Financial Stress Impact of Covid-19 Pandemic: Lessons Learned from Strategies Adopted by Low-Income Households

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Abstract

This research examined the impact of the Covid-19 pandemic on financial stress of households and strategies adopted by low-income households to deal with such financial stress. A survey on 577 respondents was carried out using a simple random sampling technique to acquire data. Binary logit model and probit model were applied to achieve the research objectives. Findings demonstrate that during Covid-19 pandemic low-income people had escalated financial stress and that respondents' age, income volatility, family financial efficiency, medication cost, and creditors' pressure all have substantial influences on financial stress. Findings of gender based analysis indicate that male respondents had experienced more financial stress compared to female respondents. Results of robustness check confirm the main findings of the study. This study also discovered that low-income households had adopted several strategies, mostly changing eating habits, taking loans and selling personal properties to deal with financial stress caused by Covid-19 pandemic. Based on the findings, this study offers policy recommendations that may alleviate financial stress by reducing the financial constraints of extreme poor individuals.

Keywords: Bangladesh, financial stress, low-income households, binary model

1. Introduction

The Covid-19 pandemic is distinct from previous crises in terms of its potential for adverse economic and societal impacts. Covid-19 pandemic is having a direct damaging influence on the economy in various ways. Border closures, stay-at-home regulations, lockdowns, hazard control in the workplace, and travel limitations, for example, all have direct impacts on people's socioeconomic lives, particularly in low-income communities. Job loss, reduced employment chances, loss of income, inability to repay loans, and food insecurity all have a negative influence on impoverished people, causing them to experience financial stress.

The first three confirmed Covid-19 cases were reported in Bangladesh by the Institute of Epidemiology Disease Control and Research (IEDCR) on March 8, 2020 (IEDCR, 2022). In the name of lockdown, the Bangladeshi government issued general leave that began on March 26, 2020, and has been extended several times so far. Like other nations, in Bangladesh, the financial stress impact on the family's poor and middle-class breadwinners is growing. According to ILO (2020), between 80 to 90 percent of the labour force is unorganized and working in risky positions in Bangladesh. The groups most negatively impacted are low-income, marginalized individuals, who are mostly self-employed and earn daily pay. Moreover, financial difficulties and increased economic disparity, particularly for some socio-demographic groups, result both from the virus itself as well as the actions implemented to prevent the outbreak (Brodeur, Gray, Islam, & Bhuiyan, 2021).

The poorest and most vulnerable people in the country are Char dwellers, who reside close to the riverside (Sarker, Wu, Alam, & Shouse, 2019). Char people rely heavily on their daily income in order to survive. Additionally, they have relatively few employment options because of the lack of geographic, social, political, and moral uncertainty. Char terrestrials who have experienced income loss because of the pandemic are more concerned with providing for their families' needs, such as food and income, than they worry about their own health and medical care. Furthermore, people who live in extreme poverty are more prone to worrying about their finances than those who suffer mild or moderate food insecurity or are persistently poor. Stressful social and financial conditions have been brought on by the Covid-19 pandemic's quarantine policies, restricting measures, and employee income losses as a result of the recession (Manojkrishnan & Aravind, 2020).

Therefore, numerous studies on Covid-19's effects and the psychological toll of the population's lockdown have been conducted globally, including Bangladesh (Blanco, Cruz, Frederick, & Herrera, 2022; Bodrud-Doza, Shammi, Bahlman, Islam, & Rahman, 2020; El-Zoghby, Soltan, & Salama, 2020; Parvin, et al., 2021; Thayer & Gildner, 2021). However, there is dearth of studies on the financial stress experienced by the low-income households, particularly char people, during the pandemic. With a focus on the breadwinners of the char terrestrial families in northern Bangladesh, the current study aims to understand the financial stress caused by the Covid-19 pandemic. The research questions are: what are the factors that caused people's financial stress during the pandemic period? What are the coping strategies taken by the families' to reduce financial stress during Covid-19 pandemic?

The study makes numerous noteworthy contributions. First, this study provides information on how the Covid-19 pandemic and financial stress are related. Secondly, this study adds to the growing corpus of research on the relationship between financial stress and the Covid-19 pandemic and thus contributes to body of existing knowledge. Thirdly, knowing what factors affected a family's financial stress and adjustment during the epidemic would help practitioners and policymakers be better prepared for such circumstances in the future. Finally, the study's findings are helpful in suggesting the tactics and strategies that might be used at the macroeconomic and microeconomic levels by policy makers and economic agents for economic recovery following the coronavirus pandemic crisis.

2. Literature Review

Covid-19 pandemic and its impact has become a hot issue which has gained a great concern to all as it poses threat especially financial challenges. Among multifaceted impacts, financial stress impact to low-income household is a great concern. Because, during Covid-19 pandemic, low-income households did not have or reduced work opportunities to manage their financing needs and thus they felt financial stress. Following sections describe financial stress and relevant literatures of Covid-19 and financial stress impact.

2.1 Conceptualizing Financial Stress

There is no commonly agreed definition of financial stress. A lack of savings, difficulty in paying bills on time, going hungry, not being able to pay the mortgage or rent on time, excessive usage of credit cards or debt are all symptoms of financial stress. Financial stress has been connected to risks to family income such as job loss, natural disaster, epidemic, or disability. It can also be more accurately defined as the difficulty, anxiety, strain, or tension experienced due to changes in a family's financial situation. Families that lack sufficient income, wealth, or debt to cover economic difficulties face psychological stress or unhappiness brought on by money (Park & Kim, 2018). When a person or a family is unable to make ends meet, they experience financial stress, which can have a negative impact on their lives. According to Ponnet, Wouters, Goedemé and Mortelmans (2016), financial stress is the mental or physical health issues that result from being unable to meet basic necessities, battling financial difficulties, and having deficit funds at the month's end. Financial stress is generally described as signs of mental or physical illness caused by many types of economic uncertainty (Friedline, Chen, & Morrow, 2021).

2.2 Previous Studies

Covid-19 pandemic was a unique crisis having numerous destructive effects for households, of which financial stress is noteworthy. Scholars around the world found evidences, though very few, that during Covid-19, people were affected negatively including mental and financial depression. Employing data on survey of 510 Egyptian adults, El-Zoghby et al. (2020) observed that due to Covid-19 pandemic there was a rise in financial stress among most Egyptian adults. Wilson et al. (2020) investigated the relationship between mental healths, financial difficulties resulting from the Covid-19 epidemic, and unstable employment by utilizing survey data from 474 US workers. Findings of the study showed that financial anxiety, depressive symptoms and the impression of employment insecurity were brought by Covid-19. Additionally, it was discovered that financial worry significantly mediates the link between employment instability and mental health. Dawel et al. (2020) conducted a survey on 1296 Australian adults and revealed that, in contrast to job loss, financial hardship brought on by the pandemic was a significant predictor of poorer mental health. Barrafrem, Västfjäll and Tinghög (2020) used survey data of over 1000 people to look at how the Covid-19 outbreak affects the local, national, and worldwide economies; how people see the future state of the economy; and how this perspective relates to their financial well-being. The study's findings showed that those who had negative views about their household's economic future reported lower financial security and higher degrees of financial worry. Codagnone et al. (2020) conducted a study in which they investigated the connection between an unstable economic condition and damaging economic shocks brought on by the Covid-19 pandemic and feelings of anxiety, stress, and sadness. The authors found that 42.8% of the population is at danger of experiencing economic pressure due to financial instability and an adverse economic climate, based on data obtained from Italy, Spain, and the United Kingdom. Parvin et al. (2021) used the snowball sampling survey method to examine income earners' physiological anxiety during the Covid-19 lockdown period and found that 52.94 percent of family income earners expressed worry about the high cost of daily necessities and 49.41 percent said they were started to fear impending economic insecurities. Thayer and

Gildner (2021) conducted a survey on pregnant women residing in the US and found 43% of participants responded that Covid-19 pandemic had caused them financial stress. Even after adjusting for covariates including participant education and income, financial stress was shown to be strongly correlated with an increased risk of a clinically severe depression score. Blanco et al. (2022) observed that Latino adults in California were facing tremendous stress throughout the pandemic because to their job market experiences and family circumstances. Authors also found that the Covid-19 epidemic appeared to have had a more impact on women.

Using a panel survey of 1510 US adults, Kelley et al. (2023) investigated the relationships changes in financial stress related to COVID-19 and relational wellbeing by using mixed approach. Authors used the family adjustment and adaptation response (FAAR) model and found that more than 35% of the respondents' financial stress has gotten worse since Covid-19. These in-depth analyses shed light on the particular causes and effects that contributed to greater financial stress in both individuals and families. Rodrigues, Silva and Franco (2023) states that family financial stress can be predicted by the Covid-19 crises because it affects income and negative emotions, such as fear and demotivation that impair well-being. Analysing survey data of 134 Portuguese families, Rodrigues et al. (2023) found that the Covid-19 pandemic crisis has resulted in financial strain on families of all sizes, as well as anxiety and discouragement as a result of the widespread lockdown.

A chunk of studies have been conducted based on peoples' psychological stress during lockdown with no or little focus on households' financial stress. In addition, existing literatures lacks in investigating the factors that caused poor people's financial stress during pandemic. Present study fills this research gap.

3. Methods

3.1 Survey Area and Their Description

Bangladesh is the most expansive delta globally, enclosed by the overflow lowlands of three major rivers. The nation is primarily enclosed by the Padma, Brahmaputra-Jimuna, and Meghna rivers. They face an ongoing threat from natural catastrophes. Rangpur and Kurigram, two northern districts, were selected as the focus of this research and the description of survey area have been provided in Table 1.

In northern Bangladesh, the Char people, who inhabit riverbank sediment and sand, are among the most vulnerable and impoverished. Zones situated in the vicinity of the Tista and Brahmaputra rivers are optimal for the designated char regions. The districts exhibit considerable similarity with respect to climate and population density. Furthermore, they possess a limited number of health issues, significantly depend on day labourers, and are economically grounded in agriculture.

Table 1. Char area description

Char upazila	Location	Area Km^2	Population	Density Km^2	Source of income %	River	Literacy %	Sanitary Latrine use %	Landless %
Ulipur[1]	$25^0 33'$ N $89^0 29'$ E	504.19k m^2	359,626	713	Agriculture 69.42, Non-agriculture 3.10, commerce 10.61, Transport 1.2, service 5.61, construction 1.1, and Others 6.55.	Brahmaputra, Tista, Dharla	34.91	Sanitary 33.52, non-sanitary 19.03. Have not 47.75	45.3
kurigram Sadar[2]	$25^0 45'$ N $89^0 34'$ E	276.45k m^2	259,157	937	Agriculture 53.32, Non-agriculture 10.12, Commerce .13.01 Transport 3.15, Service 8.97, and Others 10	Brahmaputra, Dharla	38.38	Sanitary 28.11, non-sanitary 25.29 and have not 46.60	52.03

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[1] https://en.banglapedia.org/index.php?title=Ulipur_Upazila

[2] https://en.banglapedia.org/index.php/Kurigram_Sadar_Upazila

| Raumari[3] | $25^0 27'$ N $89^0 45'$ E | 197.80k m² | 165815 | 838 | Agriculture 77.40, Non-agriculture 3.57, Commerce 6.40, Others 7.5 | Brahmaputra | 24.69 | Sanitary 16.75, non-sanitary 53.94 and have not 29.31 | 44.95 |
| Gangachara[4] | 25 '57' N 89 '21'E | 272.28k m² | 259,856 | 954 | Agriculture 76.04, Non-agriculture l4.78, Industry 0.28, Commerce 9.36, Transport 2.17, Service 3.43, Construction 0.36, and Others 3.29. | Tista, Bullai, Bara Beel, Dondara Beel, Ghaghat | 32.95 | Sanitary 11.03 non-sanitary 25.47, and have not 63.50 | 41.56 |

Source: Prepared by the author.

Seven administrative units that are representative of those surrounding Bangladesh's main rivers will be the focus of our analysis. The following units comprise the division: Gujimary & Babur char at Saheber alga union, Ulipur, Kurigram; char Jatrapur at Jatrapur union, Kurigram Sadar; char Saulmari at Saulmari union, Raumari, Kurigram; Jadur char at Jadur char union, Raumari, Kurigram; and Binbinar char and char Mukutpur at Kolkonda union; Ichlir char at Luxmitari union, Gangachara, Rangpur. Certain communities rely on subsistence agriculture for comparable agricultural products. Without exception, the overwhelming majority of Char's inhabitants do not own land. The Char people are highly dependent on agriculture for survival. In addition to their agricultural endeavors, they participate in the construction, transportation, trading, and service sectors. In the exposed zones, there are few health problems and an illiteracy rate of close to 35%. A mere fraction of Char's populace employs hygienic latrines; nearly half lack access to adequate sanitation facilities. Approximately a quarter of the population uses soiled latrines. Our primary emphasis is on these locations due to their resemblance to real-world characteristics, susceptibility to Covid-19 risks, and government closure during the epidemic. The subjects of this investigation are those who have been impacted by the Covid-19 pandemic.

3.2 Data Collection

To ascertain the extent of prior knowledge in the subject areas and to devise the study plan, an initial survey was conducted. In response to primary feedback, the subsequent domains were chosen for further investigation. Further inquiries were carried out at the subsequent locations: Gujimary & Babur char at Saheber alga union, Ulipur, Kurigram; char Jatrapur at Jatrapur union, Kurigram Sadar; char Saulmari at Saulmari union, Raumari, Kurigram; Jadur char at Jadur char union, Raumari, Kurigram; and Binbinar char and char Mukutpur at Kolkonda union; Ichlir char at Luxmitari union, Gangachara, Rangpur. The pandemic scenario affects a significant proportion of the world's impoverished, according to a reconnaissance survey. Once these potentially distinct individuals were identified, a subset of the total respondents was selected using a sampling procedure suited to the type of population. Individuals were selected using a straightforward random method with 95% confidence intervals. The characteristics of the data that was sampled are illustrated in Table 2.

The sample size is figured out by the targeted communities on the basis of Population Proportionate to Size (PPS), and the sample is then rearranged to make sure that every group in both districts has the minimum sample size required. For the purpose of selecting N=577 individuals from the four poorest communities, non-probability sampling techniques were adopted. Using persuasion and voluntary sampling approaches, the individuals are chosen. A unique respondent identification number, ranging from ID-1 to ID-577, was assigned to each respondent. During sampling, several factors are considered, including age group, income, income variability, family financial health, health care expenses, taking loans from financial institutions or informal sectors, consumption habits, changing ways of earning, government support. The overwhelming respondents were from Northern Bangladesh. Table 2 indicates that males constitute 55.63 percent of the respondents, while females comprise 44.37%. The age distribution of the respondents was suitable for this study: 27.56 percent are classified as 18–25, 31.89 percent as 26–35, and 23.22% as 36–55. In that location, these age brackets are referred to as "work-in-force groups." According to Table 2, 39.51% of the total population have completed elementary education, while 46.10% have never attended school. This percentage is in accordance with the literacy rate

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[3] https://en.banglapedia.org/index.php?title=Raumari_Upazila

[4] https://en.banglapedia.org/index.php?title=Gangachara_Upazila

provided Table 1. It is important to note that 36.57 percent of the respondents are housewives, while 46.79 percent are farmers. The majority of respondents earn a monthly income between BDT 5000 and BDT 9999, which is comparable to the poverty level in the study area.

Table 2. Sample characteristics (Sample size, N=577)

Variable	Category	Count	Percentage
Gender	Male	321	55.63
	Female	256	44.37
	Total	577	100
Age	Below 18 years	13	2.25
	18-25 years	159	27.56
	26-35 years	184	31.89
	36-45 years	134	23.22
	46-60 years	76	13.17
	61 years or above	11	1.91
	Total	577	100
Education	Primary School	228	39.51
	SSC or equivalent	65	11.27
	HSC or equivalent	10	1.73
	Graduate or equivalent	4	0.69
	Post-graduate	4	0.69
	No formal education	266	46.10
	Total	577	100
Employment status	Self-employed	43	7.45
	Businessman	34	5.89
	Government employee	4	0.69
	Daily labor	15	2.60
	Farmer	270	46.79
	Housewife	211	36.57
	Total	577	100
Monthly income	Below 1000 BDT	53	9.19
	1000-4999 BDT	174	30.16
	5000-9999 BDT	297	51.47
	10000-14999 BDT	31	5.37
	15000-19999 BDT	15	2.60
	20000 BDT or above	7	1.21
	Total	577	100

Source: Prepared by the author based on Survey.

3.3 Data Processing and Analysis

The questionnaire survey was closed-ended. To make the qualitative data useful, it was coded and converted into numbers. The required analysis was carried out using STATA software after the data had been coded. The results were then evaluated, interpreted, and compared to those of related investigations. In the end, a conclusion was made based on the objectives of the study.

3.4 Selection, Description and Operationalization of Explanatory Variables

Age: This study anticipates a correlation between age of the respondents and financial stress. Jaffar, Faizal, Selamat and Alias (2023) assert that the age of young adults positively correlates with financial stress during the Covid-19 pandemic, whereas Bierman (2014) discovered that financial stress escalates with the advancing age of older individuals. The Covid-19 epidemic was an exceptional scenario which affected persons across all age groups in the char districts. As such this research focused on different age groups, for example, less than 18 years, 18-25 years, 26-35 years, greater than or equal to 61 years and expects a relation between age and financial stress.

Income volatility: Income volatility raises financial stress, particularly for lower-income households, according to both experimental and longitudinal research. For instance, Ridley, Rao, Schilbach and Patel (2020) observed a strong positive correlation between financial stress and income volatility, particularly for lower-income households.When individuals possess a regular and predictable income even though low, they may strategize their money, budget efficiently, and allocate savings for emergencies. Conversely, when income is erratic, households encounter uncertainty regarding their ability to meet vital expenses, such as food, rent, and healthcare, on a periodic basis. This uncertainty can result in financial stress. Income volatility was measured by the question "How did your income change during the Covid-19 pandemic", with answer options i) Decreased ii) Not changed iii) Increased. This study anticipates that income fluctuation is inversely correlated with financial stress, as more income stability fosters predictability and security.

Reducing work opportunities: A decrease in working opportunities frequently results in diminished income, which immediately exacerbates financial stress as households endeavor to fulfill their financial responsibilities. Possessing a degree of financial security, especially during a decline in conventional employment possibilities, enables families to address fundamental expenses and prevent exacerbation of financial distress. Power (2020) estimates a positive correlation between the concerns. 'Reducing work opportunities' was measured by the question "was your work opportunities reduced during the Covid-19 pandemic", with answer options i) No ii) Yes. This study expects that 'Reducing work opportunities' due to Covid-19 pandemic is correlated with financial stress.

Medication Cost: Medication costs are a prevalent medical expense for numerous healthcare systems and general people. This study considered "Medication cost" as an explanatory variable. According to Kocağ (2023), medical expenses have grown as a result of the pandemic; those who are concerned about financial difficulties brought on by Covid-19 are more likely to express worries about paying for medical expenses. The Covid-19 pandemic had significant impacts on the economy and healthcare system of Bangladesh. During the lockdown, the income of marginalized individuals substantially diminished, while the cost of pharmaceuticals escalated, imposing further psychological strain on families as they endeavored to secure essential prescriptions. To evaluate the influence of pharmaceutical expenses on financial stress, a binary question were asked to respondents: "Did you require spending more money on medication due to Covid-19", with answer options i) No ii) Yes. This method enabled researcher to quantify the financial stress imposed by escalating healthcare costs and analyze its contribution to total financial distress during Covid-19 pandemic.

Family financial efficiency: In this study "Family financial efficiency" covers the capacity of a family to manage or avoid financial difficulties. Families in nominal financial conditions are presumed to have the ability and capabilities in handling most of the financial pressures that come their way. On the other hand, families experiencing financial inefficiency have a lower ability in handling unanticipated episodes of financial shocks, which in turn increases their financial stress. Low salaries compared to the cost of living; significant debt from loans and credit cards, and high medical costs all have an effect on a family's financial efficiency (Addo, 2021). Thus, this study expects an association between family financial efficiency and financial stress, especially during Covid-19.

Creditor's pressure: Creditors are the parties to whom someone owe money. If borrower stop paying payments, creditor may pressure borrower to get the money back. An individual's income generation challenges frequently lead to creditor pressure. This can be a difficult situation for individuals with low incomes, as they often collaborate with and even consider these individuals to be friends, in addition to worrying about debt. Covid-19 pandemic limits the income generation capacity of households which lead to creditors' pressure. Creditors' pressure was measured by asking a binary question to respondents: Did you feel more pressure from creditors during this Covid-19 pandemic", with answer options i) No ii) Yes. Thus, we expect that creditors' pressure escalate financial stress of low-income people, especially during Covid-19.

3.5 Quantitative Analysis

This study examined the factors influencing financial stress using the Probit and Binary Logit models. These two types are reliable, popular, and produce results that are widely acceptable. Since it is commonly recognized that similar model types produce similar study outcomes, the results are more accurate and deemed acceptable. If the models produce different results, however, it means that the analytical process was incorrectly carried out and the outcomes are unacceptable. Therefore, these two models were used in this study to produce more accurate and palatable results.

3.5.1 Binary Logit Model

The binary logit model is commonly applied methods because estimating approaches have better features than uniform distributions (Pindyck & Rubinfeld, 1976). The maximum likelihood estimation approach is used to estimate parameters in the logit regression model. The probability of a method being used can be specified as follows:

$$Pi = F(\omega + \eta_{xi}) = \frac{1}{1 + e^{-(\omega + \eta_{xi})}} \tag{1}$$

In equation (1), Pi symbolizes the probability, x signifies a vector of explanatory variable, and e denotes the natural logarithm.

3.5.2 Probit Model

The normality assumption of the probit model is preferred by economists because of the features of the normal distribution, which makes it easy to analyze numerous specification problems (Wooldridge, 2015). According to Bryan, Deressa, Gbetibouo and Ringler (2009), the probit model is determined by the following equation:

$$y^* = \lambda_0 + \lambda_1 X + \mu \qquad (2)$$

Where the latent variable is defined by y*, X signifies explanatory variables, λ represents the parameters that are essential to be assessed, and μ indicates an error term. A list of variables and their description are presented in Table 3.

Table 3. Description of variables applied in Binary Probit and Logit Models

SL. No.	Variable	Variable type	Measurement	
			Category	Dummy
1	Age	Independent	Below 18 years	1
			18-25 years	2
			26-35 years	3
			36-45 years	4
			46-60 years	5
			61 years or above	6
2	Income volatility	Independent	Decreased	1
			Not changed	2
			Increased	3
3	Reducing work opportunity	Independent		
			No	0
			Yes	1
4	Medication cost	Independent	No	0
			Yes	1
5	Family financial efficiency	Independent		
			No	0
			Yes	1
6	Creditors' pressure	Independent	No	0
			Yes	1
7	Financial stress	Dependent	No	0
			Yes	1

Source: Prepared by the author.

4. Results and Discussion

4.1 Factors Influencing Financial Stress

The estimated outcomes of the binary logit and probit models are exhibited through Table 4 to Table 6. These two popular methods are used in this study to look into the contributing variables that influence financial stress of the poor people. Findings of probit and logit regressions are presented in Table 4 where analysis have been conducted by setting the reference group as age below 18 years and adding individual dummy variables representing the other five age groups to compare the differences between each group. This research shows that the Covid-19 pandemic affected individuals across the age spectrum in the char areas. Findings indicate that people of all age had financial stress. This is because, Covid-19 pandemic was an exceptional scenario which impacted everyone's lives and living with income from different sectors including agriculture, farming and business. So, to maintain their daily lives, these low-income people had to think about how can they lead their life and from where the required amount of funds will be collected. Results also indicate that younger people aged upto 35 years had felt more financial stress than that of older people aged over 61. This finding is similar to the finding of Jaffar et al. (2023) which observed that young adults faced higher financial stress during the Covid-19 period. Among the char areas young people generally make their economic contribution towards the family through local markets and the informal sectors. Because of Covid-19 enforced lock-downs and economic difficulties, several youth lost income or saw it reduced hence extending its impact on financial stress. While on its part Bierman (2014) argues that as older people age 64 years and above have financial stress as because old people become weaker and more likely to be out of labor market. Thus, we conclude that people at all ages of these char areas had financial stress during Covid-19 pandemic.

Table 4. Outcomes of probit and logistic regressions (Default group: 'Age'; Sample size, N=577); Dependent vaiable: Financial stress

Explanatory Variable	Probit				Logit			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Income volatility	0.070***	0.042**	0.056**	0.049**	0.148***	0.111**	0.161**	0.126**
Reducing work opportunity	-0.200**	-0.192*	-0.209**	-0.192*	-0.296**	-0.277**	-0.316**	-0.276**
Medication cost	0.261**	0.249*	0.236*	0.244*	0.505**	0.481*	0.468*	0.474*
Family financial efficiency	-0.552**	-0.556**	-0.537**	-0.550**	-1.020**	-1.036**	-0.983**	-1.018**
Creditors' pressure	0.010	0.009	0.009	0.010	0.008	0.009	0.008	0.009
Age	-0.069**				-0.147**			
Age group less than 18 Years as reference group								
Age group2 18-25		-0.277*				-0.383*		
Age group3 26-35		-0.058*				-0.116*		
Age group4 36-45		0.003				-0.126**		
Age group5 46-60		0.033				0.004		
Age group6 ≥61		-0.045*				0.064		
Age 61			-0.254*				-0.458*	
Age 46				-0.240**				-0.362**
_cons	1.130*	1.196*	1.158*	1.148**	1.718*	1.832*	1.723**	1.730*
LR chi2(7)	10.750	10.330	11.370	10.060	10.650	11.340	10.020	10.120
Log likelihood	-180.860	-180.650	-180.345	-181.000	-180.710	-180.120	-180.020	-180.540
Pseudo R2	0.028	0.027	0.034	0.027	0.027	0.037	0.028	0.029

Note: ***, ** and * indicates variables significant at 1%, 5% and 10% respectively

Source: Author's calculation based on Survey data.

Table 5 to Table 6 represents the findings based on gender of the respondents. Findings provided in Table 5 and Table 6, indicates that both male and female respondents of almost all ages had financial stress during Covid-19 which confirm the main findings of this study that the people at all ages, regardless of gender, were financially stressed. Results also indicate that male households experienced greater financial stress than female households. For example, looking at Table 5 and Table 6, it can be seen that male respondents with age 18-25 years have coefficient of -0.081 based on probit model, in Table 5 and -0.197 based on logit model in Table 5 respectively which is higher than the coefficient -0.071 based on probit model in Table 6 and -0.157 based on logit model in Table 6 of female respondents with same age. Similarly, looking at coefficients of all explanatory variables provided in Table 5 and Table 6, it is evident that male households of different age groups had greater financial stress than female households of different age groups. These findings are realistic on the ground that men are mainly handling financial management of a house and they did not have income during the pandemic. Thus, men felt more financial stress compared to women.

Instability in one's income can lead to feelings of powerlessness and increased financial stress. Income volatility causes financial stress because it raises the fear that one would not have enough money to take care of one's family or pay off one's debts. Similar to the findings of Ridley et al. (2020), this study observed that income volatility has significant influences on the financial stress of all. Households with lower income had more income fluctuations during the Covid-19 pandemic, which frequently makes it difficult for them to meet their financial obligations. Paying expenses and meeting essential needs like food, shelter, medical care, and childcare generate more financial stress due to income volatility.

Findings suggest that reducing work opportunities has significant negative influence on financial stress. Mostly, this is because of lockdowns called by the government agencies as one of preventive measures of Covid-19. Findings also suggest that compared to their counterpart, reducing work opportunities has significant negative influence on financial stress of male households while found negative but insignificant impacts for female. The reason may be attributed to the fact that female households typically work at home for example, with their sewing machines and thus not significantly reduced their work opportunities.

Result indicates that medication costs increase the level of financial stress significantly for all low-income households, with a higher magnitude for male compared to female. During Covid-19, social isolation, mask use, mass testing, home isolation, different hospitalization requirements, and lockdowns were some of the public health measures put in place at various periods to contain the disease. Care for a Covid-19 patient came at an additional burden for many families, which was already hit hard by the economic slump caused by lockdowns. The Covid-19 pandemic has resulted in a

general increase in the cost of healthcare due to the financial burden it has placed on individuals. As household main earner, the financial stress was more for male.

This research observed that family financial efficiency has significant negative impact on financial stress of both male and female respondents. Family heads have considerable and rising out-of-pocket expenses, bill expansion, and massive debt, all of which limit reserves needed for housing, electricity, and food and increase the level of financial stress. Finally, results shows that the level of financial stress goes up when the pressure from creditors' goes up. Typically, low-income people borrow money from non-government organisations, moneylenders, families and friends for which they have to repay regularly, mostly on instalment basis. Due to preventive measures of Covid-19 including lockdowns, low-income people were unable to generate cash inflow required to repay the money. As such creditors pressured them to give their money back. Eventually, financial stress of lower-income people increased.

Thus, the main finding of the study, provided in Table 4 is that during Covid-19 crisis, low-income people had more financial stress due to factors including age, income volatility, reducing work opportunities, medication cost, family financial efficiency and creditors' pressure. A gender based analysis and findings provided in Table 5 and Table 6 confirm the main findings of the study. In addition, it states that men had more financial stress than women.

Table 5. Outcomes of probit and logistic regressions (Sex=Male; Sample size, N1=321; Default group: 'Age'); Dependent vaiable: Financial stress

	Probit				Logit			
Explanatory Variable	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Income volatility	0.067**	0.082**	0.078**	0.086**	0.117*	0.160**	0.163**	0.162**
Reducing work opportunity	-0.395*	-0.430**	-0.427*	-0.420*	-0.755*	-0.818**	-0.806*	-0.788
Medication cost	0.197*	0.234*	0.304**	0.250*	0.403*	0.449*	0.570**	0.488
Family financial efficiency	-0.972**	-0.931*	-1.009**	-0.951**	-1.646*	-1.571**	-1.704**	-1.605**
Creditors' pressure	0.286**	0.262	0.263	0.268	-0.313	0.315	0.334*	0.334
Age	-0.022*				-0.417*			
Age group less than 18 Years as reference group								
Age group2 18-25		-0.081				-0.197		
Age group3 26-35		-0.080				0.010		
Age group4 36-45		0.006				-0.140		
Age group5 46-60		0.089				0.180		
Age group6 ≥61		-0.019				-0.219		
Age61			-0.143*				-0.291*	
Age 46				-0.101**				-0.221**
_cons	1.153*	1.191*	1.099**	1.106**	1.945*	2.051*	1.844**	1.849**
LR chi2(7)	14.340	13.540	13.740	12.540	14.780	13.100	13.480	12.610
Log likelihood	-105.270	-106.182	-105.839	-106.348	-105.315	-106.155	-105.965	-106.401
Pseudo R2	0.066	0.059	0.061	0.560	0.066	0.058	0.060	0.059

Note: ***, ** and * indicates variables significant at 1%, 5% and 10% respectively

Source: Author's calculation based on Survey data.

Table 6. Outcomes of probit and logistic regressions (Sex=Female; Sample size, N2=256; Default group: 'Age'); Dependent vaiable: Financial stress

Explanatory Variable	Probit Model 1	Probit Model 2	Probit Model 3	Probit Model 4	Logit Model 1	Logit Model 2	Logit Model 3	Logit Model 4
Income volatility	-0.066	-0.078	-0.091**	-0.072	-0.077	-0.081	-0.101	-0.102*
Reducing work opportunity	-0.079**	-0.076**	-0.035	-0.066*	-0.102	-0.102	-0.077	-0.097
Medication cost	0.037*	0.027	0.055***	0.004	0.066*	0.059	0.102***	0.009
Family financial efficiency	-0.437**	-0.432*	-0.393	-0.412	-0.877**	-0.811	-0.710	-0.823
Creditors' pressure	0.006*	0.009	0.008	0.016**	0.005*	0.009	0.007	0.023**
Age	-0.002*				-0.005*			
Age group less than 18 Years as reference group								
Age group2 18-25		-0.091**				-0.187**		
Age group3 26-35		-0.077**				-0.112**		
Age group4 36-45		0.054*				0.069**		
Age group5 46-60		0.025				-0.021		
Age group6 ≥61		-0.015				0.034		
Age 61			-0.006				-0.013	
Age 46				-0.011				-0.210
_cons	0.360	0.409	0.335	0.251	0.610	0.702	0.662	0.525
LR chi2(7)	11.460	11.830	12.210	11.230	10.520	10.710	11.330	12.450
Log likelihood	-64.543	-65.208	-65.015	-65.143	-64.567	-65.321	-65.125	-65.178
Pseudo R2	0.082	0.064	0.086	0.076	0.081	0.082	0.076	0.077

Note: ***, ** and * indicates variables significant at 1%, 5% and 10% respectively

Source: Author's calculation based on Survey data.

4.2 Robustness Check

In order to check the robustness of the results, logarithm of 'age' have been taken and incorporated into the analysis. Probit and logit regressions have been run on entire sample, separately on male respondents' response and female respondents' response. Results are provided in Table 7. According to Table 7, during Covid-19, low-income people had more financial stress due to factors including age, income volatility, reducing work opportunities, medication cost, family financial efficiency and creditors' pressure. Which means results of robustness check, even with gender based analysis, are similar to the baseline results of the study. Therefore, it can be concluded that the findings of this research are robust and conclusive.

Table 7. Results of robustness check; Dependent vaiable: Financial stress

Explanatory Variable	Entire Sample; N=577 Probit Coef.	Entire Sample; N=577 Probit P>z	Entire Sample; N=577 Logit Coef.	Entire Sample; N=577 Logit P>z	Sex=Male; N1=321 Probit Coef.	Sex=Male; N1=321 Probit P>z	Sex=Male; N1=321 Logit Coef.	Sex=Male; N1=321 Logit P>z	Sex=Female; N2=256 Probit Coef.	Sex=Female; N2=256 Probit P>z	Sex=Female; N2=256 Logit Coef.	Sex=Female; N2=256 Logit P>z
Log of age	0.366*	0.087	0.695*	0.081	0.859*	0.053	1.748*	0.012	0.020*	0.075	-0.026*	0.083
Income volatility	-0.014*	0.054	-0.076*	0.077	-0.008*	0.081	-0.055**	0.037	-0.089	0.807	-0.092	0.895
Reducing work opportunity	-0.208**	0.052	-0.310*	0.074	-0.453*	0.041	-0.777*	0.064	0.047	0.111	0.167	0.163
Medication cost	0.220**	0.085	0.441*	0.062	0.196	0.163	0.377	0.351	0.221*	0.054	0.457*	0.078
Family financial efficiency	-0.540***	0.002	-0.992***	0.009	-0.999***	0.008	-1.750**	0.024	-0.439	0.118	-0.873	0.107
Creditors' pressure	0.009**	0.015	-0.010*	0.045	0.001*	0.093	0.004*	0.084	-0.040	0.753	-0.067	0.168
_cons	1.064**	0.019	1.649*	0.069	0.966**	0.056	1.366*	0.055	1.220*	0.061	1.994**	0.029
LR chi2(7)	10.19		10.70		10.34		11.13		10.03		5.98	
Log likelihood	-183.13		-183.196		-109.149		-109.034		-70.209		-70.1682	
Pseudo R2	0.0271		0.028		0.047		0.045		0.035		0.13	

Note: ***, ** and * indicates variables significant at 1%, 5% and 10% respectively

Source: Author's calculation based on Survey data.

4.2 Coping Strategies to Deal with Financial Stress

Figure 1 illustrates comparative statistics on strategies adopted for dealing with financial stress by men and women. Financial hardship, fear, and disruptions of too many people's normal habits brought on by the Covid-19 pandemic have an effect on eating habits. According to the findings, both genders, around 16% of males and over 17% of females, have changed their eating habits to reduce daily food expenses. Women are more concerned about family financial management while economic hardship results in women – the highest percentage – coping with this financial strategy compared to men. During the global pandemic, many people experienced job loss and loss of work opportunities, resulting in both genders changing their ways of earning to fulfil basic family needs. In addition, both sexes, male and female, about 5.14% and 5.31%, respectively, received government financial support. According to the findings, nearly 12% of male respondents have taken loans from formal and informal sources, compared to over 9% of females. Finally, nearly 11% of males and females adopted the financial strategy of selling personal property to meet financial demands. Overall, male participants adopted more financial strategies than women to cope up with financial stress caused by the Covid-19 pandemic.
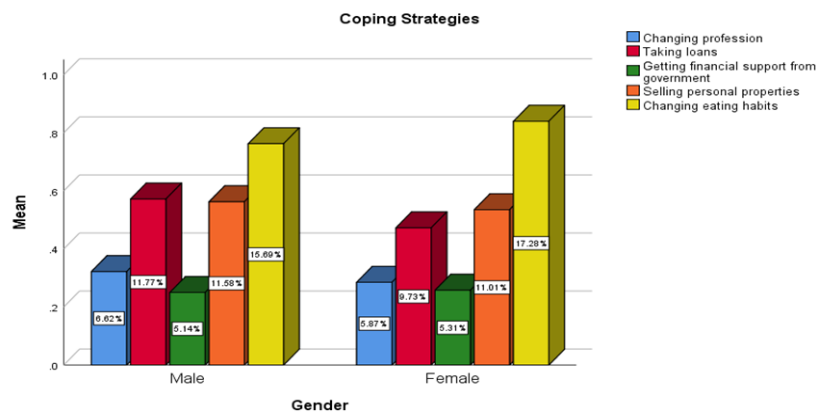

Figure 1. Financial strategies adopted by both sex

Source: Survey data.

5. Conclusions

Due to the COVID-19 people from all ages and all income groups suffered tremendously and this brought various challenges including financial challenges, for individuals and households. Household financial stress increased dramatically as a result of these difficulties, especially for low-income households. The concern expressed in this research is the financial stress of the low-income people in Bangladesh during the Covid-19 pandemic. As a result, this research carried out a study and gathered data from 577 respondents—321 men and 256 women—in the poorest areas of Bangladesh. Using binary logit and probit models, this research revealed that respondents' age, income volatility, medication cost, and creditors' pressure all have significant impacts on financial stress of the people. Findings of this study reveals that during Covid-19 pandemic, all people had financial stress while compared to their counterpart, male felt more financial stress. This is because, compare to women, men are generally the main income source and handle family financial management. People adopted a number of coping financial strategies to meet their financial needs and lower the financial stress during the Covid-19 pandemic. It is evident that both men and women meet their financial needs by taking loans, changing eating habits, selling personal assets and getting government financial support.

5.1 Significance of the Study

The significance of this study is that it sheds light on low-income people's financial stress during the pandemic. Survey research findings such as this can help policymakers assess the financial stress of poor people in light of Bangladesh's socioeconomic difficulties. Given the myriad of problems faced by low-income households and the potential for further vulnerabilities amidst the pandemic's wave, the government, development partners, and international agencies will consider findings of this research and formulate policies accordingly to mitigate the impact of crisis such as the Covid-19 pandemic on these vulnerable areas. Financial advisors will be called upon not only to provide financial advice and counsel during the crisis time, but also to interact with people whenever they encounter problems. Furthermore, the results of the study will be used to help manage financial stress in the event of a pandemic not only in similar parts of Bangladesh but also in other countries.

5.2 Limitations and Future Research

One of the limitations of this study is that it has considered only a few regions in Bangladesh rather than the entire country. Future studies may consider more number of factors along with mental and physical factors that may cause

financial stress of households. In addition, furture studies may take into account the contextual and political choices related to the Covid-19 pandemic depression that will help alleviating the financial stress on families.

Authors' contributions

There is just an author for this manuscript.

Competing interests

The author declare that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Obtained.

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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References

Addo, M. (2021). *Exploring income volatility and financial health among middle-income households*. Retrieved from https://repository.upenn.edu/cgi/viewcontent.cgi?article=5853&context=edissertations

Barrafrem, K., Västfjäll, D., & Tinghög, G. (2020). Financial well-being, COVID-19, and the financial better-than-average-effect. *Journal of Behavioral and Experimental Finance*, *28,* 1-5. https://doi.org/10.1016/j.jbef.2020.100410

Bierman, A. (2014). Reconsidering the relationship between age and financial strain among older adults. *Society and Mental Health*, *4*(3), 197-214. https://doi.org/10.1177/2156869314549675

Blanco, L., Cruz, V., Frederick, D., & Herrera, S. (2022). Financial stress among Latino adults in California during COVID-19. *Journal of Economics, Race, and Policy*, *5*(2), 134-148. https://doi.org/10.1007/s41996-021-00087-0

Bodrud-Doza, M., Shammi, M., Bahlman, L., Islam, A. R. M. T., & Rahman, M. M. (2020). Psychosocial and socio-economic crisis in Bangladesh due to COVID-19 pandemic: A perception-based assessment. *Frontiers in public health*, *8*, 1-17. https://doi.org/10.3389/fpubh.2020.00341

Brodeur, A., Gray, D., Islam, A., & Bhuiyan, S. (2021). A literature review of the economics of COVID‐19. *Journal of Economic Surveys*, *35*(4), 1007-1044.   https://doi.org/10.1111/joes.12423

Bryan, E., Deressa, T. T., Gbetibouo, G. A., & Ringler, C. (2009). Adaptation to climate change in Ethiopia and South Africa: Options and constraints. *Environmental science & policy*, *12*(4), 413-426. https://doi.org/10.1016/j.envsci.2008.11.002

Codagnone, C., Bogliacino, F., Gómez, C., Charris, R., Montealegre, F., Liva, G…, Veltri, G. A. (2020). Assessing

concerns for the economic consequence of the COVID-19 response and mental health problems associated with economic vulnerability and negative economic shock in Italy, Spain, and the United Kingdom. *Plos one*, *15*(10), 1-16. https://doi.org/10.1371/journal.pone.0240876

Dawel, A., Shou, Y., Smithson, M., Cherbuin, N., Banfield, M., Calear, A. L., & Batterham, P. J. (2020). The effect of COVID-19 on mental health and wellbeing in a representative sample of Australian adults. *Frontiers in psychiatry*, *11*, 1-8. https://doi.org/10.3389/fpsyt.2020.579985

El-Zoghby, S. M., Soltan, E. M., & Salama, H. M. (2020). Impact of the COVID-19 pandemic on mental health and social support among adult Egyptians. *Journal of community health*, *45*(4), 689-695. https://doi.org/10.1007/s10900-020-00853-5

Friedline, T., Chen, Z., & Morrow, S. P. (2021). Families' financial stress & well-being: The importance of the economy and economic environments. *Journal of Family and Economic Issues*, *42*(1), 34-51. https://doi.org/10.1007/s10834-020-09694-9

IEDCR. (2022). *Covid-19*. Retrieved from https://dghs-dashboard.com/pages/covid19.php

ILO. (2020). *Informal economy in Bangladesh.* Retrieved from https://www.ilo.org/dhaka/Areasofwork/informal-economy/lang--en/index.htm

Jaffar, N., Faizal, SM., Selamat, Z., & Alias, N. (2023). Muslim young adults' financial strain and financial stress during the COVID-19 pandemic: The moderating role of religiosity. *Heliyon, 9*(10), 1-14. https://doi.org/10.1016/j.heliyon.2023.e21047

Kelley, H. H., Lee, Y., LeBaron-Black, A., Dollahite, D. C., James, S., Marks, L. D., & Hall, T. (2023). Change in financial stress and relational wellbeing during Covid-19: Exacerbating and alleviating influences. *Journal of Family and Economic Issues*, *44,* 34-52. https://doi.org/10.1007/s10834-022-09822-7

Kocağ, E. K. (2023). Financial wellbeing during Covid-19 pandemic: Concerns about medical costs. *International Journal of Business and Economic Studies*, *5*(3), 208-224. https://doi.org/10.54821/uiecd.1343533

Manojkrishnan, C. G., & Aravind, M. (2020). Covid-19 pandemic and its impact on labor force: A new model based on social stress theory and prospect theory. *Scientific Papers of the University of Pardubice. Series D. Faculty of Economics and Administration*, *28*(3), 1-12. https://doi.org/10.46585/sp28031070

Park, W., & Kim, J. (2018). How are money worries affecting middle-aged, young-old, and old–old people's perceived couple relationship? *Journal of Family and Economic Issues*, *39*(1), 34-48. https://doi.org/10.1007/s10834-017-9547-2

Parvin, R. A., Islam, M. S., Akter, M. S., Mohammod, S. S., Hossain, M. B., & Rashid, S. (2021). Psychosocial anxiety from lockdown due to Covid-19 to income earner of the family: An evidence from Northern Bangladesh. *Sociology Mind*, 11(3), 65-80.   https://doi.org/10.4236/sm.2021.113006

Pindyck, R. S., & Rubinfeld, D. L. (1976). *Econometric models and business forecasts* (4th ed.). New York, NY: McGraw-Hill.

Ponnet, K., Wouters, E., Goedemé, T., & Mortelmans, D. (2016). Family financial stress, parenting and problem behavior in adolescents: An actor-partner interdependence approach. *Journal of Family Issues*, *37*(4), 574-597. https://doi.org/10.1177/0192513X13514409

Power, K. (2020). The COVID-19 pandemic has increased the care burden of women and families. *Sustainability: Science, Practice and Policy*, *16*(1), 67-73. https://doi.org/10.1080/15487733.2020.1776561

Ridley, M., Rao, G., Schilbach, F., & Patel, V. (2020). Poverty, depression, and anxiety: Causal evidence and mechanisms. *Science*, *370*(6522), p.eaay0214. https://doi.org/10.1126/science.aay0214

Rodrigues, M., Silva, R., & Franco, M. (2023). COVID-19: Financial stress and well-being in families. *Journal of Family Issues*, *44*(5), 1254-1275. https://doi.org/10.1177/0192513X211057009

Sarker, M. N. I., Wu, M., Alam, G. M., & Shouse, R. C. (2019). Livelihood vulnerability of riverine-island dwellers in the face of natural disasters in Bangladesh. *Sustainability*, *11*(6), 1-23. https://doi.org/10.3390/su11061623

Thayer, Z. M., & Gildner, T. E. (2021). COVID‐19‐related financial stress associated with higher likelihood of depression among pregnant women living in the United States. *American Journal of Human Biology*, *33*(3), 1-16. https://doi.org/10.1002/ajhb.23508

Wilson, J. M., Lee, J., Fitzgerald, H. N., Oosterhoff, B., Sevi, B., & Shook, N. J. (2020). Job insecurity and financial concern during the COVID-19 pandemic are associated with worse mental health. *Journal of occupational and environmental medicine*, 62(9), 686-691. https://doi.org/10.1097/JOM.0000000000001962

Wooldridge, J. M. (2015). *Introductory econometrics: A modern approach* (6th ed.). Scarborough, Ontario: Cengage Learning.