities using a lot quality assurance sampling (LQAS) methodology (Rath and Solanki, 2019). In each of 35 communities, depending on the size of supervision areas, either 95 or 114 households with children under 18 years old were selected to participate. This Rapid Recovery Assessment included the same households as were selected for the LQAS survey. Data collection for the Rapid Recovery Assessment occurred from June 22 to June 26, 2020. Informed consent was

obtained from all participants prior to the administration of the rapid assessment questionnaire (Kang et al., 2021).

## Available Variables

Data on household demographics, employment, food availability, affordability, and market access were collected. The socio-demographic information collected included residence location (urban vs. rural), the respondent's age, gender, occupation before COVID-19, type of water sources, household size, number of children under 5, between 6 and 12, and between 13 and 18 years of age, whether there were any pregnant or lactating women in residence, and whether any household member experiences chronic illness or disability.

Employment and livelihood questions asked about the main sources of income before the COVID-19 pandemic, any experiences of income change due to the pandemic and its lockdowns, what coping mechanisms were employed to offset income loss, and the main reasons for the pandemic's disruption of livelihood. In terms of the severity of the pandemic's impact on each household's ability to carry out livelihood activities, the possible choices were: "Yes. Fully," "Yes. Severely," "Yes. Moderately," "Yes. Slightly," and "No." For this paper, "Yes. Fully" and "Yes. Severely" were aggregated into a single variable representing a full or severe impact on livelihood, while the other three replies were grouped together to represent a slight or lesser impact.

The household's food security was ascertained through questions pertaining to the number of meals consumed by adults and children the day prior to the survey's administration, the current volume of food stock, the presence of specific food group items within the household, and the reported expenditure on food supplies before and during the COVID-19 pandemic. When asked if items from certain food groups (starch, protein-rich, legumes, green leafy vegetables, energy-dense, and dairy foods) were available, respondents selected from: yes, no, or don't know. A response of "yes" was categorized as the item being "fully available."

Lastly, questions covered the availability of essential items in local markets. Specifically, variables were collected on the availability of food and essential items at markets, as well as the affordability of food, essential medicines, housing, and loan payments. For the questions regarding item availability in local markets, responses of "always" and "sometimes" were grouped together to mean the item was "available" and were compared to the other options, which represented the item being "unavailable." Similarly, for all the affordability questions, any responses of "fully" and "partially" affordable were grouped together to mean the object was "affordable." All other responses were aggregated into a single variable representing the item being "unaffordable."

Additionally, the survey asked whether households were receiving regular updates on the status of the COVID-19 pandemic and local policies. If applicable, the channels through which the respondent regularly received these updates were also collected.

## Statistical Analysis

Comparability between households reporting a perceived severe (full or severe) impact of the COVID-19 pandemic and those reporting less (moderate, slight, or no) impact was evaluated using chi-square tests on the households' background characteristics including gender, residence (rural vs. urban), occupation before the COVID-19 pandemic, and their ability to meet the household's water and sanitation needs. The mean weekly food expenditure during the pandemic was compared to the mean food expenditure before the COVID-19 pandemic using a paired student *t*-test.

The differences in terms of the availability of food items within the household and at markets and the affordability variables between the two livelihood impact groups, those reporting the pandemic had a severe or full impact vs. those reporting a lesser impact, were analyzed using multivariable logistic regression. Gender of respondents, residence type (rural vs. urban), and the main source of income before the COVID-19 pandemic were all included, a priori, in the multivariable logistic regression models. Additionally, clustering at each area unit was taken into consideration. For each variable, the crude and adjusted odds ratios and 95% confidence intervals (CI) were estimated. All data were analyzed using the Stata 16.0 software (StataCorp College Station, TX).

## Ethical Disclosure

Informed consent was obtained from all participants prior to the administration of the rapid assessment questionnaire. Additionally, participation in the survey was voluntary and all information was handled following data protection regulations, including the anonymization of data before processing. This study was deemed to have an exemption of ethical review from the Johns Hopkins School of Public Health.

## RESULTS

### Background Characteristics

Of the 3,431 respondents, the majority (88.2%) reside in rural areas; more than half were men (52.4%), and three quarters were older than 35 years old (75%). Occupationally, 67.4% were engaged in agriculture, 45.9% are daily casual laborer, and 20.9% received a salaried income (**Table 1**). Additionally, of the 3,431 total respondents, 657 (19.2%) indicated that the COVID-19 pandemic had either "fully or severely" impacted their livelihood, and 2,774 (80.9%) indicated that they had been less impacted (**Supplementary Table 1**).

The respondents in the less impacted group were more likely to be male (54.4 vs. 43.8%;  $p < 0.001$ ) than those in the fully or severely impacted group (**Table 1**). Similarly, most of the study households in both groups lived in rural areas. The proportion of rural households was higher among the less impacted group (91.4%) than the fully or severely impacted group (74.7%), ( $p < 0.001$ ). There was no difference in the proportion of respondents across the age categories between the two groups ( $p > 0.08$ ).

The fully or severely impacted group had more respondents receiving income through salaried work (26.0 vs. 19.8%;

**TABLE 1** | Background characteristics of the two livelihood groups.

Demographics	Less impacted group (n = 2,774)	Fully or severely impacted group (n = 657)	P-value***	Total sample (n = 3,431)
Residence type			<0.001**	
Rural	2,536 (91.4%)	491 (74.7%)		3,027 (88.2%)
Urban	238 (8.6%)	166 (25.8%)		404 (11.8%)
Gender <sup>a</sup>			<0.001**	
Male	1,508 (54.4%)	287 (43.8%)		1,795 (52.4%)
Female	1,262 (45.6%)	369 (56.3%)		1,631 (47.6%)
Age			0.076	
Younger than 25 years	104 (3.8%)	21 (3.2%)		125 (3.6%)
25–34 years	620 (22.4%)	116 (17.7%)		736 (21.5%)
35–44 years	1,161 (41.9%)	289 (44.0%)		1,450 (42.3%)
45–54 years	515 (18.6%)	139 (21.2%)		654 (19.1%)
55 years or older	374 (13.5%)	92 (14.0%)		466 (13.6%)
Main source of income (before COVID-19) <sup>b</sup>				
Agriculture/livestock	2,011 (72.5%)	302 (46.0%)	<0.001**	2,313 (67.4%)
Daily or casual labor	1,267 (45.7%)	307 (46.7%)	0.626	1,574 (45.9%)
Salaried income	546 (19.7%)	171 (26.0%)	<0.001**	717 (20.9%)
Migrant worker	248 (8.9%)	108 (16.4%)	<0.001**	356 (10.4%)
Petty trade	53 (1.9%)	48 (7.3%)	<0.001**	101 (2.9%)
Fully able to meet water, sanitation, and hygiene (WASH) needs <sup>b</sup>				
Drinking and cooking	2,199 (79.3%)	556 (84.6%)	0.002**	2,755 (80.3%)
Toilet	2,088 (75.3%)	563 (85.7%)	<0.001**	2,651 (77.3%)
Bathing and personal hygiene	2,216 (79.9%)	575 (87.5%)	<0.001**	2,791 (81.3%)

\*\* $p < 0.01$ .\*\*\* $P$ -values were computed by chi-square tests.<sup>a</sup>Due to the small sample size, those who marked "other" as their gender were excluded from the table ( $n = 5$ ).<sup>b</sup>These questions allowed respondents to select multiple answer choices.

$p < 0.001$ ) and petty trade (7.3 vs. 1.9%;  $p < 0.001$ ) than the less impacted group. The fully or severely impacted group also had more respondents indicate they were migrant workers (16.4%) compared to 8.9% in the less impacted group ( $p < 0.001$ ). Notably, the less impacted group had more respondents earning income through agriculture (72.5%) than the fully or severely impacted group (46.0%), ( $p < 0.001$ ).

Lastly, across every water, sanitation, and hygiene (WASH) use category, the fully or severely impacted group had a greater proportion of respondents who indicated that they were able to meet their household's needs than the less impacted group in all categories (all  $p < 0.05$ ).

## Income Loss and Change in Food Expenditure Before and During COVID-19

There were sizeable differences in income change between the fully or severely impacted group and less impacted group (Table 2). A loss of income was reported by 85.4% of respondents in the fully or severely impacted group, while only 39.9% of respondents in the less impacted group reported job or salary loss ( $p < 0.001$ ). A higher proportion of the less impacted group experienced no change in income (49.4%) compared to the fully or severely impacted group (8.5%), ( $p < 0.001$ ). More households in the less impacted group switched to their secondary source of

income (10.4%) than households in the fully or severely impacted group (5.3%).

Weekly household food expenditures before and during the pandemic were also compared (Figure 1 and Supplementary Table 4). For the less impacted group the mean (SD) weekly food expenditure did not differ during the pandemic (370,890 Vietnam Dong (VND [1,960,673])), compared to before the pandemic (344,351 VND [959,922]), (tested by paired  $t$ -test;  $p = 0.46$ ). However, for the fully impacted group a significant decline was found from 422,377 VND (1,199,561) before the pandemic to 370,890 VND (1,960,673) during the pandemic ( $p = 0.01$ ).

## Availability and Affordability of Food and Essential Items

The availability of food groups differed considerably by the type of food (Table 3). Starch products were widely available to both the less impacted (94.3%) and the fully or severely impact group (93.0%). Pulses and legumes and milk products were the two categories least available to both livelihood groups. Only 49.2% of the less impacted group and 47.8% of the fully or severely impacted group noted that pulses and legumes were available locally. Similarly, less than half of the respondents in both the less impacted and fully or severely impacted groups reported

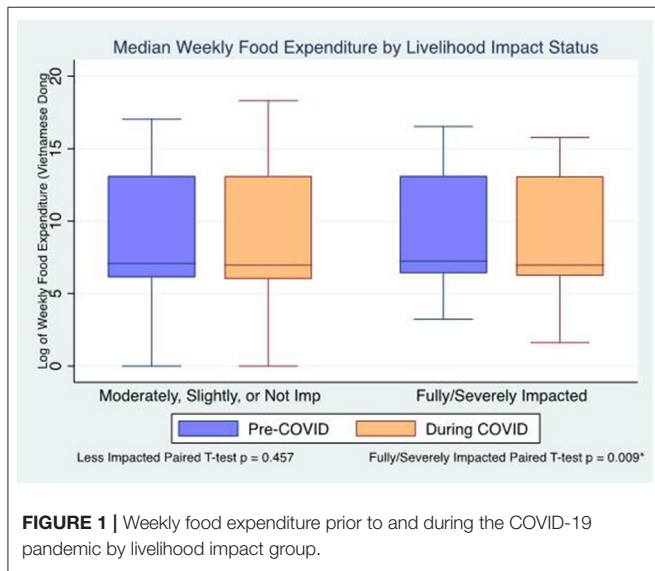


**TABLE 2** | Change in source of employment and income due to Covid-19.

	Less impacted group (n = 2,774)	Fully or severely impacted group (n = 657)	P-value***	Total sample (n = 3,431)
Change in employment and income due to COVID-19			<0.001**	
Decreased work or salary	1,107 (39.9%)	560 (85.4%)		1,667 (48.6%)
Increased work or salary	9 (0.3%)	6 (0.9%)		15 (0.04%)
Shifted to a secondary income	287 (10.4%)	35 (5.3%)		322 (9.4%)
No change	1,371 (49.4%)	56 (8.5%)		1,427 (41.6%)

\*\*p < 0.01.

\*\*\*P-values were computed by chi-square tests.



**FIGURE 1** | Weekly food expenditure prior to and during the COVID-19 pandemic by livelihood impact group.

an availability of milk products (36.3 vs. 47.0%, respectively). After adjusting for gender, residence type, and the primary source of income before COVID-19, the odds ratio for the availability of milk products was not statistically significantly different between the two groups. The odds of green and leafy vegetables being available were significantly lower among the fully or severely impacted group, compared to the less impacted group (aOR = 0.62; 95% CI: 0.38, 0.99;  $p = 0.05$ ).

The fully or severely impacted group's respondents reported more availability of fresh food, other basic food items, hygiene items, and essential medicines in local markets (82.2, 90.4, 90.4, and 81.1%) than the less impacted group (71.3, 85.3, 82.6, and 66.6%). After adjustment, the odds of the availability of hygiene items in the fully or severely impacted group was 1.64 times the odds of these items being available in the less impacted group (95% CI: 1.13, 2.39;  $p = 0.01$ ). Similarly, the adjusted odds ratio of essential medicines being available in the fully impacted group relative to the less impacted group was 1.80 (95% CI: 1.29, 2.50;  $p < 0.001$ ).

Many respondents in both groups reported difficulties affording daily items. Rent and loan payments were the items reported to be least affordable among both groups. Rent was only

reported to be fully affordable by 16.8 and 17.1% of respondents in the less impacted and fully impacted groups, respectively. Reported rates of loan payment affordability were only slightly higher at 20.0 and 19.8%, respectively. Hygiene products and food were the items that were most affordable for the two groups. However, even in the case of hygiene products and food, roughly half of respondents, indicated that the items were not currently fully affordable. After adjusting for baseline characteristics, the affordability of these items was comparable between both groups (all  $p > 0.05$ ).

## DISCUSSION

The COVID-19 pandemic, and its associated lockdowns, have had an unprecedented impact on the global economy, which has been disproportionately felt by low-and middle-income countries (Eaton, 2020; Tran C. et al., 2020). This study leverages data collected as part of Rapid Recovery Assessment in the initial stages of the pandemic to evaluate the impacts of the pandemic on livelihood and food security in Vietnam in June 2020.

In recent years, Vietnam has observed a sizeable increase in economic output, coupled with a stark decline in the country's undernourished population [Food and Agriculture Organization of the United Nations (b)]. Estimates from just prior to the pandemic placed the total number of undernourished individuals just above 6 million out of a total population of over 97 million [Food and Agriculture Organization of the United Nations (a); General Statistics Office, 2020]. Studies in Vietnam have shown that food insecurity tends to be associated with demographic and socio-economic factors like age, education, and household income (Vuong et al., 2015). Other crises have previously been shown to stress these vulnerabilities, resulting in increased and unequal experiences of food insecurity (Maes et al., 2010; Vilar-Compte et al., 2015; Costa et al., 2017; Maia et al., 2019). The presence of disparities in the experience of food insecurity in Vietnam, paired with evidence for demographic differences in the severity of COVID-19's economic and livelihood impact, raises concerns regarding the potential of the COVID-19 pandemic to deepen these inequities to eliminate recent progress.

The present study stresses that the fully or severely impacted and less impacted group differed in terms of their background characteristics. The more impacted group had a

**TABLE 3 |** Accessibility, affordability, and availability of items by livelihood impact group.

Food item is currently available		Number of respondents (percentage)	Crude OR (95% CI)	P-value	Adjusted OR (95% CI) <sup>a</sup>	P-value
Starch	Less impacted (REF)	2,617 (94.3%)	1.00		1.00	
	Fully impacted	611 (93.0%)	0.80 (0.44, 1.44)	0.45	0.87 (0.54, 1.40)	0.57
Protein rich	Less impacted (REF)	1,962 (70.7%)	1.00		1.00	
	Fully impacted	455 (69.3%)	0.93 (0.59, 1.47)	0.76	0.98 (0.67, 1.45)	0.93
Pulses and legumes	Less impacted (REF)	1,365 (49.2%)	1.00		1.00	
	Fully impacted	314 (47.8%)	0.95 (0.64, 1.39)	0.77	0.97 (0.66, 1.41)	0.86
Green leafy vegetables	Less impacted (REF)	2,528 (91.1%)	1.00		1.00	
	Fully impacted	524 (79.8%)	0.38 (0.20, 0.73)	0.004*	0.62 (0.38, 0.99)	0.050*
Other fruits and vegetables	Less impacted (REF)	2,010 (72.5%)	1.00		1.00	
	Fully impacted	424 (64.5%)	0.69 (0.43, 1.10)	0.12	0.82 (0.55, 1.21)	0.31
Energy-dense food	Less impacted (REF)	2,045 (73.7%)	1.00		1.00	
	Fully impacted	486 (74.0%)	1.01 (0.73, 1.41)	0.94	0.94 (0.67, 1.31)	0.72
Milk products	Less impacted (REF)	1,007 (36.3%)	1.00		1.00	
	Fully impacted	309 (47.0%)	1.56 (1.06, 2.30)	0.026*	1.35 (0.86, 2.10)	0.19

Item is available at market <sup>b</sup>		Number of respondents (percentage)	Crude OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Fresh food items	Less impacted (REF)	1,979 (71.3%)	1.00		1.00	
	Fully impacted	540 (82.2%)	1.85 (1.16, 2.98)	0.01*	1.48 (0.97, 2.25)	0.07
Basic food items	Less impacted (REF)	2,365 (85.3%)	1.00		1.00	
	Fully impacted	594 (90.4%)	1.63 (1.06, 2.51)	0.03*	1.34 (0.92, 1.97)	0.13
Hygiene products	Less impacted (REF)	2,290 (82.6%)	1.00		1.00	
	Fully impacted	594 (90.4%)	1.99 (1.33, 2.99)	0.001**	1.64 (1.13, 2.39)	0.01*
Essential medicines	Less impacted (REF)	1,847 (66.6%)	1.00		1.00	
	Fully impacted	533 (81.1%)	2.16 (1.52, 3.06)	0.001**	1.80 (1.29, 2.50)	0.001**

Item is affordable <sup>c</sup>		Number of respondents (percentage)	Crude OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Food	Less impacted (REF)	1,056 (38.1%)	1.00		1.00	
	Fully impacted	272 (41.4%)	1.15 (0.79, 1.68)	0.47	0.93 (0.70, 1.23)	0.60
Rent	Less impacted (REF)	457 (16.5%)	1.00		1.00	
	Fully impacted	112 (17.1%)	1.04 (0.73, 1.50)	0.82	1.07 (0.74, 1.56)	0.72
Essential medicines	Less impacted (REF)	908 (32.7%)	1.00		1.00	
	Fully impacted	268 (40.8%)	1.42 (0.96, 2.09)	0.08	1.15 (0.84, 1.58)	0.37
Loan payments	Less impacted (REF)	554 (20.0%)	1.00		1.00	
	Fully impacted	130 (19.8%)	0.99 (0.72, 1.36)	0.94	1.12 (0.83, 1.50)	0.47
Hygiene products	Less impacted (REF)	1,435 (51.7%)	1.00		1.00	
	Fully impacted	389 (59.2%)	1.35 (0.93, 1.96)	0.11	1.15 (0.84, 1.57)	0.38

\**p* < 0.05.

\*\**p* < 0.01.

<sup>a</sup>Gender of respondents, residence type (rural vs. urban), and the main source of income before the COVID-19 pandemic were all included, a priori, in the multivariable logistic regression models.

<sup>b</sup>A response of "yes" meant the item was "fully available." "No" and "Don't know" were grouped together to represent not being "fully available."

<sup>c</sup>Responses of "fully" and "partially" affordable were grouped together as "affordable." All other responses were aggregated to represent being "unaffordable."

higher proportion of urban residents, females, and was also more likely to earn their income through salaried work and petty trade. On the other hand, the less impacted group was more likely to earn their income through agriculture work. Ultimately, the fully impacted group was more likely to report a loss of income because of the pandemic. This trend of a disproportional impact between rural and urban areas was also

found in neighboring countries (Kang et al., 2021). In India and Myanmar, job loss and income reduction were also more pronounced in urban compared to rural areas, leading to more urban residents reducing their food expenditure during the pandemic (Kang et al., 2021). Additionally, a higher proportion of urban residents were engaged in daily laborer or salaried work, rather than agricultural work, which may have made them more

susceptible to job market volatility, as seen in both India and Bangladesh (Vyas, 2020; Zillur Rahman et al., 2020).

The results of this study suggest that while the self-reported livelihood impact status was generally well-aligned with reporting a loss of income, the association between a household reporting a full or severe impact and the other health and nutrition indicators of household food availability, affordability, and market access were not as robust. Understanding the differences between these self-reported livelihood impact groups in terms of food security, and economic metrics can help identify those households that are the most vulnerable to the pandemic, as well as strategies to increase resilience while simultaneously mitigating the current pandemic's severity.

It is notable that the respondents in the fully or severely impacted group were more likely to be female. The explanation for this likely encompasses many factors, but many among these may be rooted in cultural gender norms. Women often fulfill the caretaking roles as the food producers and preparers in this region; however, it is common, if not expected, for these women, under scarcity pressures, to prioritize filling their household members' mouths before their own (World Bank Group, 2009; Botreau and Cohen, 2019; Fuhrman et al., 2020). Women in Vietnam are also more likely to be living in extreme poverty (income below \$1.90 PPP per day) than their male counterparts (2.1 vs. 1.8%), (Asian Development Bank, 2021). Together, these differences may partially explain the higher proportion of females identifying that they were fully or severely impacted by the pandemic.

### Availability of Food Groups

Both the fully or severely and less impacted groups had similar availabilities of most food groups, with leafy green vegetables being the notable exception. Leafy green vegetables were more available in the less impacted group than the fully impacted group. The less impacted group was also more likely to have agriculture and livestock as their major source of income. Factors including disruptions to transportation, food handling, and processing have heightened the scarcity of certain food items in urban centers throughout Southeast Asia (Padhee and Pingali, 2020). Relatedly, farming households in nearby countries have reported less loss of income, along with being less impacted by food supply issues or market closures (Headey et al., 2020a). It is plausible that these forces have combined to enable the less impacted group, which is more likely to be employed in agriculture, to have a comparably greater availability of green and leafy vegetables relative to their fully or severely impacted peers.

Additionally, research in Vietnam's region suggests that rural households are often more resilient to shocks in the global economy, largely due to their diverse sources of income as a result of their employment in agriculture (Waibel et al., 2020). This is, at least in part, due to a greater diversification of crop and livestock production which better ensures income sustainability, and nutritional diversity in the face of economic hardships (Adjimoti and Kwadzo, 2018). It follows, that similar strategies might be undertaken in urban centers to build resilience. Solutions like urban gardens and agriculture have proven to create sustainability and ensure that access to nutritious food

persists through crises like this (Galhena et al., 2013; Lal, 2020). However, while these solutions would provide greater stability in the medium and long-term, other interventions are needed to alleviate the immediate impacts of the pandemic. In the short-term, countries like the Philippines, with the help of the Asian Development Bank, have provided food installments directly to the nation's most vulnerable households, particularly during lockdowns, when the risks of food insecurity are their greatest (Kim et al., 2020). Direct provision of food or the allocation of financial resources to the individuals in vulnerable demographics may be a feasible strategy to offset the short-term economic consequences of public health lockdowns and to protect many households from experiencing immediate and severe food insecurity during the global pandemic.

### Availability of Key Items in Markets

The odds of local market availability of hygiene items and essential medicines were greater among the fully and severely impacted group compared to the less impacted group. However, this study found that during the early lockdown period, there were no differences in the availability of fresh or staple food. Following the initial domestic cases of COVID-19, Vietnam's government began aggressively implementing strict public health measures (Quach and Hoang, 2020). The similar availability of fresh and basic foods at markets may suggest that, at least in the early stages, the market's function was not substantially impacted by the COVID-19 mitigation policies. Other studies also suggest that in the time-period of data collection for this study, local market systems largely were resistant to pandemic-related shocks (Béné et al., 2021).

### Affordability of Essentials

No differences were observed in the odds of affordability between the two groups. The fully and severely impacted group more frequently reported a loss of income than the less impacted group, and there was relatedly a slight drop in reported food expenditure from before the pandemic to during the pandemic. However, while this group reported a larger decline in food expenditure relative to before the pandemic, the total food expenditure during the pandemic was comparable between the two groups. As a result, even though the fully and severely impacted group witnessed a greater decline in household salaries and expenditures from their baseline, essential items may have remained equally, or more, affordable for them. This suggests that self-determination of a severe economic impact may represent a relative change in the household's economic status from before the pandemic that is not indicative of current vulnerability. This supports similar findings that the COVID-19 pandemic exacerbates pre-existing conditions to most heavily impact the lowest income countries and the citizens with the lowest socio-economic status within these countries (Eaton, 2020; Sherburne-Benz et al., 2020).

The minimal observed differences in affordability within Vietnam's context may also be aided by some of the social protection policies implemented by Vietnam. Shortly after the end of the country-wide lockdown, Vietnam's government initiated a 5-month deferment of land rental

fees, complemented by a reduction in land and housing rents beginning on April 7, 2020 (Tran T. P. T. et al., 2020). Policies like these may further explain why there are no significant differences in the affordability of rent between the two groups. Expansions of similar policies to cover other essential items may assist in further protecting the most vulnerable citizens.

## Strengths and Limitations

This study utilized data collected rapidly during the initial phases of the COVID-19 pandemic. These data provide insight into the ways that households were impacted by the initial spread of the virus, and country-wide lockdowns. Following Vietnam's lockdown period, these data are useful for specifically investigating the effects of the lockdown and other movement restrictions on household-level livelihood and food security. However, this study has several limitations. First, this selective choice of participants does not guarantee that the results are generalizable to the entire country population. Due to the urgent need to collect data at the beginning of the pandemic, communities with an established relationship with the regional World Vision offices were sampled. Secondly, this survey uses cross-sectional data that were collected at one point in time. As a result, there are no data available from prior to the pandemic. Comparisons to the household's economic status before the pandemic were made based on self-reported data, which could be susceptible to recall bias. Similarly, as byproduct of cross-sectional surveys capturing a snapshot at one time-point, there could be additional issues with temporality and reverse causality. Lastly, it may have been beneficial to have been able to measure and adjust for additional variables that were not gathered through the initial Rapid Response Assessments. For example, factors like a respondent's education level, which was not measured in this survey, may also impact their responses, and should be collected in future studies.

## CONCLUSIONS AND RECOMMENDATIONS

It is worth noting that Vietnam's response to the COVID-19 pandemic stands apart from many peers for its efficiency and impact on minimizing the health impacts of the pandemic. Additionally, Vietnam's government has implemented policies and programs that have allowed the economy to continue to experience modest growth in the face of global economic declines (General Statistics Office, 2021). While acknowledging these achievements, it is also important to recognize the potential for improvements in social and economic protection programs. As mentioned, strategies like urban agriculture and rent moratoriums can address disparities in COVID-19's impacts on livelihood and food security in the short and medium-term.

The findings from this paper reveal that those who lose income or report to be most severely impacted are not necessarily those who report they are most affected by the pandemic. Rather,

those individuals with pre-existing vulnerabilities are those that most directly feel the food insecurity and economic impacts of a global pandemic and country-wide lockdowns. As a result, long-term policies need to emphasize achieving sustainable growth and equity. Domestic and international organizations should pay particular attention to the individuals that are employed informally, as these households may not be included in current economic protection and unemployment policies (Nguyen et al., 2020).

Lastly, many households are engaging in other coping activities to make ends meet. These strategies include reducing meals, sending children to work, and borrowing money from relatives and friends (**Supplementary Tables 2, 3**). While alternatives exist for some households, the COVID-19 pandemic is widespread, affecting the ability of households to utilize other coping mechanisms. As a result, the government must play a role in ensuring that social security measures are available to ensure that the most vulnerable households remain resilient to shocks to food and economic systems.

## DATA AVAILABILITY STATEMENT

The data analyzed in this study is subject to the following licenses/restrictions: the data that support the findings of this study are available from the World Vision but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the corresponding author upon reasonable request and with permission of the World Vision. Requests to access these datasets should be directed to Dr. Yunhee Kang, [ykang12@jhu.edu](mailto:ykang12@jhu.edu).

## ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent from the participants' legal guardian/next of kin was not required to participate in this study in accordance with the national legislation and the institutional requirements.

## AUTHOR CONTRIBUTIONS

AA performed the analysis and drafted the manuscript. AB and JW assisted in data curation and contributed to the writing of the manuscript. AA and YK conceived and designed the analysis. CC and EW supported overall research procedure and contributed to the writing of the manuscript. YK had primary responsibility for the final content of the manuscript. All authors reviewed and edited the manuscript.

## SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsufs.2021.739140/full#supplementary-material>



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