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Inequalities in adequate maternal healthcare opportunities: evidence from Bangladesh Demographic and Health Survey 2017–2018

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ABSTRACT

Objectives This study investigated the inequalities in access to maternal healthcare services in Bangladesh.

Design and setting This study used cross-sectional data from the nationally representative Bangladesh Demographic and Health Survey conducted in 2017–2018. The survey encompassed diverse regions and households across Bangladesh. The study used the Human Opportunity Index (HOI) and Shapley's decomposition technique to measure the inequality in access to maternal healthcare opportunities.

Participants This study included 20 127 women aged 15–49 years. Among them, 5012 women had live births in the preceding 3 years of the survey, forming the study sample.

Primary and secondary outcome measures This study has no secondary outcome variable. The primary dependent variable is 'adequate maternal healthcare', a dichotomous variable.

Results Household wealth status contributed the highest to inequality in accessing adequate maternal healthcare services (41.4%) such as receiving at least four antenatal care (ANC) visits (39.7%), access to proper ANC (50.7% and 44.0%) and health facility birth (43.4%). Maternal educational status contributes the second highest inequality among all factors in accessing adequate maternal healthcare (29.5%). Adequate maternal healthcare presented the lowest coverage rate and opportunity index among all (approximately 24% with HOI=17.2).

Conclusions We found that attained adequate maternal healthcare had the lowest coverage and widest dissimilarity, while wealth index, education and place of residence are the major factors that contribute to inequalities in accessibility to maternal healthcare services in Bangladesh. These findings underscore a need for pro-poor interventions to narrow the economic inequalities between the poor and rich in terms of accessibility to maternal healthcare services. The results indicate the need for the Bangladeshi government and its health department to strengthen their commitment to improving female education. Investments should be made in initiatives that facilitate the proximity of maternal healthcare services to women in rural areas.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ The use of Bangladesh Demographic and Health Survey (BDHS) provided a large nationally representative dataset that can be based on to generalise the findings to the Bangladeshi women population and other resource-constrained settings with similar contextual characteristics as Bangladesh.

⇒ Also, the use of Human Opportunity Index, D-index and decomposing technique was appropriate for understanding the inequalities in accessibility to maternal healthcare services.

⇒ Given that the study relied on data from the BDHS that uses cross-sectional design, the inequalities observed cannot be interpreted as causal inferences.

⇒ Also, the questions on adequate maternal healthcare, antenatal care (ANC), ANC from skilled personnel and delivery at the health facility were self-reported. Hence, there is the possibility of recall and social desirability bias.

⇒ Moreover, residual factors such as community norms and cultural beliefs were not available in the BDHS; hence, we are unable to test how that contributes to the observed inequalities.

BACKGROUND

Globally, there is unequivocal consensus from literature that access and utilisation of maternal healthcare services is a critical strategy that contributes substantially to reducing maternal deaths.[1] This is because access and utilisation of maternal healthcare services provides women with timely interventions such as services from skilled health professionals during childbirth, emergency obstetric care and the opportunity to have pregnancy-related complications detected and treated on time.[2–4] Nevertheless, maternal mortality rate remains unacceptably high particularly in low-income and middle-income countries such as Bangladesh.[5] For instance, the WHO reports that in 2017,

nearly 810 women died each day as a result of preventable pregnancy and childbirth-related complications.[6] In the case of Bangladesh, the rate of maternal deaths had declined by 40% between 2001 and 2010, from 574 to 200 deaths per 100 000 live births, with an annual diminishing rate of 5.9%.[7] If this trajectory of decline continues, then Bangladesh may not be able to achieve the 3.1 of the Sustainable Development Goals (SDGs) which envision to reduce maternal deaths to 70 per 100 000 live births. However, the country may be closer to achieving the SDGs if there is equity in the accessibility and utilisation of maternal healthcare services.[8]

In the context of this study, maternal healthcare encapsulates access and use of antenatal care (ANC), delivery at the health facility, childbirth by skilled care provider and receiving adequate care. Previous studies show inequalities in the utilisation of maternal healthcare services.[9–11] For example, a study conducted in Malawi found inequalities in the utilisation of maternal healthcare services across the dimensions of wealth, education and place of residence.[9] Similarly, a related study from India reported geographical inequalities in using maternal healthcare services.[11] In Bangladesh, Pulok et al[12] have revealed the existence of socioeconomic inequalities in the usage of maternal healthcare services. These inequalities are a threat to the attainment of the SDGs, particularly target 3.1, thus emphasising a need for more evidence-based research to understand the dynamics and nuances of the existing inequalities in access and utilisation of maternal healthcare services.

Despite the importance of unearthing and understanding the inequalities in both access to and utilisation of maternal healthcare services, a preponderance of empirical literature has been one sided, focusing only on inequalities in the utilisation of maternal healthcare services.[9–11] Bangladesh's situation is not different as studies have only investigated the inequalities in using maternal healthcare services.[12–14] However, there are few studies that have explored the accessibility dimension. For example, Ahmed et al,[5] and Di Novi and Thakare[15] investigated inequalities regarding accessibility to maternal healthcare services in Bangladesh. However, in Ahmed et al's study, only gender inequality in accessibility to maternal healthcare services was investigated.[5] To the best of our knowledge, no study in Bangladesh has simultaneously investigated inequalities in access to adequate maternal healthcare services, ANC from skilled health personnel, receiving at least four ANC visits and delivery at a health facility. Therefore, there is a a significant limitation in the current understanding of the inequality dynamics regarding access to maternal healthcare services in Bangladesh. We, therefore, aimed to narrow this gap by investigating the inequalities in access to maternal healthcare services in Bangladesh. The study expands on the Human Opportunity Index (HOI), created by the World Bank in 2006, and measures how socioeconomic and demographic factors predict inequalities in access to maternal healthcare services. We also categorise inequality according to the circumstances using Shapley's decomposition technique. This approach shows how much each scenario element contributes to overall inequalities in access to maternal healthcare services.

METHODS

Data source
Nationally representative 2017–2018 Bangladesh Demographic and Health Survey (2017–2018 BDHS) data had been used in this study. The data provide several nationally representative maternal and child health indicators along with socioeconomic status. The BDHS was first carried out in 1993 and since then it was carried out every 3–4 years.

Data collection
The data of the 2017–2018 BDHS were collected under the authority of the National Institute of Population Research and Training. The 2017–2018 BDHS uses a two-stage stratified sampling technique to select study participants. Clusters usually known as enumeration areas (EAs) were selected in the first stage using probability proportional to EA size. In the second stage, using systematic sampling, households were selected from the EAs. From the selected households, a total of 20 127 women aged 15–49 years were interviewed. Details of the sampling procedure were described elsewhere.[16] Among the interviewed women, only 5012 gave live births in the previous 3 years of the survey. Thus, the study population was formed through these 5012 women. Moreover, there was no missing value; hence, we used information of 5012 women for the final analysis. Data screening for women who had last birth in the last 3 years preceding the survey is presented in figure 1.

Maternal healthcare opportunities
Opportunities are recognised as the essential set of goods and services that enable individuals to fulfil their potentials.[17] The opportunity to access the maternal healthcare services throughout pregnancy has an indispensable role in fostering positive health outcomes for both the mother and child through the mitigation of potential risks and complications associated with pregnancy. As for the opportunity to access maternal healthcare, we use the following indicators: access to ANC care, access to minimum required ANC visits, access to medically trained persons who provided ANC, access to institutional delivery and access to adequate maternal healthcare. Here, access to adequate maternal healthcare services is a composite indicator, and the descriptions of this indicator along with other indicators are given in table 1.

Circumstances
According to the principle of equal opportunities, everyone deserves equal chance of accessing the opportunities, irrespective of their circumstances. Personal, family or community characteristics that one cannot
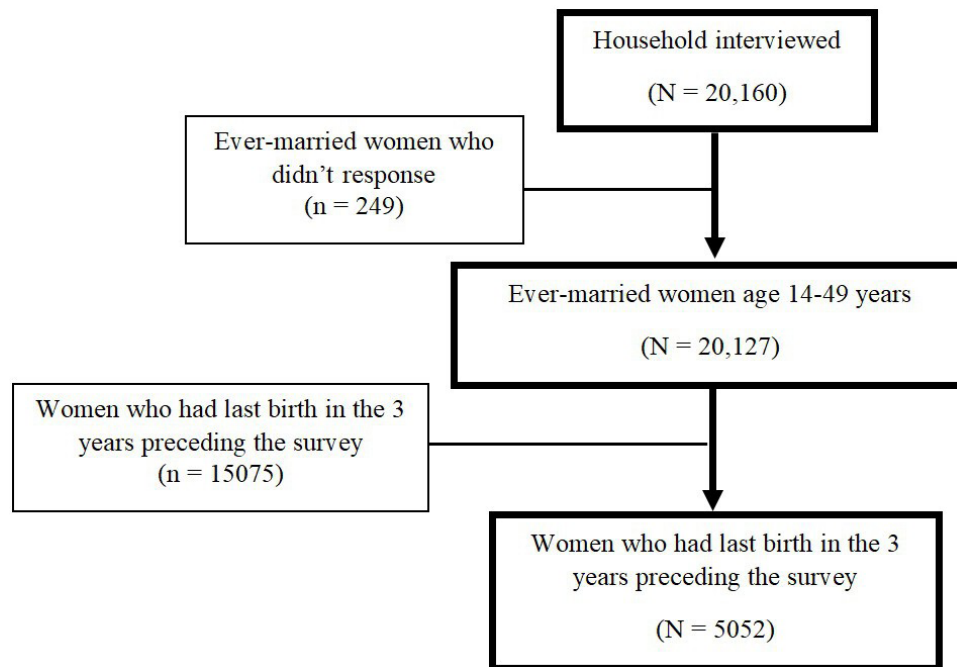
Figure 1 Data screening for women who had their last birth in the last 3 years preceding the Bangladesh Demographic and Health Survey 2017–2018.

directly influence are acknowledged as circumstances.[18] Studies have demonstrated that utilisation of maternal healthcare opportunities is affected by different factors such as wealth status, living area and educational levels.[19–21] Mothers can have considerably limited influences on these distinctive grouping factors. Therefore, in the context of this study, these stratified characteristics can be classified as circumstances. Based on the existing literature, eight circumstances were selected for this study. Descriptions of the selected circumstances are given in table 2.

Statistical analyses

For this study, we have used weighted data. Descriptive analysis was performed at first, and then, the association between the circumstances and maternal healthcare opportunities was assessed using the X^2 test. We calculate the HOI and the dissimilarity index (D-index) for each maternal health opportunity to measure inequality of maternal health opportunity. The methodological framework of this study was developed based on measures of inequality of opportunity used in previous studies.[22 23] The D-index measures relative inequality in allocating

Table 1	List of opportunities and their descriptions
Opportunity	**Description**
Access to ANC care	Women who had completed at least one ANC visit are considered to have had access to ANC care.
Access to minimum required ANC visits	Women who had made four or more ANC visits are recognised to have had access to minimum required ANC visits.
Access to medically trained person who provided ANC	Women who received at least one ANC from medically trained personnel are acknowledged as having access to medically trained persons who provided ANC; whereas doctors, nurses, midwives, family welfare visitors, community healthcare providers, subassistant community medical officers are recognised as medically trained persons.[34]
Access to institutional delivery	Women whose delivery occurred in a health facility are regarded as having obtained the access to institutional delivery. Here, health facilities encompassed those operating within public, private and NGO sectors such as NGO static clinic and delivery hut.
Access to adequate maternal healthcare	Based on the aforementioned indicators, a composite indicator for access to maternal and child healthcare was developed which takes the value 1 if all the conditions for adequate healthcare are met. Women who had made at least four ANC visits with one or more visits from medically trained providers and made institutional delivery are considered to have adequate maternal healthcare access.

ANC, antenatal care; NGO, non-governmental organisation.

Table 2 Categorisation of the circumstances

Circumstances	Categories
Age at delivery	Less than 20 years
	20–34 years
	More than 34 years
Educational status	No education (indicates that the individual has not received any formal education)
	Primary education (indicates that the individual has completed 1–4 years of education)
	Secondary education (indicates that the individual has completed 5–9 years of education)
	Higher education (indicates that the individual has completed 10 or more years of education)
Employment status	No
	Yes
Healthcare decision	Self
	Partner/husband
	Others
Wealth status	Poorest
	Poorer
	Middle
	Richer
	Richest
Religion	Islam
	Others
Residence	Urban
	Rural
Division	Barisal
	Chattogram
	Dhaka
	Khulna
	Mymensingh
	Rajshahi
	Rangpur
	Sylhet

maternal health opportunities over various groups defined by different circumstances. The index quantifies the ratio of mothers who need access to maternal healthcare services, relative to those who enjoy access to the corresponding services. We estimated the D-index using the following three steps:

First step: we computed the conditional likelihood by fixing a binary function between maternal healthcare opportunities and circumstances (X_1, X_2, X_3,…, X_8) using logistic regression where X_1=age at delivery, X_2=educational status, X_3=employment status, X_4=healthcare

decision, X_5=wealth status, X_6=religion, X_7=residence, X_8=division.

Second step: we estimated predicted probability for access to maternal healthcare services considering the chosen circumstances.

Third step: we estimated the D-index and the probability of access to care (p) using the following equations:

$$\bar{p} = \sum_{i=1}^{n} w_i p_i$$

Where $w_i = \frac{1}{n}$ and n denotes number of disjoint groups defined by the circumstances.

$$D - index = \frac{1}{2\bar{p}} \sum_{i=1}^{n} w_i |p_i - \bar{p}|$$

The values of D range from 0 to 1 in general and 0–100 in percentage. D takes the value 0 for perfect equality in the access to maternal healthcare opportunities.

Human Opportunity Index

Penalising the degree of inequality in the distribution of essential maternal health services among different groups based on the circumstances, the HOI assesses the availability of essential maternal health services that are fundamental to positive motherhood.[22] This index was developed by the World Bank with exterior researchers and represented in 2009.[24] HOI was computed as:

$$HOI = \bar{p}(1 - D)$$

Where D is the D-index of inequality of opportunities in accessing basic services for circumstance groups. (1−D) will be equal to 1 when the inequality of opportunity (D) is 0. It means that the coverage rate or average access ($\bar{p}$) will become equal to that much of access to the opportunity and HOI is independent of circumstances. The HOI is graded on a scale ranging 0–100, where the score 100 means the society received universal coverage of the health services.

Shapley's decomposition method

Shapley's decomposition[25] method was used to find out the relative contribution of each circumstance to the inequality. The contribution of each circumstance (C_j) to the inequality of maternal healthcare opportunities is estimated by the following equation:

$$D_{c_j} = \sum_{s \subseteq N/\{N\}} \frac{s!\,(n-s-1)!}{n!} \left[D\left(S \cup \{C_j\}\right) - D(S) \right]$$

where:
N=denotes total number of the circumstances.
n=denotes the number of selected circumstances in N.
s=denotes a subset of N circumstances without C_j.
D(S)=denotes estimated D-index using a set of circumstances (S).
D(S∪{C_j})=D-index calculated with the circumstance C_j and the subset of circumstances S.

Then, the contribution of C_j circumstance to the D-index is examined by the following formula:

$$\theta_{c_j} = \frac{D_{c_j}}{D(N)}, \text{ where } \sum_{j \in N} \theta_{c_j} = 1$$

We use the inequality of opportunity module in Stata V.17.

Statistical software

The most popular instruments for statistical computation, R (V.4.0.3) and Stata (V.17), were used to conduct our analysis.

Patient and public involvement

This study was based on secondary data analysis, so there was no direct patient and public involvement.

RESULTS

Table 3 provides an overview of the demographic characteristics of the mothers. Most mothers reside in rural areas, accounting for 65.6% of the sample. The highest percentage of mothers falls within the age group of 20–24 years, constituting 35.4%. In terms of education, 53.1% of mothers have completed secondary education. The majority of households (87.9%) have a male household head.

Regarding employment status, 62.5% of mothers do not have work. Approximately half of the mothers (50.3%) opted for institutional delivery. A significant proportion of mothers (91.9%) had access to ANC care, and 83.2% received care from qualified providers. However, 64% of mothers did not receive the required ANC.

Furthermore, 75.6% of mothers did not receive adequate care. The healthcare decisions for 64.6% of mothers were made by their husbands. Lastly, 70.8% of mothers had their first birth between the age of 20 and 34 years.

Table 4 shows the association between the percentage distribution and adequate care of mothers, which was related to Bangladesh's sociodemographic characteristics. It presented the factors significantly associated (p<0.001, or p<0.01, or p<0.05) with adequate care, which were residence, division, education, wealth status, religion, working status, healthcare decision and age at birth.

Access to adequate maternal healthcare significantly differs by the mothers' residence.

Almost 36.5% of mothers from urban areas got adequate maternal healthcare and only half (18.1%) in rural areas.

Moreover, a significant relationship was found between division and adequate maternal healthcare in Bangladesh. Mothers from Dhaka (31.7%) and Khulna (31.1%) got the highest maternal care among all divisions. Approximately 20% of mothers from Barisal got adequate maternal healthcare. However, in Mymensingh, 18.7% and in Sylhet, 18.3% of mothers got adequate care.

Table 4 shows the positively significant association between adequate maternal healthcare and respondents' education. It was prominent that mothers with higher education (47.3%) got adequate maternal healthcare. Moreover, 21.1% of mothers with secondary and 10.1% of

Table 3 Frequency distribution of selected socioeconomic and maternal healthcare characteristics

Variables	Frequency	Percentage
Respondent's current age		
15–19	869	17.3
20–24	1773	35.4
24–29	1310	26.1
30–34	749	14.9
35–49	311	6.2
Residence		
Urban	1725	34.4
Rural	3287	65.6
Division		
Barisal	533	10.6
Chattogram	835	16.7
Dhaka	741	14.8
Khulna	524	10.5
Mymensingh	603	12.0
Rajshahi	527	10.5
Rangpur	559	11.2
Sylhet	690	13.8
Education		
No education	312	6.2
Primary education	865	17.3
Secondary education	2663	53.1
Higher education	1172	23.4
Sex of household head		
Male	4404	87.9
Female	608	12.1
Wealth status		
Poorest	1079	21.5
Poorer	1017	20.3
Middle	905	18.1
Richer	988	19.7
Richest	1023	20.4
Religion		
Islam	4589	91.6
Other	423	8.4
Working status		
No	3132	62.5
Yes	1880	37.5
Sex of child		
Male	2624	52.4
Female	2388	47.6
Institutional delivery		
No	2492	49.7
Yes	2520	50.3

Continued

Table 3 Continued

Variables	Frequency	Percentage
Access to ANC care		
No	408	8.1
Yes	4604	91.9
Qualified provider		
No	844	16.8
Yes	4168	83.2
Access to required ANC visit		
No	3210	64.0
Yes	1802	36.0
Adequate care		
No	3787	75.6
Yes	1225	24.4
Healthcare decision		
Self	374	7.5
Partner/husband	3236	64.6
Others	1402	28.0
Age at childbirth		
<20	1239	24.7
20–34	3550	70.8
>34	223	4.4

ANC, antenatal care.

mothers with primary education got adequate maternal healthcare, respectively. Among the mothers with no education, only 6.7% got adequate maternal healthcare.

Again, wealth status affected adequate maternal healthcare in Bangladesh, where almost 51.1% of mothers from the richest family, 28.6% from richer family and 22.5% from middle-income family got adequate maternal healthcare. Among the poorer and poorest mothers, 12.1% and 8.5% got adequate maternal healthcare, respectively. On top of that, the percentage of adequate care received by working mothers (20.1%) is lower than that received by non-working mothers (27.0%). Mothers who gave birth in middle age got the highest maternal healthcare (25.6%), and this was found to have significant relation.

In terms of healthcare decisions, it was observed that there was a significant association between adequate maternal healthcare with respondents' healthcare decisions. Adequate maternal healthcare was observed when the decision was taken by only the respondent (25.1%), but if this decision was made jointly (respondent as well as the husband), then the percentage of adequate maternal healthcare increased (approximately 26%).

HOI, D-index and coverage (C) of maternal healthcare in Bangladesh are presented in table 5. The highest coverage rate and HOI were found for the third indicator of access to ANC care. The highest access to ANC means most of the mothers can access ANC. The same indicator's dissimilarity (D) value is lower among all five indicators

Table 4 Association between adequate maternal healthcare with selected socioeconomic healthcare

| Variables | Adequate maternal healthcare | | |
	No (%)	Yes (%)	P value
Respondents' current age			
15–19	78.1	21.2	0.08
20–24	76.3	23.8	
25–29	73.4	26.6	
30–34	74.1	25.9	
35–49	77.2	22.8	
Residence			
Urban	63.5	36.5	<0.001
Rural	81.9	18.1	
Division			
Barisal	80.1	19.9	<0.001
Chattogram	78.1	21.9	
Dhaka	68.3	31.7	
Khulna	68.9	31.1	
Mymensingh	81.3	18.7	
Rajshahi	72.1	27.9	
Rangpur	72.8	27.2	
Sylhet	81.7	18.3	
Educational status			
No education	93.3	6.7	<0.001
Primary education	89.9	10.1	
Secondary education	78.9	21.1	
Higher education	52.7	47.3	
Sex of household head			
Male	75.5	24.5	0.99
Female	75.7	24.3	
Wealth status			
Poorest	91.5	8.5	<0.001
Poorer	87.9	12.1	
Middle	77.5	22.5	
Richer	71.4	28.6	
Richest	48.9	51.1	
Religion			
Islam	76.0	24.0	0.01
Other	70.7	29.3	
Employment status			
No	73.0	27.0	<0.001
Yes	79.9	20.1	
Sex of child			
Male	74.8	25.2	0.21
Female	76.4	23.6	

Continued

Table 4 Continued

| Variables | Adequate maternal healthcare | | |
	No (%)	Yes (%)	P value
Healthcare decision			
Self	74.9	25.1	0.002
Partner/husband	74.2	25.8	
Others	78.9	21.1	
Age at delivery			
<20	78.5	21.5	0.01
20–34	74.4	25.6	
>34	77.6	22.4	

(3.3). Among the maternal healthcare opportunities, access to medically trained persons who provided ANC also has a high coverage rate (C=83.2) and HOI (77.5). Similarly, there was less inequality in the access to this opportunity (D=6.8).

Both 'access to minimum required ANC visits' (C=36.0; HOI=29.7) and 'access to institutional delivery' (C=50.3; HOI=40.9) exhibited significantly lower coverage rates than the preceding two opportunities. The D-indices for 'access to minimum required ANC visits' and 'access to institutional delivery' were 17.3 and 18.6, respectively. The composite indicator, that is, adequate maternal healthcare, presented the lowest coverage rate as well as opportunity index (approximately 24% with HOI=17.2). Naturally, the dissimilarity rate was highest (29.6%).

The decomposition of inequality of maternal healthcare (table 6) reveals that it is the household wealth status that contributes much more inequality to accessing the adequate maternal healthcare services (41.4%), such as receiving at least four ANC visits (39.7%), access to

Table 5 Opportunity and inequality in maternal healthcare

Variables	Coverage	Dissimilarity	Human Opportunity Index
Access to minimum required ANC visits	36.0	17.3	29.7
Access to medically trained person who provided ANC	83.2	6.8	77.5
Access to ANC care	91.9	3.3	88.8
Access to institutional delivery	50.3	18.6	40.9
Access to adequate maternal healthcare	24.4	29.6	17.2

ANC, antenatal care.

proper ANC (50.7% and 44.0%) and health facility birth (43.4%). Maternal educational status contributes as the second highest inequality in accessing adequate maternal healthcare (29.5%). For access to at least four ANC visits, maternal education contributes 31.4% of the total inequality; for access to ANC from qualified staff, maternal education contributes 27.2% of the total inequality; for access to ANC, maternal education contributes 34.8% of the total inequality; and for access to healthcare delivery, maternal education contributes 27.4% of the total inequality. Division contributes the lowest inequality among factors included in this study.

DISCUSSION

The present study was conducted to investigate the inequalities in access to maternal healthcare services in Bangladesh using a large nationally representative dataset while expanding on HOI and using Shapley's decomposition technique. From the opportunity index analysis, it is indicative that the coverage of ANC and ANC from skilled health personnel was high, whereas adequate maternal healthcare and having attended at least four ANC visits had the lowest coverage. Nonetheless, the highest dissimilarity was reported in the dimension of adequate maternal care, indicating that there is wide inequality in receiving adequate maternal care in Bangladesh.

It is evident from the decomposition analysis that the factors that contributed the most to inequalities across all the five maternal healthcare opportunities were wealth index, education and place of residence. The findings correlate with evidence from previous studies conducted in Bangladesh,[15] Sierra Leone,[26] Indonesia[27] and Togo.[28] A plausible explanation for the contribution of wealth status to inequalities in access to maternal healthcare services could be explained from the perspective that women of higher wealth status often have a higher likelihood of visiting a hospital and, when necessary, pay for both the transport cost and the actual healthcare services compared with those from poorer wealth index.[28 29] This implies that for Bangladesh to be able to improve women's accessibility to maternal healthcare services, pro-poor policies and interventions would have to be instituted to bridge the existing economic inequality gap.

The findings that education is a major contributor to inequality in terms of accessibility to maternal healthcare services could be explained from different perspectives. First, education has been found to be significantly correlated with higher likelihood of women's autonomy and empowerment.[30 31] This empowerment allows women to take critical healthcare decisions such as decisions to deliver at the health facility, receive ANC and receive the recommended number of ANC visits. Another perspective to this observation could be that educated women tend to be more self-sufficient in their finances and may have the economic resources to pay for maternal healthcare when necessary.[30 32] We also postulate that women who have received formal education may have access to

Table 6 Decomposition of inequality of maternal healthcare

Variables	Access to minimum required ANC visits	Access to medically trained person who provided ANC	Access to ANC care	Access to institutional delivery	Access to adequate maternal healthcare
Division	0.8	2.3	1.5	0.6	0.6
Residence	22.2	11.2	8.7	14.2	19.5
Religion	1.2	0.7	1.9	3.0	1.1
Educational status	31.4	27.1	34.9	27.4	29.5
Wealth status	39.7	50.7	44.0	43.4	41.4
Employment status	1.4	4.9	4.5	9.6	4.8
Healthcare decision	2.9	0.8	0.5	1.6	1.8
Age at delivery	0.6	2.3	4.1	0.2	1.3

ANC, antenatal care.

varied sources of health information and better understand the need to seek maternal healthcare services and even request services when healthcare providers do not offer that to them.

The third major contributor to inequalities in accessibility to maternal healthcare in Bangladesh was the place of residence. Similarly, Atake[28] and Zere *et al*[29] have also reported that there are significant rural–urban inequalities in the accessibility to maternal healthcare services, with those residing in rural areas being the most disadvantaged. This observation could be due to the better transportation infrastructure and adequately staffed and well-equipped health facilities in urban areas compared with rural areas.[28] Another possible explanation could be that the nearest health facility to women in rural areas may be distant from residents.[33] Hence, making maternal healthcare services accessible to rural-dwelling women is challenging. This result is a call for aggressive policies and interventions to target rural-dwelling women for maternal healthcare services. Practically, the findings could inform the implementation of interventions to increase the availability and proximity of primary healthcare facilities to women in rural areas.

Strengths and limitations

The present study has several limitations that must be considered in the interpretation of the findings. Given that the study relied on data from the BDHS that uses cross-sectional design, the inequalities observed cannot be interpreted as causal inferences. Longitudinal studies would be needed to establish causality in the factors that contribute to inequalities in accessibility to maternal healthcare services. Also, the questions on adequate maternal healthcare, ANC, ANC from skilled personnel and delivery at the health facility were self-reported. Hence, there is the possibility of recall and social desirability bias. Moreover, residual factors such as community norms and cultural beliefs were not available in the BDHS; hence, we are unable to test how those contribute to the observed inequalities. Notwithstanding the limitations,

there are some strengths that are noteworthy. The use of BDHS provided a large nationally representative dataset that can be based on to generalise the findings to the Bangladeshi women population and other resource-constrained settings with similar contextual characteristics such as Bangladesh. Also, the use of HOI, D-index and decomposing technique was appropriate for understanding the inequalities in accessibility to maternal healthcare services.

CONCLUSION

The study concludes that attaining adequate maternal healthcare had the lowest coverage and widest dissimilarity. We also conclude that wealth index, education and place of residence are the major factors that contribute to inequalities in accessibility to maternal healthcare services in Bangladesh. These findings underscore a need for pro-poor interventions to narrow the economic inequalities between the poor and rich in terms of accessibility to maternal healthcare services. Also, the results point to the need for the Bangladeshi government and its health department to strengthen their commitment to improving female education. Additionally, there is a need to invest in initiatives that would bring maternal healthcare services closer to women residing in rural areas.

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