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RESEARCH

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Disease-specific distress healthcare financing and catastrophic out-of-pocket expenditure for hospitalization care in Bangladesh

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Abstract

Background Out-of-pocket (OOP) expenditure is one of the most common payment strategies for hospitalization care in Bangladesh, and the share of OOP expenditure has been increasing at an alarming rate. This study aimed to investigate the OOP costs of hospitalization care, the impact of OOP on catastrophic healthcare expenditure (CHE) and financial distress, and the associated factors.

Methods We used data from the most recent nationally representative dataset, the Bangladesh Household Income and Expenditure Survey 2022. A total of 14,395 households were surveyed, with 1973 household members hospitalized due to various illnesses. Respondents were asked to provide information regarding hospitalization care for the year preceding the survey. Households were considered to have CHE if they spent at least 25% of their total consumption expenditure or 40% of their non-food consumption expenditure on healthcare. Distress financing was defined as covering OOP healthcare costs by selling assets, borrowing money, or receiving financial assistance from friends or relatives. Multivariate logistic regression models were used to identify the determinants of CHE and distress financing.

Results The annual average OOP cost of hospitalization was USD 418, with the OOP cost nearly twice as high in private facilities compared to public ones (USD 538 vs. USD 283). The highest OOP costs were observed for cancer treatment (USD 2365), followed by COVID-19 (USD 1391). Overall, 6.72% and 9.03% of hospitalized patients experienced CHE at 25% of total expenditure and 40% of non-food expenditure, respectively, while about 61% of patients faced distress financing due to hospitalization.

Conclusion Financial hardship due to hospitalization remains high in Bangladesh. These findings will help policymakers adopt more effective healthcare financing strategies and improve the efficiency of public health investments.

Keywords Catastrophic, Distress financing, Out-of-pocket expenditure, Universal Health Coverage, Bangladesh

Introduction

Despite significant improvements in various health indicators globally, providing access to affordable healthcare remains a major challenge in the developing world including Bangladesh [1]. As a lower- middle income country, Bangladesh is committed to achieve

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Universal Health Coverage (UHC) by 2032. UHC, a priority objective of the World Health Organization (WHO), aims to ensure that all individuals have access to essential healthcare services of sufficient quality without facing financial hardship [2]. Although UHC service coverage index has significantly increased from 37 in 2010 to 52 in 2021 in Bangladesh, financial hardship has worsened than before, experiencing a sharp rise in out-of-pocket (OOP) health spending [3]. Consequently, many individuals are often forced to borrow money, sell assets, or reach out for assistance from friends or relatives, often leading to catastrophes in many households and exploring distress healthcare financing during treatment care. Financial protection is a crucial aspect of UHC, and many countries have made great efforts to strengthen it. Unfortunately, many resource-poor countries often struggle to achieve financial health protection and mitigate the financial consequences of illness.

In the South-East Asia Region, OOP health expenditure is the main source of healthcare funding. More than half of the SEAR countries including Bangladesh finance more than one-third of their current health spending from OOP expenses [3]. Bangladesh's healthcare system is facing various challenges including limited access to healthcare services, limited health workforce along with inadequate mechanisms for financial risk protection [4]. Healthcare financing relies on a mix of general revenue taxation, out-of-pocket payments, and donations from development partners' contributions for healthcare financing strategies in Bangladesh [5]. Bangladesh currently lacks both a national health insurance system and a well-established private health insurance sector. OOP expenditure constitutes the largest share of payment mechanism for hospitalization in Bangladesh and the share of OOP expenditure has been increasing alarmingly from 55.9% in 1997 to 68.5% in 2020 according to the Bangladesh National Health Account [6], and reaching approximately 74% in 2022 according to the Global Health Expenditure dataset [7]. As a consequence, many households face catastrophic health expenditures and nearly 5 million people fall into poverty every year in Bangladesh [8, 9]. Furthermore, a study conducted in Bangladesh revealed that about 43% of households who used healthcare did so by selling properties, borrowing, or receiving assistance from relatives [10].

In Bangladesh, the pluralistic healthcare system often leads individuals to typically visit multiple providers to seek treatment resulting in increased cost of care [11, 12]. Out-of-pocket spending was predominantly driven by spending on medicines (64.6%) followed by laboratory charges (11.7%) and consultation fees (10.8%) according to the most recent data available [6]. While public health facilities typically charge lower fees during hospitalization, accessing healthcare services from private providers requires significantly higher OOP expenditures, making these services less accessible for low-income individuals [13]. As a result, many low-income individuals turn to seek healthcare from untrained healthcare providers which can lead to harmful care and even inability to pay for adequate healthcare at the point of service results in unmet need of care [14, 15]. To address the financial burden of OOP expenditures, the implementation of risk-pooling mechanisms for healthcare financing is recommended, though such financing mechanisms are rarely observed in Bangladesh.

Bangladesh is in the middle of an epidemiological transition while the disease is shifting from communicable disease (e.g., cholera, malaria) to various non-communicable diseases (e.g., diabetes, hypertension, obesity) [16]. The changing disease pattern is associated with increasing hospitalisation and rising healthcare costs both nationally and locally [17, 18]. CHE and distress health financing are the tools mostly used to capture financial protection in health [19, 20]. However, the intensity of financial burden may vary across various socio-economic strata as well as across regions. Although various literature indicates the overall intensity and factors of OOP healthcare expenditure, the financial burden of disease-specific hospitalization has been less studied in Bangladesh which are crucial for assessing the progress of achieving UHC in Bangladesh [8, 9, 17, 21]. Despite Bangladesh's commitment to Universal Health Coverage (UHC), financial hardship from high out-of-pocket (OOP) health expenditures has intensified, especially after the COVID-19 pandemic. However, limited research examines the disease-specific burden of OOP spending on hospitalization and its impact on catastrophic health expenditure (CHE) and distress financing at a national level. Existing studies are often hospital-based or lack a post-pandemic perspective, leaving gaps in understanding socioeconomic disparities in financial hardship, the economic consequences of hospitalization, and the effectiveness of health financing policies [17, 18]. Addressing these gaps with nationally representative household data is crucial for developing targeted, evidence-based financial protection strategies to advance UHC in Bangladesh. With this backdrop, using data from the latest Household Income and Expenditure Survey (HIES)−2022, this study aimed to assess the OOP costs of hospitalization care, the CHE, financial distress, and identify their determinants. This statistic may have implications for setting future healthcare policy priorities for achieving UHC in Bangladesh and may provide lessons for other countries in the South-Asian region.

Methods

Data sources and study settings

This study analysed data from the latest Household Income and Expenditure Survey (HIES) 2022 dataset conducted by the Bangladesh Bureau of Statistics (BBS) [22]. HIES is a nationally representative survey that consists of various information including socio-demographic characteristics, income, consumption and healthcare expenditure of households. This cross-sectional survey followed a two-stage stratified cluster sampling technique under the sampling frame provided by the Bangladesh Population and Housing Census 2022. The Primary Sampling Unit (PSU) was the Enumeration Area (EA) of the Population and Housing Census 2022. Each EA is a cluster of around 100 households. In the first stage, the required number of PSUs was selected, and a complete household listing was carried out for the selected PSUs. Then, in the second stage, 20 households were selected randomly from each selected PSU for the field interview. Stratification was conducted to represent the country. First, each of the eight administrative divisions by rural and urban areas was treated as a domain or leading stratum. Therefore, the survey has 16 (8 rural + 8 urban) domains or main strata. The detailed methodology has been reported elsewhere [22]. A total sample of 14,395 households were surveyed while 1,973 household members were hospitalized due to various illnesses. Respondents were requested to provide information relating to in-patient treatment (defined as an overnight stay) for the last 1-year preceding the survey. The data collected included the individual characteristics of the patient, household-related information, cause of hospitalization, type of healthcare provider, out-of-pocket healthcare expenditure (OOP expenditure), coping strategies and others.

Estimation of OOP expenditure, CHE and financial distress

OOP cost is defined as the expenses incurred by patients or households at the time of receiving healthcare services, including cost-sharing and informal payments (e.g., tips and under-the-table payments) but excluding insurance premiums and any reimbursements from the third-party payers [23]. The incidence of CHE was estimated from the fraction of OOP expenditure for inpatient care in relation to household consumption expenditure which exceeds a certain threshold [20]. These consist of operation costs, consultation/doctor fees, bed/cabin charges, medication costs, medical investigations costs and other expenses that are paid for outright by the individual households. For CHE incidence estimation, there is no single agreed threshold. However, two definitions are often used for such estimations. Firstly, OOP expenditure is compared with total household consumption expenditure (THCE) [20, 24] and secondly, such expenditure is compared with the total non-food consumption expenditure (NFCE) of the households [8, 20, 25, 26]. The most commonly used thresholds are 10%, 25%, 30%, and 40% [20, 27, 28]. We have considered the households that incur 25% of THCE (household expenditures), and 40% of NFCE were used as the CHE thresholds in this study [8, 20, 26]. Distress financing was defined as the financing mechanism for OOP expenditure by selling assets, borrowing money, and seeking and getting assistance from friends/relatives [29]. The outcome variables, incidence of catastrophic health expenditures and distress financing, were dichotomous. Catastrophic health expenditure was constructed as a dichotomous variable where "no (0)" and "yes (1) denote the households that not facing and facing. Similarly, "yes" as an incidence of distress financing and "no" otherwise.

Explanatory variables

After a rapid review of the literature, based on similar types of studies a number of independent variables were taken into account to determine the determinants of the incidence of CHE and distress financing in the context of Bangladesh [29–32]. At the individual level the patient's age, gender, educational attainment, as well as the type of health care provider chosen for the in-patient treatment while the number of earners in the family, place of residence, administrative division, and wealth status are recognized as household level variables. The wealth quintile was constructed by evaluating a range of household assets using principal component analysis (PCA), and then these scores were divided into five equal categories, from the lowest to the highest 20%.

Statistical analysis

This study adopted descriptive statistics and multivariate logistic regression analysis. Proportion, mean, and standard deviation were used to present descriptive data. The predictors of CHE and distress financing owing to OOP expenditure on hospitalization were investigated using binary logistic regression models, with the results provided as odds ratios (i.e., exponential form of the regression coefficient, OR = exp (beta)) and 95% confidence intervals. Multi-stage cluster designs of HIES 2022 were considered during the sampling weight adjustment. All statistical analyses were performed using the statistical package STATA 17.0 (Stata Corp., College Station, TX, USA) and results were interpreted as statistically significant at a p-value of < 0.05.

Results

Background characteristics of the study participants

A total of 1973 hospitalized patients were included in the study (Table 1). The highest percentage of the patient

Table 1 Background and household characteristics of the study participants (N = 1973)

Characteristics	Weighted Frequency n (%)	95% CI
Age		
Mean age (mean ± SD, years)	35.00 ± 21.00	(34.96, 36.76)
< 18	351 (17.79)	(17.78, 17.81)
18–35	742 (37.58)	(37.56, 37.6)
36–49	334 (16.95)	(16.93, 16.96)
50–60	279 (14.15)	(14.13, 14.16)
> 60	267 (13.53)	(13.52, 13.55)
Sex of the patients		
Male	794 (40.22)	(40.21, 40.24)
Female	1179 (59.78)	(59.76, 59.79)
Patients Education level		
No formal education	604 (30.62)	(30.6, 30.63)
Primary education	419 (21.26)	(21.24, 21.27)
Secondary education	675 (34.22)	(34.2, 34.24)
Higher secondary education	152 (7.71)	(7.7, 7.72)
Higher	122 (6.19)	(6.18, 6.2)
Number of earners		
One earner	1082 (54.85)	(54.83, 54.87)
Two and more earners	891 (45.15)	(45.13, 45.17)
Place of residence		
Urban	1312 (66.49)	(66.48, 66.51)
Rural	661 (33.51)	(33.49, 33.52)
Administrative Division		
Barisal	89 (4.52)	(4.52, 4.53)
Chittagong	510 (25.85)	(25.83, 25.87)
Dhaka	462 (23.44)	(23.42, 23.45)
Khulna	208 (10.53)	(10.52, 10.54)
Mymensingh	130 (6.59)	(6.58, 6.6)
Rajshahi	231 (11.69)	(11.68, 11.7)
Rangpur	198 (10.02)	(10.01, 10.03)
Sylhet	145 (7.36)	(7.35, 7.37)
Wealth status		
Poorest	282 (14.31)	(14.29, 14.32)
Poorer	409 (20.75)	(20.73, 20.76)
Middle	406 (20.58)	(20.57, 20.6)
Richer	411 (20.81)	(20.8, 20.83)
Richest	465 (23.55)	(23.53, 23.57)
Total (N)	1973 (100)	

(37.58%) belonged to the 18 to 35-year-old age group followed by the less than 18-year-old (17.79%) and the average age of the patients was found 35 years while about 60% of respondents were female and 34.22% completed secondary level education. Among the patients, more than half of the individuals (54.85%) belonged to families with only one earner while 66.49% of patients belonged to the urban areas. Regarding the wealth quintile, almost a quarter (23.55%) of the study patients belonged to the richest wealth quintile while only 14.31% of them came from the poorest households.

Table 2 Case-specific hospitalization (%) across healthcare provider

Diseases/reasons for hospitalization	Hospitalization in last 12 months n (%)		
	Health care provider		
	Public (%)	Private (%)	All (%)
Pregnancy-related complications	80 (8.6)	260 (24.91)	340 (17.23)
Diarrhoeal infections	145 (15.6)	29 (2.73)	173 (8.79)
Injuries	75 (8.08)	56 (5.4)	131 (6.66)
Respiratory infections	75 (8.09)	44 (4.22)	119 (6.04)
Heart disease	49 (5.22)	59 (5.7)	108 (5.47)
Pain	53 (5.67)	44 (4.21)	97 (4.89)
Fever	66 (7.12)	10 (0.93)	76 (3.85)
Eye infections	13 (1.41)	48 (4.61)	61 (3.1)
Kidney diseases	23 (2.52)	27 (2.61)	51 (2.57)
Blood pressure	32 (3.49)	16 (1.54)	48 (2.45)
Pneumonia	26 (2.8)	21 (1.99)	47 (2.37)
Liver diseases	14 (1.49)	25 (2.43)	39 (1.99)
Weakness/dizziness	22 (2.4)	15 (1.45)	38 (1.9)
Covid-19	22 (2.38)	14 (1.34)	36 (1.83)
Paralysis	17 (1.8)	13 (1.22)	29 (1.49)
Ear/ENT problems	10 (1.07)	17 (1.64)	27 (1.37)
Typhoid	12 (1.31)	9 (0.86)	21 (1.07)
Scabies/skin diseases	13 (1.4)	4 (0.42)	17 (0.88)
Epilepsy	4 (0.47)	10 (0.97)	15 (0.74)
Mental health	9 (0.98)	5 (0.51)	14 (0.73)
Jaundice	5 (0.55)	8 (0.76)	13 (0.66)
Cancer	8 (0.85)	5 (0.45)	13 (0.64)
Dysentery	9 (0.93)	3 (0.3)	12 (0.6)
Tuberculosis	4 (0.38)	1 (0.12)	5 (0.24)
Malaria	2 (0.19)	2 (0.22)	4 (0.21)
Dental problem	1 (0.05)	1 (0.08)	1 (0.07)
Others	140 (15.06)	297 (28.46)	437 (22.14)
All diseases	929 (100%)	1044 (100%)	1973

Case-specific hospitalization across healthcare provider

Table 2 shows the causes of hospitalizations in both public and private healthcare facilities in the last 12 months preceding this survey. Among the total inpatients (n = 1973), more than half of the total patients (52.92%) were hospitalized in various private healthcare facilities for various disease treatments. The top causes of hospitalization were pregnancy-related complications (17.23%), diarrheal infections (8.79%), various injuries (6.66), respiratory infections (6.04%) and heart disease (5.47%). In private facilities, the top causes

of hospitalization were pregnancy-related complications (24.91%), heart disease (5.7%) and injuries (5.4%) while in public hospitals, diarrheal infections (15.6%), respiratory infections (8.09%) and injuries (8.08%) were the major causes of hospitalization.

OOP expenditure across public vs. private healthcare facilities

Table 3 summarizes the average disease-specific out-of-pocket (OPP) expenditure in public and private healthcare facilities. The annual average OOP expenditure was USD 418 (SD = 790) while the average OOP expenditure was almost two times higher in private facilities (283 ± 656) than in public healthcare facilities (283 ± 656). The highest OOP cost was observed for treatment of cancer (USD 2365), followed by covid-19 (USD 1391) and heart disease (USD 1053). Among the public hospitalized patients, the highest average OOP cost was observed among cancer patients (USD 2209), heart diseases (USD 760), mental illness (USD 720) and covid-19 (USD 635). The average OOP cost is highest among the patients who had been admitted to private facilities due to cancer (USD 2627), covid-19 (USD 2590) and heart disease (USD 1292).

Financial distress due to hospitalization

The disease-specific incidence of catastrophic health expenditure (CHE) across different diseases is presented

Table 3 Healthcare provider-specific mean out-of-pocket healthcare expenditure on hospitalization by diseases in Bangladesh, United States Dollar (USD)[a]

Diseases/reasons for hospitalization	OOP expenditure (in USD) due to hospitalization in last 12 months		
	Health care provider		
	Public	Private	All
	Mean ± SD	Mean ± SD	Mean ± SD
Cancer	2,209 ± 2,306	2,627 ± 2,362	2,365 ± 2,257
Covid 19	635 ± 768	2,590 ± 2,782	1,391 ± 2021
Heart disease	760 ± 1,257	1,292 ± 1,690	1,053 ± 1,527
Liver diseases	603 ± 452	960 ± 1,265	834 ± 1,053
Jaundice	112 ± 90	1,256 ± 1825	807 ± 1,410
Mental health	720 ± 947	749 ± 513	731 ± 792
Kidney diseases	467 ± 688	842 ± 912	668 ± 830
Pneumonia	558 ± 1,111	683 ± 801	614 ± 975
Injuries	277 ± 509	724 ± 917	468 ± 744
Dysentery	64 ± 117	1,542 ± 53	462 ± 695
Blood pressure	312 ± 417	503 ± 780	375 ± 562
Ear/ENT problem	163 ± 119	453 ± 275	347 ± 268
Paralysis	421 ± 620	237 ± 162	342 ± 483
Eye Infections	280 ± 363	339 ± 480	326 ± 455
Tuberculosis	301 ± 169	364 ± 1	317 ± 137
Respiratory infections	197 ± 300	401 ± 489	272 ± 391
Pregnancy-related complications	169 ± 142	283 ± 180	256 ± 178
Weakness/dizziness	110 ± 159	445 ± 1,226	246 ± 787
Malaria	41	381 ± 43	236 ± 208
Typhoid	160 ± 228	298 ± 253	219 ± 242
Pain	102 ± 226	324 ± 298	203 ± 282
Epilepsy	50 ± 18	240 ± 186	183 ± 172
Diarrhoeal Infections	67 ± 147	334 ± 341	111 ± 215
Scabies/skin diseases	90 ± 91	145 ± 39	104 ± 83
Dental problem	137	60	90 ± 53
Fever	68 ± 60	139 ± 106	77 ± 70
Others	389 ± 801	505 ± 735	468 ± 760
All diseases	283 ± 656	538 ± 875	418 ± 790

[a] 1 USD = 94.7000 BDT at the end of July 2022

in Table 4 using two different threshold levels at 25% of THCE and 40% of NFE and distress financing for financial hardship by diseases due to hospitalization in the last 12 months. Overall, 6.72% and 9.03% of hospitalized patients incurred CHE at 25% of THCE and 40% of NFE respectively (Table 4). At the same time, hospitalization due to cancer treatment incurred a higher CHE (50.18% at both 25% of THCE and 40% of NFE) followed by covid-19 (20.87% at 25% of THCE and 9.56% at 40% of NFE) and pneumonia (19.93% at both 25% of THCE and 40% of NFE). Overall, distress financing due to hospitalization was reported at 61.01% and mainly for tuberculosis treatment (93.66%), followed by malaria (90.41%), paralysis (86.94%) and epilepsy (79.16%).

Figure 1 represents the coping mechanisms and distress financing for hospitalized individuals. We observed various coping strategies during hospitalization while the largest share of financing emerged from savings (32.6%). However, 26.78% had to borrow money while 18.72% and 15.51% of the individuals had to seek help from friends and relatives and sell assets, respectively. Regular income represents only 6.39% of the total, underscoring the inadequacy of regular earnings to meet in-patient care costs. This study observed that about 61.01% of the individuals faced distressed financing due to OOP expenditure of in-patient treatment in Bangladesh. Across healthcare facilities, individuals were more financially distressed while seeking treatment from the private hospital (65.27%) compared to the public hospital (56.49%) (Supplementary Figure S1).

Determinants of CHE & Financial distress

Table 5 presents statistically significant determinants of the incidence of CHE using 25% of total household

Table 4 Catastrophic health expenditure and distress financing due to out-of-pocket spending on hospitalization in Bangladesh

Diseases/reasons for hospitalization	Catastrophic health expenditure due to hospitalization in last 12 months n (%)				Distress Financing due to hospitalization in the last 12 months	
	25% of THCE		40% of NFE			
	Frequency (%)	95% CI	Frequency (%)	95% CI	Frequency (%)	95% CI
Diarrhoeal infections	1 (0.4)	(0.39, 0.4)	3 (1.55)	(1.54, 1.57)	75 (43.88)	(43.81, 43.94)
Fever	0 (0)	(0, 0)	0 (0)	(0, 0)	37 (48.43)	(48.33, 48.53)
Dysentery	0 (0)	(0, 0)	0 (0)	(0, 0)	8 (68.67)	(68.44, 68.91)
Pain	2 (1.62)	(1.59, 1.64)	5 (4.88)	(4.84, 4.91)	64 (65.9)	(65.82, 65.99)
Injuries	16 (11.82)	(11.77, 11.87)	21 (15.65)	(15.6, 15.71)	89 (67.95)	(67.87, 68.02)
Blood pressure	5 (9.66)	(9.59, 9.73)	5 (9.66)	(9.59, 9.73)	29 (58.92)	(58.8, 59.04)
Heart disease	19 (17.35)	(17.29, 17.42)	14 (13.15)	(13.1, 13.21)	64 (59.35)	(59.27, 59.43)
Respiratory infections	6 (5.41)	(5.37, 5.44)	10 (8.37)	(8.33, 8.42)	79 (66.37)	(66.3, 66.45)
Weakness/dizziness	1 (2.27)	(2.23, 2.31)	1 (2.27)	(2.23, 2.31)	19 (51.31)	(51.16, 51.45)
Covid 19	7 (20.87)	(20.75, 20.99)	3 (9.56)	(9.47, 9.65)	18 (52.34)	(52.19, 52.48)
Pneumonia	9 (19.93)	(19.83, 20.03)	9 (19.93)	(19.83, 20.03)	33 (70.62)	(70.5, 70.73)
Typhoid	0 (0)	(0, 0)	0 (0)	(0, 0)	11 (50.02)	(49.83, 50.2)
Tuberculosis	0 (0)	(0, 0)	1 (17)	(16.7, 17.3)	4 (93.66)	(93.46, 93.85)
Malaria	0 (0)	(0, 0)	0 (0)	(0, 0)	4 (90.41)	(90.15, 90.66)
Jaundice	1 (10.37)	(10.22, 10.52)	2 (11.51)	(11.36, 11.66)	9 (70.08)	(69.86, 70.3)
Pregnancy-related complications	3 (0.9)	(0.89, 0.91)	15 (4.29)	(4.28, 4.31)	176 (51.73)	(51.68, 51.78)
Cancer	6 (50.18)	(49.94, 50.43)	6 (50.18)	(49.94, 50.43)	13 (100)	
Mental health	2 (10.7)	(10.56, 10.84)	4 (28.62)	(28.42, 28.83)	10 (71.31)	(71.11, 71.52)
Paralysis	2 (8.02)	(7.93, 8.11)	4 (12.17)	(12.06, 12.27)	26 (86.94)	(86.83, 87.05)
Epilepsy	0 (0)	(0, 0)	0 (0)	(0, 0)	11 (79.16)	(78.98, 79.35)
Scabies/skin diseases	0 (0)	(0, 0)	0 (0)	(0, 0)	9 (50.64)	(50.44, 50.85)
Kidney diseases	6 (12.31)	(12.23, 12.39)	5 (9.87)	(9.8, 9.95)	39 (77.09)	(76.99, 77.2)
Liver diseases	3 (8.44)	(8.37, 8.52)	11 (28.41)	(28.28, 28.53)	27 (67.65)	(67.52, 67.78)
Ear/ENT problems	0 (0)	(0, 0)	1 (4.45)	(4.39, 4.52)	20 (74.21)	(74.06, 74.36)
Eye infections	1 (2.44)	(2.41, 2.48)	4 (6.88)	(6.82, 6.93)	42 (68.19)	(68.09, 68.29)
Dental problem	0 (0)	(0, 0)	0 (0)	(0, 0)	1 (61.48)	(60.74, 62.21)
Other	41 (9.53)	(9.51, 9.55)	55 (12.64)	(12.61, 12.67)	283 (65.40)	(65.36, 65.44)
All diseases	132 (6.72)	(6.71, 6.73)	178 (9.03)	(9.02, 9.05)	1199 (61.01)	(60.99, 61.03)

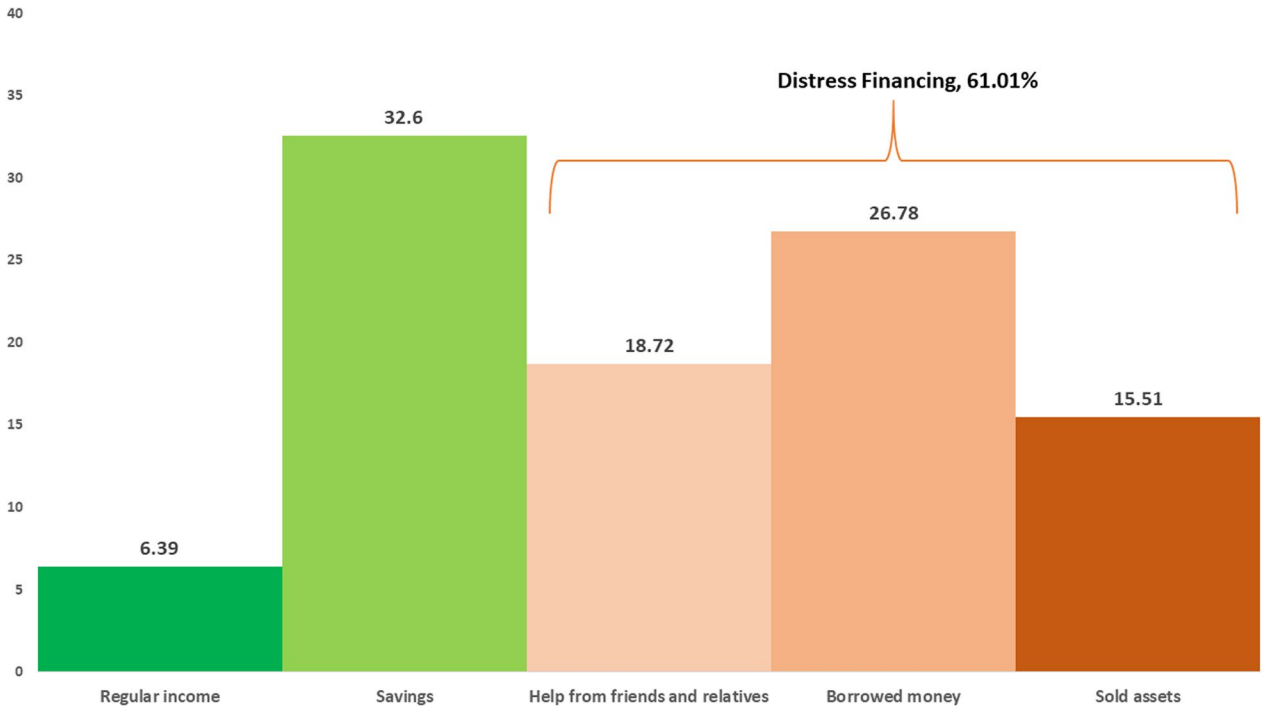

Fig. 1 Distress Financing due to hospitalization (%)

consumption expenditure (model A), 40% of non-food expenditure threshold levels (model B) and distress financing (model C) due to hospitalization using the multiple logistic regression model. The study shows that patients between 36–49 years were more prone to CHE by 2.54 times at 25% of the THCE threshold (AOR = 2.54, 95% CI 1.34, 4.79) compared to any other age group. Male patients were more likely to incur CHE at both the threshold level (AOR = 1.63, at 25% of the THCE and AOR = 1.75, 95% at 40% of NFE). Households with a single earner were 1.67 times (95% CI 1.09, 2.54) times more likely to experience CHE using 40% of the NFE threshold, compared to multiple earners in the households. The odds of incurring CHE were significantly higher for rural residents (AOR: 1.58; 95% CI 1.01, 2.47) compared to their urban counterparts at 40% of the NFE threshold. While individuals residing in Dhaka, Rangpur had significantly higher odds of incurring CHE at the 25% threshold, such a significant relationship was not observed regarding the 40% NFE threshold level. However, patients who were hospitalized at private facilities had 1.53- and 2.10-times higher odds of facing CHE incidence at 25% of the THCE and 40% of NFE, respectively compared to public facilities. A higher probability of distress financing was observed among patients aged 18–35 years (AOR = 1.91) and aged 50–60 years (AOR = 1.69). The odds of facing distress financing were 2.80 and 2.49 times higher for patients with no formal education and primary education respectively compared to those with higher education. The patients from the Chittagong division face significantly higher odds of facing distress financing (AOR = 3.39, 95% CI 2.07, 5.56). Patients from the poorest and middle wealth quintile faced distress financing significantly more compared to the patients from the richest quintile. Similar to the incidence of CHE, we observed that patients who were hospitalized in private facilities were 1.79 times more likely to face distress financing than public facilities.

Discussion

Bangladesh has made significant improvements in many health indicators including healthcare coverage due to the nature of the pluralistic healthcare system over the last two decades [33]. The country has initiated various healthcare policies for its citizens; however, the OOP healthcare cost is increasing alarmingly which often leads to inequity of healthcare utilization across socio-economic strata [34]. Recent studies indicated that OOP cost for healthcare places a heavier burden on the poor, and drives them into catastrophic health expenditure, and financial distress through assistance from friends and relatives or borrowings or sale of household assets [10, 31]. This study aimed to assess the catastrophic OOP

Table 5 Determinants of catastrophic health expenditure and distress financing due to out-of-pocket health expenditure on hospitalization in Bangladesh

Variables	Catastrophic health expenditure		Model C (distress financing)
	Model A (25% of THCE)	Model B (40% of NFE)	
	Adjusted OR	Adjusted OR	Adjusted OR
Age of the patients			
< 18	0.74 (0.34–1.64)	0.86 (0.42–1.75)	1.43 (0.91–2.24)
18–35	1.58 (0.81–3.08)	1.58 (0.81–3.09)	1.91** (1.23–2.94)
36–49	2.54** (1.34–4.79)	1.63 (0.82–3.23)	1.43 (0.89–2.28)
50–60	1.31 (0.64–2.72)	1.44 (0.68–3.04)	1.69* (1.05–2.71)
> 60	Reference	Reference	Reference
Sex of the patients			
Male	1.63* (1.07–2.48)	1.75* (1.13–2.71)	1.29 (0.97–1.70)
Female	Reference	Reference	Reference
Patients' education level			
No formal education	1.16 (0.47–2.86)	2.04 (0.63–6.66)	2.80** (1.50–5.22)
Primary education	1.07 (0.43–2.65)	1.9 (0.57–6.35)	2.49** (1.34–4.61)
Secondary education	1.5 (0.66–3.41)	1.95 (0.62–6.17)	1.67 (0.94–2.95)
Higher secondary education	1.23 (0.46–3.31)	1.19 (0.32–4.46)	1.21 (0.63–2.34)
Higher	Reference	Reference	Reference
Number of earners			
One earner	1.31 (0.89–1.92)	1.67* (1.09–2.54)	1.14 (0.86–1.49)
Two and more earners	Reference	Reference	Reference
Place of residence			
Urban	Reference	Reference	Reference
Rural	1.26 (0.85–1.85)	1.58* (1.01–2.47)	1.18 (0.90–1.54)
Administrative Division			
Barisal	1.71 (0.66–4.42)	1.98 (0.89–4.44)	1.05 (0.64–1.73)
Chittagong	1.76 (0.70–4.44)	1 (0.44–2.24)	3.43*** (2.09–5.62)
Dhaka	2.98* (1.21–7.33)	0.9 (0.38–2.15)	1.02 (0.63–1.64)
Khulna	1.78 (0.72–4.37)	1.1 (0.46–2.60)	1.39 (0.86–2.24)
Mymensingh	Reference	Reference	Reference
Rajshahi	1.81 (0.74–4.38)	1.02 (0.45–2.29)	1.12 (0.69–1.81)
Rangpur	3.11** (1.35–7.17)	1.27 (0.59–2.76)	1.1 (0.68–1.80)
Sylhet	1.61 (0.64–4.03)	0.83 (0.35–1.99)	1.39 (0.85–2.25)
Wealth status			
Poorest	1.09 (0.56–2.11)	1.88 (0.84–4.18)	1.94* (1.17–3.21)
Poorer	1.13 (0.59–2.13)	1.82 (0.84–3.92)	1.42 (0.91–2.21)
Middle	0.96 (0.53–1.72)	1.06 (0.49–2.28)	1.63* (1.06–2.51)
Richer	1 (0.54–1.85)	1.19 (0.58–2.46)	1.26 (0.82–1.94)
Richest	Reference	Reference	Reference
Health care provider			
Government	Reference	Reference	Reference
Private	1.53* (1.02–2.29)	2.10*** (1.37–3.23)	1.79*** (1.35–2.38)
Mean VIF	2.32	2.63	2.63

***p < 0.001, **p < 0.01, *p < 0.05

expenditure and financial distress due to hospitalization and associated factors using the latest nationwide household income and expenditure dataset.

This study observed that overall, 1,973 individuals were admitted and stayed overnight in the hospital at least once in which a higher proportion of the individuals

were hospitalized in private facilities compared to the public facilities. Public facilities are highly subsidized in Bangladesh and people often access healthcare services at a comparatively lower cost than private facilities [35]. However, the total number of beds in public facilities is lower than in private facilities in Bangladesh [36]. Further, the perceived poor quality of healthcare services often led to the loss of faith in public hospitals in Bangladesh [37, 38]. A similar pattern of preferring private facilities over public facilities was also observed in other studies primarily due to the perceived poor quality of care in public hospitals [32, 39]. Like other settings, we also found that a number of individuals were hospitalized due to non-communicable diseases (NCDs) which often entail high out-of-pocket costs [40, 41]. As anticipated, OOP expenditure was twice as high at private healthcare facilities compared to public ones due to the nature of the profit maximiser [31]. The increasing number of private healthcare sectors and high healthcare service charges increased OOP costs in Bangladesh, and thus often inaccessible for the poorest segments of society [13]. As a consequence, poor households often receive care from non-trained health professionals like traditional healers which may put their health at risk and ultimately complex treatment is required at later stages [42]. Similar to our study, a higher OOP cost was observed at private facilities than at public facilities in various settings [32, 43]. Among the NCDs, the treatment cost was highest among the patients hospitalized due to cancer followed by the other various NCDs such as heart disease and liver diseases [32, 44, 45] while the latest Covid-19 also poses a significant financial burden for hospitalized cases [46].

Due to the substantial reliance on OOP expenditures, individuals are often subjected to experienced CHE and distress financing to cover only hospital expenses. This study found that using 25% of total household consumption expenditure (THCE) and 40% of non-food expenditure (NFE) thresholds, overall, about 6.72% and 9.03% of the individuals faced CHE due to OOP cost on hospitalization. A similar high prevalence of CHE is common in many settings including India (11.15%), Pakistan (13.15%), Iran (16.48%), Nigeria (35.99%) [47–50]. This study found a significantly higher incidence of catastrophic health expenditure (CHE) among patients predominantly treated for conditions such as cancer, pneumonia, COVID-19, heart diseases, and injuries. Given the significant OOP expenditures for cancer treatment, it is notable that 50.18% of individuals experienced CHE related to their hospitalization for cancer treatment at both 25% of THCE and 40% of NFE. These findings align with studies conducted in India, China, Vietnam, Pakistan, Nepal, and Sri Lanka, which emphasize that NCDs in general, and cancer and liver diseases in particular, are associated with higher rates of CHE [32, 51].

OOP costs often lead to financial hardship for the people accessing the healthcare services. We observed that more than 60% of patients faced distress financing as they depended on borrowing, assistance from friends and relatives, and selling various assets to combat high OOP costs. Compared to other sources of distress financing, borrowing was more common than selling assets as it is considered low-risk and less likely to push households into poverty [29, 30]. Previous studies from low and lower-middle-income countries indicate that many households incur financial debt or sell their assets to manage healthcare costs, with 25.9% of low-income households borrowing money or selling assets according to the World Health Survey [32, 52–54]. An earlier study also documented that more than 50% of patients suffered financial distress due to hospitalization in Bangladesh (58.0%) which was higher than in many other settings such as India and Malaysia [30, 32]. Additionally, distress financing was particularly higher among those who sought treatment from private healthcare facilities, and for diseases such as cancer, and tuberculosis as seen in other studies [31, 32]. This risk was higher among the poorest households and in countries with insufficient health insurance coverage like Bangladesh [10]. It was well evident that risk-pooling mechanisms such as social health insurance may mitigate the consequences of OOP cost and financial distress, however, less than 1% of the population belongs to various health insurance schemes in Bangladesh [55]. In this context, the burden of OOP may be tackled if the patient can access the pre-payment and pooling mechanisms which is hardly seen in Bangladesh.

Geographic location was also evident to be a significant predictor, with individuals from rural areas facing higher odds of facing CHE compared to individuals from urban areas. These findings align with previous studies conducted in various settings [31, 32, 56]. This may be attributed to the greater distance to health facilities in rural areas, which discourages timely healthcare-seeking behaviour [57, 58]. Consequently, rural residents may have delayed seeking care until their conditions become more severe, resulting in an increased risk of incurring CHE. Similarly, the Dhaka and Rangpur divisions face 2.99- and 3.10-times higher odds of facing CHE respectively at 25% of THCE compared to the Mymensingh division. This regional variation suggests uneven financial protection and accessibility to healthcare services across different administrative areas.

This study's findings indicate a significant disparity in distress financing among various socio-demographic groups. The patients with low levels of education faced

greater financial hardship, compared to their higher-educated counterparts, which suggests that educational attainment plays a critical role in financial resilience, potentially due to better employment opportunities and income levels among the more educated. The fact that financial hardship was higher in private health facilities than in public facilities could be attributable to high treatment costs at private facilities as they are not subsidized as the public hospitals and they operate without having any financial support from the government [59]. This finding highlights the greater financial burden associated with private healthcare and underscores the need for policies to properly regulate private facilities and enhance the affordability and accessibility of private healthcare services.

This study has several limitations. The study relied on data obtained from a national household survey, which is subject to recall and reporting bias among other problems. Further, due to the cross-sectional nature of this survey, we could not provide evidence of a causal relationship between various factors with outcome variables. We capture the incidence of catastrophic OOP and financial distress for those households who sought hospitalized care and did not consider those who needed services but could not afford them. This could lead to an underestimation of the incidence and intensity of catastrophic healthcare expenditure. Despite those limitations, study findings can be generalised to the national level because the study gathered data from the latest nationally representative household expenditure of Bangladesh.

Conclusion

This study revealed the significant financial burden in terms of CHE and distress financing due to high OOP expenditure for hospitalization. Additionally, this study underscores the greater OOP expenditure, CHE, and distress financing associated with private healthcare facilities compared to public healthcare facilities with diseases such as cancer, COVID-19, pneumonia, and heart disease incurred a greater financial hardship than other diseases when it came to hospitalization. These findings point to critical barriers to achieving UHC in Bangladesh and emphasize the need for a national social health protection scheme in national and state health policies, and prioritizing healthcare services in health facilities based on disease burden. By providing these insights, this study aims to support policymakers in Bangladesh in devising the required steps to safeguard patients from financial hardship. This study also suggests that a mixture of alternative healthcare financing mechanisms should be explored to reduce CHE and distress financing, as the current financing mechanism is relying too much on OOP expenditure and struggling to provide financial protection to patients from lower-income households.

Abbreviations

BBS	Bangladesh Bureau of Statistics
BIDS	Bangladesh Institute of Development Studies
CHE	Catastrophic healthcare expenditure
HIES	Household Income and Expenditure Survey
NFCE	Non-food consumption expenditure
OOP	Out-of-pocket
THCE	Total household consumption expenditure
UHC	Universal Health Coverage
WHO	World Health Organization

Supplementary Information

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Additional file 1.

Additional file 2.

Author contributions

ARS led the conception and design of the study and had full access to all of the data in this study and took responsibility for the integrity of the data and the accuracy of the data analysis. ARS, AH and RI did the statistical analysis and interpreted the data. ARS, AH and RI finalized, copy-edit and approved the final manuscript.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

This study did not require ethical approval as it used an unidentifiable secondary Household Income and Expenditure Survey dataset. According to the BBS, written informed consent was obtained from respondents and mothers/caretakers on behalf of the children enrolled in the survey.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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