

Noninstitutional Births and Newborn Care Practices Among Adolescent Mothers in Bangladesh

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ABSTRACT

Objective: To describe home-based newborn care practices among adolescent mothers in Bangladesh and to identify sociodemographic, antenatal care (ANC), and delivery care factors associated with these practices.

Design: The 2007 Bangladesh Demographic Health Survey, conducted from March 24 to August 11, 2007.

Setting: Selected urban and rural areas of Bangladesh.

Participants: A total of 580 adolescent women (aged 15–19 years) who had ever been married with noninstitutional births and having at least one child younger than 3 years of age.

Methods: Outcomes included complete cord care, complete thermal protection, initiation of early breastfeeding, and postnatal care within 24 hours of birth. Descriptive statistics and multivariate logistic regression methods were employed in analyzing the data.

Results: Only 42.8% and 5.1% newborns received complete cord care and complete thermal protection. Only 44.6% of newborns were breastfed within 1 hour of birth. The proportion of the newborns that received postnatal care within 24 hours of birth was 9%, and of them 11% received care from medically trained providers (MTP). Higher level of maternal education and richest bands of wealth were associated with complete thermal care and postnatal care within 24 hours of birth but not with complete cord care and early breastfeeding. Use of sufficient ANC and assisted births by MTP were significantly associated with several of the newborn care practices.

Conclusions: The association between newborn care practices of the adolescent mothers and sufficient ANC and skilled birth attendance suggest that expanding skilled birth attendance and providing ANC may be an effective strategy to promote essential and preventive newborn care.

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The United Nations International Children's Emergency Fund (UNICEF) reported that in 2009 the number of neonatal deaths globally constituted 37% all child deaths, resulting in about 3.7 million neonatal deaths per year (2009). A majority (98%) of these neonatal deaths occur in developing countries where most newborns die at home under the care of mothers, relatives, and traditional birth attendants (Chandrashekar et al., 2006; Saha & Kabir, 2009). Although Bangladesh is on track to achieve Millennium Development Goal 4 (MDG4), to reduce child mortality to approximately less than 50 per 1,000 live births by 2015 (Bangladesh Progress Report, 2007), childhood mortality rates still remain very high. According to the National Institute for Population and Research and Training (NIPORT) in 2007 the mortality rate for

those younger than 5 years of age was 65 per 1,000 live births, and neonatal deaths accounted for almost one half of all under-five mortality. The high number of newborn deaths is a major concern, for the reduction of under-five mortality and to achieve MDG 4.

According to the most recent statistics released by the Bangladesh Bureau of Statistics (BBS) in 2003, adolescent men and women (aged 15–19 years) constitute one third of the total population of Bangladesh. This period is characterized by high risk for early and unwanted sexual activity, forced marriage, and pregnancy-related events (Rahman, 2009). Infants born to adolescent women face a significantly higher risk of death compared to infants born to older women (Atuyambe et al., 2008). The

United Nations Population Fund (UNFPA) reported that in 1999, the neonatal, infant, and under-five mortality rates among live births of adolescent girls were at least 38%, 34%, and 24% higher than the rates for women aged 20 to 29. In 2001, the World Health Organization (WHO) reported that rates of newborn death averaged about 50% higher for adolescent mothers versus mothers in their 20s. A large U.S. study found a 55% higher risk of neonatal death for infants of mothers aged 10 to 15 years, a 19% higher risk of neonatal death for infants of mothers aged 16 to 17 years, and a 6% higher risk of neonatal death for infants of mothers aged 18 to 19 years compared to babies of mothers aged 20 years or more. Previous research has also shown an independent adverse effect of early pregnancy on newborn health, even after controlling for a range of confounding factors such as parity, education, previous birth interval, maternal cigarette smoking, antenatal visits, etc. (Conde-Agudelo, Jose, & Lammers, 2005).

Bangladesh is a developing country, and maternity hospitals are inadequate. Most pregnant mothers, especially adolescent mothers, are accustomed to getting help from qualified or unqualified traditional birth attendants (TBAs) during delivery or from their relatives or neighbors' (Rahman, 2009). Because *dais* (trained or untrained birth attendants) are called only at the onset of labor, it is not customary for them to perform antenatal check-ups or to examine the position of the fetus in the weeks preceding the birth. If no complications are present, TBAs do not refer the mother for antenatal care, as they feel it is not needed or mandatory (Blanchet, 1991). In addition, in Bangladesh a woman's movement during pregnancy is considered shameful, young women lack a voice within the family, and pregnancy-related knowledge and decision-making authority are commonly vested in older women. In Bangladesh, older women, especially mothers-in-law, did not consider antenatal care (ANC) essential during pregnancy and often discouraged their young daughters-in-law from attending (Chowdhury, Mahbub, & Chowdhury, 2003).

Care practices immediately following delivery contribute to a newborn's risk of morbidity and mortality (Saving Newborn Lives [SNL], 2001; Tinker, Hoope, Azfar, Bustreo, & Bell, 2005). A set of practices that reduce neonatal morbidity and mortality have been outlined as essential and preventive newborn care practices (Marsh et al., 2002; SNL; WHO, 1998). These practices include complete cord care (cutting the umbilical cord with a sterilized instrument and tying it with a sterilized

Infants born to adolescent women face a significantly higher risk of death compared to infants born to older women.

thread), complete thermal care (drying and wrapping the newborn immediately after delivery and delaying the newborn's first bath to reduce hypothermia risk), initiation of breastfeeding within the first hour after birth, and postnatal care within 24 hours of delivery. These interventions save newborn lives (Bhutta, Darmstadt, Hasan, & Haws, 2005; Darmstadt et al., 2005; Marsh et al.; SNL).

Extensive research has documented high rates of home deliveries unattended by skilled health professionals (84%-90%) (Chandrashekhara et al., 2006; Osrin et al., 2002; Rahman, 2009) and the relationship with home deliveries of unhygienic and high-risk newborn care practices among South Asian women of childbearing age (Allisyn et al., 2009; Chandrashekhara et al.; Dutta, 2009; Gurung, 2008; Osrin et al.). However, routine newborn care practices among adolescent mothers in the home have not been investigated. Adolescent mothers often lack knowledge, education, experience, income, and power relative to older mothers, and routine newborn care practices among adolescent mothers may be substantially different than older mothers. In this article we describe selected newborn care practices related to cord care, thermal care, breastfeeding, and immediate postnatal care among adolescent mothers with homebirths and examine the association of selected sociodemographic, antenatal, and delivery care factors with these practices.

Methods

Data Sources

We used data from the 2007 Bangladesh Demographic Health Survey (BDHS), conducted by the NIPORT of the Ministry of Health and Family Welfare of Bangladesh from March 24 to August 11, 2007. Data collection procedures for the BDHS were approved by the ORC Macro Institutional Review Board. The BDHS sample was drawn from all Bangladeshi adults who reside in private dwellings. A stratified, multistage cluster sample of 361 Primary Sampling Units (PSUs), 134 in urban areas and 227 in rural areas, was constructed. The PSUs were borrowed from a sampling frame created for the 2001 census of Bangladesh and which was termed Enumeration Areas (EAs). The 2007 BDHS used five questionnaires. Of the 11,178 ever-married women

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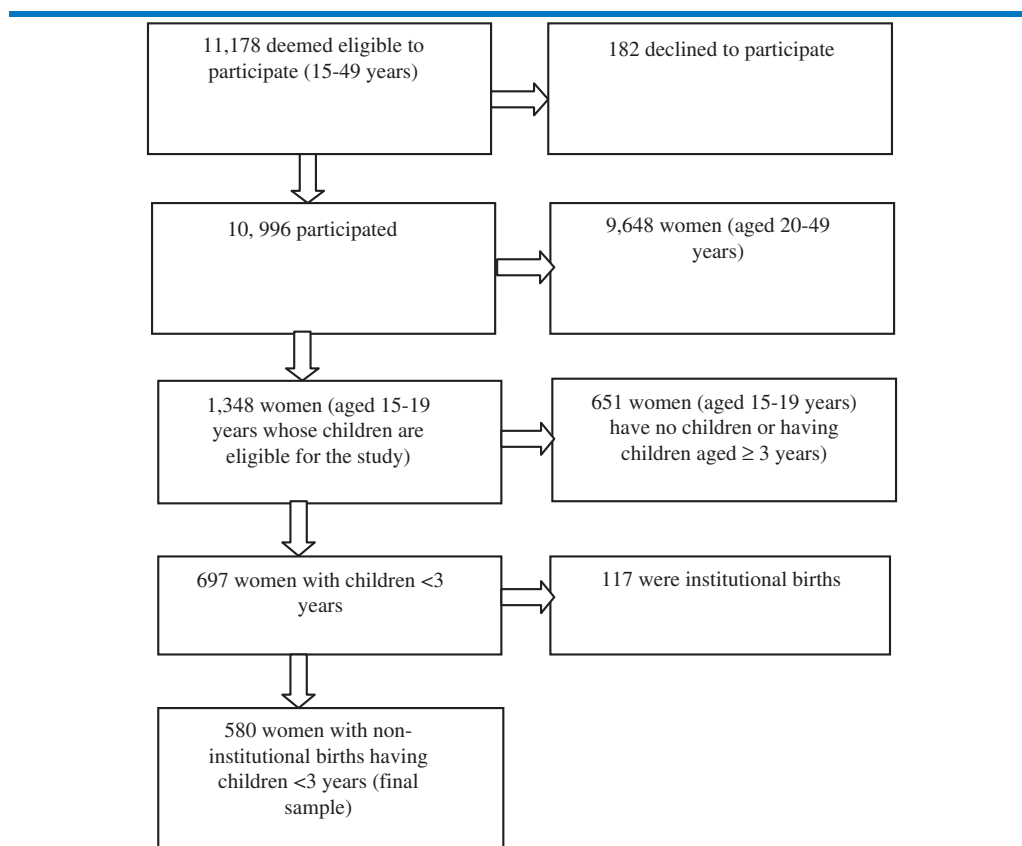


Figure 1. Selection of sample.

aged 15 to 49 years deemed eligible to participate in the women's questionnaire of maternal and child health behaviors and outcomes, 10,996 participated (98.4% response rate). For purposes of the present analyses, only those ever-married adolescent women (aged 15–19 years) with noninstitutional births (deliveries at respondents and others homes) and having at least one child younger than 3 years of age were included ($N = 580$; Figure 1).

Measures

We analyzed four newborn care practices under two subheadings: essential newborn care practices and preventive check-up. The category of essential newborn care practices includes complete cord care, complete thermal protection, and early breastfeeding. Preventive check-up consists of postnatal care within 24 hours of delivery. Complete cord care among the newborns of adolescent mothers was constructed from the following combined responses: whether the respondent used any modern instrument (blade or scissors) to cut the cord, whether the instrument was boiled before use, and whether nothing was applied to the cord (WHO, 1998). Complete thermal protection was mea-

sured from the following combined responses: whether the respondent wiped and wrapped the newborn within <10 minutes after birth and, whether the newborn were first bathed 72 or more hours following birth, which is the recommended practice in Bangladesh (NIPO, 2007). *Early breastfeeding* was defined as the mother initiating breastfeeding within 1 hour of birth. *Immediate postnatal care* was defined as the newborn receiving a postnatal checkup within 24 hours of birth.

Covariates

Explanatory variables were age of mother at child-birth (<15 or ≥ 15 years), residence (rural or urban), level of maternal education (no education, primary or secondary), frequency of mass media exposure (watching television regularly, irregularly, or not at all), sex of the child (male or female), birth interval (<24 or ≥ 24 months), wealth index, ante-natal care (sufficient, insufficient, or not at all), permission to go to health center alone (restricted or unrestricted), and delivery assistance (medically trained or nonmedically trained personnel). The BDHS wealth index originally was constructed using the entire sample from the Demographic and

Health Survey based on interviewer-observed assets, including ownership of consumer items and the characteristics of the dwelling place in 2007. Individual household wealth scores were grouped by quintile, with 1 indicating the poorest and 5 indicating the wealthiest 20% of households (Rutstein & Johnson, 2004).

Data Analysis

Descriptive statistics (percentages) were used to describe the data. Two-way tables assessed the relationship between dependent and independent variables and the chi-squared test was used to observe differences. Bivariate analyses described the association between independent and dependent variables and a multivariate analysis was used to show the factors affecting outcome variables. To determine which factors were most strongly associated with the newborn care practices among the adolescent mothers, four adjusted binary logistic regressions were employed. For the logistic regression analysis, all variables were entered in one step (fitting the model using the "enter" criteria in SPSS for Windows 16.0). Adjusted odds ratios (Ors) with their 95% confidence intervals (CI) were then calculated. Multicollinearity in the logistic regression analyses was checked by examining the standard errors for the regression coefficients. In our study all of the independent variables in all five fitted models for each health services utilization outcome had a standard error < 0.90 indicating an absence of multicollinearity. Missing values are omitted from the analysis.

Results

The background characteristics of the participants are presented in Table 1. More than two fifths of the adolescent mothers had their last birth before age 15 and 16.2% were uneducated. More than one third of the adolescent mothers had no ANC, while only 12% of mothers had unrestricted permission to go to the hospital alone. Nonmedically trained

Table 1: Characteristics of the Study Population (N = 580), Bangladesh Demographic Health Survey 2007

Characteristics	Frequency (n)	Percentage (%)
Mother's age at birth (years)		
< 15	246	42.4
≥ 15	334	57.6
Residence		
Urban	138	23.8

Table 1. Continued

Characteristics	Frequency (n)	Percentage (%)
Rural	442	76.2
Education		
Secondary	13	2.2
Primary	473	81.6
No education	94	16.2
Sex of the child		
Male	279	48.1
Female	301	51.9
Birth interval		
≥ 24 months	63	52.1
< 24 months	58	47.9
Permission to go to hospital alone		
Unrestricted	69	12.0
Restricted	511	88.0
Antenatal care		
No care	230	39.7
Insufficient	259	44.7
Sufficient ^a	91	15.7
Frequency of mass media exposure		
Regularly	46	7.9
Irregularly	245	42.2
Not at all	289	49.8
Wealth index		
Poorest	102	17.6
Poorer	163	28.1
Middle	137	23.6
Richer	110	29.0
Richest	68	11.7
Delivery assistance		
Medically trained provider ^b	29	5.0
Nonmedically trained provider ^c	551	95.0

Note.

^aSufficient: Received at least four or more antenatal care visits.

^bMedically trained provider = qualified doctor, nurse/midwife, paramedic, family welfare visitors, community-skilled birth attendant, medical assistant, sub assistant community medical officer.

^cNonmedically trained provider = health assistant, family welfare assistant, trained and untrained traditional birth attendants, unqualified doctor, and other.

providers (NMTP) attended 95% of the births, whereas doctors with a medical degree, nurses, or community skilled birth attendants assisted in 5% of cases (Table 1).

The levels of selected newborn care practices (essential and preventive) are presented in Table 2. Blade was the most common modern instrument used to cut the umbilical cord. Relatively few of these blades came from a delivery bag (7.6%). In 43.8% of cases something was applied on the cord. Of these, 29% were potentially harmful substances (e.g., mustard oil with garlic, boric powder, shidur, talcum powder, blue ink, turmeric juice). Only 42.8% of newborns received complete cord care (use of a modern cutting instrument, instruments boiled before the cord was cut, and nothing applied to the cord). The proportion of newborns that received complete thermal protection was 5.1% (i.e., dried and wrapped within 10 minutes after birth and first bathed 72 or more hours following birth). Only 44.6% of newborns were breastfed within 24 hours of birth. Postnatal care was received by only 9% of newborns; only 11% of these were seen by received care from medically trained providers (MTP) (Table 2).

Table 2: Selected Newborn Care Practices (N= 580), Bangladesh Demographic Health Survey 2007

	No. of Cases (n)	Percent-age (%)
Essential newborn care		
Cord care		
Type of instrument used to cut the umbilical cord		
Modern instrument	536	97.1
Traditional instrument	11	2.0
Cord was not cut	5	0.9
Instruments boiled before the cord was cut	444	81.2
Material applied to the cord		
Not necessarily harmful	86	14.8
Potentially harmful	168	29.0
Nothing applied to the cord	326	56.2
Complete cord care	234	42.8
Wiping, wrapping, and bathing the newborn		
Wiping		
Wiped immediately (< 10 min)	144	26.1

Table 2. Continued

	No. of Cases (n)	Percent-age (%)
Wiped not immediately (10+ min)	172	31.2
Newborn not wiped before washing	236	42.8
Wrapping		
Wrapped immediately (< 10 min)	107	19.4
Wrapped not immediately (10+ min)	228	41.4
Newborn not wrapped before washing	216	39.2
Bathing		
< 24 hr	341	61.8
24-71 hr	96	17.4
≥ 72 hr	111	20.1
Baby not bathed	4	0.7
Complete thermal protection	28	5.1
Breastfeeding		
Timing of breastfeeding initiation		
Within 1 hr of birth ("Early breastfeeding")	258	44.6
Within 1 day of birth	530	91.4
Received prelacteal feed	427	61.4
Given colostrum immediately after birth	515	88.8
Preventive checkup		
Postnatal checkup		
Timing of newborn first postnatal checkup from any type of provider		
Within 24 hr of delivery	52	9.0
> 24 hr of delivery	84	14.6
No postnatal check up	444	76.4
Type of providers		
Medically trained providers	64	11.0
Non-medically trained providers	73	12.6

Note. Modern instrument: blade or scissors from delivery bag or from other sources; Traditional instrument: bamboo strips and others.

Not harmful substances: antibiotics or antiseptics.

Harmful substances: mustard oil with garlic, boric powder, shidur, talcum powder, blue ink, turmeric juice.

Bivariate comparison of complete cord and thermal care, early breastfeeding practices, and postnatal care within 24 hours of birth by the selected sociodemographic and ANC and delivery care factors are presented in Table 3. Significant differences in levels of all four care practices were observed by mother's education level, ANC, and birth assistance ($p < .05$). Wealth index was associated with significant differences in complete thermal protection, early breast-

feeding practices, and postnatal care ($p < .05$), whereas frequency of mass media exposure was associated with significant differences in complete cord care and postnatal care ($p < .05$; Table 3).

Multivariate Analysis

Complete Cord Care

In the adjusted model, frequency of mass media exposure of watching television regularly (OR = 1.5,

Table 3: Levels of Selected Newborn Care Practices by Socio-Demographic and Antenatal and Delivery Care Factors (N = 580), Bangladesh Demographic Health Survey 2007

Characteristics	Complete Cord Care		Complete Thermal Protection		Early Breastfeeding		Postnatal Checkup Within < 24 hr of Birth	
	%	p value	%	p value	%	p value	%	p value
Mother's age at birth (years)								
< 15	40.9	.46	4.1	.37	43.3	.65	7.3	.23
≥ 15	44.0		5.8		44.5		10.2	
Residence								
Rural	42.5	.82	4.8	.57	42.7	.05	10.1	.57
Urban	43.5		6.0		46.3		8.5	
Education								
No education	36.7	.43	4.5	.04	39.2	.04	3.2	< .001
Primary	41.7		6.7		44.0		9.5	
Secondary	47.1		15.4		61.1		30.8	
Sex of the child								
Male	43.1	.87	6.0	.32	46.3	.26	9.3	.77
Female	42.4		4.2		41.2		8.6	
Birth interval								
< 24 months	40.0	.13	1.6	.48	46.2	.95	3.2	.06
≥ 24 months	54.0		3.6		49.3		12.1	
Permission to go to hospital alone								
Unrestricted	57.5	.79	6.2	.82	44.5	.36	14.5	.012
Restricted	55.4		4.9		43.1		8.2	
Antenatal care								
No care	40.7	.008	2.8	.04	40.7	.03	3.9	< .001
Insufficient	41.9		5.6		44.2		11.6	
Sufficient	50.6		9.5		47.9		14.3	
Frequency of mass media exposure								
Regularly	47.2	.045	5.2	.97	47.3	.11	12.2	.006
Irregularly	42.2		5.1		45.3		6.9	

Table 3. Continued

Characteristics	Complete Cord Care		Complete Thermal Protection		Early Breastfeeding		Postnatal Checkup Within < 24 hr of Birth	
	%	p value	%	p value	%	p value	%	p value
Not at all	39.2		4.4		39.8		4.3	
Wealth index								
Poorest	40.0	.97	0.6	.008	42.7	.04	7.3	<.001
Poorer	42.6		4.9		42.8		9.8	
Middle	43.1		6.6		43.1		11.5	
Richer	44.6		7.5		43.3		28.3	
Richest	44.8		9.0		47.7		32.1	
Delivery assistance								
Medically trained provider	48.8	.03	7.9	.006	44.6	.007	34.5	<.001
Nonmedically trained provider	36.7		3.0		40.6		7.6	

95% CI [1.22, 2.93]) was the only sociodemographic factor found to be associated with complete cord care. Complete cord care was associated with receiving sufficient ANC (OR = 1.7, 95% CI [1.23, 2.76]) and birth assisted by MTP (OR = 1.7, 95% CI [1.11, 2.26]; Table 4).

Complete Thermal Protection

Mothers with secondary educational level (OR = 2.5, 95% CI [1.58, 2.68]) and those belonging to the richest quintile index (OR = 1.7, 95% CI [1.26, 2.88]) were more likely to report complete thermal care. Sufficient ANC (OR = 3.7, 95% CI [1.34, 11.2]) and births assisted by MTP (OR = 1.6, 95% CI [1.23, 2.76]) were associated with complete thermal protection (Table 4).

Early Breastfeeding

Sociodemographic predictors were not significantly associated with early breastfeeding. But sufficient ANC checkup (OR = 1.6, 95% CI [1.13, 2.78]) and birth assisted by MTP (OR = 2.2, 95% CI [1.52, 8.62]) were significantly associated with initiation of early breastfeeding (Table 4).

Postnatal Care

Significant sociodemographic predictors of postnatal care within 24 hours of birth were maternal age at birth ≥ 15 years, urban residence, primary or secondary education, autonomy to go to the hospital alone, and higher wealth indices. Sufficient ANC (OR = 4.8, 95% CI [3.01, 5.46]) and births assisted by MTP (OR = 6.3, 95% CI [2.87, 14.6]) were significantly associated with postnatal checkup within 24 hours of birth (Table 4).

Discussion

Findings indicated that only 42.8% of adolescent mothers reported complete cord care practices of their newborn. Sufficient ANC and births assisted by MTP improved complete cord care practices among these adolescent mothers. A study in rural India also reported that ANC and skilled attendances at birth were significantly associated with clean cord care (Baqui et al., 2007). It was expected that ANC visits would have a positive effect on newborn care practices. With adequate counseling during ANC, mothers may become more aware of the risks of use of traditional instrument for cutting the umbilical cord and other harmful practices caring for the umbilical cord stump (Baqui et al., 2007; McDonagh, 1996; SNL, 2001). One of the most positive aspects of ANC is that it may influence women to select a trained attendant at during and after birth (Atuyambe et al., 2008). Trained personnel help to convey the right message to mothers about complete cord care practices (Neifert, 1999). Mass media exposure also had a positive effect on complete cord care practices. In recent years, a number of governmental and non-governmental organizations have enriched their maternal and child health related programs on television, radio, and newspapers that may have increased mother's knowledge about newborn care practices.

Hypothermia can easily occur if a newborn is left wet and unprotected from cold while waiting for the placenta to be delivered (WHO, 1998). The delay in drying and wrapping the newborn found in this study (only 26.1% and 19.4% newborn were wiped

Table 4: Adjusted Odds Ratio and 95% Confidence Interval for Selected Newborn Care Practices by Socio-Demographic and Antenatal and Delivery Care Factors (N = 580), Bangladesh Demographic Health Survey 2007

Characteristics	Complete Cord Care		Complete Thermal Protection		Early Breastfeeding		Postnatal Checkup Within < 24 hr of Birth	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Mother's age at birth (years)								
< 15	1.0	—	1.0	—	1.0	0.77, 2.59	1.0	1.33, 3.22
≥ 15	1.1	0.80, 1.61	1.43	0.64, 3.24	1.1		2.5	
Residence								
Rural	1.0	—	1.0	—	1.0	—	1.0	—
Urban	1.1	0.70, 1.56	1.3	0.55, 2.96	1.2	0.83, 1.61	2.3	1.55, 3.49
Education								
No education	1.0	—	1.0	—	1.0	—	1.0	—
Primary	1.4	0.85, 2.17	1.6	0.46, 2.19	1.4	0.28, 1.86	3.5	1.49, 8.19
Secondary	1.2	0.36, 4.20	2.5	1.58, 2.68	1.8	0.94, 2.98	5.8	1.55, 21.7
Sex of the child								
Female	1.0	—	1.0	—	1.0	—	1.0	—
Male	1.1	0.73, 1.44	1.4	0.68, 3.12	1.2	0.91, 1.66	1.3	0.89, 1.97
Birth interval								
< 24 months	1.0	—	1.0	—	1.0	—	1.0	—
≥ 24 months	1.5	0.84, 3.65	2.3	0.21, 7.87	1.1	0.57, 2.2	2.5	0.82, 7.72
Antenatal care								
No care	1.0	—	1.0	—	1.0	—	1.0	—
Insufficient	1.1	0.85, 1.56	2.1	1.21, 3.52	1.2	0.88, 2.02	1.9	0.89, 2.06
Sufficient	1.7	1.23, 2.76	3.7	1.34, 11.2	1.6	1.13, 2.78	4.8	3.01, 5.46
Frequency of mass media exposure								
Not at all	1.0	—	1.0	—	1.0	—	1.0	—
Regularly	1.5	0.89, 2.93	1.1	0.19, 3.95	1.1	0.61, 1.94	1.5	0.64, 3.36
Irregularly	1.1	0.53, 1.56	0.05	0.46, 2.25	1.4	0.99, 1.85	2.5	0.84, 3.94
Women's autonomy								
Restricted	1.0	—	1.0	—	1.0	—	1.0	—
Unrestricted	1.2	0.65, 1.88	1.2	0.42, 3.76	1.3	0.64, 1.61	1.6	1.21, 2.77
Wealth index								
Poorest	1.0	—	1.0	—	1.0	—	1.0	—
Poorer	0.96	0.57, 1.59	0.89	0.43, 0.97	1.1	0.73, 1.94	1.4	0.58, 3.33
Middle	1.1	0.61, 1.78	1.2	0.53, 1.34	1.2	0.75, 1.97	1.6	0.69, 3.95
Richer	1.2	0.64, 1.94	1.3	0.89, 2.16	1.2	0.77, 2.08	5.1	2.24, 11.2
Richest	1.2	0.65, 2.07	1.7	1.26, 2.88	1.6	1.32, 1.96	6.1	2.65, 13.7
Delivery assistance								
Nonmedically trained provider	1.0	—	1.0	—	1.0	—	1.0	—
Medically trained provider	1.7	1.11, 2.26	1.6	1.23, 2.76	2.2	1.52, 8.62	6.3	9.12, 22.6

Only 42.8% of adolescent mothers reported complete cord care practices for their newborns.

and wrapped within <10 minutes after birth) is consistent with previous other South Asian studies (Chandrashekar et al., 2006; Iyengar, 1990; Osrin et al., 2002). In South Asia, it is believed that mother and her baby are polluted or dirty (*napak*) after birth (Jeffery & Jeffery, 1995; Winch et al., 2005), and that the baby's risk of pollution can be removed by bathing (Winch et al.). This notion promotes immediate bathing of the baby and removal of the protective vernix. These behaviors make the newborn more vulnerable to hypothermia and infections increasing the risk of neonatal mortality. Our results support these previous findings, indicating that only 20.1% newborn were first bathed 72 or more hours following birth. The proportion of newborns that received complete thermal protection was only 5.1% (i.e., dried and wrapped within 10 minutes after birth plus first bathed 72 or more hours following birth), thus showing high vulnerability to hypothermia of newborns of the adolescent mothers.

Among the sociodemographic factors in the multivariate model, secondary level of education and having the highest wealth were significantly associated with complete thermal care. The relationship between improved maternal education and under-five survival has been well documented, and thus more educated mothers would be expected to report complete thermal protection, as would mothers with a higher standard of living (Baqui et al., 2007). It has been shown that mothers from wealthy families are expected to seek modern/medical health services for the health of newborns. Although mothers who received ANC and were attended by MTP were more likely to report complete thermal care, two studies suggest that Indian health care providers may not recognize the need to prevent neonatal hypothermia (Dragovich et al., 1997; Engle, 2002). Therefore, training of the community health workers or lay health advisors, educating adolescent mothers on neonatal and ANC care practices may be a feasible solution to improve thermal care.

Breastfeeding is almost universal in Bangladesh, and according to BDHS report 2007 approximately 97% of children of adolescent mothers were breastfed at some point (NIPORT, 2007). However, prelacteal feeding is common among women in Bangladesh, and it is common to delay breastfeeding initiation for several days. Usually, breastfeeding

is delayed until the mother is cleaned to a holy state. A practice of withholding breastfeeding up to 3 days after the birth of a child is also observed (Amin & Khan, 1989). Relatives provide information on breastfeeding, as do TBAs and other mothers. Colostrum is rejected because it looks like pus (thick consistency) and is termed "dirty milk." It is believed to be harmful (poisonous), cause diarrhea and abdominal pain, and/or contain some evil spirit. Due to its thick and concentrated texture, it is believed that the baby cannot not digest colostrum. Many studies from India and other South Asian countries indicated that women commonly wait several days after birth to begin breastfeeding, avoid giving colostrums or supplement breastfeeding with other foods or liquids (Huffman, Zehner, & Victoria, 2001; Singh, Haldiya, & Lakshminarayana, 1997; Singh, Kumar, & Rana, 1992). Consistent with these previous studies our study also demonstrated that more than one half of the adolescent mothers did not initiate breastfeeding within 1 hour of birth. The protection provided by early initiation of breastfeeding against the risk of neonatal mortality was supported in a study in rural Ghana. It showed that 16% of neonatal deaths could be averted if all infants were breastfed from day 1 and 22% if breastfeeding started within the first hour (Badrudin, Inam, Ramzanali, & Hendricks, 1997). As the newborn is most active during the first hour after birth and sucks more vigorously during this period, lactation is more likely to be successfully established if breastfeeding is initiated early. Sufficient ANC and births assisted by MTP improved the odds of early breastfeeding initiation in the present study.

Mothers and their newborns are vulnerable during the postnatal period, especially during the first 24 hours following the birth (Baqui et al., 2009; Chakraborty, Islam, Chowdhury, & Bari, 2002). In Bangladesh more than two thirds of newborn deaths occurred on the day of birth and over the next few days (Erin, Uzma, Stevel, & Heidi, 2007). Yet postnatal care programs are among the weakest of all reproductive and child health programs in the region (Uzma et al., 2006). Findings reveal that only 23.4% of newborns received postnatal care. Postnatal care by MTP and within 24 hours after birth was found to be very low (11.0% & 9.0%). Our results from bivariate and multivariate analysis confirmed the importance of maternal education of adolescent mothers on the utilization of postnatal care services within 24 hours of birth of their newborn.

The strong influence of mother's education on the use of postnatal services is consistent with findings from other studies (Titaley, Dibley, & Roberts, 2009;

Wamani, Tylleskar, Nordrehaug, Tumwine, & Peterson, 2004). Newborns among the rural adolescent mothers were less likely to receive care within 24 hours of birth as compared to urban adolescent women. Many studies also document a lower use of health services by rural women because of the distances that must be covered to reach these services (Bhatia & Cleland, 1995). Use of postnatal care services within 24 hours of birth was higher for mothers who gave birth after age 15 years. We found that compared to those who received no ANC, adolescent mothers who received three or more ANC visits were approximately 3 times more likely to seek postnatal care for their newborn within 24 hours of birth. Assisted birth by MTP also had a strong association with postnatal care of the newborn within 24 hours of birth.

Strengths and Limitations

Strengths of this study were that the data came from a large government survey conducted in 2007 and a relevant subset of women aged 15 to 19 who had home births and at least one child younger than 3 years of age provided a sample of 580. The survey interviewers were trained to respond to questions about the selected topics and fieldwork was monitored through visits by representatives from United States Agency for International development (USAID), Macro International, and NIPOORT.

Some limitations are inherent with a cross-sectional survey that involved reporting of past behaviors and therefore a chance of recall bias. Another limitation of the study is that it examined only four behaviors. Other important behaviors such as eye care management, care of the preterm and/or low-birth-weight newborn, and management of newborn illness were not possible to analyze, also mother and newborn skin-to-skin contact was not included in thermal protection response. Findings were based on self-reported newborn care practices and may therefore be different from actual practices. Despite these limitations, this study provides some valuable insights into associated factors of newborn care practices among adolescent mothers may respond to health promotion interventions.

Conclusions

The majority of the adolescent mothers in Bangladesh with home deliveries practiced many unsafe essential and preventive newborn care behaviors, such as use of untrained attendants, unsafe cord care, and immediate bathing of the baby. Higher levels of maternal education and higher socioeconomic status were associated with complete thermal protection and postnatal care within the recommended time,

Expanding skilled birth attendance and providing antenatal care may be effective strategies to promote essential and preventive care.

but not with complete cord care and early breastfeeding. The most promising findings of the present study were the positive association between sufficient ANC and birth assisted by MTP and several of the newborn care practices. These findings offer further evidence that expanding skilled birth attendance and providing ANC may be an effective strategy to promote essential and preventive care.

Because the majority of women, especially adolescent mothers, prefer home deliveries and home deliveries are perceived as easy and convenient, in resource-poor countries like Bangladesh with weak primary care health system, it is important to establish a good outreach and home-based newborn care intervention. Such intervention should focus on the following: (a) training of the dais (untrained local birth attendants) and TBAs (traditional birth attendants), (b) educating mothers and other caretakers, and (c) designing a package of simple and culturally-acceptable practices for routine postnatal care of neonates. This may serve as a feasible solution than constructing and staffing an entirely new clinic and having to deal with the logistics of cost, mothers' autonomy to visit the clinics, and other factors. These findings may be relevant in other resource-limited settings as well where neonatal mortality is common. Future qualitative studies, however, are needed to investigate the reasons behind these unsafe newborn care practices, especially for adolescent mothers to ensure proper newborn care practices.

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REFERENCES

- Allisyn, C., Choudhury, N., Nazib, U., Zaman, K., Zunaid, A., & Tasnuva, W. (2009). Newborn care practices among slum dwellers in Dhaka, Bangladesh: A quantitative and qualitative exploratory study. *BMC Pregnancy and Childbirth*, 17, 9-54. doi:10.1186/1471-2393-9-54.
- Amin, R., & Khan, A. H. (1989). Characteristics of traditional midwives and their beliefs and practices in rural Bangladesh. *International Journal of Gynecology and Obstetrics*, 28(2), 119-125.
- Atuyambe, L., Mirembe, F., Tumwesigye, N. M., Annika, J., Kirumira, E. K., & Faxelid, E. (2008). Adolescent and adult first time mothers' health

- seeking practices during pregnancy and early motherhood in Wakiso district, central Uganda. *Reproductive Health*, 5(1), 13. doi:10.1186/1742-4755-5-13.
- Badruddin, S. H., Inam, S. N., Ramzanali, S., & Hendricks, K. (1997). Constraints to adoption of appropriate breast feeding practices in a squatter settlement in Karachi, Pakistan. *Journal of Pakistan Medical Association*, 47(2), 63-68.
- Bangladesh Bureau of statistics. (2003). *Bangladesh population census, 1991*. Dhaka, Bangladesh: Bureau of Statistics, Statistics Division, Ministry of Planning.
- Bangladesh Progress Report. (2007) *Millennium development goals: Mid-term Bangladesh progress report 2007*. General Economic Division, Planning Commission, Government of the People's Republic of Bangladesh.
- Baqui, A. H., Ahmed, S., Arifeen, S., Darmstadt, G. L., Rosecrance, A. M., & Mannan, I. (2009). Effect of timing of first postnatal care home visit on neonatal mortality in Bangladesh: An observational cohort study. *British Medical Journal*, 14, 339. doi:10.1136/bmj.b2826.
- Baqui, A. H., Darmstadt, G. L., Williams, E. K., Kumar, V., Kiran, T. U., & Panwar, D. (2007). Newborn care in rural Uttar Pradesh. *Indian Journal of Pediatrics*, 74, 241-247.
- Bhatia, J. C., & Cleland, J. (1995). Determinants of maternal care in a region of South India. *Health Transition Review*, 5(2), 127-142.
- Bhutta, Z., Darmstadt, G., Hasan, B., & Haws, R. (2005). Community-based interventions for improving prenatal and neonatal health outcomes in developing countries: A review of the evidence. *Pediatrics*, 115(2), 519-617. doi:10.1542/peds.2004-1441.
- Blanchet, T. (1991). *An anthropological study of maternal nutrition and birth practices in Nasiragar, Bangladesh*. Dhaka, Bangladesh: Save the Children Fund. pp. 41-48.
- Chakraborty, N., Islam, M. A., Chowdhury, R. I., & Bari, W. (2002). Utilization of postnatal care in Bangladesh: Evidence from a longitudinal study. *Health and Social Care in the Community*, 10(6), 492-502. doi:10.1046/j.1365-2524.2002.00389.x.
- Chandrasekhar, T., Sreeramareddy, H. S., Joshi, S., Binu, V., Sreekumar, S. G., & Neena, C. (2006). Home delivery and newborn care practices among urban women in western Nepal: A questionnaire survey. *BMC Pregnancy and Childbirth*, 6, 27-34. doi:10.1186/1471-2393-6-27.
- Chowdhury, A. M. R., Mahub, A., & Chowdhury, A. S. (2003). Skilled attendance at delivery in Bangladesh: an ethnographic study. Research Monograph Series. BRAC Research and Evaluation Division, Dhaka, Bangladesh, 22, 37-51.
- Conde-Agudelo, A., Jose, M., & Lammers, C. (2005). Maternal-perinatal morbidity and mortality associated with adolescent pregnancy in Latin America: Cross-sectional study. *American Journal of Obstetrics and Gynecology*, 192(2), 342-349.
- Darmstadt, G. L., Bhutta, Z. A., Cousens, S., Adam, T., Walker, N., & Bernis, L. (2005). Evidence-based, cost-effective interventions: How many newborn babies can we save? *Lancet*, 365, 977-988.
- Dragovich, D., Tamburlini, G., Alisjahbana, A., Kambarami, R., Karagulova, J., & Lincetto, O. (1997). Thermal control of the newborn: Knowledge and practice of health professionals in seven countries. *Acta Paediatrica*, 86(6), 645-650.
- Dutta, K. A. (2009). Home based newborn care: How effective and feasible. *Indian Pediatrics*, 46, 835-840.
- Engle, P. (2002). Infant feeding styles: Barriers and opportunities for good nutrition in India. *Nutrition Reviews*, 60(5), S109-S114.
- Erin, S., Uzma, S., Stevel, W., & Heidi, W. (2007). *Postnatal care: A critical opportunity to save mothers and newborns*. Policy perspectives on newborn health. Retrieved from <http://www.prb.org/pdf07/ SNLPNCBriefFinal.pdf>
- Gurung, G. (2008). Practices on immediate care of newborn in the communities of Kailali District. *Nepal Medical College Journal*, 10(1), 41-44.
- Huffman, S., Zehner, E., & Victoria, C. (2001). Can improvements in breast feeding practices reduce neonatal mortality in developing countries? *Midwifery*, 17(2), 80-92. doi:10.1054/midw.2001.0253.
- Iyengar, S. (1990). Prevention of neonatal hypothermia in Himalayan villages: Role of the domiciliary caretakers. *Tropical and Geographical Medicine*, 43(3), 293-296.
- Jeffery, R., & Jeffery, P. (1995). Traditional birth attendants in north India: The social organization of childbearing. In S. Lindenbaum (Ed.), *Knowledge, power and practice: The anthropology of medicine in everyday life*. Berkeley, CA: University of California Press, 7-31.
- Marsh, D., Darmstadt, G., Moore, J., Daly, P., Oot, D., & Tinker, A. (2002). Advancing newborn health and survival in developing countries: a conceptual framework. *Journal of Perinatology*, 22(7), 572-576.
- McDonagh, M. (1996). Is antenatal care effective in reducing maternal morbidity and mortality? *Health Policy and Planning*, 11(1), 1-15.
- National Institute for Population and Research Training. (2007). *Bangladesh demographic and health survey 2007 (Vol. 145)*. Dhaka, Bangladesh: Author. Retrieved from <http://www.measuredhs.com/pubs/pdf/FR207/FR207%5BApril-10-2009%5D.pdf>
- Neifert, M. R. (1999). Clinical aspects of lactation: Promoting breastfeeding success. *Clinics in Perinatology*, 26(2), 281-282.
- Osirin, D., Tumbahangphe, K., Shrestha, D., Mesko, N., Shrestha, B., & Manandhar, M. (2002). Cross sectional, community based study of care of newborn infants in Nepal. *British Medical Journal*, 325, 1063. doi:10.1136/bmj.325.7372.1063.
- Rahman, M. (2009). Deliveries among the adolescent mothers in rural Bangladesh: Who provide assistance? *World Health Population*, 11(2), 5-14.
- Rutstein, S. O., & Johnson, K. (2004) DHS Comparative Reports No. 6: The Wealth Index. Calverton, MD: ORC Macro. Retrieved from [http://www.childinfo.org/files/DHS.WealthIndex\(DHS.Comparative.Reports\).pdf](http://www.childinfo.org/files/DHS.WealthIndex(DHS.Comparative.Reports).pdf)
- Saha, S., & Kabir, M. (2009). Survival of newborns: Implications for achieving the Millennium Development Goal 4 in Bangladesh. *World Health Population*, 11(1), 5-13.
- Saving Newborn Lives. (2001). *State of the world's newborns*. Washington, DC: Save the Children. Retrieved from <http://www.healthynewbornnetwork.org/partner/save-children>
- Singh, M., Haldiya, K., & Lakshminarayana, J. (1997). Infant weaning and feeding practices in some semi-arid rural areas of Rajasthan. *Journal of Indian Medical Association*, 95(11), 576-578.
- Singh, R., Kumar, O., & Rana, R. (1992). Breastfeeding and weaning practices among urban Muslims of district Lucknow. *Indian Pediatrics*, 29, 217-219.
- Tinker, A., Hooper, P., Azfar, S., Bustreo, F., & Bell, R. (2005). A continuum of care to save newborn lives. *Lancet*, 365, 822-825.
- Titaley, C. R., Dibley, M. J., & Roberts, C. L. (2009). Factors associated with non-utilization of postnatal care services in Indonesia. *Epidemiology and Community Health*, 63(10), 827-831. doi:10.1136/jech.2008.081604.
- United Nations International Children's Emergency Fund. (2009). *Maternal and newborn health. State of the world's children*. New York, NY: Author. Retrieved from <http://www.unicef.org/sowc09/docs/SOWC09-FullReport-EN.pdf>
- United Nations Population Fund. (1999). Adolescent reproductive health in the Asian and Pacific Region. *Asian Population Studies Series*, 156, 17-62.
- Uzma, S., Asiruddin, S. K., Helal, S. I., Imteaz, I., Mannan, M., & Murray, J. (2006). Immediate and early postnatal care for mothers and newborns in rural Bangladesh. *Journal of Health Population and Nutrition*, 24(4), 508-518.

- Wamani, H., Tylleskar, T., Nordrehaug, A., Tumwine, J. K., & Peterson, S. (2004). Mothers' education but not fathers' education, household assets or land ownership is the best predictor of child health inequalities in rural Uganda. *International Journal for Equity in Health*, 3(1), 9. doi:10.1186/1475-9276-3-9.
- Winch, P. J., Alam, M. A., Akther, A., Afroz, D., Ali, N. A., & Ellis, A. A. (2005). Local understandings of vulnerability and protection during the neonatal period in Sylhet district, Bangladesh: A qualitative study. *Lancet*, 366(9484), 478-485.
- World Health Organization. (1998). *Care of the umbilical cord: A review of the evidence*. Geneva, Switzerland: Author, 35pp. Retrieved from <http://www.who.int/reproductive-health/publications/MSM98.4/care.umbilcal.cord.pdf>
- World Health Organization. (2001). *Adolescent pregnancy*. WHO Discussion Papers on Adolescence, Department of Child and Adolescent Health and Development, World Health Organization, Geneva, Switzerland.