

Assessing the Effects of Households' Slow and Rapid Onset Disaster-Related Displacement on Quality Antenatal and Delivery Care Service Utilization in Rural Bangladesh

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Background

Globally, Bangladesh is one of the most vulnerable countries to climate change (CC) and associated natural disasters. The country is highly exposed to both slow-onset hazards, including temperature rise, drought, sea-level rise, river erosion, and land and water salinization, and rapid-onset hazards such as tropical cyclones, thunderstorms, coastal storm surges, heavy rainfall, floods, landslides, and extreme heat (Eckstein et al., 2021). Changes in the environment have exposed millions of Bangladeshis annually to climate-related sudden-onset and slow-onset extreme events and forced them to become displaced (Mohammad, 2015; Poncelet et al., 2010; Vorosmarty et al., 2009). It is worth noting that displacement in the future, whether temporary or permanent and by choice or not, would be an important survival strategy for more than 30 million disaster-affected people in Bangladesh (Etzold & Mallick, 2015; Shamsuddoha & Chowdhury, 2009).

While several studies captured the livelihood and other socio-economic burdens of climate change and displacement, there are few studies to indicate the links between climate-related displacement and health (Haque et al., 2020b). Previous research conducted only in the mainland regions of Bangladesh (Haque et al., 2020a, 2020c) and Pathfinder International (Pathfinder, 2023) have generated evidence on the nexus between climate-related displacement and access to maternal health service. However, most of these studies were conducted using a small number of cases affected either by slow or rapid onset of disasters without having any comparisons between these two broader groups of disasters and between coastal and mainland riverine areas. Moreover, none of the prior research draws comparisons in the use of quality antenatal care by displacement status and by slow-onset and rapid-onset disasters or considers the effects of these factors on quality antenatal and delivery care. Drawing such comparisons is pivotal and globally recognized for ensuring equity in access to and utilization of quality maternal healthcare services for the large and growing number of climate-vulnerable women (Sorcher et al., 2024).

Methods and materials

This study focuses on two categories of climate-induced vulnerabilities: i) Rapid onset and ii) Slow onset of climate change-related events and targets study areas accordingly. Rapid-onset disaster is associated with districts, located in coastal regions, prone to cyclones and tidal surges, while slow-onset disaster is linked to districts, located in mainland regions, vulnerable to floods and riverbank erosions. Geographic targeting for this study was done based on a scientific study on climate change-induced disasters, displacement, and vulnerability (Golam & Rahman, 2022). The study areas were first divided into two: the slow-onset in the mainland region and the rapid-onset in the coastal region, and thereafter displaced and non-displaced. For both regions, districts, sub-districts, unions, villages, and potential participants' households, were identified for sampling framework through the use of purposive and sampling techniques. Households with children aged three years or younger and those who had experienced displacement at least once before the survey date, in the ten and twenty years for riverine coastal regions respectively, were included in the sampling list. Conversely, households with children aged three years or under were considered eligible only for preparing the sampling list. Finally, displaced and non-displaced households within the villages in both regions were selected from an eligible sampling list systematically.

For this study data were generated between December 2023 and January 2024 through a cross-sectional survey conducted with an approved structured questionnaire (ERC-EXT-

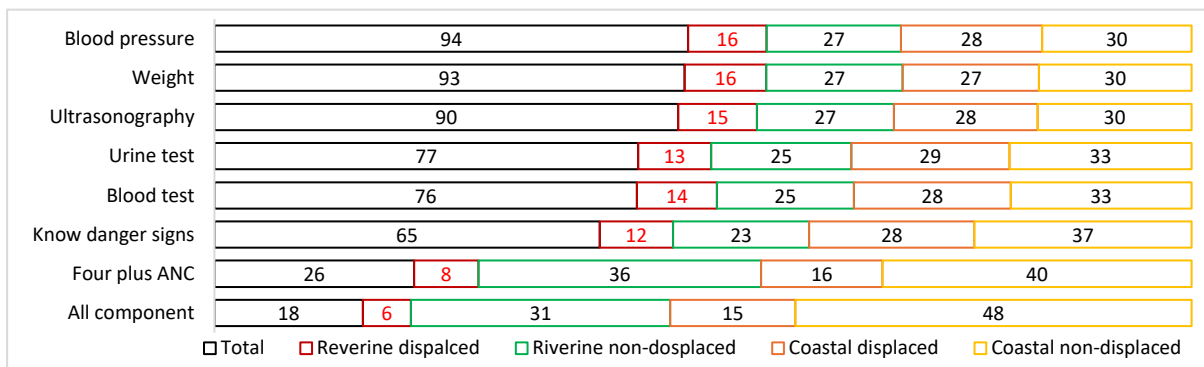
23/282023) from 2,400 households including 1200 internally displaced due to climate change and 1200 non-displaced households to distinguish the effects of displacement. Half of the 1200 displaced households were selected from slow-onset disaster-prone riverine areas, and the rest originated from rapid-onset disaster-prone coastal areas. A comparable process was applied in selecting the non-displaced households. We used multivariate logistic regressions to examine the factors associated with using quality antenatal and HC-based delivery care and to draw comparisons by displacement status.

Results

Use of quality of antenatal care and its determinants

Out of the 1929 mothers who received ANC services, blood pressure was measured for 94%, weight was measured for 93%, and ultrasonography was done for 90%, as indicated in Figure 1. Around 77% of mothers tested urine and 76% tested their blood during pregnancy. Nearly two-thirds of mothers were aware of pregnancy-related danger signs. Mothers from displaced households, especially in slow-onset disaster-prone mainland regions, were significantly less likely to receive specific ANC services compared to mothers from riverine non-displaced, coastal displaced, and coastal non-displaced households. Only 26% of mothers received four or more ANC services, while only 8% and 16% of riverine and coastal displaced mothers had received such services.

Figure 1: Percentage of mothers who received specific and all ANC-related services by household displacement status



The overall prevalence of quality ANC, which includes all components of ANC, is quite low, only 18% among the sample mothers, and is particularly low among riverine and coastal displaced households' mothers (Figure 1 and Table 2). Only 6% and 15% of riverine and coastal displaced household mothers respectively had quality ANC, which is almost three times lower than that of riverine and coastal non-displaced household mothers. Mothers' lower age, lower education, husbands' lower education, households' lower income, and greater time and costs to reach medical doctors also reduce the odds of using QANC.

Table 1: Factors associated with mothers' utilization of quality ANC during their last pregnancy

Predictor variables	Mothers who received quality ANC (%), N=1929	Sig.	Multivariate odds ratios (CIs) of mothers who received quality ANC	Sig.
Household displacement status				
Riverian displaced	6.1	0.00	1	
Riverian non-displaced	21.1		1.71(0.99-2.94)	0.06
Coastal displaced	9.8		1.25(0.72-2.16)	0.44
Coastal non-displaced	29.7		2.70(2.20-6.22)	0.00
Mothers' age at marriage				
≤ 17	14.9	0.00	1	
≥ 18	25.2		1.01(0.75-1.36)	0.95
Mothers' current age				
15-19	11.8	0.05	1	
20-24	18.6		1.05(0.48-2.31)	0.90
25-29	22.5		1.42(0.75-2.69)	0.28
30-34	18.3		2.11(1.17-3.80)	0.01
≥ 35	10.1		1.61(0.89-2.90)	0.11

Number of children				
One	18.7		1	
Two	20.1	0.01	1.07(0.75-1.52)	0.70
Three or more	13.5		1.06(0.64-1.75)	0.83
Mothers' education (years)				
≤ 9	12.6		1	
≥ 10	33.3	0.00	1.86(1.35-2.56)	0.00
Husband's education (years)				
≤ 9	13.4		1	
≥ 10	30.6	0.00	1.49(1.09-2.04)	0.01
Household's monthly income				
≤ 10000	8.5		1	
10001-15000	11.2		1.03(0.65-1.65)	0.89
15001-20000	18.5	0.00	1.51(0.95-2.42)	0.08
≥ 20000	31.3		2.45(1.56-3.86)	0.00
MBBS doctors available				
≤ 5 km	22.2		1	
≥ 6 km	16.1	0.00	1.01(0.73-1.39)	0.98
Time ^{MNT} to reach MBBS doctors				
≤ 49	22.0		1	
≥ 50	14.5	0.00	0.74(0.54-1.01)	0.06
Costs ^{BDT} to reach MBBS doctors				
Within 59	21.1		1	
≥ 60	15.0	0.00	0.68(0.49-0.94)	0.02
Model χ^2 (df) with significance level			249.09(18); $p < 0.00$	
Overall predicted percentage			83.4	
-2Log likelihood (Nagelkerke score)			1562.79(0.199)	

Use of health facility for delivery care and its determinants

Out of 2400 sample mothers, 44.5% had HCbD. Mothers from riverine-displaced households had an HCbD rate of only 20%, which is 51%, 17%, and 30% points lower than mothers from non-displaced riverine, coastal displaced, and coastal non-displaced households respectively (Table 3). Increased ANC, higher marital and current age of mothers, higher birth order, husband's greater education, and longer distance to reach medical doctors are also conducive to heightened HCbD rate.

Table 2: Distribution of mothers who gave birth at a health center (HC) by predictor variables

Predictor variables	Mothers who gave birth at a HC (%)	Sig.	Multivariate odds ratios (CIs) of mothers who delivered their last child at a health center			
			Model-1	Sig.	Model 2	Sig.
Households' displacement status						
Riverian displaced	20.0	0.00	1		1	
Riverian non-displaced	71.5		7.03(5.28-9.37)	0.00	5.22(3.87-7.04)	0.00
Coastal displaced	36.5		2.56(1.90-3.44)	0.00	1.82(1.36-2.45)	0.00
Coastal non-displaced	50.0		2.86(2.16-3.78)	0.00	1.83(1.34-2.49)	0.00
Utilization of ANC						
No ANC	18.0	0.00			1	
1-3 ANC	44.3				2.91(2.18-3.88)	0.00
≥ 4 ANC	70.4				6.21(4.39-8.75)	0.00
Mothers' age at marriage						
≤ 17	40.0	0.00	1		1	
≥ 18	57.0		1.06(0.84-1.33)	0.61	1.51(1.15-2.00)	0.00
Mothers' current age						
15-19	37.1	0.00	1		1	
20-24	48.1		1.41(1.02-1.95)	0.04	1.41(1.01-1.96)	0.04
25-29	43.9		1.43(0.97-2.10)	0.07	1.37(0.92-2.04)	0.13
30-34	46.2		1.94(1.25-3.00)	0.00	2.00(1.27-3.15)	0.00
≥ 35	40.7		1.78(1.09-2.91)	0.02	1.89(1.14-3.14)	0.02
Birth order						
One	50.3	0.00	1		1	
Two	43.3		0.71(0.55-0.92)	0.01	0.71(0.54-0.93)	0.01
Three or more	38.0		0.63(0.44-0.89)	0.01	0.65(0.45-0.93)	0.02
Mothers' education (years)						
≤ 9	37.9	0.00	1		1	
≥ 10	68.1		1.68(1.28-2.21)	0.00	1.03(0.82-1.30)	0.79
Husband's education (years)						
≤ 9	38.4	0.00	1		1	

≥ 10	65.1		1.49(1.14-1.94)	0.00	1.36(1.03-1.78)	0.03
Husband's occupation						
Agricultural cultivation	38.9		1		1	
Job (public/private)	62.3		1.20(0.82-1.76)	0.34	1.26(0.86-1.87)	0.24
Labor work (daily basis)	33.2		0.74(0.53-1.03)	0.07	0.81(0.58-1.13)	0.22
Fisherman/boatman	30.1	0.00	0.71(0.48-1.05)	0.09	0.74(0.50-1.11)	0.15
Mason/painter/blacksmith	47.1		1.07(0.76-1.50)	0.70	1.20(0.84-1.71)	0.31
Small business	61.8		1.42(0.97-2.08)	0.07	1.42(0.96-2.11)	0.08
Others	56.6		1.13(0.71-1.81)	0.60	1.19(0.74-1.91)	0.47
Religion						
Muslim	43.3		1		1	
Others	70.5	0.00	1.43(0.90-2.27)	0.13	1.32(0.81-2.14)	0.26
MBBS doctors available						
≥5 km	55.4		1		1	
≥ 6km	40.2	0.00	0.76(0.62-0.93)	0.01	0.76(0.61-0.93)	0.01
<i>Model $\chi^2(df)$ with significance level</i>			<i>505.4(20), $p<0.00$</i>		<i>622.25(22), $p<0.00$</i>	
<i>Overall predicted percentage</i>			<i>70.7</i>		<i>71.3</i>	
<i>-2Log likelihood (Nagelkerke score)</i>			<i>2793.05(0.254)</i>		<i>2676.20(0.306)</i>	

Conclusions and policy recommendations

Households displaced by slow-onset disasters experienced greater socioeconomic and health-related disadvantages compared to households of any other groups. Displacement is not only unfavorable for the mother's utilization of ANC but also for the utilization of quality ANC (all components of ANC services). Only a quarter of the displaced mothers compared to a mere handful of the non-displaced mothers had quality ANC during the last pregnancy. Household displacement effects are also detrimental for women to deliver birth at a health facility. Less than half of the displaced women than that of the non-displaced women had HC-based delivery. Like with quality ANC, women from households displaced by slow-onset disasters had the lowest likelihood of HC-based delivery, ranging from 2 to 5 times lower compared to any other groups. In light of these findings, QANC and delivery service provisions appointing additional nurses and doctors at local health facilities, and greater maternity allowance coverage for displaced mothers, particularly in slow-onset disaster-prone areas, are proposed policy responses.

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