

Hidden Costs of Institutional Delivery in Public Facilities in Bangladesh: A Comparative Analysis of Public and Private Sector Expense

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Research Article

Keywords: Delivery Cost, Maternal Health, BDHS, Health Financing

Posted Date: June 16th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-9740523/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

Although public health facilities in Bangladesh are intended to provide maternal health services at low or no cost, families often still bear considerable expenses during childbirth. This study aimed to compare delivery costs between public and private health facilities using nationally representative data and to assess whether public facilities truly offer a substantially lower financial burden.

Methods

Data were drawn from the 2022 Bangladesh Demographic and Health Survey (BDHS), including 3,095 institutional deliveries. Descriptive analyses examined average delivery costs (in USD) by facility type and mode of delivery, disaggregated by administrative division, and a multivariable linear regression model was fitted to identify factors associated with total delivery cost.

Results

Nationally, average costs for caesarean deliveries were USD 254.7 in private and USD 204.3 in public facilities, while for normal deliveries costs were USD 104.4 and USD 59.8, respectively. In multivariable analysis, private facility delivery ($\beta = 47.8$; 95% CI: 37.7–57.9), caesarean mode ($\beta = 120.3$; 95% CI: 103.9–136.6), longer duration of stay (3 days or more), and belonging to the richest wealth quintile ($\beta = 39.0$; 95% CI: 24.4–53.6) were independently associated with higher costs. Considerable geographic variation was observed, with Sylhet (USD 317.4), Chattogram (USD 288.8), and Barishal (USD 289.0) reporting the highest caesarean delivery costs and Rajshahi (USD 201.1), Khulna (USD 208.6), and Rangpur (USD 216.0) the lowest.

Conclusion

While private facilities consistently incur higher costs, the cost advantage of public facilities is smaller than expected, suggesting families still face substantial out-of-pocket expenses even in nominally free public facilities. Policy efforts must go beyond service fee waivers to address hidden and indirect costs in order to improve financial protection and equity in maternal healthcare in Bangladesh.

Introduction

Despite decades of global progress in maternal health, financial barriers to childbirth care remain a critical obstacle for households in low- and middle-income countries (LMICs). The global maternal mortality ratio declined by approximately 40% between 2000 and 2023, yet progress has slowed markedly since 2016, and profound inequalities in access to quality intrapartum care persist across and

within countries [1]. A key, often underappreciated, dimension of these inequalities is the financial burden that families bear at the time of delivery—a burden that can deter timely care-seeking, force households into debt or asset depletion, and ultimately undermine efforts to achieve universal health coverage (UHC) [2].

For many households in LMICs, giving birth in a health facility carries substantial out-of-pocket costs that extend well beyond any official service fee. Direct medical expenses such as medicines, laboratory investigations, consumables combine with indirect costs such as transportation, food, and accommodation for accompanying family members to create a formidable financial burden [3, 4]. These pressures intensify markedly when a caesarean section (CS) is performed: operating theatre charges, anesthesia fees, and a longer inpatient stay rapidly accumulate, pushing households toward distress financing strategies including borrowing, asset sale, or forgoing other essential expenditures [4–6]. The financial shock of childbirth is therefore not confined to complicated or emergency deliveries; it can arise even after a routine institutional birth, particularly in settings where informal payments and supply shortages are endemic.

Bangladesh presents a critical and timely case for studying delivery-related out-of-pocket expenditure. The country has made impressive strides in facility-based delivery, yet the caesarean section rate among institutional deliveries now exceeds 70%, among the highest in South Asia, raising serious concerns about both clinical appropriateness and financial consequences for families [7–9]. Public facilities are mandated to provide essential maternal health services at no or nominal cost through the Essential Service Package (ESP) [10], and several targeted financing instruments exist: the Maternal Health Voucher Scheme (MHVS) [11], the Mother and Child Benefit Programme (MCBP) [12], and the Shasthyo Surokhsha Karmasuchi (SSK) health protection scheme for below-poverty-line households [13]. Yet the presence of these programmes has not eliminated out-of-pocket payments. Studies from government hospitals in Bangladesh show that families routinely purchase medicines, diagnostics, and pay informal charges, items that should be provided free of charge, with some households spending multiples of their monthly income on a single delivery [5, 14]. Similar findings have been reported from India and Ethiopia, where indirect costs such as transportation and lost wages further compound the financial burden even in nominally free public facilities [15, 16]. These costs often surge around the time of birth and are likely undercounted in routine national statistics, meaning the true financial burden on households is greater than official figures suggest.

Despite this growing body of evidence, nationally representative and comparable estimates of delivery-related expenditures in Bangladesh remain lacking. Most existing studies focus on specific facilities or regions, and rarely incorporate key determinants of cost such as length of hospital stay. Geographic variation in delivery costs across administrative divisions also remains unexplored. These gaps limit the ability of policymakers to identify where financial burdens are greatest and to design targeted interventions accordingly.

To address these gaps, this study uses nationally representative data from the Bangladesh Demographic and Health Survey (BDHS) 2022 to quantify what households report paying at the time of delivery. We disaggregate expenditures by facility category (public hospitals, private hospitals, private clinics/NGOs), mode of delivery (vaginal vs. caesarean), length of stay, and administrative division. To assess affordability, we express typical payments as a share of Bangladesh's GDP per capita, a transparent benchmark that can be tracked over time and compared with regional peers. By generating nationally representative estimates, this study establishes a benchmark for delivery costs and identifies population groups and geographic areas where financial pressures are greatest, offering evidence to inform policies aimed at improving financial protection and equity in maternal healthcare. In doing so, it contributes to the wider international debate on the design and adequacy of health financing mechanisms in pursuit of Universal Health Coverage, and provides actionable evidence for strengthening Bangladesh's maternal health financing system.

Methods

Data overview

The 2022 BDHS is the ninth nationally representative DHS survey conducted in Bangladesh; it was implemented through a collaboration between the National Institute of Population Research and Training (NIPORT) and the ICF, with financial support from the Government of Bangladesh and the USAID. The 2022 BDHS employed a two-stage stratified sampling design based on the 2011 population census of the People's Republic of Bangladesh, where the whole country was divided into 2,96,718 geographic regions or enumeration area (EAs). Each EA had about 120 households on an average. Villages with more than 120 households were split, while those with fewer than 80 were merged with nearby areas [17]. These EAs were used as the primary sampling unit (PSU) of the sampling design. In the first stage, 674 enumeration areas (EAs) were selected with a probability proportional to size. In the second stage, a systematic sample of 45 households per EA was chosen, totaling 30,330 households (19,665 rural and 10,665 urban). Of these, 30 households per EA were randomly selected for the long questionnaire, covering 20,220 households in total. Comprehensive demographic and health information was collected from 19,987 ever-married women aged 15–49 years [18].

For the current study, a sample of 3,095 (weighted) ever-married women aged 15–49 years who reported a most recent live birth delivered in a health facility during the reference period, and for whom complete information on delivery cost was available. Supplementary Fig. 1 details the analytical sample used in this study.

Outcome variable

The primary outcome was total cost of delivery, derived from the BDHS question: “How much did you pay in total for your last delivery?” Respondents reported the total amount paid out-of-pocket in Bangladeshi

Taka (BDT) for their most recent delivery. For comparability, all costs were converted to United States Dollars (USD) using an average exchange rate of 1 USD = 93 BDT for 2022, based on historical exchange rate data.

Explanatory variable

The primary explanatory variable was place of delivery, categorized as public or private health facilities. Public facilities included government hospitals and other government health institutions, while private facilities comprised private hospitals, clinics, and other private medical facilities.

Additional explanatory variables were selected based on prior evidence of their association with healthcare utilization and delivery-related expenditure. These included mode of delivery (vaginal or caesarean section), type of birth assistance (neither doctor nor nurse /midwife /paramedic, either one, or both), and duration of facility stay (1, 2, 3, 4, 5, and 6 or more days).

Socioeconomic and geographic characteristics were also included, namely household wealth index (poorest, poorer, middle, richer, richest), place of residence (urban or rural), and administrative division (Dhaka, Barisal, Chattogram, Khulna, Mymensingh, Rajshahi, Rangpur, and Sylhet). Detailed definitions and categorizations of all explanatory variables are provided in Supplementary Table 1.

Statistical analyses

Descriptive analyses were conducted to summarize delivery costs in terms of both mean and median, along with interquartile range. After sorting the cost data, we have dropped the top and bottom 1% data in order to reduce the skewness of the cost distribution. To estimate the adjusted association between delivery place type and delivery cost, linear regression models were fitted with total delivery cost as the dependent variable. The primary exposure was the place of delivery, with public facilities specified as the reference category. Models were adjusted for mode of delivery, type of birth assistance, duration of hospital stay, household wealth index, place of residence, and administrative division. The normality of model residuals was assessed using histograms (Supplementary Fig. 2).

All analyses accounted for survey weights, and the linear regression model was fitted by adjusting for stratum and clusterwise variations with the *survey* package in R. Throughout the study, a 5% level of significance was considered; therefore, any p value less than 0.05 was considered to indicate statistical significance.

Results

Of the 3,095 institutional deliveries, nearly three-quarters of deliveries occurred in private or NGO facilities (74%), while 26% took place in public facilities, with district hospitals and Upazila Health Complexes accounting for the largest shares among public-sector deliveries (Table 1). Caesarean

section was the predominant mode of delivery (70.9%), and the majority of births (75.5%) were assisted by both a doctor and a nurse/midwife/paramedic. Almost half of women (51.8%) remained in the facility for 3–5 days following delivery. Institutional deliveries were more common among women from higher wealth quintiles, and a larger proportion of deliveries occurred among rural residents. Regional variation was observed, with the highest proportion of deliveries reported in Dhaka division, followed by Chattogram and Khulna.

Table 1
Distribution of institutional deliveries by facility type, delivery characteristics,
and socio-demographic factors, Bangladesh, BDHS 2022.

Group	Number of Birth	Percentage of Birth
Place of delivery		
Public Facility	794	26.0
Medical College Hospital	125	4.1
Specialized Govt Hospital	21	0.7
District Hospital	237	7.6
MCWC	89	2.9
Upazila Health Complex	237	7.7
Other Public Sector	3	0.1
UH & Family Welfare Center	55	1.8
Community Clinic	26	0.8
Delivery Hut	2	0.1
Private & NGOs	2301	74.0
Private Medical College Hospital	20	0.6
Private Hospital	668	21.6
Private Clinic	1529	49.4
Other Private Medical	2	0.1
NGO Static Clinic	83	2.7
Mode of Delivery		
Vaginal	900	29.1
CS	2195	70.9
Delivery assisted by		
Neither doctor nor a nurse/midwife/paramedic	77	2.5
Either one	680	22.0
Bothd	2338	75.5
Duration of stay after delivery (days)		

Group	Number of Birth	Percentage of Birth
Place of delivery		
1	442	14.3
2	357	11.5
3	126	4.1
4	642	20.7
5	835	27.0
6	694	22.4
Wealth Index		
Poorest	399	12.9
Poorer	566	18.3
Middle	647	20.9
Richer	714	23.1
Richest	769	24.8
Area of residence		
Urban	953	30.8
Rural	2142	69.2
Division		
Barishal	159	5.1
Chattogram	628	20.3
Dhaka	811	26.2
Khulna	416	13.4
Mymensingh	226	7.3
Rajshahi	363	11.7
Rangpur	331	10.7
Sylhet	159	5.1
Total	3095	100.0

Table 2
Average and median delivery costs (in US dollar) by mode of delivery and selected characteristics, Bangladesh, BDHS 2022.

	Cost (in USD)					
	CS delivery			Normal delivery		
Group	# Birth	Avg.	Median [IQR]	# Birth	Avg.	Median [IQR]
Place of delivery						
Public	297	204.3	172.0 [108, 269]	498	59.8	43.0 [22, 70]
Private	1896	254.7	215.1 [161, 323]	379	104.4	75.3 [54, 129]
Birth assisted by						
Neither doctor nor a nurse/midwife/paramedic	13	273.7	258.0 [215, 323]	53	36.9	32.3 [22, 54]
Either one	246	254.0	215.1 [161, 323]	429	73.1	53.8 [32, 75]
Both	1934	247.1	215.1 [161, 323]	395	92.7	64.5 [43, 108]
Duration of stay after delivery (days)						
1	49	255.4	215.1 [161, 323]	386	56.7	53.8 [27, 65]
2	23	208.5	215.1 [54, 290]	313	77.1	53.8 [32, 90]
3	47	247.8	215.1 [172, 323]	72	122.0	96.8 [54, 161]
4	573	264.5	236.6 [161, 323]	50	135.0	108.0 [54, 185]
5	4779	243.9	215.1 [161, 323]	17	166.0	167.0 [108, 230]
6	722	251.5	215.1 [161, 323]	39	158.0	108.0 [54, 226]
Wealth Index						
Poorest	225	223.8	215.1 [161, 269]	169	60.8	43.0 [22, 75]
Poorer	366	227.6	215.1 [151, 297]	176	79.3	53.8 [32, 86]

	Cost (in USD)					
	CS delivery			Normal delivery		
Middle	433	242.4	215.1 [161, 323]	185	66.7	53.8 [30, 86]
Richer	517	251.1	215.1 [161, 323]	187	81.2	53.8 [32, 108]
Richest	652	271.7	268.8 [183, 323]	160	112.7	74.6 [54, 142]
Area of residence						
Urban	863	259.0	236.6 [161, 323]	306	87.9	53.8 [32, 108]
Rural	1330	242.8	215.1 [161, 323]	571	76.3	53.8 [32, 108]
Division						
Barishal	230	289.0	268.8 [185, 323]	79	96.8	53.8 [32, 108]
Chattogram	285	288.8	268.8 [215, 323]	218	93.0	64.5 [43, 108]
Dhaka	373	262.2	236.6 [183, 323]	107	89.7	53.8 [32, 108]
Khulna	365	208.6	211.3 [129, 269]	91	52.2	32.3 [22, 54]
Mymensingh	250	253.8	236.6 [161, 323]	71	61.7	43.0 [23, 75]
Rajshahi	277	201.1	193.5 [136, 237]	77	64.5	53.8 [32, 75]
Rangpur	250	216.0	215.1 [161, 269]	102	51.5	37.6 [22, 54]
Sylhet	163	317.4	322.6 [215, 430]	132	84.0	53.8 [32, 108]
Total	2193	248.1	215.1 [161, 323]	877	79.5	53.8 [32, 107]

Across all subgroups, delivery costs were higher for CS compared with normal deliveries, with overall average costs of USD 248.1 and USD 79.5, respectively (Table 2). For both delivery modes, costs were higher in private facilities (CS: USD 254.7; normal: USD 104.4) than in public facilities (CS: USD 204.3; normal: USD 59.8). Delivery costs tended to increase with longer duration of hospital stay and higher household wealth quintile, particularly for CS, where average costs ranged from USD 223.8 among the

poorest to USD 271.7 among the richest quintile. Urban residents incurred higher costs than rural residents for both CS (USD 259.0 vs. USD 242.8) and normal deliveries (USD 87.9 vs. USD 76.3). Regional variation was observed; for CS, the highest average costs were reported in Sylhet (USD 317.4), Barishal (USD 289.0), and Chattogram (USD 288.8), while the lowest were in Rajshahi (USD 201.1) and Khulna (USD 208.6). A similar regional pattern was observed for normal deliveries, with Barishal (USD 96.8) and Chattogram (USD 93.0) reporting the highest costs and Rangpur (USD 51.5) and Khulna (USD 52.2) the lowest.

Across all divisions, private facilities consistently showed higher average costs than public facilities for both delivery modes (Fig. 1). For normal deliveries, the difference between private and public facilities ranged from USD 14 in Barishal (108 vs. 94) and Mymensingh (72 vs. 58) to 52 in Sylhet (115 vs. 63). For caesarean deliveries, private facilities also incurred higher costs, with differences ranging from 36 in Rajshahi (212 vs. 176) to 83 in Barishal (294 vs. 211). Regional variation was evident: Sylhet, Chattogram, and Barishal consistently reported higher costs, particularly for caesarean deliveries in private facilities (330, 299, and 294, respectively), whereas Rajshahi, Rangpur, and Khulna had comparatively lower costs across both delivery modes and facility types.

Table 3

Adjusted associations between explanatory variables and total delivery cost (in USD), BDHS 2022.

Adjusted associations between explanatory variables and total delivery cost (in USD), DDHS 2022.				
Factors	Coefficient	95% CI		P value
		lower	higher	
Place of delivery (Ref. Public)				
Private	47.8	37.7	57.9	< 0.01
Mode of delivery (Ref. Vaginal)				
CS	120.3	103.9	136.6	< 0.01
Birth assisted by (Ref. Neither doctor nor a nurse/midwife/paramedic)				
Either one	9.7	-18.5	37.9	0.5
Both	13.6	-14.5	41.6	0.3
Stay duration (Ref. 1 day)				
2	1.2	-14.7	17.0	0.9
3	33.9	10.9	56.8	< 0.01
4	52.4	33.8	71.1	< 0.01
5	36.8	18.0	55.6	< 0.01
6	52.5	34.0	71.1	< 0.01
Wealth Index (Ref. Poorest)				
Poorer	6.0	-8.4	20.4	0.4
Middle	9.6	-4.6	23.9	0.2
Richer	12.1	-2.1	26.2	0.1
Richest	39.0	24.4	53.6	< 0.01
Area of residence (Ref. Urban)				
Rural	0.3	-8.5	9.0	1.0
Division (Ref. Dhaka)				
Barishal	17.0	1.0	33.1	< 0.01
Chattogram	20.6	6.7	34.6	< 0.01
Khulna	-46.2	-60.6	-31.8	< 0.01

Factors	Coefficient	95% CI		P value
		lower	higher	
Mymensingh	-2.8	-18.8	13.1	0.7
Rajshahi	-50.6	-65.8	-35.3	< 0.01
Rangpur	-34.6	-50.1	-19.0	< 0.01
Sylhet	30.0	13.8	46.2	< 0.01

Deliveries in private facilities were associated with an additional USD 47.8 (95% CI: 37.7–57.9) compared with public facilities (Table 3). Caesarean deliveries incurred higher costs than vaginal deliveries, with an adjusted increase of 120.3 (95% CI: 103.9–136.6). Longer duration of stay was associated with higher costs: compared with a 1-day stay, stays of 3 or more days were associated with increases ranging from 33.9 (95% CI: 10.9–56.8) for 3-day stays to 52.5 (95% CI: 34.0–71.1) for 6-day stays, while a 2-day stay showed no notable difference. Among wealth quintiles, only women in the richest quintile showed a notably higher cost compared with the poorest (39.0; 95% CI: 24.4–53.6), while differences across lower quintiles were not notable. Area of residence and type of birth attendant were not associated with delivery cost in the adjusted model. Geographic variation was observed, with higher costs in Sylhet (30.0; 95% CI: 13.8–46.2), Chattogram (20.6; 95% CI: 6.7–34.6), and Barishal (17.0; 95% CI: 1.0–33.1), and lower costs in Rajshahi (-50.6; 95% CI: -65.8 to -35.3), Khulna (-46.2; 95% CI: -60.6 to -31.8), and Rangpur (-34.6; 95% CI: -50.1 to -19.0), all relative to Dhaka.

Table 4
Mean Delivery Cost by Length of Stay, Place of Delivery, and Mode of Delivery, BDHS 2022.

Stay (days)	CS Delivery, Mean (n)		Normal Delivery, Mean (n)	
	Public Hospital	Private Hospital	Public Hospital	Private Hospital
1	15.7 (7)	25.1 (42)	4.4 (240)	6.7 (146)
2	9.3 (6)	22.9 (17)	4.7 (171)	8.9 (142)
3	20.9 (10)	23.6 (37)	8.5 (34)	13.0 (38)
4	21.0 (64)	25.1 (509)	10.9 (22)	15.0 (28)
5	18.6 (84)	23.2 (695)	10.9 (8)	18.6 (9)
6 or more	18.8 (126)	24.4 (596)	12.3 (23)	17.4 (16)

Across all lengths of stay, mean delivery costs were higher in private hospitals than in public hospitals for both CS and normal deliveries (Table 4). For CS deliveries, private hospital costs ranged from 22.9 to 25.1 across stay durations, compared with 9.3 to 21.0 in public hospitals. For normal deliveries, private hospital costs ranged from 6.7 to 18.6, while public hospital costs ranged from 4.4 to 12.3. For both

facility types and delivery modes, costs generally increased with longer duration of stay, with the exception of CS deliveries in public hospitals, where the pattern was less consistent, partly due to small cell sizes. The largest gap between private and public facilities was observed for shorter stays among CS deliveries, while for normal deliveries the private-public difference widened with increasing length of stay.

Discussion

This study provides national level evidence on delivery costs in Bangladesh by examining how out-of-pocket expenditure relates to the type of delivery and total duration of hospital stay. Where a previous study has shown that caesarean section and facility delivery are associated with higher costs in Bangladesh [19], our findings add that financial burden persists even in routine, uncomplicated delivery. This highlights a gap between the policy commitment for free maternity services and what families actually experience in public healthcare facilities in Bangladesh.

Routine care in public facilities is not truly free

In clinical practice, the postpartum duration of hospital stay is often used as an indicator of whether the recovery is following the expected course. For uncomplicated births, the WHO recommends to stay in the hospital for at least 24 hours after birth [20]. In case of a caesarean section, discharge timing is more variable. Some pathways support discharge after 24 to 36 hours for uncomplicated cases, whereas in many settings, 3–4 days of hospital stay is still usual after caesarean section [21].

Based on this, we examined and found that families still had to pay out-of-pocket even within the usual period of hospital stay after delivery. This suggests that the cost of delivery is not limited to complications or longer hospital stay period, rather it exists within the routine care.

This is particularly important for caesarean delivery, which now accounts for more than 70% of institutional births in Bangladesh [22]. As a result, the higher cost associated with caesarean section delivery has become a major financial burden for families undergoing institutional delivery.

Why do costs continue in public facilities in Bangladesh: Comparison with regional evidence

A key reason is the persistence of hidden and indirect costs beyond official service charges. Evidence from Bangladesh shows that families often spend a substantial share of their household income on medicines, supplies, informal payments, transport, food, and caregiving support, even in government facilities [14]. As a result, financial burden remains high, although services are officially free or subsidized.

According to the Bangladesh Health Facility Survey 2022, the availability of basic laboratory diagnostic tests in public health facilities remains limited yet [23]. This means that many of the public facilities are still unable to run routine investigations. This pushes patients to do the tests from nearby private clinics where available, and they have to pay the high charges out of their pocket.

In our study, the main drivers of delivery cost were mode of delivery and the duration of hospital stay. This pattern is consistent with findings from other low- and middle-income countries. Caesarean section emerged as the strongest cost driver, with much higher expenditure compared to normal delivery. Similar patterns have been reported in India, where the mode of delivery is a key determinant of out-of-pocket spending [24], and in Nepal, where both caesarean delivery and longer hospital stays significantly increase costs [25].

We also found that longer hospital stays were associated with higher costs. This is likely because expenses such as food, accommodation for the attendants, and other daily expenditures continue to accumulate over time. Although our study did not measure these separately, evidence from Nepal suggests that food and transportation alone can account for a large share of out-of-pocket spending [26]. During the hospital stay, these ongoing non-medical expenses can substantially increase the total delivery cost.

Finally, existing financing mechanisms in Bangladesh also contribute to this gap between policy and reality. Financial protection programmes, such as vouchers and cash transfers, are targeted rather than universal [27]. Although some subsidies are available, they often do not cover the whole delivery expenses [28]. As a result, services may be described as free in policy, but remain partially affordable in practice yet.

These findings suggest that the idea of free maternity care in public facilities remains fragile. Hidden costs, indirect expenses, and incomplete subsidy coverage continue to weaken financial protection that public services are meant to provide.

Policy implications

The relatively small cost difference between public and private facilities suggests that the current public-sector financing does not provide sufficient financial relief. If policy commitment is to reduce out-of-pocket spending in a meaningful way, it needs to go beyond simply waiving the service fees. Instead, it has to be the wider range of costs related to delivery that needs to be addressed. These findings have direct implications for the broader health system: unless delivery financing is integrated into a comprehensive Essential Services Package that covers both medical and non-medical costs, Bangladesh's progress toward Universal Health Coverage will remain fragile for the most vulnerable households.

A key priority is to address hidden and indirect costs. Removing or reducing user fees for clinical services alone may have a limited impact if people need to pay for medicines, diagnostics, informal

payments, and other non-medical expenses [29]. Inclusion of essential drugs and diagnostics, along with the basic inpatient support in the maternity benefit packages, could help reduce the out-of-pocket expenditure to a significant extent. At present, many households receive free care in principle, but in practice, the actual expenses accumulate quietly.

Second, the high out-of-pocket expenses associated with caesarean delivery demand the need for better financial protection. It underscores the need for greater policy attention through subsidies or insurance mechanisms that will cover the full delivery expenses, including pre-operative, operative, and post-operative care. Without this, women requiring caesarean delivery may face the greatest financial hardship.

Third, financing mechanisms should be strengthened alongside improvements in service delivery. Expanding coverage, improving targeting, and ensuring timely reimbursement could enhance the effectiveness of these programs [30]. These approaches should focus on protecting families from major financial shocks during delivery, particularly poorer households who are least able to bear the cost. At the same time, stronger facility-level accountability is highly needed to reduce informal payments and shortages of medicines and supplies. Financial protection is not achievable if families have to purchase essential items by stepping outside the system.

Strengths and limitations

This study has several key strengths. First, it uses nationally representative data from the 2022 BDHS, enabling generalisable estimates of delivery costs across facility types, delivery modes, wealth groups, and geographic divisions. Second, it provides a novel contribution by analysing delivery costs jointly by mode of delivery and duration of hospital stay. Length of stay is a clinically meaningful proxy for care intensity and a major driver of both medical and non-medical costs, yet it is rarely incorporated in cost analyses. Stratifying costs by both delivery mode and length of stay reveals gradients that are not captured by average estimates. Third, multivariable regression was used to adjust for key sociodemographic and delivery-related factors, improving comparability across groups. Fourth, expressing costs relative to GDP per capita provides an interpretable and internationally comparable measure of affordability.

Several limitations should be considered. First, delivery costs were self-reported and may be subject to recall bias. Second, the total cost measure is aggregated and does not distinguish between direct medical, indirect, and informal payments, limiting identification of specific cost drivers. Third, non-monetary costs, such as time lost by patients and caregivers, were not captured. Fourth, residual confounding from unmeasured factors, including clinical complexity and facility quality, cannot be excluded. Finally, selection bias may arise from unobserved differences between women choosing public versus private facilities, which cannot be fully addressed in cross-sectional data.

These limitations should be considered when interpreting the findings and highlight the need for future studies using detailed, itemised cost data and facility-linked clinical information.

Conclusion

This study provides nationally representative evidence that delivery-related out-of-pocket expenditure in Bangladesh remains high, with caesarean section and private facility delivery being the strongest cost drivers. Even within routine durations of hospital stay, families continue to incur costs in public facilities, suggesting that the policy commitment to free maternity care has not translated fully into financial protection in practice. The relatively modest cost differential between public and private facilities further indicates that official fee waivers alone are insufficient if hidden and indirect costs remain unaddressed. Geographic variation in delivery costs across divisions points to the need for spatially targeted interventions. To meaningfully reduce the financial burden of childbirth, policies must go beyond service fee removal to encompass essential medicines, diagnostics, and indirect costs, with particular attention to households undergoing caesarean delivery and those in higher-cost divisions. Strengthening existing financing mechanisms and improving facility-level accountability will be essential steps toward achieving equitable financial protection in maternal healthcare in Bangladesh.

Declarations

Ethical Approval

This study used publicly available, anonymized data from the Bangladesh Demographic and Health Survey (BDHS) 2022, which received ethical approval from the ICF Institutional Review Board and the National Research Ethics Committee of Bangladesh. As the data were de-identified and publicly available, no additional ethical approval was required.

Consent for publications

Not applicable

Competing interest

The authors declare no conflicts of interest

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Author Contribution

MHP contributed to the conceptualisation, data analysis and interpretation, drafting of the manuscript, and critical revision. SN contributed to the conceptualisation, data analysis and interpretation, drafting of

the manuscript, and critical revision. MIHK contributed to the conceptualisation, drafting of the manuscript, and critical revision. All authors read and approved the final version of the manuscript.

Acknowledgement

The authors gratefully acknowledge the DHS Program for providing access to the BDHS 2022 dataset. icddr,b is also grateful to the Government of Bangladesh and Canada for providing core/unrestricted support.

Data Availability

The data supporting the findings of this study are derived from the 2022 Bangladesh Demographic and Health Survey (BDHS 2022), publicly available through the DHS Program. Researchers may request access at <https://dhsprogram.com/data/available-datasets.cfm>.

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Figures

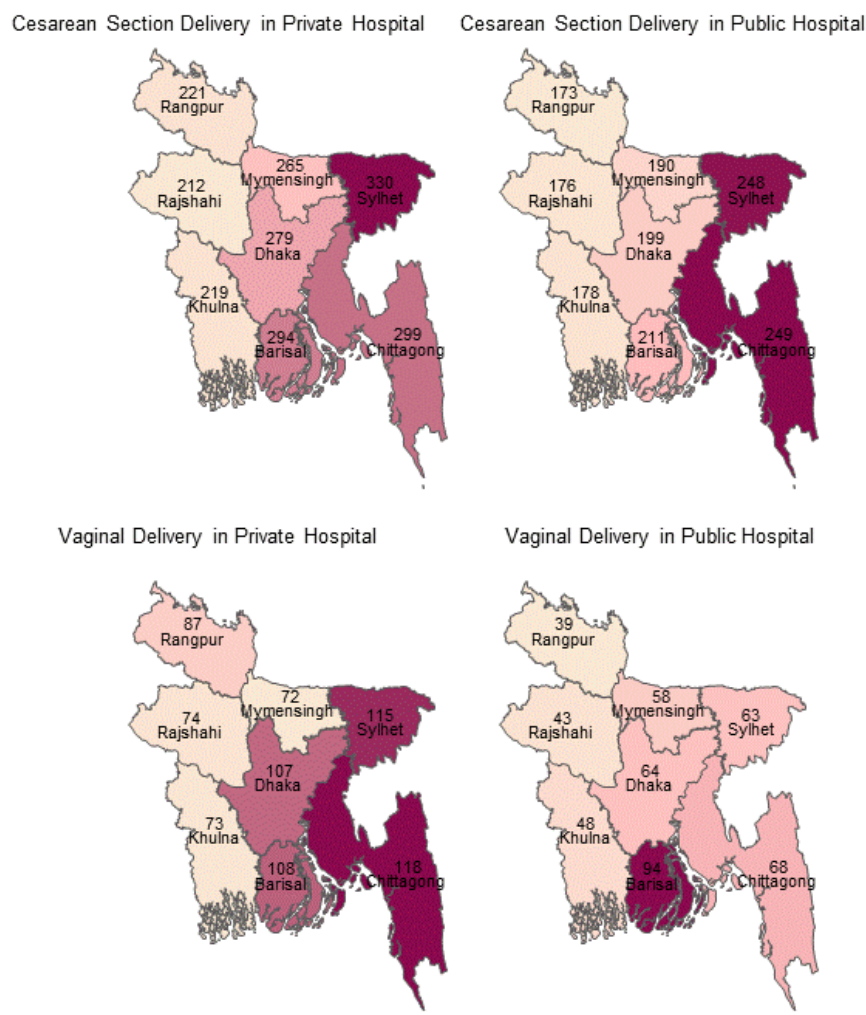


Figure 1

Average delivery cost by division, place of delivery, and mode of delivery, Bangladesh, BDHS 2022.

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