Covid-19, Food Insecurity and Coping Strategies of the Extreme Poor in Bangladesh

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Abstract

This paper aims to assess food insecurity during the Covid-19 pandemic and coping strategies of the extreme poor in Bangladesh. Food security was measured in terms of shortage of food during the week before survey, with 532 households sampled from 9 districts. Results show that nearly 91% of the households faced a medium to severe level of food insecurity during the pandemic: about 37% of the households suffered severe food-insecurity, while roughly 52% suffered moderate food insecurity. To cope, nearly three-fourths of the food secure households used regular income, food-stock, and savings to access food. The severely food-insecure households adopted mostly borrowing strategies (80% of the households). The Logit model-based results show that the odds ratios of severe food insecurity were over 1, suggesting a deterioration of food insecurity for households which were led by females, had a special needs member, had a higher number of family members, suffered from previous shocks, and had previous loans.

JEL Classification Codes: E21, I31, I38, P46

Keywords: Food Insecurity, Consumption Rationing, Covid-19, Bangladesh.

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Introduction

The novel coronavirus (Covid-19), originating from Wuhan of China, has seen rapid spread across the globe since 2019, even forcing the World Health Organization (WHO) to declare a global pandemic. Within a year of the declaration, Covid-19 infected more than a hundred million people and caused the deaths of a couple of millions (Worldometer, 2021). In response, border restrictions and internal lockdown strategies were adopted by most countries affected (Erokhin & Gao, 2020; Mouloudj, Bouarar & Fechit, 2020; Ruszczyk, Rahman, Bracken & Sudha, 2020; Zurayk, 2020). The lockdown strategies soon after affected domestic trade, exports-imports, economic institutions, financial institutions, and the income of individuals as well as households (Erokhin & Gao, 2020; Zurayk, 2020). An immediate income shock was faced by day laborers, people employed temporarily, small vendors, and other low-income earners in urban areas of developing countries (Paul, Nath, Mahanta, Sultana, Kayes, Noon, Jabed, Podder, & Paul, 2021; Ruszczyk et al., 2020). Though the initial effect was urban-centric in developing countries, it eventually spread across the countries with varying degrees of impact (Paul et al., 2021; Ruszczyk et al., 2020). And while the pandemic inflicted health crisis led to an economic crisis across the world, coping strategies were not uniformly adopted by individuals, households, and institutions (Zurayk, 2020). Cortes and Forsythe (2020), using the Current Population Survey (CPS) data, showed that Covid-19 exacerbated inequality in the labor market, and employment loss was ubiquitous. However, individuals in low-paying occupations and industries, women, and disadvantaged people were affected badly (Cortes & Forsythe, 2020; Zurayk, 2020). During this unexpected global covariate shock, poor households became dependent on insufficient external support which thereby forced them to adopt internal short-term and long-term coping strategies. This paper aims to explore the food security status and coping strategies of the extreme poor of Bangladesh to manage Covid-19 inflicted food insecurity.

Methodology

The study used 532 extremely poor sample households[4] from nine districts of Bangladesh[5]. The districts were selected randomly from coverage of the Gratuitous Relief (GR) program of Bangladesh. From each of the districts, on average, 60 samples were drawn randomly from selected villages and interviewed through a structured questionnaire. The current sampling frame

[4] The households were beneficiaries of the Gratuitous Relief program of Bangladesh.

[5] The survey area covers a small part of nine districts: Bhola, Cox's Bazar, Gaibandha, Gopalganj, Jamalpur, Kurigram, Satkhira, Shariatpur, and Sunamganj.

purposively considered extremely poor households under assumption that the participants of the GR program truly represent the distribution of extreme poverty.

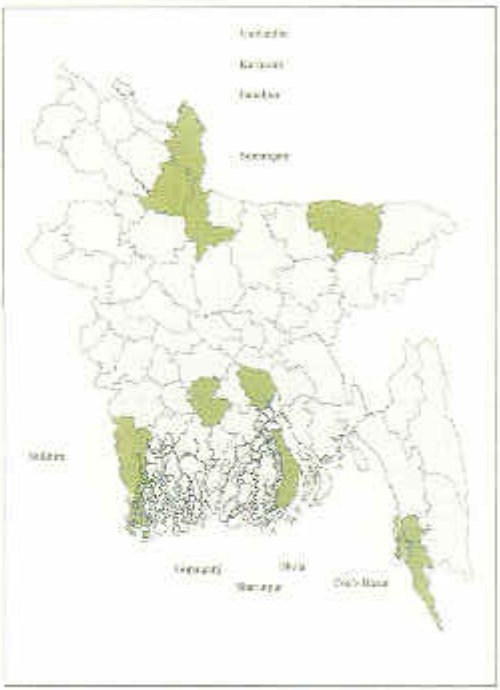

Figure 1: Survey Areas
Source : Authors' own

Most respondents were household heads or spouses (94%) and the remaining were adult members of the households. The average age of respondents was 44.8 years. 38.5% of the respondents were literate and the average years of schooling was 2.0 years. The average age of female respondents was higher than male respondents and they had a lower literacy rate but higher years of schooling compared to male respondents.

The study attempted to understand the food security status of households during the pandemic, while also drawing a comparison with the situation pre-pandemic. Food security was measured using the stock of food, and number of meals taken during as well as before the pandemic. It also aimed to explore, besides the pandemic, what factors exacerbated the food security situation.

To model the determinants of food insecurity, we generated a binary food security status variable based on the perception of stock of food in the household. A similar dichotomous variable was generated based on the number of meals taken before and during the pandemic. Following Woolridge (2002), let us assume that y_i denotes the food insecurity status of the household containing a value 0 for food secure households and 1 for food insecure households; the matrix X includes a set of socioeconomic variables, and the form of the binary response model is given by $P(y = 1|X) = G(X\beta) = p(X)$ where X is $1 \times K$, β is $K \times 1$, and the first element of X to be unity. The density of y given X can be written as;

$$f(y|x_i,\beta) = [G(x_i\beta)]^y[1-G(x_i\beta)]^{1-y}, \quad y = 0,1$$

The log-likelihood for observation i is a function of the $K \times 1$ vector of parameters, and the data (x_i, y_i):

$$l_i(\beta) = y_i log[G(x_i\beta)] + (1-y_i)[1 - G(x_i\beta)]$$

Assuming that $G(\cdot)$ is the logistic cdf, the maximum likelihood estimator β will be a logit estimator.

Literature Review

The discussion on widespread effects of Covid-19 on lives and livelihoods is dynamic as it affects all classes of people in society but at varying degrees. It affects the extreme poor worse than groups relatively better off. In poverty literature, the extreme poor are people living below the lower poverty line, i.e. the people who do not have the minimum level of income to meet even basic needs. The effect of Covid-19 on the labor market is also present in recent literature, within the larger area focused on effects of the pandemic. Cajner et.al. (2020) state that within the two weeks between March 14 and March 28 of 2020, the U.S. economy lost about 13 million paid jobs, and the cumulative loss till April 4, 2020 was 18 million whereas, during the entire Great Recession of 1932, the loss was 9 million. Kartseva and Kuznetsova (2020) estimate that half of those employed in the Russian labor market experienced high risks of dismissal, reduction of wages, delays in payments, forced leave, etc. Juranek et.al. (2020) show that in Sweden, the labor market shocks due to Covid-19 were present but were low compared to other Nordic countries.

Household food security refers to the secured access of households to sufficient food at all times (The Food and Agriculture Organization, 1985). In the 1996 World Food Summit, food security was defined as existing 'when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life' (Shaw, 2007). In 1981, Amartya Sen shattered the theory that food insecurity, the opposite of food security, was mainly a result of lack of availability of foodstuffs, by proving that individuals' food security was primarily dependent on their possibilities to access food, their '[ability] to establish entitlement to enough food' either through production-based, labour-based, trade-based, transfer-based, or other entitlement relationships. Maxwell et.al. (2003) suggests the use of Coping Strategies Index (CSI) as a rapid tool for measuring food security. In another study, Khandker et.al. (2012) used the number of meals daily consumed by the household members to measure food security and the situation of hunger in households.

Maxwell et.al. (2003), another study, listed six points to measure CSI as a proxy means of measuring food security which represented the potential coping strategies during crisis: (i) Eating less preferred foods, (ii) Limiting portion size, (iii) Borrowing food or money to buy food, (iv) Maternal buffering, (v) Skipping meals, and (vi) Skipping eating for whole days. Shariff and Khor (2008) used two types of coping mechanisms: (i) food-related coping strategies (e.g., reducing the number of meals, receiving food from others, cooking whatever was available, and reducing the amount of food cooked) and (ii) coping based on income and expenditure (e.g., borrowing money, sale of asset, reducing expenditure on education, and health, etc.).

While morbidity, mortality, isolation, social distancing, and mental health issues were major concerns in terms of health (Kar, Arafat, Kabir, Sharma, & Saxena, 2020), coping with the loss of income due to the pandemic was the major challenge for a majority of lower as well as middle income households. Kansiime et.al. (2021) found that in Kenya and Uganda, people adopted more food-based coping strategies compared to alternative livelihoods and they found that the pandemic reduced dietary quality through inducement of poor food consumption. Wieser et.al. (2020) found that in Ethiopia, one-fifth of households relied on savings to cope with the loss of income and this was larger in urban areas. The second most important coping strategy was consumption rationing.

Like other least developed and developing countries, low-income groups in Bangladesh suffered the most from the loss of income and livelihoods during the pandemic (Paul et al., 2021). Individuals and households had to resort to different coping strategies to recover from the loss of income and subsequent food insecurity (Paul et al., 2021; Ruszczyk et al., 2020). Ruszczyk et.al. (2020) reported that as strategies to cope with the shocks due to Covid-19, the households adopted consumption rationing, switching from good quality food to inexpensive starchy staples, the increase of the share of food to total expenditure, taking out loans, and accessing relief. A recent study by Paul et al. (2021) explored the livelihood related impact of Covid-19 on the lower income people of Bangladesh who live on daily earnings. The study found that the livelihood of about 94 percent of the respondents has been affected by the pandemic and the lower-income people have come under the category of the hardcore poor, while also becoming more marginalized than before.

Results

The respondents reported that around 89 percent of the households faced food shortages during the pandemic: about 37 percent faced severe food shortages

and 52 percent medium shortages. The food shortages were severe among the female-led households (53 percent) compared to male-led households (35 percent). The male-led households faced mostly a moderate level of food shortages (Table 1).

Table 1: Food Status during the Pandemic, 2020

Characteristics	Category	Gender of Household Head		Weighted average
		Male	Female	
Food shortage during the pandemic	Severe	34.83	52.73	37.10
	Medium	53.30	40.00	51.61
	No shortage	11.87	7.27	11.29
Meals before COVID-19	Two meals with the full stomach	14.44	16.67	14.72
	Two meals with half stomach	5.03	4.55	4.97
	Three meals with the full stomach	68.05	63.64	67.50
	Three meals with less than the full stomach	12.47	15.15	12.81
Meals during Covid-19	One meal	0.44	0.00	0.38
	Two meals with a full stomach	25.93	25.37	25.86
	Two meals with half stomach	17.21	8.96	16.16
	Three meals with the full stomach	27.45	10.45	25.29
	Three meals with less then the full stomach	28.98	55.22	32.32

Characteristics	Category	Gender of Household Head		Weighted average
		Male	Female	
The situation of meals compared to before pandemic	Improved[a]	5.25	9.09	5.74
	Worsened[b]	46.83	57.58	48.18
	Unchanged	47.92	33.33	46.08
Who rationed?	Adults	43.98	37.1	43.12
	Children	1.16	1.61	1.21
	Everyone	18.52	38.71	21.05
	None	36.34	22.58	34.62
Managing food	Food stock	8.52	3.03	7.82
	Regular income	27.29	16.67	25.95
	Savings	4.15	4.55	4.2
	Asset sale	1.09	3.03	1.34
	Borrowing/loan	26.42	25.76	26.34
	On credit purchase of goods	21.18	9.09	19.66
	Relief	2.18	6.06	2.67
	Borrowing from relatives/neighbors	8.95	28.79	11.45
	Others	0.22	3.03	0.57
Poverty	Headcount rate (%)	85.94	76.10	84.88

Source: Household Survey (2020). Note: The figures in the table represent percentage of households.

The respondents reported that before the pandemic, their family had above one meal during a day and the majority of them (80.31 percent) had three meals: (i) 67.5 percent had three meals with a full stomach, and (ii) 12.81 percent had three meals with less than a full stomach. During the pandemic, 57.61 percent of the households had three meals: (i) around one-fourth had three full meals, and (ii) 32.32 percent of the households had three meals with less than a full stomach. The number of meals during the pandemic increased during the pandemic for 5.74 percent of the households which was 9.09 percent among

[a] The number of meals and the quantity in the meals increased during the pandemic

[b] The number of meals and the quantity in the meals reduced during the pandemic. This includes both food rationing and the lower number of meals taken in a day

the female-led households and 5.25 percent among the male-led households. The adults mostly rationed consumption (About 85 percent of the households were living below the national poverty line[5].

The results show that 25.95 percent of the households used their regular income to purchase food and 7.82 percent used the food stock to manage a week during the survey. Around 26 percent of the households had to borrow money to manage food in the last week during the survey and about 20 percent of households purchased food on credit. The relief was scanty but informal borrowing was engaged in. Only 2.67 percent of the households used relief to access food whereas 11.45 percent of the households borrowed from relatives or neighbors. Over one-third of the female-led households managed food through relief and borrowing from relatives and neighbors, another one-third purchased food by cash credit or on credit. Nearly half of the male-led households used cash credit or on credit to manage food during the last week of the survey and over one-third used regular income and food stock to manage food.

The discussion shows that the food security status of nearly half of the households worsened during the pandemic and they had to manage food by credit (cash or on credit), borrowing from relatives and neighbors, and their regular income. As the sole source of food finance, the tendency of the households was not high.

Table 2: Demographic and Socioeconomic Characteristics of the Food Secure and Insecure Households during the Pandemic, 2020

Characteristics	Food security status				t-stat		
	Severe	Medium	No shortage	Total	Severe vs. Medium	Severe vs. No shortage	Medium vs. No shortage
Female household head	18.01	9.82	8.16	12.67	2.35	1.67	0.36
	0.39	0.30	0.28	0.33			
Literate (Yes 1)	31.06	43.30	42.86	38.71	2.45	1.53	0.06
	0.46	0.50	0.50	0.49			
Years of schooling	1.95	2.27	2.10	2.13	1.00	0.30	0.36
	3.26	3.02	2.84	3.09			

[5]The weighted national poverty line of HIES (2016) has been updated using the inflation rate.

Characteristics	Food security status				t-stat		
	Severe	Medium	No shortage	Total	Severe vs. Medium	Severe vs. No shortage	Medium vs. No shortage
Household size	4.84	4.84	5.10	4.87	0.04	0.88	0.98
	1.74	1.65	1.98	1.72			
Total monthly household income (average)	6709	8268	10020	7886	3.60	4.40	2.33
	3951	4360	6339	4597			
Number of earners	1.15	1.17	1.37	1.19	0.55	2.48	2.39
	0.42	0.42	0.81	0.49			
Monthly household expenditure	8512	8511	9520	8628	0.001	1.38	1.35
	4067	4496	5655	4493			
Monthly food expenditure	6446	5861	6133	6111	1.84	0.57	0.60
	3407	2748	3253	3073			
Monthly non-food expenditure	2174	2632	3178	2518	2.39	3.18	1.52
	1494	2045	2831	1983			
Monthly savings	171	782	1469	633	4.46	4.79	2.07
	395	1707	3379	1731			
Disabled person in the household	16.15	9.38	8.16	11.75	2.00	1.40	0.27
	0.37	0.29	0.28	0.32			
Shocked in previous year	75.78	50.89	61.22	61.29	5.10	2.00	1.31
	0.43	0.50	0.49	0.49			
Had loan in last year	67.08	58.93	55.10	61.52	1.63	1.53	0.49
	0.47	0.49	0.50	0.49			

Source: Author's calculation (2021) [Data: Household Survey (2020)]

The survey results showed that nearly 91 percent of the households faced a medium to severe level of food insecurity during the pandemic: about 37 percent of the households became severely food insecure, and around 52 percent were moderately food insecure (Table 1). The results showed that among the severe food insecure households, 18 percent were led by female heads whereas that was

8.16 percent among food secure households. The literacy rate and the years of schooling of the household head were higher among the food secure households compared to the food insecure households but the gaps were not statistically significant, and there was no significant difference in the average number of household size among those two groups. There were statistically significant differences in the average monthly household income and the average number of earners between the food-secure and food insecure households. The average monthly household income of the moderately food insecure households was BDT 8268. and BDT 6709 for severely food insecure households, whereas that was BDT 10020 among the food secure households. The average number of earners in the household was 1.37 among the food secure households and that was 1.15 among the severely food insecure households. The majority of the income of the severely food insecure households spent their income on food, nearly three-fourths of the total spending, and that was less than two-thirds among the food secure households. The food insecure households had lower monthly savings (BDT 171 among severely food insecure households. and BDT 782 among the moderate food insecure households) compared to the food secure households (BDT 1469). The incidence of disability, the presence of a disabled member in the household, and previous loan burden were high among the food insecure households compared to the food secure households.

Table 3: Coping Strategies by the Nature of Food Security during the Pandemic, 2020

Coping strategy	Food security status				|t-stat|		
	Severe	Medium	No shortage	Total	Severe vs. Medium	Severe vs. No shortage	Medium vs. No shortage
From own storage	1.88	8.07	31.25	8.35	2.64	7.04	4.60
	(0.14)	0.27	0.47	0.28			
Buying by regular income	9.38	18.83	33.33	16.94	2.58	4.24	2.23
	(0.29)	0.39	0.48	0.38			
From savings	2.50	3.14	10.42	3.71	0.37	2.39	2.33
	(0.16)	0.17	0.31	0.19			
Money from selling out assets	0.63	2.69	0.00	1.62	1.49	0.55	1.15
	(0.08)	0.16	0.00	0.13			
From borrowing/ loan	45.00	21.97	16.67	29.93	4.91	3.63	0.82

Coping strategy	Food security status				|t-stat|		
	Severe	Medium	No shortage	Total	Severe vs. Medium	Severe vs. No shortage	Medium vs. No shortage
	(0.50)	0.41	0.38	0.46			
Buying goods in	15.00	30.94	4.17	22.06	3.64	2.00	3.92
on credit purchase	(0.36)	0.46	0.20	0.42			
From relief	4.38	3.14	0.00	3.25	0.63	1.47	1.24
	(0.21)	0.17	0.00	0.18			
Borrowing from relatives/	20.00	10.76	4.17	13.46	2.54	2.63	1.40
neighbors	(0.40)	0.31	0.20	0.34			
Others	1.25	0.45	0.00	0.70	0.88	0.78	0.46
	(0.11)	0.07	0.00	0.08			

Source: Author's calculation (2021) [Data: Household Survey (2020)]

The results show that the food secure households managed food by following four major strategies: (i) use of own stock (31.25 %), (ii) purchase with regular income (33.33%), (iii) use of savings (10.42%), and (iv) borrowing. Nearly three-fourths of the food secure households managed food using regular income, stock, and savings. The severely food insecure households adopted mostly borrowing strategies (80% of the households): (i) borrow from institutions (45%), (ii) on credit purchase (15%), and borrow from relative/ neighbors (20%). Around 52 percent of moderately food insecure households used borrowing and on credit purchase as coping strategies. As a coping mechanism, few households adopted asset sale strategies and were dependent on external support. There were statistically significant differences among severely, moderate, and food-secure households in using food stock as a method of coping with the food insecurity during the pandemic. The food secure and moderately food insecure households used food stock to meet food demand during the pandemic. Regular income was an important source of money to buy food during the crisis among the food secure households. The severely and moderately food insecure households were statistically homogenous in terms of using savings, distressed asset sales, and relief as coping strategies.

Table 4: Determinants of Food Insecurity (Logit Model-Based Results)

Explanatory variables	Model 1		Model 2		Model 3	
	Odds ratio	z-value	Odds ratio	z-value	Odds ratio	z-value
Gender of household head (Female=1)	1.85	2.18	1.77	2.02	1.49	1.41
Household size	1.11	1.86	1.08	1.29	1.11	1.83
Presence of disabled member	2.55	3.05	2.21	2.61	2.04	2.35
Affected by shocks in the previous year	2.75	4.59				
Loan in the previous year (Yes=1)			2.37	4.29		
Monthly savings (BDT)					1.00	-3.82
Constant	0.11	-6.07	0.16	-5.57	0.29	-4.01

Source: Author's calculation (2021) [Data: Household Survey (2020)]

Using Logit models, three sets of results were estimated and reported in table 4. In each model, the common three explanatory variables were the gender of the household head, number of members in the household, and presence of a disabled member in the household. In model 1, a dummy variable indicating the status of the households 'affected or not affected by shocks in the previous year', model 2, a dummy variable indicating whether the household having the previous loan, and the third model included the monthly savings volume as an explanatory variable. The results in each model show that the odds ratios of food insecurity were above one for all of the explanatory variables in the three models except that for the savings variable in model 3. The results reveal that food insecurity was aggravated among the female-led households, households having a disabled member, those with a larger household size, households affected by shocks in the previous year, and households having lower savings balances. The results confirm that food insecurity was worsened among marginalized, disadvantaged, and vulnerable people.

Discussion

We can thus see how there was turmoil inflicted within households because of the lockdown. This immediately affected the regular flow of income for many of the day laborers, small vendors, and low-paid wage earners. The sudden stalemate of the economy brought the great concern of food insecurity for the poorest section of the country. Perceptions and studies showed that food insecurity aggravated substantially. Hamadani et.al. (2020) found that between May 19 and June 18, 2020, any level of food insecurity increased by around 52 percent. They showed that around 31 percent of the households were food secure, whereas 17.6 percent were mild, 36.5 percent were moderate, and 15.3 percent were severely food insecure. In our study, we found that nearly 89 percent of the households faced a medium to severe level of food insecurity. The difference in the level of food insecurity could be for the different times of the survey, the classification of food security, and the characteristics of the respondents. Moreover, our survey covered the extremely poor people of nine districts of Bangladesh whereas the study of Hamadani et.al. (2020) focused on women and their families in rural Bangladesh. The urban dwellers were badly affected by the pandemic at the early stages compared to rural areas. Das et.al. (2020) found that around 90 percent of the households faced different levels of food insecurity during the pandemic, an almost similar scenario to us, and severe food insecurity was higher among the urban households (42%) than the rural households (15%). They also found that to cope with food insecurity, the households followed the borrowing strategy (76% of the households borrow), and changed consumption patterns (74% of the households), consumed fewer quantities. We also found that borrowing was the principal strategy of the severely food insecure households whereas the food secure household used food stock, regular income, and savings to cope with food insecurity. Kundu et. al. (2020) in their paper have found that the effects of households' socio-economic variables and Covid-19 on income and occupation are the important predictors of household food security (HFS), and household dietary diversity (HDD) in Bangladesh. The study showed that the HFS and HDD was low when the respondents have no formal education, are employed other than in a government job, and have a low monthly income. The study found that over 70 percent of household income earners faced income reduction during the pandemic which has negatively affected the HFS and HDD of respective households. In another study, Ahmed et. al. (2020) found that about 90 percent of the households reported a negative income shock following the countrywide lockdown. Households affected by income shock during the pandemic have utilized their past savings, food stocks, and loans from various sources as coping strategies.

Conclusion

The Covid-19 pandemic has highly disrupted economic activities globally and affected the physical health, mental health, food security, and overall welfare of the people. The fallout of Covid-19 has allegedly been disproportionate for the people of lower incomes. Our study shows that food insecurity increased among 89 percent of the households when compared to the situatio pre-pandemic. To cope with food insecurity, the extreme poor of Bangladesh adopted borrowing strategies whereas the food secure households used food stock, regular income, and savings as the principal strategies.

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