

Skilled maternal healthcare and good essential newborn care practice in rural Bangladesh: A cross-sectional study

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Abstract

Background and Aims: Essential newborn care (ENC) practices play an important role in reducing the risk of infant mortality and morbidity. Therefore, more studies are needed on ENC practices. Skilled maternal healthcare can be a good strategy to increase the practice. Learn about the independent and joint effects of skilled maternal healthcare during pregnancy and childbirth on newborn care practices.

Methods: The study used a cross-sectional data obtained from Bangladesh Multiple Indicator Cluster Survey, 2019. To investigate the association between maternal healthcare utilization and good ENC practice (cord care, delayed bathing, and immediate breast-feeding), χ^2 test and *t*-test in bivariate and binary logistic regression analysis, respectively have been performed after taking into account complex survey design.

Results: Only about 24% (95% confidence interval [CI]: 22.95%–25.89%) women given birth at home in rural Bangladesh followed good newborn care practice. The results obtained from adjusted regression analysis showed that a woman was 24%, 49%, and 75% more likely of having good ENC practice if she received four or more skilled checkups during antenatal period only (adjusted odds ratios [AOR]: 1.24, 95% CI: 0.97, 1.60), received assistance from SBA during delivery only (AOR: 1.49, 95% CI 1.12, 1.97) and received skilled healthcare in both pregnancy and delivery (AOR: 1.75, 95% CI 1.13, 2.71), respectively compared to a woman who did not get an opportunity to receive skilled healthcare during pregnancy and delivery. Among the selected confounders, maternal age at birth, birth order, education of household heads and religion showed a significant association with good ENC practice.

Conclusion: The study revealed that proper maternal healthcare during pregnancy and childbirth from skilled health personnel can improve the rate of ENC practices. For this, more training programs should be started, especially at the community level, and health promotion activities are needed to create awareness about efficient maternal healthcare practices.

KEYWORDS

Bangladesh, home births, maternal healthcare, newborn care, skilled health personnel

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1 | BACKGROUNDS

Though several steps have been taken to reduce neonatal mortality globally, the decline in neonatal mortality is slower than under-five mortality.¹⁻³ The Sustainable Development Goal (SDG) for neonatal mortality was fixed at 12 or less per 1000 births that needs to be achieved by 2030. Bangladesh is far from this target as the current neonatal rate is 30 per 1000 births.⁴ Both under-five and neonatal mortality rates are declining in Bangladesh, but the decline in neonatal mortality has been exceedingly slower as neonatal and under-five mortality have declined by 42% and 66% in the last two decades.⁴ Most neonatal deaths take place within the first 24 h after birth.^{5,6} Complications of prematurity and birth defects are the major causes of newborn deaths.⁷ In developing countries like Bangladesh, bulk of neonatal deaths occurs due to imperfect manner of newborn care practice, intra-partum, and conditions of labor.^{2,7-9} Hence, to reduce neonatal mortality, strategies must be developed to ensure safe delivery and improve essential newborn care (ENC) practices.¹⁰

Every newborn baby needs ENC regardless of where it is born or its size. ENC should be applied immediately after the baby is born and continued for at least the first 7 days after birth.¹¹ A potential risk factor for neonatal infection is cord cutting and tying practices. A large number of infants die of neonatal tetanus and severe bacterial infections each year due to improper care of newborn's cord.⁷ By practicing clean cord care and clean delivery, these infections are preventable and can be reduced. To save newborn lives, clean cord care has been identified as an intervention.¹² Globally, around 40 million mothers give birth at home every year without getting any assistance from skilled birth attendants¹³ and most home deliveries take place in developing countries, where traditional practices such as applying unclean substances to the cord increase the risk of tetanus and bacterial infection.¹⁴

Hypothermia is the body temperature below the normal range (36.5–37.5°C) and neonate hypothermia increases mortality and morbidity such as intracranial hemorrhage and sepsis.¹⁵ Therefore, it is essential to maintain an appropriate temperature for the newborn. Hypothermia may be allied with low environmental temperatures, low birth weight, prematurity, early bathing of newborn birth asphyxia, low socioeconomic conditions of household, and intra-uterine growth restriction.^{16,17} To reduce the risk of hypothermia, Bangladesh's National Neonatal Health Strategy and Guidelines recommend that bathing should be delayed for at least 72 h after birth.^{16,18,19}

WHO also recommends that breastfeeding should be initiated early and preferably within 1 h of birth⁷ because it is one of the effective interventions that can reduce 55%–87% of all-causes related to neonatal mortality and morbidity.²⁰ Immediate breastfeeding keeps the newborn warm and also reduces the risk of hypothermia.¹⁶ Breastfeeding also reduces the risk of diarrhea, neonatal sepsis, meningitis, and pneumonia.²¹

Therefore, safe cord care (boiled instruments), thermal care (delayed bathing), and early initiation of breastfeeding are the ENC practices recommended by WHO to reduce neonatal mortality and

morbidity in both institutional and noninstitutional deliveries.²²⁻²⁴ Most of the neonatal deaths are preventable and around two-thirds could be saved by providing quality newborn care.^{24,25}

Newborn care practices are usually available for institutional births, but scarce for the noninstitutional deliveries. In developing countries, the majority of births are noninstitutional and were delivered at home without having a skilled birth attendant leading to neonatal morbidity and mortality.¹² In Bangladesh, 46.4% of all births and 50.4% of births in rural areas occur at home.²⁶ Besides, in developing countries like Bangladesh, a little is known about newborn care practices.¹² Therefore, understanding newborn care practices at home is necessary to reduce neonatal morbidity and mortality rate in rural setting of Bangladesh.

According to the WHO, a woman should have four or more check-ups by skilled health professionals during pregnancy and seek the help of a skilled birth attendant (SBA) during childbirth.^{27,28} Pregnant women can understand the importance of ENC practices through the advice of skilled health personnel during antenatal period to reduce neonatal mortality and morbidity.²² The United Nations has set a Sustainable Development Goal (SDG 3.1.2) to ensure SBA for all births to reduce neonatal and maternal mortality. In rural home delivery, a very small portion of women receive assistance from skilled health professionals.^{29,30} Recognizing the importance of SBA, the Government of Bangladesh has been training community birth attendants to improve the quality of delivery care in home settings.³¹ The studies revealed that a lack of quality care at delivery or absence of skilled health personnel immediately after birth and on the first day of life increases the risk of neonatal death.^{31,32}

The present study emphasizes maternal health care utilization during pregnancy and childbirth to have access to ENC practices for home deliveries in rural settings. Some studies have independently examined the effects of SBA or ANC follow-up on ENC practice but, to the best of my knowledge, no previous study has examined the combined effect of SBA and skilled ANC follow up.^{27,29,33} Therefore, the main aim of this study is to identify the joint effects of taking at least four skilled health check-ups and getting assistance from SBAs after controlling some socioeconomic and demographic factors on ENC practices for home births in rural Bangladesh. Thus, the research findings will help policymakers and other stakeholders to develop the necessary interventions to improve neonatal health.

2 | METHODS

2.1 | Sample design

Data obtained from Bangladesh Multiple Indicator Cluster Survey (MICS), 2019 have been utilized in this study. The sample for the survey was nationally representative and covered the entire population of the country.²⁶ The sampling frame of the 2011 Population and Housing Census of the People's Republic of Bangladesh, provided by Bangladesh Bureau of Statistics (BBS) has been considered in the survey. To collect the sample of households,

the survey used two-stage stratified sampling technique. The enumeration areas (EAs) were the primary sampling units (PSU) and 3220 EAs were selected with probability proportional to the EA size in the first stage taking with 634 EAs in urban areas and 2,586 in rural areas. In the second stage, an average of 20 households per EA were selected using a systematic random sampling approach. Therefore, a total of 64,400 households were selected but 64,378 women were successfully interviewed from 61,242 households. The complete sample design of the survey is available in Bangladesh MICS 2019 final report.³⁴

2.2 | Study participants

In this study, information only on the last child of a mother giving birth at home preceding 2 years of the survey was considered. The study included the data only from rural areas, because around 85% of home deliveries occurred in rural areas.²⁶ Thus, the rural non-institutional births have been considered to develop efficient

interventions to improve newborn health in rural areas of Bangladesh. The unweighted sample of the study was 3863 but the weighted sample size is 3615. Figure 1 displays the selection criteria of study participants.

2.3 | Outcome measure

In this paper, an attempt has been made to analyze ENC practice in terms of umbilical cord care of newborn, delayed bathing to 72 h after birth and initiating breastfeeding within 1 h of birth. For safe cord care, the WHO recommended to use boiled or clean instruments to cut the umbilical cord of newborn. The dependent variable of the study was newborn care practice and it was measured based on the three ENC mentioned above. If a woman practices all three newborn cares for her recent baby, the woman practices good ENC and a value of 1 is assigned for this practice; and if the woman missed one or more ENC practices for her recent baby, the woman practices poor ENC.

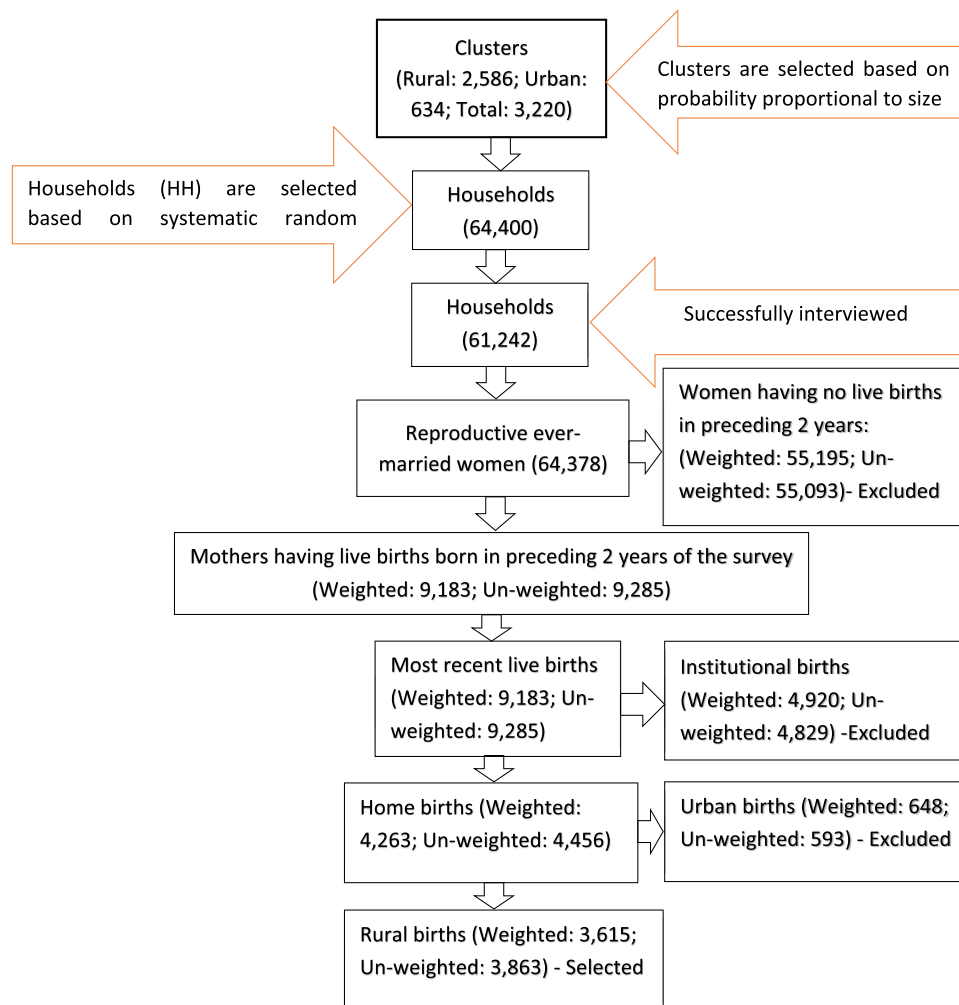


FIGURE 1 Flowchart for the selection of study participants

2.4 | Main exposure: Skilled maternal healthcare

Maternal skilled healthcare is the primary exposure measured based on the checkups and assistance from skilled health attendants during pregnancy and childbirth, respectively in the study. According to WHO, skilled health attendants are called those health providers who are either qualified doctors, nurses, midwives, paramedics, family welfare visitors, or community skilled attendants.^{4,26} Following literatures, we have set two categories for skilled antenatal care checkups: four or more skilled checkups and no or below three skilled checkups,^{27,28} and we have also categorized the assistance of skilled birth attendant as yes and no. Finally, for maternal skilled healthcare, we have combined these two variables and divided them into four categories as: no if nothing is true, ANC only if at least four skilled checkups during pregnancy is true, delivery only if assistance of skilled health personnel during delivery is true, and both if four or more skilled antenatal checkups and skilled birth attendant are true.

2.5 | Control variables

Based on the literature review, a number of socioeconomic and demographic factors of mother and birth characteristics of each child have been considered as covariates that may influence the ENC practices.^{12,16,21,35,36} Explanatory variables related to mother characteristics includes maternal age (<20; 20–34 and 34+); birth order (first birth; 2nd to 3rd; 4th to 6th and 7th+); educational qualification (no education, primary, secondary, higher); wealth index (poorest; poor; middle; rich and richest); religion (non-Muslim, Muslim); Father's educational qualification (no education, primary, secondary, higher); and gender of the child (male, female) have been considered as control variables.

2.6 | Statistical analysis

First, exploratory data analysis has been done for all selected variables. Prevalence of using different ENC practices (cord care, delayed bathing, and immediate breastfeeding) along with the prevalence of good ENC practice by background characteristics of respondents has been computed in the study. To examine the unadjusted association between skilled maternal healthcare and good ENC practice, a simple binary logistic regression model has been considered. Finally, a multivariable binary logistic model was used to find out the adjusted effect of skilled maternal health care on good ENC practice after adjusting some potential selected covariates. All computations have been completed taking sampling weights into account in the analysis using SVY setting in STATA to control overestimation and underestimation of the estimates. For the purpose of analysis, STATA 14 has been used.

3 | RESULTS

3.1 | Exploratory analysis

Around 78% of the women did not have the opportunity to get at least 4 ANC checkups or assistance from skilled health personnel during their pregnancy and delivery. Only 11.21% mothers received 4+ skilled checkups at pregnancy who did not continue to get assistance at delivery from the skilled personnel. On the other hand, only about 8% mothers received assistance from qualified health professionals at delivery but they did not receive 4+ skilled checkups during pregnancy. Very few of the mothers (2.88%) had the scope of getting skilled personnel in both pregnancy and childbirth (Table 1). It is also clear from the table that most of mothers (71.98%) were from age group 20 to 34 years in this study. Around one-fourth of all selected children are the first child of their parents. Only a few of the respondents were highly educated (7.18%), whereas 15.61% of mothers did not have any institutional education. Most of the respondents were Muslim and the sex ratio of child was almost 1:1. Most mothers belong to the poorest wealth quintile. Secondary and higher education levels of household head were relatively lower compared to mothers.

The results given in Table 1 also showed about 85% of the rural mothers giving birth at home reported that the cords of their newborn babies were cut with a clean and boiled instrument.

The prevalence of cord care practice among the categories of skilled maternal healthcare was not different from each other. Again, the rate of delayed bathing revealed that less than half of the mothers (42.08%) bathed their newborns after 72 h. Mothers having trained or qualified health attendants during pregnancy or delivery care were more likely to practice the delayed bathing than the mothers who were deprived to receive 4+ skilled checkups during pregnancy period or getting assistance from SBA at delivery. For instance, 39% of mothers without receiving skilled maternal healthcare during pregnancy and delivery, 50% of mothers taking skilled ANC checkups only, 55% of mothers assisted by SBA at delivery only and 58% of mothers getting assistance from skilled health personnel at both pregnancy and delivery were practiced bathing of newborns to 72 h of birth. Moreover, about 63% of the newborns were breastfed within one hour after their birth. The early initiation of breastfeeding practice was not influenced by skilled maternal healthcare-seeking behavior, although observed prevalence between getting assistance at delivery only and getting assistance at both pregnancy and delivery showed a difference.

3.1.1 | Good ENC practice

Nearly a quarter (24.42%) of the mothers from rural Bangladesh had good ENC practice. The highest prevalence of good ENC practice was found for mothers who received support from skilled

TABLE 1 Distribution of socio-demographic and economic characteristics along with the prevalence of essential newborn care practices for home births in rural Bangladesh, MICS 2019.

Variables	n (%)	Cord care	Delayed bathing	Immediate breast-feeding	Good ENC practice
Skilled Maternal Health Care (<i>p</i> value)		0.767	<0.001	0.598	<0.001
No	2818 (77.96)	84.47	39.04	63.48	22.86
Only ANC (≥ 4)	406 (11.21)	86.33	49.68	63.02	27.40
Only delivery	287 (7.95)	86.08	55.40	59.21	31.33
Both	104 (2.88)	85.80	58.18	61.93	35.79
Maternal age (<i>p</i> value)		0.012	0.004	0.559	0.019
<20	725 (20.05)	83.31	46.08	64.85	28.57
20–34	2547 (70.47)	84.55	41.99	62.66	23.62
35+	343 (9.48)	90.34	34.33	62.10	21.56
Birth order (<i>p</i> value)		0.023	0.005	0.419	0.177
1st	920 (25.44)	83.63	45.66	61.08	27.09
2nd–3rd	2041 (56.47)	84.09	42.42	63.07	23.45
4th–6th	606 (16.76)	89.17	36.00	65.84	23.20
7th+	48 (1.33)	85.62	35.85	64.28	29.59
Wealth index (<i>p</i> value)		<0.001	0.381	0.186	0.107
Poorest	1353 (37.42)	80.21	40.26	64.60	22.03
Poor	943 (26.08)	85.57	44.02	63.72	26.71
Middle	705 (19.50)	88.16	40.83	62.09	24.24
Rich	456 (12.62)	89.84	44.97	57.81	25.36
Richest	158 (4.38)	91.03	43.42	65.00	29.22
Mother's education (<i>p</i> value)		0.034	<0.001	0.480	0.079
No Education	564 (15.61)	87.46	30.75	63.14	20.47
Primary	1125 (31.12)	83.21	40.59	65.00	23.96
Secondary	1666 (46.09)	84.34	46.15	61.80	25.48
Higher	260 (7.18)	89.55	47.07	62.32	28.15
HH Head's Education (<i>p</i> value)		0.048	0.002	0.989	0.010
No Education	1490 (41.21)	82.96	38.71	62.77	22.08
Primary	1199 (33.18)	86.08	43.70	63.37	26.61
Secondary	757 (20.94)	85.41	43.77	62.90	23.83
Higher	169 (4.67)	90.20	52.85	63.74	32.01
Religion (<i>p</i> value)		0.038	0.535	0.997	0.151
Non-Muslim	228 (6.31)	78.09	44.22	63.05	28.73
Muslim	3387 (93.69)	85.30	41.94	63.04	24.13
Gender of child (<i>p</i> value)		0.213	0.394	0.533	0.904
Male	1806 (49.95)	84.05	42.85	62.51	24.51
Female	1809 (50.05)	85.61	41.32	63.57	24.32
Total	3615	84.85	42.08	63.04	24.42

health personnel at both antenatal care period and delivery (35.79%). The rate of good ENC practice was 27.40% for the mothers who only received at least four ANC visits by skilled providers, 31.33% for the mothers who were assisted by skilled birth attendants during delivery only (Table 1). Therefore, it can be revealed that the good ENC practice was positively influenced by skilled maternal healthcare-seeking behavior.

3.2 | Skilled maternal healthcare in good ENC practice

Binary logistic regression was performed in the study to find the unadjusted and adjusted influences of skilled maternal healthcare on good ENC practice. Table 2 summarizes the unadjusted and adjusted effects, that is, odds ratios along with the 95% confidence intervals. The maternal healthcare-seeking behavior by trained personnel was found to have a significant association with good ENC practice before or after adjusting the effects of other covariates. Both models showed similar directions to the estimates. The odds of good ENC practice were highest for mothers who received skilled health support at both pregnancy and childbirth. After controlling the effects of other covariates, skilled maternal healthcare plays an important role on good ENC practice.

Here, the odds of having good ENC practices was 24% higher for the receiver of having only at least 4 ANC visits by skilled providers (adjusted odds ratios [AOR]: 1.24, 95% confidence interval [CI]: 0.97, 1.60) compared to mothers with non-skilled maternal healthcare providers. Moreover, the odds of good ENC practice was also 49% higher for the mothers with trained birth attendants during delivery (AOR: 1.49, 95% CI: 1.12, 1.97). If mothers received both types of skilled maternal healthcare, the odds of practicing good ENC was the highest (AOR: 1.75, 95% CI: 1.13, 2.71), that is, 75% higher compared to mothers with no skilled maternal healthcare.

TABLE 2 Unadjusted odds ratios (UOR) and adjusted odds ratios (AOR) for good essential newborn care (ENC) practice by skilled maternal healthcare for home births in rural Bangladesh.

Variables	Good ENC practice			
	UOR	95% CI	AOR ^a	95% CI
Skilled Maternal Healthcare				
No	1.00		1.00	
Only ANC (≥4)	1.31*	(1.04, 1.63)	1.24****	(0.97, 1.60)
Only delivery	1.65***	(1.29, 2.13)	1.49**	(1.12, 1.97)
Both	1.70**	(1.15, 2.51)	1.75*	(1.13, 2.71)

^aAdjusted by maternal age, birth order, wealth index, mother's education, household head's education, religion and gender of the child.

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.10$

4 | DISCUSSION

This study has explored the prevalence of ENC practices (cord care, delayed bathing, and immediate breastfeeding) along with good newborn care practices among the noninstitutional live births in rural settings of Bangladesh using the evidence of Bangladesh MICS, 2019. The study prevalence presents that, among home deliveries in rural area, 85%, 42%, and 63% births were practiced by safe cord care, delayed bathing, and immediate breastfeeding, respectively in Bangladesh, but jointly only about 24% babies had been found to have all three essential practices (good ENC practice). Comparing the results with the report of BDHS 2017-18, we have found almost similar results⁴ but the ENC practices have increased over the years.³⁷⁻³⁹ The findings are consistent with estimates at the national level for home deliveries. Compared with other nationals, these estimates are higher than Nepal⁴⁰ and Pakistan.⁴¹ The discrepancy may be due to differences in socioeconomic, socio-cultural aspects or differences in sample size.²⁷ It can also happen due to the variation of maternal healthcare from skilled health personnel during pregnancy and childbirth.²⁷ Some studies conducted in South Asia^{42,43} and the Lawra district of Ghana⁴⁴ have also found low coverage of clean cord care among home births. Again, the WHO recommended that every newborn should initiate breastfeeding within 1 h after birth for better health of the newborns.⁴⁵ The present rate of immediate breastfeeding is not good enough with respect to the WHO, but it may be possible to improve the rate by spreading the importance of early initiation of breastfeeding to the mothers. Several studies from Bangladesh and other South Asian countries have found some reasons for delayed initiation of breastfeeding which are: pre-lacteal feeding such as honey or water, avoiding giving colostrum, supplemental breastfeeding with other foods or liquids are practiced in the society.¹²

Maternal healthcare utilization can be a possible strategy to increase good ENC practice, especially in home deliveries in rural areas. Thus, the present study has tried to understand the empirical association between maternal healthcare utilization and ENC practice and hence the study identified that maternal skilled healthcare is a potential contributor for good ENC practice. Both the unadjusted and adjusted odds ratios of skilled healthcare showed the same significant directions, and the adjusted results revealed that a woman was 24%, 49%, and 75% more likely of having good ENC practice if she received four or more skilled checkups during antenatal period, received assistance from SBA during delivery and received skilled healthcare in both cases, respectively compared to a woman who did not get an opportunity to receive skilled healthcare during pregnancy and delivery. Previous studies found similar significant positive effects of ANC follow-up or skilled birth attendants on ENC practices,^{19,27,29,46} but these studies modeled ENC practices separately and did not take into account the combined effect of skilled ANC follow-up and skilled birth attendant on ENC practices. This positive effect may happen due to the extra experience and knowledge of skilled health personnel. Skilled health attendants

who assist women during maternal healthcare periods are usually educated and follow the regulations of national and international standards, and they are also trained personnel to handle normal pregnancies, childbirths, and immediate postpartum checkups in women and newborns.^{47,48} Women can receive knowledge of ENC practices through counseling from skilled health professionals during pregnancy and hence women do that accordingly in the postpartum period of delivery.^{18,49} Again, as skilled health personnel are qualified and trained for normal deliveries, women may have the opportunity to receive direct benefits from SBA during childbirth for good ENC practices. Therefore, if a woman receives assistance from skilled health professionals during both antenatal care and delivery periods, the woman will have a better chance of having good ENC practice compared to all other women, and the current study findings have proved this statement.

To the best of our knowledge, no study has yet been conducted to address how skilled maternal healthcare utilization contributes to taking good ENC practice in Bangladesh. In this paper, an attempt has been made to explore this issue. The study also has some limitations. First of all, we did not include urban areas of Bangladesh in the study, although the ENC practices were also not good in urban areas. The causal relationship of the skilled maternal healthcare with good ENC practice cannot be examined because the Bangladesh MICS, 2019 data was a cross-sectional. In addition, some recall and social acceptability biases regarding ENC practices can exist in the data set as the women reported information for their last live birth delivered within 2 years preceding the survey.

5 | CONCLUSION

This study has focused on the association of skilled maternal healthcare utilization and good ENC practice. We have found low prevalence for both maternal healthcare utilization and good ENC practice. The study revealed that proper maternal healthcare during pregnancy and childbirth from skilled health personnel can improve the rate of ENC practices. For this, more training programs should be started, especially at the community level, so that more qualified health professionals are made in the rural areas of Bangladesh. The message of the need for skilled checkups during pregnancy and assistance of skilled health personnel during childbirth should spread among women for improved ENC practice so that no newborn dies in this condition. Therefore, health promotion activities are needed to create awareness about efficient maternal healthcare practices.

AUTHOR CONTRIBUTIONS

All authors have read and approved the final version of the manuscript [CORRESPONDING AUTHOR or MANUSCRIPT GUARANTOR] had full access to all of the data in this study and take complete responsibility for the integrity of the data and the accuracy of the data analysis.

Ahsan Rahman Jamee: Conceptualization, Data curation, Formal analysis, Writing—original draft, Writing—review and editing. **Kanchan K. Sen:** Data curation, Formal analysis, Writing—original draft, Writing—review and editing. **Wasimul Bari:** Conceptualization, Supervision, Writing—original draft, Writing—review and editing.

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CONFLICT OF INTEREST

The authors declared no conflict of interest.

DATA AVAILABILITY STATEMENT

This study used data from Bangladesh Multiple Indicator Cluster Survey (MICS) 2019, which are available at <https://mics.unicef.org/surveys>.

ETHICS STATEMENT

No ethics approval was required as this study used cross-sectional data which is available freely and publicly with all identifier information removed. To access and analyze the data set we obtained an official permission from UNICEF MICS headquarter New York. The survey protocol was approved by technical committee of the Government of Bangladesh lead by Bangladesh Bureau of Statistics (BBS). The participants' anonymity and confidentiality were assured.

TRANSPARENCY STATEMENT

The lead author, Ahsan Rahman Jamee, affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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