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Original Article

Catastrophic Health Expenditure and Disease Burden among Rural Households in Bangladesh: A Cross-Sectional Study from Mirsharai, Chittagong

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Abstract

Households in rural Bangladesh face severe financial hardship due to rising healthcare costs, particularly for chronic and non-communicable diseases. This study examined the patterns of illness, treatment practices, and catastrophic health expenditure among residents of Masjidia village, Mirsharai, Chittagong. A community-based cross-sectional survey was conducted in 2016 among 152 households to retrospectively assess healthcare utilization and expenditure patterns for 2015-2016. Convenience sampling was used due to geographical constraints. Catastrophic health expenditure was defined as spending exceeding 10% of total household income. Data were collected using structured questionnaires and analyzed descriptively. Illness prevalence was 84.2% among respondents. The average annual household income was BDT 35,352, while total healthcare expenditure accounted for 52.5% of this income, exceeding the catastrophic threshold by fivefold. Medication costs were the major expense, comprising 49–82% of total healthcare spending, followed by consultation, investigation, and transport costs. Most treatments were sought from private clinics and specialists, indicating high out-of-pocket dependency. The reliance on allopathic medicine remained dominant (above 94%), reflecting both accessibility and perceived efficacy. Health spending in rural Bangladesh imposes a catastrophic financial burden on households, driven primarily by medication costs and private-sector dependence. Targeted interventions—including subsidized essential medicines, expansion of community-based insurance, and improved public primary healthcare—are essential to reduce financial vulnerability and promote equitable access.

Keywords: *Rural health, health expenditure, catastrophic spending, non-communicable diseases, Bangladesh, socioeconomic burden, health financing, out-of-pocket costs.*

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INTRODUCTION

Healthcare expenditure has emerged as a major public health and socioeconomic challenge in low- and middle-income countries (LMICs) such as Bangladesh. Although the nation has made substantial progress in improving health indicators through expanding service delivery and disease control initiatives, the burden of out-of-pocket (OOP) expenditure remains disproportionately high. The World Health Organization (WHO) defines catastrophic health expenditure (CHE) as healthcare spending that exceeds a specific proportion of household income or total consumption, leading to impoverishment and financial distress among affected families[1].

In Bangladesh, more than 67% of healthcare expenditure is paid directly out-of-pocket, one of the highest rates in South Asia[2]. Limited coverage of health insurance and

inadequate public-sector health financing drive households to rely heavily on private providers and pharmacies[3]. For low-income rural communities, even minor illness can impose substantial financial hardship, often forcing households to borrow money, sell assets, or forego essential consumption.

Several studies have highlighted that catastrophic expenditure disproportionately affects rural and economically vulnerable populations, especially those suffering from chronic and non-communicable diseases (NCDs) such as cardiovascular disease, diabetes, and chronic respiratory disorders[4–6]. In the absence of financial protection mechanisms, such households frequently experience a downward spiral of poverty, disease, and debt.

Mirsharai, a semi-rural upazila in Chittagong district, typifies these challenges. Local households face increasing costs for medical consultation, diagnostic services, and medicines, most of which are sourced from private facilities[7]. Despite high disease prevalence, empirical data on the extent and pattern of catastrophic health spending at the village level remain scarce.

Therefore, this study aimed to assess the burden and determinants of catastrophic health expenditure among rural households in Masjidia village, Mirsharai, Chittagong. The specific objectives were to identify the prevalence of illness, analyze patterns of healthcare-seeking behavior, and quantify the proportion of households incurring catastrophic expenditure. The findings may inform policymakers and development partners in designing equitable health financing and community-based risk protection models for rural Bangladesh.

MATERIALS AND METHODS

Study Design and Setting

This study was carried out in Masjidia village, part of Mirsharai Upazila in Chittagong District, Bangladesh. We conducted a cross-sectional study and analysed the retrospective expenditures for the year 2015 combined with the appropriate data from 2016.

Study Population and Eligibility

Both men and women living in the village were invited to take part. Those who were present during the data collection and agreed to participate were included. People who were absent, critically ill, or unable to answer questions were not included.

Sample Size and Sampling

It was necessary to conduct convenient sampling due to the limits of the geographical area. Although this method was not probabilistic, it allowed for the rapid collection of data from hard-to-reach families, similar to approaches used in other LMIC research. The study found a 15% difference in spending burden (a=0.05, P=0.80) among 152 households, which is aligned with prior LMIC surveys.

Data Collection

The data was collected by 26 medical students working in pairs, forming 13 teams. Every team received ten questionnaires comprising both open-ended and fixed-choice forms. Face-to-face interviews with participants allowed them to compile details on health together with socioeconomic background as well as demography. Teams had clipboards, blood pressure monitors, and writing tools, among other things. Closely monitoring the procedure when faculty members made sure everything went as planned.

Variables and Definitions

Researchers collected information on general factors like age, sex, religion, job, education, family type and size, and socio-economic status. Education levels ranged from illiterate to graduate and beyond. Families were categorized into different types. Nuclear families consist of parents and their children. Joint families include multiple married couples living together. Extended families are made up of a young couple, their children, and their parents.

Socioeconomic status was measured using a modified scale based on household income, type of housing, land ownership, and sanitation. Based on their scores, families were placed into lower, lower-middle, upper-middle, or upper-class categories.

Health-related information focused on costs:

Direct costs such as medicine, transport, doctor visits, tests, and special diets. Indirect expenses include missed income from illness or caregiving as well as days off from work or education. Healthcare utilization includes kind of provider (specialist, MBBS doctor, village doctor); where patients sought treatment (private clinic, hospital, community clinic); and treatment approaches (allopathic or homeopathic).

Data Quality and Analysis

Descriptive statistics: Frequencies (%) for categorical variables (disease prevalence, provider types); means (SD) for continuous variables (income, expenditures).

Expenditure-income ratios: Percentage of income spent on healthcare calculated per WHO standards.

Bias mitigation: Recall bias (2015 data): Cross-verified large purchases (> BDT 500) with prescriptions/receipts where available. Missing data: Excluded incomplete responses (n=2; 1.3% of sample). Subgroup consistency checks: Stratified analysis by socioeconomic status confirmed expenditure patterns. No inferential statistics were applied due to descriptive design and non-random sampling.

Ethical Considerations

Before the interviews, participants were told about the study's purpose, how their information would be used, and assured of confidentiality. Only those who agreed gave verbal consent. Faculty members oversaw ethical standards, following guidelines for research in community health.

RESULTS

Socio-demographic profile and economic condition of the respondents

Table I presents the socio-demographic profile of the study participants. Among 152 surveyed households, mean age ± SD of the respondents was 33.9 ± 9.1 years and majority of them (58%) were between 31–45 years of age, followed by 34% of those were in 15–30 years. The most were Muslim 140 (92.11%), male 105 (69.08%) and married 121 (79.61%). Regarding education, 56 (36.84%) were illiterate or completed primary level, 68 (44.74%) secondary, 28 (18.42%) completed higher secondary or above. Occupation-wise, job constituted the largest group 49 (32.24%), followed by small traders/ business 41 (26.97%) and farmer/ day Labourer29 (19.08%). In terms of family structure, 91 (59.87%) of respondents lived in nuclear families, 53 (34.87%) in joint families, and 8 (5.26%) in extended families. Most of the families 97 (63.82%) lived in with five or more members, followed by 43 (28.29%) with four members, 12 (7.89%) with two or three members. Regarding earning members, 95 (62.5%) of households had only one earning member, 38 (25.0%) had two, 19 (12.5%) had three.

Table-I : Socio-demographic profile of the study participants

Variable	Category	Frequency (n)	Percentage (%)
Age (in years) (Mean ± SD = 33.9 ± 9.1 years)	15–30	52	34.2
	31–45	88	57.9
	46–60	12	7.9
Gender	Male	105	69.08
	Female	47	30.92
Religion	Muslim	140	92.11
	Hinduism	12	7.89
Marital Status	Married	121	79.61
	Unmarried	21	13.82
	Widowed/ Divorced	10	6.57
Education	Illiterate and Primary Level	56	36.84
	Secondary Level	68	44.74
	Higher Secondary & above	28	18.42
Family structure	Nuclear	91	59.87
	Joint	53	34.87
	Extended	8	5.26
Family Syze	2 to 3 members	12	7.89
	4 members	43	28.29
	5 or more members	97	63.82
Occupation	Small Traders/ Business	41	26.97
	Farmer/ Day Labourer	29	19.08
	Job	49	32.24
	Workers Abroad	12	7.89
	Others	21	13.82
Earning Members	1	95	62.50
	2	38	25.00
	3 and Above	19	12.50

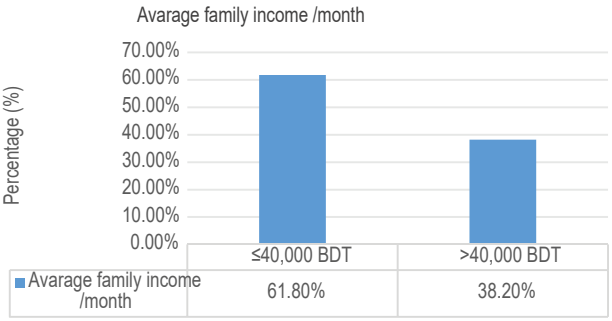

Figure- 1: Economic Status of the Respondents

Figure 1 showing the distribution of monthly family income among respondents. The majority (61.8%) reported earning ≤40,000 BDT, while 38.2% earned >40,000 BDT.

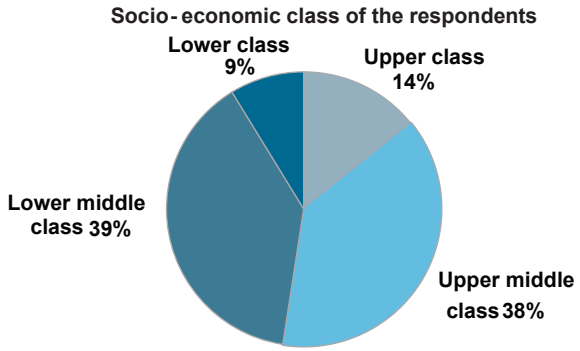

Figure 2: Socio-economic class of the respondents

Health and Disease Status of the respondents

Figure 2 displays the distribution of socio-economic class of the respondents; among respondents 39% was found lower middle class, 38% was upper middle class, 14% upper class and 9% lower class

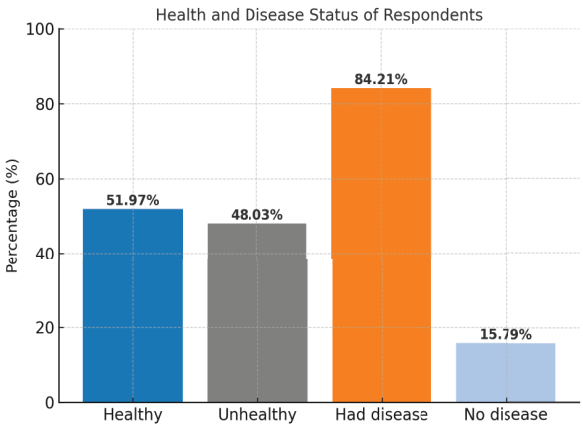

Figure 3: Health and Disease Status of Respondents

Comparative Healthcare Expenditure Patterns

Figure 3 illustrates the overall health and disease profile of the study respondents. Among the total participants, 51.97% were reported as healthy, while 48.03% were unhealthy during the study period. In contrast, when considering disease, 84.21% of respondents reported having experienced at least one disease episode during 2015, whereas 15.79% had no disease. The findings indicate that although slightly more than half of the population considered themselves healthy, a large majority had experienced illness within the reference period, reflecting a notable overlap between perceived and clinically reported health status.

Table II presents the comparative patterns of healthcare expenditure for the calendar years 2015 and 2016 in the study areas. In 2015, the total healthcare expenditure for the 152 respondents reached BDT 2,170,597, resulting in a per capita cost of BDT 14,280.24. In contrast, the total expenditure in 2016 saw a significant decline to BDT 432,668, with a per capita cost of BDT 2,846.49. Medication represented the largest portion of expenditure at 48.99% (BDT 1,063,380), followed by consultation fees at 25.28% (BDT 548,732), investigation costs at 12.82% (BDT 278,320), transport at 10.33% (BDT 224,185), and miscellaneous costs at 4.01% (BDT 86,980) in 2015. However, in comparison to 2016, medication expenses increased proportionally, accounting for 63.72% of total expenditure (BDT 275,676), while investigation costs (12.16%, BDT 52,650) and transport (12.60%, BDT 54,492) remained significant. Consultation costs (9.83%, BDT 42,550) and other costs (1.69%, BDT 7,300) experienced a relative decline.

For the larger group of 667 family members in 2015, the total healthcare expenditure was BDT 2,857,217, with a notably lower per capita cost of BDT 4,283.68. Medication expenses again dominated at 60.44% (BDT 1,727,007), followed by transport costs at 10.15% (BDT 289,945), consultation fees at 11.56% (BDT 330,430), investigations at 8.87% (BDT 253,510), and other costs at 9.04% (BDT 258,325). Similarly, for the family members in 2016, the total healthcare expenditure was recorded at BDT 1,072,054, with a per capita cost of BDT 1,607.28. Medication expenses constituted the major share at 82.05% (BDT 879,611), while shares for transport (6.24%, BDT 66,930), consultation (4.05%, BDT 43,473), investigations (4.62%, BDT 49,480), and other costs (3.04%, BDT 32,560) were significantly reduced.

Table II : Comparative Healthcare Expenditure Patterns in Masjidia, Mirsharai (2015 vs. 2016) [Values in Bangladeshi Taka]

Year 2015				
Expenditure Category	Respondents (N=152)		Family Members (N=667)	
	Yearly Expenditure (%)	Per Capita	Yearly Expenditure (%)	Per Capita
Medication	1,063,380 (48.99%)	6,995.92	1,727,007 (60.44%)	2,589.22
Transport	224,185 (10.33%)	1,474.91	289,945 (10.15%)	434.70
Consultation	548,732 (25.28%)	3,610.08	330,430 (11.56%)	495.40
Investigation	278,320 (12.82%)	1,831.05	253,510 (8.87%)	380.07
Other Costs*	86,980 (4.01%)	572.24	258,325 (9.04%)	387.29
Total amount	2,170,597 (100%)	14,280.24	2,857,217 (100%)	4,283.68
Year 2016				
Medication	275,676 (63.72%)	1,813.66	879,611 (82.05%)	1,318.76
Transport	54,492 (12.60%)	358.50	66,929.62 (6.24%)	100.34
Consultation	42,550 (9.83%)	279.93	43,473 (4.05%)	65.18
Investigation	52,650 (12.16%)	346.38	49,480 (4.62%)	74.18
Other Costs*	7,300 (1.69%)	48.03	32,560 (3.04%)	48.82
Total amaount	432,668 (100%)	2,846.49	1,072,053.62 (100%)	1,607.28

Household income is stated in Bangladeshi Taka (BDT); equivalent USD values are estimated using the 2016 exchange rate of 1 USD = 78 BDT (Bangladesh Bank, 2016).

Comprehensive Treatment Decision 2015 vs. 2016

Treatment Sites (Table III)

The selection of treatment locations among respondents and their family members exhibits significant changes from 2015 to 2016. For respondents, the proportion of treatment at private clinics experienced a slight increase from 32.00% in 2015 to 35.53% at present. Visits to Upazilla Health Complex (UHC) also saw an uptick from 15.00% to 19.74%. In contrast, the utilization of medical college hospitals plummeted from 10.00% to 3.95%. Specialized hospital visits demonstrated a modest rise from 10.63% to 13.16%, while attendance at community clinics fell from 4.25% to 2.63%. Other treatment locations represented 16.06% in 2015 and 18.10% in 2016.

For family members, private clinics emerged as the primary treatment site, increasing from 29.47% in 2015 to 46.49% currently. On the other hand, the use of UHC and medical college hospitals saw a notable decline from 24.10% and 13.68% to 9.65% and 8.77%, respectively. Other sites and community clinics maintained a relatively low yet stable level of utilization.

Treatment Providers (Table III)

With respect to healthcare providers, specialists have remained the primary caregivers for respondents, representing 38.98% in 2015 and experiencing a slight decrease to 36.7% in 2016. In contrast, MBBS doctors showed a slight uptick from 35.30% to 37.3%. The share of village doctors significantly dropped from 11.77% to 4.0%, while other providers, including pharmacists and traditional healers, increased from 13.95% to 15.3%.

Among family members, the role of specialists in treatment provision has risen, increasing from 37.87% in 2015 to 44.64% currently. The engagement of MBBS doctors has decreased from 38.46% to 33.04%. Village doctors have remained stable with a minor decline, and other providers decreased from 13.02% to 11.61%.

Treatment Patterns (Table III)

Allopathic medicine remains the leading treatment pattern among both respondents and family members throughout the years. For respondents, allopathic treatment was noted at 96.32% in 2015, which slightly declined to 94.67% in 2016. Homeopathic treatment saw a small increase from 1.23% to 2.66%,

Table- III : Comprehensive Treatment Decision in Masjidia, Mirsharai (2015 vs. 2016)

Category		Respondents		Family Members	
		2015	2016	2015	2016
Treatment Site	Private Clinic	45 (32.00)	27 (35.53)	50 (29.47)	53 (46.49)
	UHC	21 (15.00)	15 (19.74)	41 (24.10)	11 (9.65)
	Medical College Hospital	15 (10.00)	3 (3.95)	23 (13.68)	10 (8.77)
	Specialized Hospital	15 (10.63)	10 (13.16)	10 (5.79)	11 (9.65)
	Union Health Center	17 (12.06)	6 (7.89)	24 (14.21)	11 (9.65)
	Community Clinic	6 (4.25)	2 (2.63)	3 (1.58)	5 (4.39)
	Other Sites	23 (16.06)	13 (18.10)	19 (11.17)	13 (11.30)
Treatment Provider	Specialist	53 (38.98)	55 (36.7)	64 (37.87)	50 (44.64)
	MBBS Doctor	48 (35.30)	56 (37.3)	65 (38.46)	37 (33.04)
	Village Doctor	16 (11.77)	16 (4.0)	18 (10.65)	12 (10.71)
	Other Providers	19 (13.95)	23 (15.3)	22 (13.02)	13 (11.61)
Treatment Pattern	Allopathic	157 (96.32)	71 (94.67)	157 (96.32)	102 (95.33)
	Homeopathic	2 (1.23)	2 (2.66)	2 (1.23)	2 (1.87)
	Traditional/Other	4 (2.45)	2 (2.67)	4 (2.45)	3 (2.80)

Treatment Patterns and Financial Burden of Healthcare in Different Socioeconomic Classes (Table IV).

A. Treatment Utilization by Socioeconomic Class

Treatment utilization exhibited minor variations across socioeconomic classes. In the lower class (n=13), every respondent (100%) exclusively utilized allopathic treatment. The lower-middle class (n=56) also demonstrated a strong inclination towards allopathic treatment, with 98.2% selecting it, while a small fraction (1.8%) opted for Hamdard (traditional herbal medicine). In the upper-middle class (n=57), 96.5% utilized allopathic treatment, whereas 3.5% preferred homeopathic treatment. The upper class (n=24) relied solely on allopathic treatment. In summary, allopathic treatment was predominant with a utilization rate of 98.0%, followed by homeopathic (1.3%) and Hamdard (0.7%).

B. Healthcare Financial Burden

The financial burden associated with healthcare is considerable in relation to income. Respondents reported an average expenditure of BDT 14,280.24 on treatment, which represented 40.4% of their income. Additional treatments for family members incurred an extra BDT 4,283.68, which accounted for 12.1% of income. The total healthcare costs averaged BDT 18,563.92, signifying a substantial 52.5% of the average family income of BDT 35,352.32. This underscores the significant economic strain that healthcare expenses impose on families within the study area.

Table IV : Treatment Patterns by Socioeconomic Class and Financial Burden of Healthcare

A Treatment Utilization by class				
Socioeconomic Class	**Allopathic n (%)**	**Homeopathic n (%)**	**Hamdard n (%)**	**Total n**
Lower (n=13)	13 (100.0)	0 (0.0)	0 (0.0)	13
Lower-Middle (n=56)	55 (98.2)	0 (0.0)	1 (1.8)	56
Upper-Middle (n=57)	55 (96.5)	2 (3.5)	0 (0.0)	57
Upper(n=24)	24 (100.0)	0 (0.0)	0 (0.0)	24
Total	147 (98.0)	2 (1.3)	1 (0.7)	150
B. Healthcare Financial Burden				
Cost Component		**Amount (BDT)**	**% of Income**	
Respondent Treatment		14,280.24	40.4	
Family Member Treatment		4,283.68	12.1	
Total Healthcare		18,563.92	52.5	
Average Family Income		35,352.32	-	

**Treatment categories represent household-level preferences for allopathic, homeopathic, and Hamdard care during 2015-2016. Healthcare financial burden was estimated based on the ratio of annual treatment costs to reported household income. All costs are expressed in Bangladeshi Taka (BDT). Approximate conversions to USD were not included to preserve the local financial context. The average exchange rate used for 2016 is 1 USD = BDT 78, according to Bangladesh Bank (2016).

spent on treatment purpose alone!

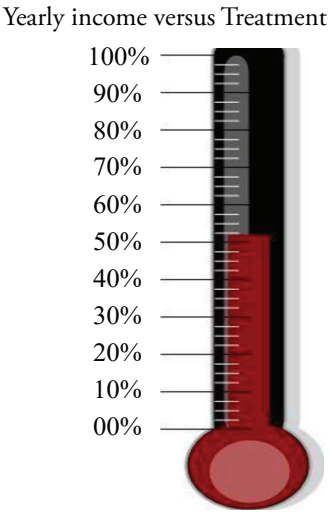

Figure-4: Yearly income versus treatment cost of a family in a thermometer chart

Figure 4 illustrates the conclusion of income versus treatment cost of a family in a thermometer chart; here displaying 52.51% of the yearly income of families of Masjidia in 2015 were

DISCUSSION

This study revealed that a very high proportion of rural households in Masjidia village experienced illness during the study period, and healthcare costs consumed an overwhelming share of household income, far exceeding the catastrophic expenditure threshold. On average, health spending accounted for 52.5% of total household income, five times higher than the WHO-recommended limit of 10% for catastrophic spending[1]. These findings confirm that illness exerts a severe economic toll on low-income households in rural Bangladesh.

The proportion of households experiencing catastrophic health expenditure in this study is consistent with findings from national and regional surveys, which estimate that between 15–25% of Bangladeshi households face CHE annually[8–10]. However, the intensity of financial burden observed here is even greater, likely reflecting the rural context and lack of access to low-cost government facilities. A WHO–World Bank report also identified Bangladesh as one of the top ten countries globally where OOP health payments push millions of households below the poverty line each year[11].

The predominance of medication costs as the largest expenditure component—constituting nearly 50–80% of total spending—is consistent with earlier studies in Bangladesh and India[12–14]. This reflects both the high price of branded drugs and the reliance on private pharmacies due to inadequate public drug supplies. Similar patterns were observed by Rahman et al.[15] and Ahmed et al.[16], who found that medicine costs alone often determine whether a household crosses the catastrophic threshold.

In terms of healthcare-seeking behavior, most respondents preferred private providers, which mirrors findings from other Bangladeshi studies showing declining confidence in public-sector services because of overcrowding, absenteeism, and perceived lower quality[17–18]. The dominance of allopathic treatment observed in this study (94%) further indicates a shift away from traditional and home-based remedies, a trend consistent with national data showing increasing biomedicalization of rural healthcare[19].

The heavy reliance on private care and self-financed drug purchases highlights the urgent need for financial protection mechanisms such as community-based health insurance, drug subsidy schemes, and expanded primary healthcare coverage. Experiences from other LMICs demonstrate that micro-insurance models, risk pooling, and voucher programs can reduce the probability of catastrophic spending[20–21]. Strengthening supply chains for essential medicines and ensuring the availability of low-cost generic drugs in rural health complexes would directly mitigate the financial burden on poor households.

CONCLUSION

Catastrophic health expenditure remains a critical challenge for rural households in Bangladesh, especially among low-income families dependent on private healthcare. With over half of household income spent on medical costs—mainly for medicines and consultations illness continues to perpetuate poverty and financial vulnerability. Strengthening financial protection through equitable health financing, affordable drug supply, and expansion of community or national insurance schemes is vital. Reinforcing primary healthcare and reducing out-of-pocket payments will be essential steps toward achieving universal health coverage and safeguarding rural populations from the economic consequences of illness.

LIMITATIONS

The study's cross-sectional design and limited sample size (n = 152) may restrict generalizability. Income and expenditure data were self-reported, introducing possible

recall bias. Nevertheless, the internal consistency of results with other national studies supports the validity of the findings.

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AUTHOR CONTRIBUTIONS

Md. Zahirul Islam and SA Shiblee supervised the study, guided its design, and contributed to manuscript preparation. Md. Habibur Rahman performed statistical analysis, interpreted findings, and assisted in drafting. Mir Khalid Hossain and Umme Kanij Fatema managed data collection, referencing, and proofreading. Md. Ebnul Akil, Md. Jewel Rana, Tanvir Ahmed, and Mezbah Ul Hoque supported fieldwork and logistics. All authors reviewed and approved the final manuscript.

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DISCLOSURE

The authors declare that they have no conflicts of interest related to the research, authorship, or publishing of this article. No financial assistance, grants, or financing were obtained from any public, commercial, or nonprofit sectors that could have affected the study results.

COMPETING INTERESTS

The authors declare no competing interests.

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