Prevalence and determinants of mother and newborn skin-to-skin contact: an assessment from the 2017-18 BDHS data

Azaz Bin Sharif[1,2] , Mohammad Delwer Hossain Hawlader[1] and Mohammad Hayatun Nabi[1]

Abstract

Background Evidence shows that skin-to-skin contact (SSC) enhances children's well-being. More information is needed on the prevalence and determinants of SSC in Bangladesh. This study aimed to estimate the prevalence and associated factors of mothers and their newborns' skin-to-skin contact in Bangladesh.

Methods Data extracted from a cross-sectional survey, (Bangladesh Demographic and Health Survey (BDHS) 2017-18), where 5304 (unweighted) women who gave birth in the last 3 years preceding the survey were included in the final analysis. Multivariable logistic regression analysis was used to identify the determinants of SSC practice. Adjusted odds ratios (aORs) with their corresponding 95% confidence intervals (CIs) were reported.

Results The prevalence of SSC practice in Bangladesh was 15.6% (95% CI [14.3, 17.0]). The adjusted regression model showed that the SSC practice was significantly associated with the geographic region, place of delivery, mode of delivery, and number of antenatal care visits. The SSC practice was 50% lower (aOR = 0.5, 95% CI [0.3, 0.8]) in the Rajshahi Division compared to the Dhaka Division. Women who had an institutional delivery had 2 times higher odds (aOR = 2.0, 95% CI [1.6, 2.5]) of SSC practice than women who had experienced a non-institutional delivery. Compared to women who delivered by cesarean section, the odds of SSC practice were 2.1 times higher (aOR = 2.1, 95% CI [1.6, 2.6]) for women who had a normal delivery. Women who completed at least four antenatal visits had 20% higher odds (aOR = 1.2, 95% CI [1.0, 1.4]) of SSC practice than women who completed fewer than four antenatal visits.

Conclusion Given that only approximately one-sixth of the surveyed women are engaged in SSC practice, informal instructional and awareness programs are necessary in Bangladesh to promote the importance and extent of SSC practice.

Keywords Skin-to-skin contact, Mother, Newborn, Prevalence, Bangladesh

*Correspondence:
Azaz Bin Sharif
azaz.sharif@northsouth.edu; azazsharif@yahoo.com
[1]Department of Public Health, North South University, Dhaka
1229, Bangladesh
[2]Global Health Institute, North South University, Dhaka 1229, Bangladesh

Introduction

Skin-to-skin contact (SSC) involves placing a naked new-born, covered with a blanket for extra warmth, on the mother's bare chest [1]. Sanabria and Gomez created a more generalized term for SSC called Kangaroo Mother Care (KMC) [2]. This was invented out of desperation when there were insufficient incubators to care for babies with low birth weights in Bogota, Columbia [3]. Researchers had learned about tiny baby kangaroos being raised in their mother's pouch and found this approach useful for preterm human babies [2].

The benefits of SSC for the mother include easier breastfeeding, increased milk supply, reduced stress and pain, and less post-partum depression [4]. In addition, newborn babies enjoy benefits from SSC, such as thermal regulation, healthy weight gain, better sleep, better brain development, relief from respiratory distress, and increased immunity [5]. Previous studies also reported compelling evidence that early initiation of breastfeeding, which is essential for the development and survival of a newborn, can be predicted by SSC [6–8]. According to a new guideline by the World Health Organization (WHO), "premature babies should be given SSC immediately after birth to improve their survival and health outcomes" [9]. Although SSC was developed as a low-cost alternative for preterm low birth weight infants instead of treating them in an incubator, the health benefits of SSC can be enjoyed equally by full-term average weight infants as well [10].

Despite numerous health benefits, low- and middle-income countries are still struggling to increase the prevalence of SSC. Recent studies demonstrated a reasonably low prevalence of SSC practice in some African and Asian countries [11, 12]. Aboagye et al., who studied the prevalence and predictors of SSC in Papua New Guinea and 17 Sub-Saharan African countries using Demographic and Health Survey (DHS) data, found the prevalence rate to be 45.2% and 45.68%, respectively [12, 13]. Similar work among the Nigerian population by Ekholuenetale et al. found a very low prevalence of approximately 12.0% [14]. Determinants of SSC studied by Bedaso et al. and Ekholuenetale et al. with MICS and hospital data in Gambia and Ethiopia were similar to those found in Papua New Guinea (35.7% and 28.1%, respectively) [1, 15]. There is a lack of national studies conducted in Bangladesh to assess the SSC prevalence and the factors associated with SSC practice. The single study was conducted by Nazia et al. in 10 districts of Bangladesh found an overall SSC prevalence of 28% [11].

The WHO developed a guideline to assist countries in safeguarding their newborns via simple life-saving interventions entitled essential newborn care (ENC) [16]. This includes recommendations from the global health community for providing care to the newborns from birth to the first few days of life [16]. The four components of ENC include thermal care, early and exclusive breastfeeding, appropriate cord care, and early treatment for low birth weight or sick newborns [17]. In ENC, SSC is one of the interventions for thermal care, in which naked newborn babies are placed on the mother's bare chest immediately after delivery for better thermal regulation [5]. However, usual obstetrical practice involves separating newborns from their mother after delivery in order to conduct routine check-ups after birth, and to allow the mother to rest [5, 18]. Separation of mother and baby can be avoided by conducting the check-ups simultaneously with SSC practice or after the immediate, critical SSC period, as recommended by the American Academy of Pediatrics [19]. Educating friends and family, increasing overall awareness, and empowering healthcare providers about the benefits of SSC may prevent unnecessary separation of mother and baby.

The practice of SSC can also help reduce neonatal (the first 28 days of life) and infant (the first year of life) mortality. In South Asia, neonatal and infant deaths account for the majority of under-5 mortality [20]. Bangladesh and the vast majority of low and middle-income nations are currently not meeting the Sustainable Development Goals (SDG) to lower infant mortality [21]. To meet the SDG targets by the year 2030 of reducing neonatal mortality to 12 per 1,000 live births, increasing compliance to the low-to-zero cost effective strategies, such as SSC, may help to reduce the burden of infant mortality. The objective of this research was to explore the status of SSC practice in Bangladesh and to determine the contributing factors that affect SSC practice by using DHS data from Bangladesh.

Methods

Study design and data source

We used the most recent nationally representative 2017–18 BDHS data, which used a cross-sectional study design, for this analysis. This survey was conducted between October 2017 and March 2018 under the authority of the National Institute of Population Science and Training (NIPORT), Medical Education and Family Welfare Division, Ministry of Health and Family Welfare. The 2017–18 BDHS used a two-stage stratified cluster sample of households. Information on ever married women between age 15 and 49 along with their ever born children was collected. The survey method, data collection process, measurement procedures, and questionnaires are available in the final report of the 2017–18 Bangladesh Demographic and Health Survey (BDHS) [22]. All the DHS data are free for public use and can be downloaded from the DHS website (https://dhsprogram.com/data/available-datasets.cfm).

The choice of the data file

The unit of analysis for this study was the children who were born to de facto interviewed mothers three years before the interview date. Hence, the KR recode file of the BDHS data would be the most appropriate data file to use to test the research questions of this study. The BDHS KR recode file contains information on 8759 children who were born five years prior to the interview date. To minimize the recall bias, only children born within the last three years of the interview date were considered and the final analytical unweighted sample consists of 5304 children shown in Fig. 1.

Outcome variable

Mother and newborn SSC during the post-partum stay is the outcome variable in this study. In Bangladesh, in order to assess SSC practice, regardless of facility or non-facility births, trained interviewers asked the mother
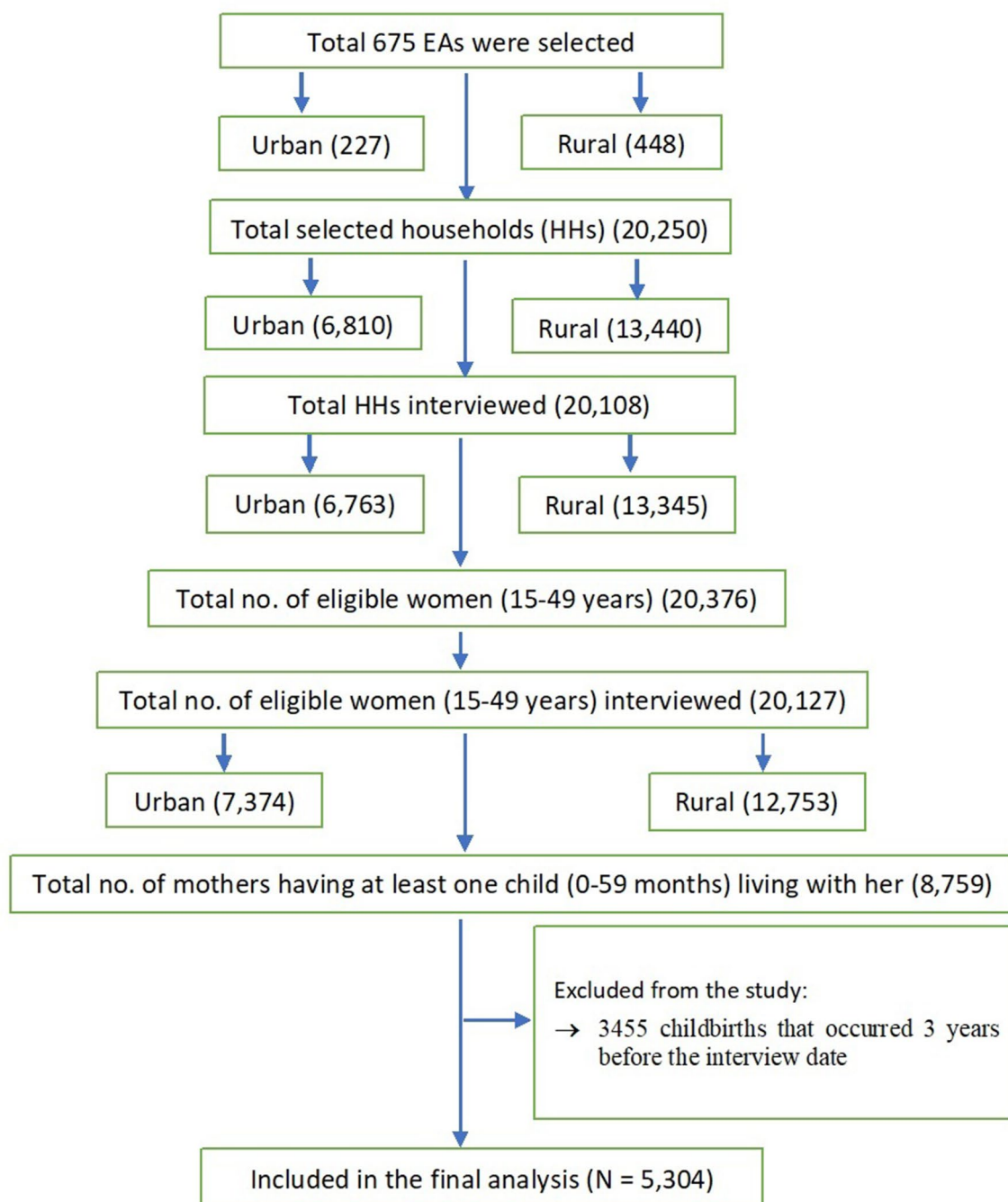
Fig. 1 The participant selection flow chart for this study from the Bangladesh Demographic and Health Survey (BDHS 201 – 18) data

about their most recent birth during the last 3 years. The exact question asked was: "After the birth, was (name) put directly on the bare skin of your chest?" Based on the previous literature [12–14] and the objective of this study, we dichotomized the response variable into "1 = having SSC" for women whose response was "put on chest, touching bare skin," while the remaining response options were categorized as "0 = not having SSC".

Independent variables
The independent variables for SSC practice in Bangladesh were selected from the BDHS data based on previous literature [1, 12–15]. Independent variables include: mother's age at birth (15–19, 20–24, 25–29, ≥30), mother's education (no education, primary, secondary, higher), mother's working status (working, not working), place of residence (rural, urban), region (Barisal, Chittagong, Dhaka, Khulna, Mymensingh, Rajshahi, Rangpur, or Sylhet), media exposure ("yes" if the answer was yes to any of the following: watching television, listening to radio, and reading newspaper or magazine; and "no" if otherwise), wealth index (lowest, second, middle, fourth, and highest), sex of the child (male, female), birth order (1, 2, ≥3), preceding birth interval (None, < 24 months, 24 months−35 months, 36 months−47 months, ≥48 months), planned pregnancy (yes, no), place of delivery (facility, non-facility), mode of delivery (normal, caesarean), and ANC visits (< 4, ≥4).

Data analysis
Weighted frequencies and percentages were calculated to show the background characteristics of the study participants and the prevalence of SSC. Considering the complex BDHS survey data, we used the "svy" command in STATA version 17.0 (StataCorp, College Station, TX, USA) for assigning the sample weight and to adjust for the clustering effect and sample stratification. A chi-square test was used to identify bivariate associations between categorical variables. Multicollinearity between explanatory variables was checked by the variance inflation factor (VIF) and no variable had a score of 5 or higher, which suggests no significant collinearity. The multivariate binary logistic regression model was used to identify the significance and the magnitude of association of the explanatory variables on SSC after controlling for other explanatory variables. The adjusted odds ratios (aOR), along with their respective 95% confidence intervals (CIs), were interpreted, and a p-value < 0.05 was considered as statistical significance.

Results
Background characteristics of study participants
The background characteristics of the study participants are presented in Table 1.

Table 1 Background characteristics of the study participants

Variables	Number	Percent
Sociodemographic characteristics		
Mother's age at birth		
15–19	1,573	29.5
20–24	1,714	32.1
25–29	1,266	23.7
≥30	785	14.7
Mother's education		
No education	351	6.6
Primary	1,471	27.6
Secondary	2,609	48.9
Higher	906	17.0
Mother's working status		
No	3,365	63.0
Yes	1,973	37.0
Place of residence		
Rural	3,911	73.3
Urban	1,427	26.7
Division		
Barisal	303	5.7
Chittagong	1,141	21.4
Dhaka	1,359	25.5
Khulna	481	9.0
Mymensing	451	8.4
Rajshahi	622	11.6
Rangpur	555	10.4
Sylhet	425	8.0
Wealth index		
Lowest	1,108	20.7
Second	1,106	20.7
Middle	1,020	19.1
Fourth	1,071	20.1
Richest	1,034	19.4
Access to media (at least once a week)		
No	2,417	45.3
Yes	2,921	54.7
Child-specific variables		
Child sex		
Female	2,543	47.6
Male	2,795	52.4
Birth order		
1	2,081	39.0
2	1,715	32.1
≥3	1,542	28.9
Preceding birth interval		
No	2,098	39.3
< 24 months	313	5.9
24–35 months	447	8.4
36–47 months	500	9.4
≥48 months	1,980	37.1
Reproductive profile		
Planned pregnancy		
No	1,094	20.5
Yes	4,244	79.5

Sharif *et al. BMC Pregnancy and Childbirth*   (2025) 25:460

Page 5 of 10

Table 1 (continued)

Variables	Number	Percent
Mode of delivery		
Caesarean	1,747	32.8
Normal	3,584	67.2
Place of delivery		
Facility	2,636	49.4
Others	2,702	50.6
Number of ANC visits		
< 4	2,677	53.0
≥ 4	2,374	47.0
Total	**5,331**	**100.0**

Mothers' and newborn's sociodemographic characteristics

In the 5,331 weighted sample, most women had their child at age 20–24 (32.1%), while the least had their child when they were ≥ 30 years (14.7%). The majority of the mothers had a secondary education (48.9%), with 6.6% having no formal education. About 73% of the participants were rural residents. The regional distribution of the study participants was diverse with 25.5% and 21.4% respectively belonging to the Dhaka and Chittagong divisions, and only 8.0%, 8.4%, and 9.0% from the Sylhet, Mymensingh, and Khulna divisions, respectively. Most mothers were not working (63%) and slightly more than half (55%) had access to at least one of the three media (television, radio, or newspaper/magazines).

Newborn characteristics

The distribution of the child's sex was 52.4% male and 47.6% female. Among the children, 39% were the first birth, 32.1% were second, and the remaining 28.9% had a birth order 3rd or higher. Most of the mothers' previous children were born 4 or more years before the survey (37.1%), while only 5.9% had their previous child born within the last 2 years.

Mothers' reproductive profile

The majority of the pregnancies were reported as planned (79.5%). Place of delivery was split evenly between institutional and non-institutional deliveries. Approximately 33% of deliveries were via cesarean section as compared to 67% for normal deliveries. Approximately 47% of mothers complied with at least 4 ANC visits for their most recent child in the previous 3 years.

Prevalence of the mothers to newborn SSC practice

The results from Fig. 2 revealed that the national prevalence of mothers to newborn SSC in Bangladesh was 15.6% (95% CI [14.3, 17.0]).

Bivariate relationship between SSC practice and explanatory variables

The prevalence of SSC along with its association across the explanatory variables are presented in Table 2. The chi-square test results showed a significant association between SSC and other explanatory variables such as mother's education, geographical region, wealth index, media exposure, place of delivery, and ANC visits. Mothers' education was significantly associated with SSC with the women in the higher education group having the highest prevalence of SSC (19.7%, 95% CI [16.9, 22.8]). Statistically, there was significant regional variation in SSC practice where the highest prevalence of SSC practice was reported in Rangpur, Barisal, and Chittagong divisions (~ 18%) and the lowest prevalence was 9.6% (95% CI [7.0, 13.0]) in the Rajshahi Division. There were also differences in the SSC practice among the mothers of different wealth indexes. Mothers from the highest wealth quintile had higher SSC prevalence (19.8%, 95% CI [16.8, 23.1]) compared to mothers from the lowest (14.6%, 95% CI [12.1, 17.6]). Mothers who had access to media had higher SSC prevalence (17.1%, 95% CI [15.4, 19.0]) than women who did not have media access (13.8%, 95% CI [12.1, 15.7]). The place of delivery was significantly associated with SSC prevalence with institutional deliveries observed at 18.2% (95% CI [16.3, 20.2]) SSC prevalence as opposed to the non-institutional deliveries at 13.1% (95% CI [11.5, 14.8]). The SSC prevalence was also associated with the mother's completion of the number of ANC visits. Mothers who completed at least 4 ANC visits (18.0%, 95% CI [16.3, 20.0]) had a higher SSC practice than mothers who completed less than 4 ANC visits (14.0%, 95% CI [12.4, 15.9]).

Adjusted effect of the factors on the mother to newborn SSC practice

The results from the multivariate logistic regression analysis are shown in Table 3. After adjusting for the covariates, SSC practice was significantly associated with the geographic region, place of delivery, mode of delivery, and ANC visits. Compared to the Dhaka Division, the odds of SSC practice were 50% lower in the Rajshahi Division (aOR = 0.5, 95% CI [0.3, 0.8]). Mothers who had an institutional delivery had 2.0 higher odds (95% CI [1.6, 2.5]) of SSC practice than mother who had a non-institutional delivery. Compared to mothers who delivered by caesarean section, the odds of SSC practice were twice as high (aOR = 2.1, 95% CI [1.6, 2.6]) for mothers who had a normal delivery. Mothers who completed the required number of ANC visits had a 20% higher odds (aOR = 1.2,
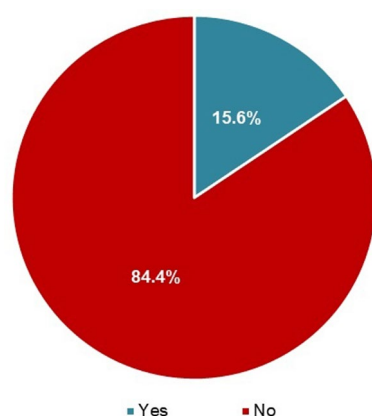
Fig. 2 The prevalence of the mother to newborn skin-to-skin contacts among Bangladeshi women based on 2017-18 BDHS data

95% CI [1.0, 1.4]) of SSC practice than women who had fewer than 4 ANC visits.

Discussion

This research is timely because SSC is a proven strategy for reducing both maternal and neonatal mortality and for achieving the expected SDG targets for maternal and neonatal mortality. We describe the status of the SSC practice in Bangladesh, the factors associated with the prevalence of SSC, and the inequalities in SSC practice based on geographical location. Using the most recent nationally representative 2017–18 BDHS data, we found that region, place of delivery, mode of delivery, and ANC visits were significantly associated with SSC practice.

The results show that the prevalence of SSC in Bangladesh is very low at only 15.6%. This indicates a decrease in SSC practice because SSC practice was estimated between 26% and 30% in the 2014 DHS surveys in Bangladesh, and data (collected from 2001 to 11) from a cluster randomization trial, respectively [17, 23]. In addition, Nazia et al., who analyzed data collected from 10 districts of Bangladesh in 2019, reported that the SSC practice was 28% [11]. When comparing our results with other South Asian countries, India (14.5%) and Nepal (16.5%) reported similar prevalence in SSC practice, although the prevalence was considerably higher in Pakistan (55%) and Sri Lanka (50%) [23–25]. Analyzing the most recent DHS surveys of 17 countries in Sub-Saharan Africa, Abogaye et al. observed the lowest prevalence of SSC practice in Nigeria (11%) and the highest in Benin (75.1%) [12]. In general, low- and middle-income countries lag behind high-income countries with SSC practice uptake [26]. This may be because women in LMIC counties are not be aware of the benefits of SSC, have cultural beliefs or

stigma against SSC, have deliveries that occur without the presence of skilled birth attendants or at home, lack knowledge because of a lack of education or infrequent ANC visits, and other sociodemographic and health facility factors [1, 27–29].

Geographic region was associated with SSC practice in this study. Similar findings were reported in a previous study based on Nigeria and Bangladesh's 2013 and 2014 DHS data, in which SSC practice was considered an explanatory variable [17]. Although there was regional variation in SSC practice, when compared to Dhaka Division, only the Rajshahi Division appears to show significantly lower prevalence in SSC practice. A possible reason could be the cultural differences between these regions. Regional disparity in Rajshahi requires further research to understand the underlying reasons for low SSC practice.

Facility deliveries and normal deliveries were associated with SSC practice in this study. Previous studies based in Bangladesh [11, 17] and in other settings [12–15] also show similar results. A possible explanation for higher SSC prevalence with facility deliveries is the presence of skilled birth attendants who are responsible for ensuring SSC practice after birth. Facility deliveries in the presence of skilled birth attendant are promoted as an essential strategy to improve both maternal and newborn health [30, 31]. Deliveries by cesarean section often occur with complicated pregnancies where there is inevitable separation between mother and newborn. However, a recommendation from the Baby Friendly Initiative states that when the mother is alert, SSC may begin immediately after a cesarean Sect. [32]. In addition, the required maternal and newborn assessments can be collected during SSC practice or delayed until the critical SSC period is over [32].

In this study, mothers who completed the recommended ANC visits (four or more) also had better SSC practice. The ANC visits may facilitate SSC practice uptake by mothers who are not knowledgeable or aware of the benefits of SSC practice. The counseling during routine ANC helps prepare mothers to care for themselves and the newborn, and to initiate early breastfeeding, which is associated with SSC. The literature that assessed SSC practice in Bangladesh [11, 17] or elsewhere confirms our findings.

Policy implications

Although Bangladesh is progressing in meeting the SDGs targets for maternal and neonatal mortality, the use of SSC, which is a low to no cost, effective method of improving maternal and neonatal health outcomes,

Sharif *et al. BMC Pregnancy and Childbirth*   (2025) 25:460

Page 7 of 10

Table 2 Bivariate relationship between the mother and newborn skin-to-skin contacts and different explanatory variables

	Percent	95% CI	*p* value
Mother's age at birth			0.732
15–19	15.3	[13.2, 17.5]	
20–24	16.0	[13.9, 18.2]	
25–29	16.3	[13.7, 19.4]	
≥ 30	14.3	[11.6, 17.5]	
Mother's education			0.008
No education	14.3	[10.4, 19.4]	
Primary	13.7	[11.6, 16.1]	
Secondary	15.4	[13.7, 17.3]	
Higher	19.7	[16.9, 22.8]	
Mother's working status			0.518
No	15.9	[14.3, 17.6]	
Yes	15.1	[13.2, 17.3]	
Place of residence			0.758
Rural	15.5	[13.9, 17.2]	
Urban	15.9	[13.7, 18.5]	
Division			0.022
Barisal	17.5	[14.3, 21.2]	
Chittagong	14.7	[11.8, 18.2]	
Dhaka	17.6	[14.1, 21.8]	
Khulna	16.0	[13.0, 19.6]	
Mymensing	16.0	[13.1, 19.3]	
Rajshahi	9.6	[7.0, 13.0]	
Rangpur	18.3	[15.1, 21.9]	
Sylhet	14.6	[11.4, 18.6]	
Wealth index			0.003
Lowest	14.6	[12.1, 17.6]	
Second	12.1	[9.9, 14.8]	
Middle	15.4	[12.9, 18.3]	
Fourth	16.4	[13.8, 19.4]	
Highest	19.8	[16.8, 23.1]	
Access to media			0.006
No	13.8	[12.1, 15.7]	
Yes	17.1	[15.4, 19.0]	
Child sex			0.818
Female	15.5	[13.7, 17.4]	
Male	15.7	[14.2, 17.4]	
Birth order			0.694
1	16.2	[14.4, 18.1]	
2	15.2	[13.2, 17.3]	
≥ 3	15.3	[13.0, 17.9]	
Preceding birth interval			0.883
No	16.2	[14.4, 18.1]	
< 24 months	16.8	[12.5, 22.2]	
24–35 months	14.8	[10.8, 20.0]	
36–47 months	15.2	[11.8, 19.3]	
≥ 48 months	15.1	[13.2, 17.2]	
Planned/unplanned pregnancy			0.771
No	15.3	[12.6, 18.3]	
Yes	15.7	[14.3, 17.2]	
Mode of delivery			0.523

Table 2 (continued)

	Percent	95% CI	*p* value
Caesarean	15.1	[13.0, 17.3]	
Normal	15.9	[14.3, 17.5]	
Place of delivery			< 0.001
Others	13.1	[11.5, 14.8]	
Facility	18.2	[16.3, 20.2]	
Number of ANC visits			0.001
< 4	14.0	[12.4, 15.9]	
≥ 4	18.0	[16.3, 20.0]	
Total	**15.6**	**[14.6, 17.4]**	

is very low. Identification of the determinants of SSC use and recommendations from this study will help the government and policy makers make informed decisions about strategies that should be designed and implemented to increase the SSC practice in the country. As a possible recommendation, the government could design a mandatory training program for healthcare workers who participate in the deliveries. Readily available training modules on SSC practice, such as the WHO Essential Newborn Training Guide, could be employed [33].

In addition, awareness campaigns focused on the benefits of SSC practice can educate all expectant mothers and their family members to ensure compliance irrespective of the place of residence, region, type of delivery, mode of delivery, socioeconomic status, and sex of the child. Effective use of existing programs, such as the Baby Friendly Hospital Initiative, can improve SSC use. The government must overcome challenges with healthcare facility preparedness for antenatal and neonatal care, adequate supply of essential ingredients for neonatal care, trained and required staff for implementing ENC, regional disparities in facilities and providers, facility deliveries and/or presence of skilled birth attendants, cesarean section deliveries for non-medical reasons, and most importantly, with developing a health insurance system for maternal and neonatal care that minimizes out-of-pocket expenses for obstetrical care.

Strengths and limitations

This study utilized nationally representative survey data with a large sample size to examine a unique aspect of mother and newborn healthcare practice. The study findings are representative and can inform government and policy makers as they use this information to foster the uptake of SSC practice. Although information about the children born to mothers in the previous five years was available, this study included only those children who were born within the previous 3 years to minimize recall bias.

Table 3 Multivariate Logistic regression output to determine the adjusted effect of different explanatory variables on the mother and newborn skin-to-skin contact

Variables	AOR	95% CI
Mother's age at birth		
15–19	1.2	[0.8, 1.8]
20–24	1.2	[0.9, 1.7]
25–29	1.2	[0.9, 1.6]
≥ 30	Ref	
Mother's education		
No education	Ref	
Primary	0.9	[0.6, 1.4]
Secondary	1.0	[0.6, 1.4]
Higher	1.1	[0.7, 1.7]
Mother's working status		
No	Ref	
Yes	1.0	[0.8, 1.2]
Place of residence		
Rural	Ref	
Urban	0.8	[0.6, 1.0]
Division		
Barisal	1.1	[0.7, 1.6]
Chittagong	0.7	[0.5, 1.1]
Dhaka	Ref	
Khulna	0.9	[0.6, 1.3]
Mymensing	1.0	[0.7, 1.4]
Rajshahi	0.5***	[0.3, 0.8]
Rangpur	1.0	[0.7, 1.5]
Sylhet	0.8	[0.5, 1.2]
Wealth index		
Lowest	Ref	
Second	0.8	[0.6, 1.0]
Middle	1.0	[0.7, 1.3]
Fourth	1.0	[0.7, 1.4]
Highest	1.3	[0.9, 1.9]
Access to media		
No	Ref	
Yes	1.2	[1.0, 1.4]
Child sex		
Female	Ref	
Male	1.0	[0.9, 1.2]
Birth order		
1	Ref	
2	0.6	[0.1, 2.9]
≥ 3	0.7	[0.2, 3.3]
Preceding birth interval		
No	Ref	
< 24 months	1.9	[0.4, 9.0]
24–35 months	1.6	[0.3, 7.8]
36–47 months	1.6	[0.3, 7.6]
≥ 47 months	1.6	[0.3, 7.4]
Planned pregnancy		
No	Ref	
Yes	1.0	[0.8, 1.3]
Mode of delivery		

Table 3 (continued)

Variables	AOR	95% CI
Mother's age at birth		
Caesarean	Ref	
Normal	2.1***	[1.6, 2.6]
Place of delivery		
Others	Ref	
Facility	2.0***	[1.6, 2.5]
Number of ANC visits		
< 4	Ref	
≥ 4	1.2*	[1.0, 1.4]

Ref = reference category

*p < .05, **p < .01, ***p < .001

This research is not free from limitations. First, this study is based on a cross-sectional survey and cannot determine any causal relationships. Second, due to the use of previously collected secondary data, this study relied on the available explanatory variables provided by the survey. Thus, some important sociocultural variables may have been missing. Finally, despite considering only the children who were born to the mothers within the last 3 years, there may be some recall bias from the distance of the childbirth from the survey date.

Conclusions

This study reported that the prevalence of mother and newborn SSC is very low in Bangladesh as compared to other low and middle-income countries. There is a variation in SSC practice in terms of the geographic regions (divisions). The place of delivery, mode of delivery, and number of antenatal visits were significantly associated with SSC practice. Appropriate measures need to be taken to ensure that expectant women receive the recommended number of ANC visits, have access to institutional deliveries, and gain confidence in normal deliveries. Furthermore, ENC needs to be ensured by minimizing regional disparities in accessing healthcare services, trained healthcare professionals, equipment and supplies, and out-of-pocket healthcare expenses in order to facilitate better SSC practice.

Author contributions
ABS, MDHH, and MHN accept full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish. ABS takes responsibility for the integrity and accuracy of the data analysis. ABS performed the statistical analysis. ABS, MDHH, and MHN produced the first draft of the manuscript. ABS, MDHH, and MHN

Sharif *et al. BMC Pregnancy and Childbirth*   (2025) 25:460

Page 9 of 10

reviewed and undertook the scientific editing of the manuscript both for statistical correctness and language appropriateness. ABS, MDHH, and MHN reviewed and undertook the scientific editing of the manuscript for language appropriateness. All authors read and approved the final version for publication.

Data availability
The study used data from the 2017–2018 Bangladesh Demographic and Health Survey. The data set is available at: https://dhsprogram.com/data/available-datasets.cfm.

Declarations

Ethical approval
The study used deidentified data from the Demographic Health Survey program, which has already received ethical approval from the participating countries, no further ethical permission was sought to carry out this research. Data was collected from online source (https://dhsprogram.com) with appropriate request. Written informed consent from the respondents enrolled in the survey and other ethical review documents are available at: https://dhsprogram.com/methodology/Protecting-the-Privacy-of-DHS-Survey-Respondents.cfm. The data set is available online publicly for all researchers, hence there is no need to approve.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

References

1. Bedaso A, Kebede E, Adamu T. Assessment of skin-to-skin contact (SSC) during the postpartum stay and its determinant factors among mothers at public health institutions in Ethiopia. BMC Res Notes. 2019;12:1–7. https://doi.org/10.1186/s13104-019-4706-8.
2. Bailey S. Kangaroo mother care. Br J Hosp Med. 2012;73:278–81. https://doi.org/10.12968/hmed.2012.73.5.278.
3. Charpak N, Ruiz JG, Zupan J, Cattaneo A, Figueroa Z, Tessier R, et al. Kangaroo Mother Care: 25 years after. Acta Paediatr. 2005;94:514–22. https://doi.org/10.1111/j.1651-2227.2005.tb01930.x.
4. Almgren M. Benefits of skin-to-skin contact during the neonatal period: governed by epigenetic mechanisms? Genes Dis. 2018;5:24–6. https://doi.org/10.1016/j.gendis.2018.01.004.
5. Moore ER, Bergman N, Anderson GC, Medley N. Early skin-to-skin contact for mothers and their healthy newborn infants. Cochrane Database Syst Rev. 2016. https://doi.org/10.1002/14651858.CD003519.pub4.
6. Gabriel MA, Martín IL, Escobar AL, Villalba EF, Blanco IR, Pol PT. Randomized controlled trial of early skin-to-skin contact: effects on the mother and the newborn. Acta Paediatr. 2010;99:1630–4. https://doi.org/10.1111/j.1651-2227.2009.01597.x.
7. Lau Y, Tha PH, Ho-Lim SST, Wong LY, Lim PI, Citra Nurfarah BZM, et al. An analysis of the effects of intrapartum factors, neonatal characteristics and skin-to-skin contact on early breastfeeding initiation. Matern Child Nutr. 2018;14. https://doi.org/10.1111/mcn.12492.
8. Safari K, Saeed AA, Hasan SS, Moghaddam-Banaem L. The effect of mother and newborn early skin-to-skin contact on initiation of breastfeeding, newborn temperature, and duration of third stage of labor. Int Breastfeed J. 2018;13:25. https://doi.org/10.1186/s13006-018-0174-9.
9. WHO advises immediate skin to skin care for survival of small and preterm babies. World Health Organization. 2022. Available from: https://www.who.int/news/item/15-11-2022-who-advises-immediate-skin-to-skin-care-for-survival-of-small-and-preterm-babies
10. Cutland CL, Lackritz EM, Mallett-Moore T, Bardají A, Chandrasekaran R, Lahariya C, et al. Low birth weight: case definition & guidelines for data collection, analysis, and presentation of maternal immunization safety data. Vaccine. 2017;35:6492–500. https://doi.org/10.1016/j.vaccine.2017.01.049.
11. Ali NB, Priyanka SS, Bhui BR, Herrera S, Azad MR, Karim A, et al. Prevalence and factors associated with skin-to-skin contact (SSC) practice: findings from a population-based cross-sectional survey in 10 selected districts of Bangladesh. BMC Pregnancy Childbirth. 2021;21:676. https://doi.org/10.1186/s12884-021-04189-3.
12. Aboagye RG, Boah M, Okyere J, Ahinkorah BO, Seidu A-A, Ameyaw EK, et al. Mother and newborn skin-to-skin contact in sub-saharan Africa: prevalence and predictors. BMJ Glob Health. 2022;7. https://doi.org/10.1136/bmjgh-2021-007731.
13. Aboagye RG, Okyere J, Dowou RK, Adzigbli LA, Tackie V, Ahinkorah BO, et al. Prevalence and predictors of mother and newborn skin-to-skin contact at birth in Papua New Guinea. BMJ Open. 2022;12. https://doi.org/10.1136/bmjopen-2022-062422.
14. Ekholuenetale M, Barrow A, Benebo FO, Idebolo AF. Coverage and factors associated with mother and newborn skin-to-skin contact in Nigeria: a multilevel analysis. BMC Pregnancy Childbirth. 2021;21:221. https://doi.org/10.1186/s12884-021-04079-8.
15. Ekholuenetale M, Onikan A, Ekholuenetale CE. Prevalence and determinants of mother and newborn skin-to-skin contact in the Gambia: a secondary data analysis. J Egypt Public Health Assoc. 2020;95:17. https://doi.org/10.1186/s42506-020-00050-1.
16. World Health Organization. Every newborn: an action plan to end preventable deaths: executive summary. Geneva: World Health Organization; 2014.
17. Singh K, Khan SM, Carvajal-Aguirre L, Brodish P, Amouzou A, Moran A. The importance of skin-to-skin contact for early initiation of breastfeeding in Nigeria and Bangladesh. J Glob Health. 2017;7:020505. https://doi.org/10.7189/jogh.07.020505.
18. Amaan A. Ensuring zero separation for a better newborn outcome. Int Breastfeed J. 2021;16:62. https://doi.org/10.1186/s13006-021-00411-2.
19. Eidelman AI, Schanler RJ. Breastfeeding and the use of human milk. Pediatrics. 2012;129–e841. https://doi.org/10.1542/peds.2011-3552
20. Carvajal-Vélez L, Amouzou A, Perin J, Maïga A, Tarekegn H, Akinyemi A, et al. Diarrhea management in children under five in sub-saharan Africa: does the source of care matter? A countdown analysis. BMC Public Health. 2016;16:830. https://doi.org/10.1186/s12889-016-3485-9.
21. Ali NB, Dibley MJ, Islam S, Rahman MM, Raihana S, Bhuiyan SET, et al. Overweight and obesity among urban women with iron deficiency anaemia in Bangladesh. Matern Child Nutr. 2021;17. https://doi.org/10.1111/mcn.13102.
22. National Institute of Population Research and Training (NIPORT). ICF International. Bangladesh Demographic and Health Survey 2017-18. Dhaka, Bangladesh, and Rockville. Maryland, USA: NIPORT and ICF; 2020.
23. Crowe S, Prost A, Hossen M, Azad K, Kuddus A, Roy S, et al. Generating insights from trends in newborn care practices from prospective population-based studies: examples from India, Bangladesh, and Nepal. PLoS ONE. 2015;10. https://doi.org/10.1371/journal.pone.0127893.
24. Senarath U, Fernando DN, Rodrigo I. Effect of training for care providers on practice of essential newborn care in hospitals in Sri Lanka. JOGNN. 2007;36:531–41. https://doi.org/10.1111/j.1552-6909.2007.00183.x.
25. Kumar R, Amir-Ud-Din R, Ahmed J, Asim M, Rashid F, Khan SA, et al. Correlates of early initiation of breast feeding and prelacteal feeding: a cross-sectional study in Sindh province of Pakistan. BMJ Open. 2023;13. https://doi.org/10.1136/bmjopen-2022-069902.
26. Abdulghani N, Edvardsson K, Amir LH. Worldwide prevalence of mother-infant skin-to-skin contact after vaginal birth: a systematic review. PLoS ONE. 2018;13. https://doi.org/10.1371/journal.pone.0205696.
27. Shamba D, Schellenberg J, Hildon ZJL, Mashasi I, Penfold S, Tanner M, et al. Thermal care for newborn babies in rural southern Tanzania: a mixed-method study of barriers, facilitators and potential for behaviour change. BMC Pregnancy Childbirth. 2014;14:267. https://doi.org/10.1186/1471-2393-14-267.
28. Adejuyigbe EA, Bee MH, Amare Y, Omotara BA, Iganus RB, Manzi F, et al. Why not bathe the baby today? A qualitative study of thermal care beliefs and practices in four African sites. BMC Pediatr. 2015;15:156. https://doi.org/10.1186/s12887-015-0470-0.
29. Hill Z, Tawiah-Agyemang C, Manu A, Okyere E, Kirkwood BR. Keeping newborns warm: beliefs, practices and potential for behaviour change in rural

Ghana. Trop Med Int Health. 2010;15(10):1118–24. https://doi.org/10.1111/j.1365-3156.2010.02593.x.

30. Kerber KJ, de Graft-Johnson JE, Bhutta ZA, Okong P, Starrs A, Lawn JE. Continuum of care for maternal, newborn, and child health: from slogan to service delivery. Lancet. 2007;370(9595):1358–69.

31. Campbell OM, Calvert C, Testa A, Strehlow M, Benova L, Keyes E, Donnay F, Macleod D, Gabrysch S, Rong L, Ronsmans C. The scale, scope, coverage, and capability of childbirth care. Lancet. 2016;388(10056):2193–208.

32. World Health Organization & United Nations Children's Fund (UNICEF). Baby-friendly hospital initiative: revised, updated and expanded for integrated care. Geneva: World Health Organization. 2009. Available from: https://iris.who.int/handle/10665/43593

33. World Health Organization. Essential Newborn Care Course Second Edition 2022 (interim edition) [Internet]. Geneva: World Health Organization. 2022 [cited 2024 Jul 6]. Available from: https://www.who.int/tools/essential-newborn-care-course

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.