



USAID
FROM THE AMERICAN PEOPLE



Barriers to and Motivators of Handwashing Behavior in the Neonatal Period

May 2012

Findings from a Formative Research Study on Maternal Handwashing in Habiganj,
Bangladesh

Shahana Parveen, icddr,b
Pavani K. Ram, University at Buffalo

Table of Contents

ACKNOWLEDGMENTS.....	iv
EXECUTIVE SUMMARY.....	v
RATIONALE	1
STUDY OBJECTIVES	1
METHODS	2
Study Site	2
Sampling and Consent Procedures	3
Duration of Data Collection and Composition of Team	3
Data Collection Tools	3
Theoretical Model	4
Data Analysis.....	5
RESULTS.....	6
Findings from the Mother Component.....	6
Findings from the Traditional Birth Attendant Component	32
DISCUSSION	45
Mother Component.....	45
TBA Component	48
CONCLUSION.....	50
REFERENCES.....	51

Acknowledgments

We would like to sincerely thank the participants in this study. Our special thanks to Ms. Rowshon Jahan, Deputy Program Manager Field Operation, MAMONI Habiganj field office, and the Upazila coordinators, field support officers, and community volunteers of the MAMONI program, who supported the field research team to obtain the list of the respondents and liaisons to communicate with the study participants. In addition, we extend our gratitude to the handwashing formative study and entire Perinatal Handwashing Study team at icddr,b and the University at Buffalo.

This report was made possible by the generous support of the American people through the United States Agency for International Development (USAID), under the terms of the Leader with Associates Cooperative Agreement GHS-A-00-08-00002-00. The contents are the responsibility of the Maternal and Child Health Integrated Program (MCHIP) and do not necessarily reflect the views of USAID or the United States Government.

The Maternal and Child Health Integrated Program (MCHIP) is the USAID Bureau for Global Health's flagship maternal, neonatal and child health (MNCH) program. MCHIP supports programming in maternal, newborn and child health, immunization, family planning, malaria, nutrition, and HIV/AIDS, and strongly encourages opportunities for integration. Cross-cutting technical areas include water, sanitation, hygiene, urban health and health systems strengthening.

www.mchip.net

Executive Summary

In Bangladesh, the neonatal mortality rate is estimated at 37 deaths per 1,000 live births, and 57% of all deaths in children less than 5 years old occur in the neonatal period.¹ Given the high burden of neonatal mortality and observational evidence that handwashing may substantially reduce neonatal mortality, we sought to identify barriers to and motivators of handwashing among mothers and other caregivers in the perinatal and neonatal period.

This study was conducted in the rural area of Habiganj district, Bangladesh, among mothers of neonates and infants, other female caregivers, fathers, and traditional birth attendants (TBAs). We employed semi-structured observations, in-depth interviews, and group discussions to explore constructs based on our theoretical model explaining maternal handwashing behavior in the neonatal period.

We interviewed and observed 20 mothers of neonates, and interviewed 12 mothers of infants greater than 28 days old and 10 traditional birth attendants. We conducted one group discussion each with mothers of infants greater than 28 days old, female caregivers other than mothers, and fathers of infants less than 6 months old. We also conducted two group discussions with traditional birth attendants living in the study area.

Our analyses suggest substantial opportunities to improve handwashing behavior among mothers in the neonatal and infant periods in Habiganj. Barriers to handwashing behavior include the lack of social norms favoring handwashing in general and in the newborn period. In addition, multiple factors, such as lack of support from elder family members, inability to buy the required quantity of soap, and responsibility for the care of multiple children, negatively affect maternal self-efficacy for improving and maintaining good handwashing behavior. Motivators of handwashing behavior include maternal aspirations for good motherhood as well as mothers' intent to nurture their newborns. Increasing access to handwashing materials in the living space occupied by mothers and newborns may have a positive impact on handwashing behavior during the newborn period.

Our findings suggest that the newborn period represents a teachable moment for mothers, during which promotion of handwashing may result in long-lasting impacts on social norms related to handwashing and improved child health.

Our data demonstrate that TBAs, commonly known as *dais* in this area, understand the importance of handwashing, and as a result, they typically wash their hands, mostly with soap, before conducting deliveries. Dais conduct deliveries with their bare hands and do not feel it is necessary to wash their hands during the course of the delivery because they perceive that they are still handling “dirty blood” during that period. Traditionally, mothers or female family members cut the cord with a boiled new blade. Dais do not remind the mother or family member to wash hands before cutting the cord. If dais cut the cord, they do not wash their hands beforehand. Sometimes, when dais' hands are soiled with blood, they wipe their hands or hold the cord with a piece of old cloth. After knotting the cord, dais typically wipe the baby with a dry piece of cloth to protect the baby from cold; then they wrap the child with another piece of cloth. The cord is usually cut after the placenta is delivered. Dais do not administer anything to cord stump immediate after cutting. After delivering the placenta, dais consider their work finished and wash their hands, usually with soap. A number of factors, such as a lack of soap in some households and the lack of emphasis on handwashing before cutting the umbilical cord, have a negative impact on dais' handwashing behaviors before and during delivery. Factors such as the perception of risk from the dirt on their hands and availability of water at the delivery room motivate dais to wash their hands before or during delivery, when they felt it is necessary.

Our findings suggest that interventions should inform dais about the risks of transmitting infection to newborns during the critical events of delivery and how handwashing before these critical events can help to reduce risk.

Rationale

Of the nearly 8.5 million children who die each year before their fifth birthday, an estimated 4 million die during the first 28 days of life. In settings with high neonatal mortality, about half of these deaths are estimated to occur because of infectious syndromes such as sepsis, acute respiratory infection, neonatal tetanus, and diarrhea.² Promotion of handwashing with soap has been shown to reduce, by half, the risk of acute respiratory infection and diarrhea in children less than 5 years old.³ Observational data from one case-control study found that neonatal mortality was significantly lower among children of mothers who reported washing their hands. This study also found that birth attendants' handwashing was associated with reduced neonatal mortality.⁴ This important study is being followed up by efforts to promote handwashing in the perinatal period at scale in several countries. To inform research studies and public health programs seeking to reduce neonatal morbidity and mortality by improving hand cleanliness, additional information is needed on the barriers to and motivators of maternal and caregiver hand hygiene in the neonatal period.

In Bangladesh, the neonatal mortality rate is estimated at 37 deaths per 1,000 live births, with 57% of all deaths among children less than 5 years old occurring in the neonatal period.¹ The Bangladesh Demographic and Health Survey of 2007 indicates that 40% of neonatal deaths, and 40% of deaths in children less than 5 years old, were attributable to diarrhea and acute respiratory infections. More than 60% of births in Bangladesh are assisted by untrained tradition birth attendants, commonly known as dais. Dais play an important role during pregnancy and childbirth in the community setting, but we have limited understanding of dais' handwashing practices while attending to deliveries. Given the high burden of neonatal mortality, and the high proportion of that mortality attributed to causes that may be prevented with hand hygiene, we conducted this qualitative research in rural Bangladesh to identify barriers to and motivators of handwashing among mothers and other caregivers in the perinatal and neonatal period and dais' handwashing practices while assisting with deliveries.

Study Objectives

The specific objective of this study for the mother component was:

- To identify motivators and barriers to hand cleansing among mothers of neonates and infants, and among other family caregivers

The study had the following objectives for the TBA component:

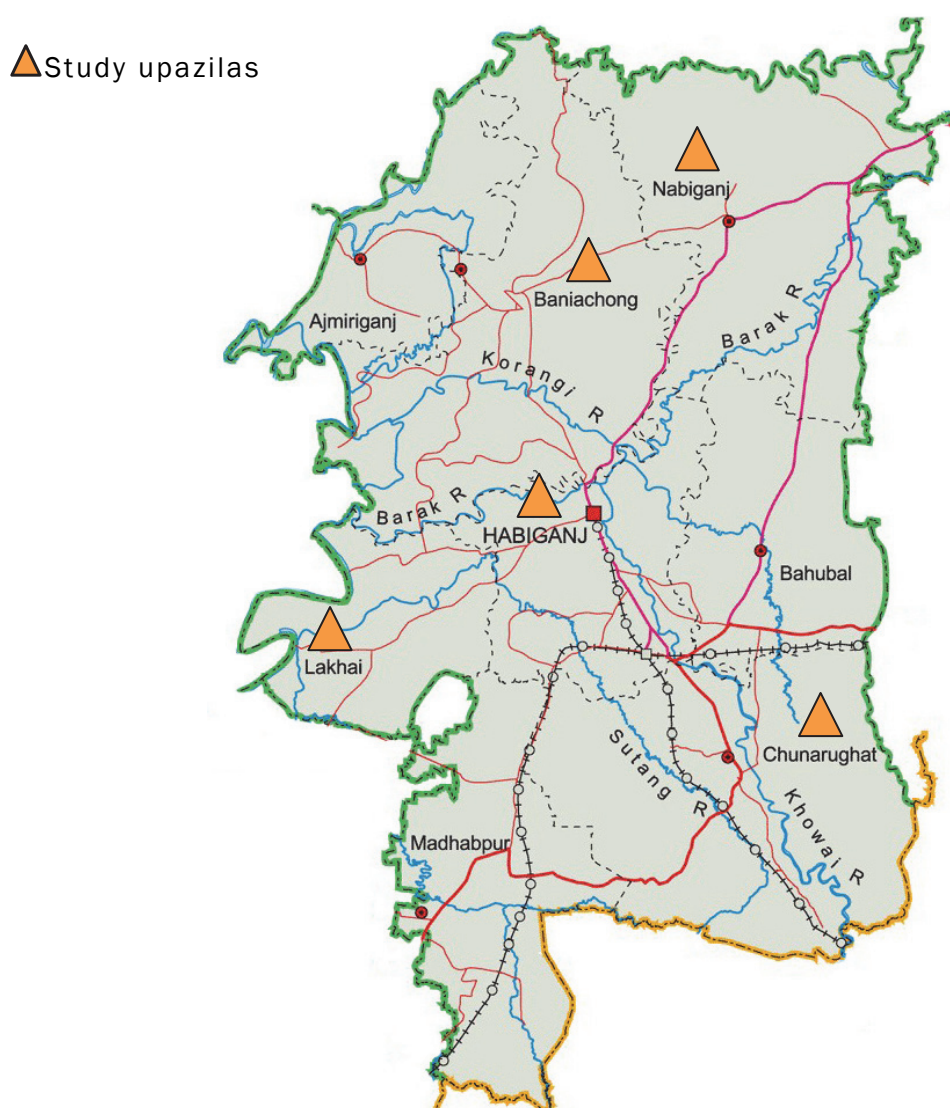
- To explore the TBAs' perceptions and practices related to hand hygiene when assisting with/conducting deliveries
- To explore the suggestions or services provided by TBAs during the antenatal and postnatal period

Methods

STUDY SITE

This study was conducted in the rural area of Habiganj district in the Sylhet division, 127 km northeast of Bangladesh's capital, Dhaka. The neonatal and infant mortality rates are higher in Sylhet than in Bangladesh's other six divisions. Bangladesh Demographic and Health Survey 2007 data show that the Sylhet division has a higher fertility rate (3.7%) than the other divisions, with 53 neonatal deaths and 84 infant deaths per 1,000 live births.¹ The USAID-supported program is being implemented by Save the Children through government service providers in eight *upazilas* (subdistricts) in Habiganj, a district located in the Sylhet division (Figure 1). MAMONI has recently introduced handwashing promotion in their intervention program. Understanding mothers' and others' perspectives on handwashing in the Habiganj area would specifically aid in designing and/or modifying ongoing MAMONI interventions to promote handwashing in the perinatal period. We selected respondents from five *upazilas* where MAMONI had not carried out any handwashing promotion activities.

Figure 1: Map of Habiganj area indicating study areas



SAMPLING AND CONSENT PROCEDURES

Save the Children has a field office in Habiganj from which they operate the MAMONI program through two local nongovernmental organizations, Shimantik and Friend in Village Development Bangladesh. The field office maintains a database of pregnant mothers in all of the intervention *upazilas*. A large group of field workers update the delivery status of the pregnant women through regular field visits.

In September 2011, we identified mothers with neonates less than 28 days old and mothers with infants less than 1 year old using Save the Children's Habiganj field office database. Using information from the database, we created a list of eligible mothers of neonates and infants greater than 28 days old (irrespective of parity). The infants were born between November 2010 and June 2011. Pregnant women had estimated delivery dates between 15 August 2011 and December 2011. From that initial list, eligible mothers were approached by a research officer who introduced the study and obtained informed consent from interested participants.

Fathers and secondary female caregivers were identified based on the recommendation of mothers of neonates (i.e., snowball sampling). We obtained written informed consent from all participants (mothers, fathers, secondary female caregivers). We collected data using qualitative methods, including in-depth interviews, five-hour semi-structured direct observations, and group discussions.

For the TBA component of the studies, we conducted interviews and group discussions with dais. Dais are locally recognized birth attendants who do not have any formal training in conducting deliveries per the World Health Organization or International Federation of Gynecology and Obstetrics definitions. To select dais for the interviews and group discussions, we obtained a list of dais from the *upazila* coordinators of the MAMONI program at Habiganj. From that list, research officers invited dais working in the study *upazilas* who had not received handwashing-related training from MAMONI during the data collection period to participate in our study. The research team obtained informed consent from the dais who were interested in participating in our study.

DURATION OF DATA COLLECTION AND COMPOSITION OF TEAM

A team of four researchers with training in anthropology collected data from September 2011 to December 2011. The four anthropologists had training and experience in data collection using various qualitative data collection tools.

DATA COLLECTION TOOLS

Observations

We conducted five-hour (8:00 a.m. to 1:00 p.m.) semi-structured observations of mothers of neonates. All observations were conducted in households to observe their daily routine, specifically related to caregiving activities for the neonates. Using a checklist, we recorded mothers' hygiene behaviors during critical times, such as before touching the baby, before breastfeeding, before preparing food for the neonate or others, after defecation/toileting, after cleaning the neonate's bottom, after other potential fecal contact (such as cleaning animals or courtyard). We also took detailed notes about the contextual factors that facilitated or hampered handwashing behavior.

In-Depth Interviews

We conducted interviews with the mothers to explore their practices, perceptions, beliefs, and knowledge related to handwashing. After completing each observation of a mother of a neonate, we requested an interview appointment at her convenience.

During interviews with traditional birth attendants, we explored their hygiene practices during child delivery and their perceptions of the need for hand hygiene during activities such as cutting of the umbilical cord, umbilical cord care after birth, and prelacteal feeding. We also explored what advice they give to mothers or other caregivers during pregnancy, specifically regarding delivery and after delivery.

Each of the interviews required 60–90 minutes.

Group Discussions

After completing all in-depth interviews, we organized four sets of group discussions with the aim of further discussing the themes that emerged from the observations and in-depth interviews. The four groups were made up of (1) mothers of infants, (2) female caregivers other than mothers, most of whom were elders from women's marital or natal families, (3) fathers of neonates or young infants (less than 6 months old), and (4) traditional birth attendants. We wanted to have a general understanding of views and common practices regarding hand hygiene, specifically related to childcare, in the study area.

Since Bangladeshi society is strongly patriarchal, usually the head of the family is a male member of the household who plays an important role in all decision-making in the household. Thus, we included fathers in our discussions to get their perceptions on study issues.

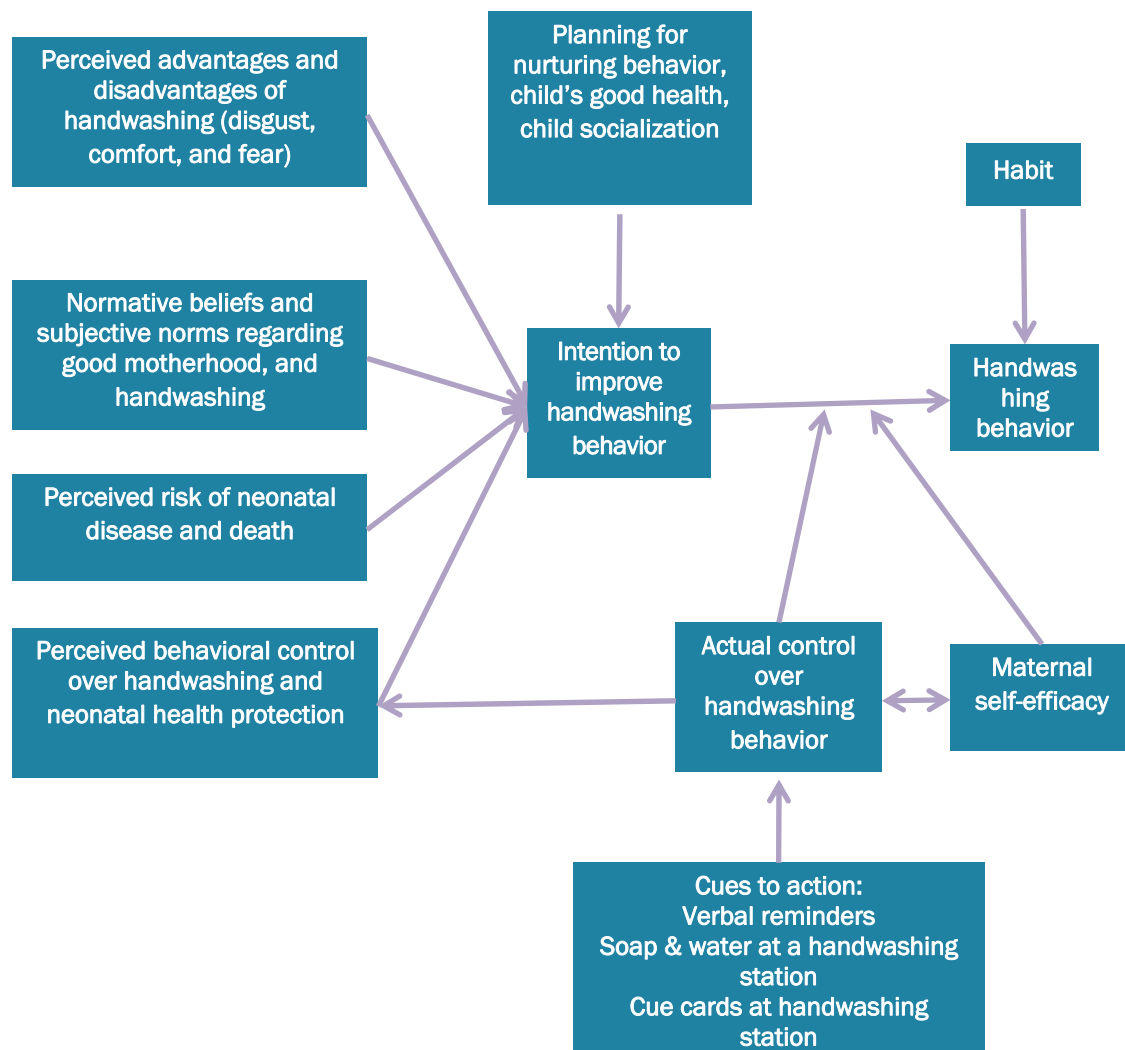
During group discussions with dais, we explored their practices during child delivery and the advice they provide to mothers about childcare (e.g., regarding cutting the umbilical cord, umbilical cord care immediate after birth, prelacteal feeding, and feeding colostrum to the baby) and other hygiene behaviors. We conducted group discussions with dais who were not included in the in-depth interviews.

We used guidelines tailored to each of the four groups. Each group discussion took 90–120 minutes.

THEORETICAL MODEL

We developed a theoretical model for explaining the determinants of maternal handwashing behavior (Figure 2). The model includes constructs from the Health Belief Model and the Theory of Reasoned Action/Theory of Planned Behavior, which aim to explain individual health behavior, as well as social cognitive theory, which addresses interpersonal constructs relevant to health behavior.^{5,6} In our model, we included the most current understanding of motivations to improve handwashing behavior among mothers in resource-poor settings.⁷ Motivating factors relevant to the perinatal and infant periods include planning for nurturing behavior, the child's good health, and child socialization; habit; normative beliefs regarding motherhood; and environmental factors such as the presence of soap and water at a handwashing station. Our qualitative research instruments address the major constructs captured by the theoretical model.

Figure 2: Theoretical model of motivations to improve maternal handwashing behavior during perinatal and infant periods



DATA ANALYSIS

We recorded all in-depth interviews and group discussions using a digital audio recorder. Researchers also took detailed notes during data collection. During semi-structured observations, the research team recorded handwashing opportunities and practices on a structured observation form. We also took detailed notes about the physical environment and context of these events during observations. We transcribed all the recorded interviews and groups discussions verbatim in Bengali. The research team then developed a code list and coded all the responses using qualitative text-organizing software (Atlas.ti). Then we performed content analysis according to the themes identified in the theoretical model shown in Figure 2. Major themes included perception of handwashing (when hands should be washed with water and/or soap), normative beliefs and subjective norms of handwashing, planning for nurturing behaviors, perceived advantages and disadvantages of handwashing, and perceived risk of neonatal diseases. We also explored what barriers (habit, financial ability, social norms, fear) and facilitators (family reinforcement knowledge, information, fear, hardware support) the participants experienced related to handwashing before or after different activities. We identified common trends and patterns from the responses and prepared summaries of each theme. Comparison of data obtained using the various qualitative methods allowed for triangulation, ultimately enriching the interpretation of our data.

Results

Table 1 shows the total number of respondents included in the observations, in-depth interviews, and group discussions. Between 6 and 8 participants took part in each of the group discussions with mothers and family members, and seven participants took part in each of the group discussions with TBAs. We first present findings from our interviews, observations, and discussions with mothers. We then describe our findings from the interviews and discussions with dais in the villages in Habiganj.

Table 1: Formative research data collection

DATA COLLECTION TOOLS	TYPE OF PARTICIPANT	# OF PARTICIPANTS
Observations	Mother of neonate < 28 days old	20
In-depth interviews	Mother of neonate < 28 days old	20
	Mother of infant > 28 days and < 12 months old	12
	Traditional birth attendant	10
Group discussions	Mother of infant > 28 days and < 12 months old	1 (6 caregivers)
	Female caregivers other than mothers	1 (6 caregivers)
	Father of neonates or young infants ≤ 6 months old	1 (6 caregivers)
	Traditional birth attendants	2 (7 dais, per GD)

FINDINGS FROM THE MOTHER COMPONENT

Demographic Information

The median age for mothers of neonates was 20 years; for mothers of infants, the median age was 21 years (Table 2). Among the 32 mothers who participated in an in-depth interview and observation, 23 reported normal delivery of their newborn/infant at home by untrained traditional birth attendants, six had normal delivery at a facility, and one had a skilled birth attendant (nurse) deliver her baby at her home chamber (community hut). The remaining two reported having cesarean section deliveries, one of which took place at a government hospital and the other at a private clinic. All the handwashing locations at our respondents' households were outside of the bedrooms and living rooms. Among the mothers of neonates, only four (out of 10) primiparous mothers and two (out of 10) multiparous mothers delivered their second child at their mother's home. The marital homes of both of the multiparous mothers were adjacent to their mothers' homes.

Table 2: Demographic information about mothers of neonates and infants participating in study (observation and in-depth interview), in Habiganj, 2011

CATEGORY	CHARACTERISTICS	# MOTHERS OF NEONATES	# MOTHERS OF INFANTS
Age of mother	Median	20	21
Sex of the child	Female	10	3
	Male	9	3
Age of the child	Median	12.5 days	5 months
Parity of mother	Primi	10	8
	Multi	10	4

CATEGORY	CHARACTERISTICS	# MOTHERS OF NEONATES	# MOTHERS OF INFANTS
Type of delivery	Normal delivery at home	16	7
	Normal delivery by skilled birth attendant at her home setting (community hut)	0	1
	Normal delivery at facility	3	3
	Cesarean section	1	1
Mother's residence during interview	Marital home	14	11
	Maternal home	6	1
Education of mothers	No education (0)	4	1
	≤ Class 5	15	4
	Class 6–8	1	5
	Class 9–10	0	2

Semi-Structured Observations of Mothers of Neonates

Handwashing behavior

In total we conducted 20 observations of the mothers of neonates, including 100 hours of childcare activities. We noted that five of the six mothers who resided in their parents' house were less occupied with household work activities than the 14 mothers who were living in their marital/in-laws' homes at the time of observation. Mothers were observed performing various household activities, such as cooking, sweeping, washing utensils, and washing clothes. Overall, mothers living at their in-laws' house in an extended family structure or at their parents' home were observed to carry out less household work compared to mothers living with only their nuclear family during the postnatal period.

Handwashing behavior at a number of critical times is described in the text below and in Table 3.

After cleaning the child's anus

We observed 22 instances of cleaning child feces/anus. One mother washed her hands once with water alone, and one mother washed her hands one time with soap. In most cases, mothers wiped the child's anus with the same *katha* (cloth diaper) that the child was wearing, and did not wash their own hands afterward. In three cases, mothers' hands came into contact with stool while the child's bottom was being cleaned and the mothers wiped off their hands on the child's *katha* or on their own clothing.

After defecation (self)

During our observation period, we did not observe any event when mothers went for defecation.

Before and after breastfeeding

In all, 102 instances of breastfeeding were observed. We observed that mothers washed their hands with water alone before breastfeeding in 10 instances (10%). We observed that the mothers did not purposefully perform this handwashing before breastfeeding; rather, their hands were washed with or without soap because the mothers had been involved in other activities that typically involve handwashing (e.g., taking a bath or bathing or washing a child, washing clothes, washing utensils). In two cases, mothers were cutting vegetables; when the child cried, the

mother washed her hands with plain water and soothed the child by breastfeeding. In two cases, mothers washed their hands before serving foods and afterward breastfed the child.

On the other hand, after breastfeeding, mothers washed their hands with water alone in only three instances among 102 breastfeeding observations.

Mother holding the baby (instead of cleaning child's anus or feeding)

Mothers spent most of their time holding their baby, engaged in another activity (e.g., breastfeeding or cleaning child's anus).

We observed only one instance in which a mother was making fuel with cow dung and her hands were soiled by the dung. The neonate was crying; the mother washed her hands with water alone and then held the baby.

Mother's contact with respiratory secretions and before holding the child

We observed three instances in which a mother's hands came into contact with respiratory secretions while she was cleaning her elder child's nose. In all of the cases, after cleaning the child's nose, the mothers threw the secretions on the ground, wiped their hands on their own clothes (e.g., the edge of their *saree* or dress), and then held the neonate.

Before eating

We observed 42 instances in which mothers ate food. They ate meals in 17 cases and snacks or betel leaf with lime in 25 cases (betel leaf consumption is common in the Habiganj area). We observed mothers washing their hands with water alone in 16 cases, and washing with soap in one case, before eating a meal. We also observed handwashing with plain water in nine instances of eating a snack or betel leaf.

Before preparing food

We observed 13 instances of food preparation. In nine instances, mothers washed their hands with water alone before preparing food. No soap was used during observations of handwashing before food preparation.

Serving food to the family members

We observed only 21 instances of mothers serving food to their family members or guests. In 15 cases, the mothers washed their hands with water alone. In one case, a mother first washed her child's cloth diaper, then washed her hands with soap, and then served food by spoon.

Before care of umbilicus

We observed five instances of a mother or other family member cleaning a child's umbilicus with mustard oil, blessed water, and hot fomentation. In the process of hot fomentation, the person first warms a piece of cloth on a fire or with an iron (used for pressing clothes), and sometimes warms her or his fingertip with that warm cloth, and then tenderly presses either the cloth or the fingertip onto child's cord stump. In all of these cases, the umbilical cord had fallen off before the observation. Among these five instances we observed two in which caregivers washed their hands with water alone before caring for the umbilicus; in one case the caregiver's handwashing occurred after the child was given a bath.

Before feeding the baby other food

In four cases we observed mothers or other caretakers feeding neonates formula milk and mustard oil, in addition to the mother's milk. In one case the caretaker washed the bottle with hot water and washed her hands at that time. After that she mixed the milk powder in the bottle with boiled water and fed the child.

Before holding the baby (caregiver other than the mother)

We observed 58 instances of individuals other than the mother of the neonate touching or holding the child. Hands were washed during only three of the 58 observations. In two cases we observed that family members who were washing utensils and cooking washed their hands as part of these activities and before holding the neonate. Conversely, in three instances, we observed that family members came in from outside and took the child into their lap without washing their hands. In three cases family members were cutting vegetables or cooking foods and then took the baby without washing their hands. In four cases older children in the family who were playing on the ground came to the child and took the child into their lap without washing their hands.

Table 3: Mothers'/caregivers' handwashing practices observed during childcare and other activities, Habiganj, 2011

ACTIVITIES	# OBSERVATIONS	# OBSERVATIONS DURING WHICH HANDS WERE WASHED WITH WATER ALONE	# OBSERVATIONS DURING WHICH HANDS WERE WASHED WITH SOAP	# OBSERVATIONS DURING WHICH HANDS WERE NOT WASHED
After cleaning child's anus	22	1 (5%)	1 (5%)	20 (91%)
After defecation (mother)	0	-	-	-
Before breastfeeding	102	10 (10%)	5 (5%)	87 (85%)
After breastfeeding	102	3 (3%)	0	99 (97%)
When mother holds the baby	1	1 (100%)	0	0
After contact with respiratory secretion and before holding the child	3	0	0	3 (100%)
Before eating rice (mother)	17	16 (94%)	1 (6%)	0
Before eating dry food/other food (mother)	25	9 (36%)	0	16 (64%)
Before preparing foods	13	9 (69%)	0	4 (31%)
Before serving foods	21	15 (71%)	1 (5%)	5 (24%)
Before care of umbilicus	5	2 (40%)	0	3 (60%)
Before feeding baby food other than formula milk (mother or other caretaker)	4	1 (25%)	0	3 (75%)
Before holding/touching the child (caregivers other than mother)	58	3 (5%)	0	55 (95%)

Barriers To and Motivators of Handwashing Behavior, As Noted During Structured Observation

During the course of the five-hour observations, we noted the following contextual factors that prevented handwashing behavior:

- In five instances (each with a different mother), we found that mothers who had more than one child but did not have any attendant support faced problems nurturing their newborn and giving attention to the older children along with performing daily household activities. For example, while one mother was cooking she had to clean her older child's anus (after defecation); after that she washed her hands with plain water and then breastfed her newborn.
- In four cases we observed that the water source was distant from the mother's household. In one instance, when a 4-year-old daughter asked for drinking water, the mother provided her daughter only a small amount of water instead of a full glass and commented to her:

[The] tube well is not near. Bringing water is a hard job [from there].

- In two cases, when the mother was about to go outside to wash her hands after cleaning the child's anus, elder family members warned the mother not to go outside until 40 days after her baby's birth. As result, the mothers did not wash their hands. Moreover, no water was stored near the mothers. One mother was even forbidden to go outside to a toilet. Mothers washed their hands (when they felt it necessary) only when family members attended the newborn or brought water or soap to them.
- We observed two instances in which mothers fed their children liquid medicine. In both cases they used the dropper that came in the medicine packet but did not wash the dropper before or after feeding the medicine.
- We observed the following contextual factors that motivated handwashing behavior:
 - In seven households family members helped mothers with household activities by tending to the neonate and taking care of elder children. Sometimes they also cooked on behalf of the mother.
 - In six cases mothers kept water in a jug or vessel inside the room and used it for washing their hands before preparing and serving food or after cleaning their children's urine or feces.
 - The husbands of three mothers who lived in single family homes were observed filling a bucket with water to keep near the mother. The husbands also helped mothers by serving food.
 - In two cases family members stored water in a bucket or vessel beside the door. One mother used the water for washing her hands before nurturing her neonate and after cleaning the child's anus. In the other case the mother went to the tube well to wash her hands while another family member pumped the tube well for her.
 - In one household we observed family members of the neonate making a temporary toilet adjacent to the bedroom of the mother and neonate, so the mother would not need to go far to use the toilet during the neonatal period.

Other

- In one case the mother soaked a piece of paper in a glass of water. Religious text was written on this paper in red ink. We were told that the paper had been soaking for five days and thus the water had become reddish. The mother fed the child two spoonfuls of the water from the glass.

- In two instances we observed mothers spit on their breast before feeding their newborn breast milk. Mothers explained later that they did it to avoid “bad eyes” (*nazar laga*) and choking during sucking. Here ‘bad eyes’ attribute to a malevolent look of any evil spirit or ill-wishing look of any person on someone that is believe able to cause harm of that person. In this community it commonly called as *nazar laga*.

In-Depth Interviews and Group Discussions

Perceptions of child illness

Most of the mothers of infants and neonates perceived that children can get sick if they are not kept clean—for example, if the mother and child do not eat fresh food; if the mother does not clean her own and her child’s clothing; if the mother does not wash the child (i.e., by bathing and wiping or washing after defecation) before holding or feeding the child; or if the mother does not wash her hands after performing any household chores and after using the toilet.

Child illness by age

A few of the mothers (three of 32) believed that for 40 days after birth, children can develop problems (e.g., lack of interest in feeding, vomiting, fever, or cold or pneumonia) if the umbilicus area is not dried. The three mothers said that in such situations children cry most of time; if the condition becomes critical, the child might even die.

Two mothers mentioned that, during delivery, if the birth attendant or relatives cut the umbilical cord without washing their hands, the baby could suffer problems with the umbilical cord, such as *pocha/gha* (swelling or gangrene, suggesting infection).

Some mothers perceived that after a few months, when children started crawling, sitting, playing with mud and water, and teething, they put their dirty hands into their mouth, which can lead frequently to illnesses such as cold, fever, and diarrhea. In addition, children older than 1 year might eat animal feces, uncooked vegetables, dust, or mud and get diarrhea or dysentery easily.

One mother of a neonate specified that between birth and 18 months, a child can suffer from diarrhea, cold, and fever. Another mother thought that children generally get sick more before 5 years of age.

Sex differences

Many mothers perceived that both male and female children are vulnerable to illness. However, a few mothers (five of 32) thought that male children are more vulnerable than a female child. One mother thought that in rural areas, male children are more vulnerable. She explained that, since males are the most important income earners in society, people’s “bad eyes” could harm a male child. On the other hand, two mothers further explained that susceptibility to illness is not related to the sex of the child; rather, children who play with mud or sand may get ill more frequently.

Preterm children

Many mothers said that children who do not complete 10 months inside the mother’s womb are considered preterm (mothers mentioned 10 months when they referred to full-term pregnancy). Mothers defined preterm births as those occurring between six and 8.5 months of pregnancy; preterm delivery was reportedly associated with problems at birth, such as malnourishment, inability to open the eyes properly, blindness or vision problems, and disparities in body parts (e.g., one hand is smaller than another). They said that preterm children are very vulnerable and frequently suffer from fever, cold, and cough.

Three mothers mentioned that sometimes preterm newborns are kept in a box (incubator) and given electric shock or kept in cotton and provided gas (oxygen) by mouth.

Seasonal variation and child illness

Mothers informed us that there is a seasonal pattern to illness, with some illnesses being more common in one season and other illnesses more common in another season (Table 4). Mothers perceived that children suffer more from cough, cold, and pneumonia during the winter.

One mother said pneumonia and tetanus are the same disease and that they use the same Bengali term for both diseases; she said that children suffer from these diseases during the winter and in the rainy season, since there is cold in both of these seasons.

Table 4: Maternal perception of seasonal differences in young infants' susceptibility to illness, Habiganj, 2011

SEASONS	ILLNESS
Summer	Loose stool/diarrhea, vomiting, fever, cold, and pneumonia from sweating; prickly and itchy skin
Rainy	Cold and cough, loose stool and vomiting, and fever
Winter	Cold and cough, pneumonia, and fever

Cold/pneumonia

Mothers informed us that normally they can identify a cold when their children are coughing or sneezing. But when the cold gets worse and turns into pneumonia, the child has fast breathing or chest in-drawing. In such serious cases, if the child does not receive treatment, he or she could even die.

Mothers in our study area followed various practices to keep children out of the cold. Mothers reported that a neonate and his/her mother always should bathe every other day at a consistent time, such as late morning. Bathing with warm water is considered appropriate to keep the child from getting cold. The mothers also said that, before neonates are bathed, their whole body should be massaged with mustard oil to protect them from cold. The mothers' practices were also influenced by environmental conditions such as weather. For example, mothers reported that on rainy or wintery days they prefer to wipe or sponge the child's body with a cloth/napkin wetted with warm water.

A few mothers said that a neonate could catch a cold easily if the mother touches water frequently. Therefore, the mother of a neonate should avoid touching water frequently (including wearing sandals while walking to avoid touching the cold floor/ground). Moreover, they said, the mother of a neonate should avoid eating cold foods and should drink warm water and eat warm food, particularly up to 40 days after delivery, to prevent a cold. They said she should also eat warm foods and drink warm water during winter.

Diarrhea/cholera

A majority of mothers commonly perceived that feeding or holding a child without washing one's hands after defecation or after doing households chores could cause the child to get diarrhea or loose stool. They said that if children are not clean, or if they eat stale food or put dirty things or animal feces into their mouth, they can get diarrhea easily. In addition, mothers' food habits, such as consuming spicy foods, can have an impact on a breastfeeding child's defecation and might cause stomach problem or a bad smell in the feces. During an episode of diarrhea in a breastfeeding child, the mother should eat rice with salt only and feed the child medicine or oral

rehydration salts. A few mothers said that if the mother of a neonate has eye contact with a patient with diarrhea, her child could get the same illness, so the mother should be conscious of these matters.

Transmission of disease from mother's womb

Two mothers mentioned that a child could inherit an illness such as pneumonia from the mother's womb. One mother added that, during pregnancy, if a mother drinks or touches a lot of water, the child could get cold after delivery.

Only one mother reported that her child was suffering from jaundice right after birth; she heard from a neighbor that mothers' food habits during pregnancy can precipitate jaundice in newborns.

Transmission of disease through breast milk

Some mothers perceived that babies are not born with diseases inherited from the womb, but after delivery they can get sick from their mothers' breast milk. Most of the mothers perceived that illnesses such as fever, cold, sneezing, and pneumonia, can be transmitted from a mother to her breastfeeding child through breast milk. One mother mentioned that after transmitting the illness to her child through her breast milk, the mother would get release from the illness.

Another said that if the mother inhaled any bad smell, it could infect her breast milk, and eventually her child could get loose stool from that milk.

Transmission of communicable and other diseases

Half of the mothers believed that their child could not get an illness from any sick family members because the child does not breastfeed from them. However, a few mothers mentioned that some illnesses such as itching, sneezing, fever, malaria, chicken pox, diarrhea, and worms could be transmitted from family members to the child. One mother explained that if a person with an itching problem takes a child onto his or her lap, the child could also get the same disease. Another mother explained that if a family member gets chicken pox, flies could sit on his/her body and transmit the disease to other family members, including a child.

Disease transmission from household dirt

Many mothers reported that children might get diarrhea from household dirt such as animal (hen, duck, and cattle) feces, foul smells from feces or anything rotten, dust, mud, dirt remaining in drinking water, or uncooked vegetables or vegetable dirt.

Norms regarding good motherhood

Mothers generally said that a good mother always takes care of and loves her baby. Half of the mothers said a good mother feeds and bathes her baby and massages the baby with oil, keeps the baby and herself clean with soap, and washes her hands before feeding and after cleaning child's anus. They explained that keeping a baby clean could prevent illness and protect the baby from germs. Mothers said that a good mother bathes her baby with warm water to prevent the child from catching a cold. They added that a good mother does not keep her baby in the mud (e.g. for play or while the mother is working) and, when the baby cries, takes the baby on her lap and soothes him or her. Only a few mothers noted that a good mother gives her child an education when the child grows up. As one mother said,

I have to take care of my baby in a well manner. I have to bathe him with warm water, if needed; massage him with oil, feed him properly . . . lull to sleep; do not let him cry; keep

him clean so that he would not get less illness . . . wash him with water after defecation, so the child would get less germs.

During discussions about good motherhood, mothers did not mention soap for handwashing; they only mentioned soap for general cleaning.

Mothers said they learned about how to nurture children from their mothers, mothers-in-law, elder sisters-in-law, or other elder female family members or neighbors. Most mothers said they prefer to seek advice from female elders because they have more than one child and are experienced in rearing children. However, a few mothers said they learned how to nurture their child by themselves by handling the baby, and a few mothers and family members (caregivers, fathers) noted that a mother learned about childcare from the MAMONI community volunteers, from village doctors, and from television.

Planning for nurturing behavior and the child's health

Planning for nurturing children

Mothers and family members generally stated that the most necessary items for nurturing a child are soap (bar and detergent), liquid *Savlon* or *Dettol* (antiseptics for cleansing skin), mustard oil, cloths and extra towels, lotion, and powder. According to mothers, soap is used for cleaning a child during bathing and for washing his/her clothes. They sometimes mix liquid *Dettol* or *Savlon* with water for bathing to prevent itching and scabies (*fut-fechur*), and they massage the child's body with mustard oil before and after bathing to prevent cold. A few mothers said that, when their child's anus becomes soiled with feces, they use soap for washing the anus; otherwise, it would smell badly. Mothers and family members try to manage funds to obtain these things for their child in any way possible, because they consider these items essential for nurturing a child.

Feeding babies

Most mothers reported that after birth, the baby was first fed colostrum. Only one mother did not feed colostrum to her baby. She said:

I pressed out the milk (colostrum) . . . I did not feed him...colostrum is diluted like water. . . I did not feed him (colostrum); otherwise, he could get diarrhea (if I fed him colostrum)! That's why I expelled colostrum . . . I heard from people that baby should not be fed colostrum.

A few mothers reported that their babies were first fed honey or concentrated sugar (*mishri*) water or glucose water. These babies continued feeding on this food since they did not get breast milk and cried for the first two to five days. Mothers of seven newborns who fed on other foods instead of breast milk reported that all the caregivers washed their hands beforehand, and in four cases they used soap.

Before feeding colostrum for the first time, a few mothers reported that they wiped their breast with a wet cloth because there was sweat on their breasts during delivery and they became dirty because delivery took place on a mat on the floor. One mother said she washed her hands with warm water before first breastfeeding her neonate:

At first the baby was bathed wiped, and then I fed the baby colostrum . . . my mother in-law made my hands washed with warm water before first feeding . . . I washed my hands because I was on the floor (during delivery); there might have [been] dirt in hands; should I feed my baby with dirty hands?

However, all mothers intended exclusive breastfeeding of their baby up to five or six months. After five to six months, they would likely to introduce the child to supplementary food, such as fruits, *khichuri* (a mix of rice and lentils, often with oil), fish, and egg. When babies are six months old, mothers started feeding them rice, *suji* (semolina), ground rice in semi-solid form, *khichuri*, and bananas. Only the mother of twins could not breastfeed exclusively because she did not have enough breast milk production. These twins were breastfed during the day time and fed formula milk from a bottle at night.

Bathing babies

Mothers generally give the first bath to a newborn three to seven days after delivery. However, one mother, whose twin babies were 17 days old at the time of our interview, noted that she had been sponging her babies with wet cloths since birth; she would bathe the babies after their heads are shaved at the traditional 21 days after birth.

Decision-making for childcare

Generally, the grandparents (paternal and maternal) and father of the child are responsible for items that are needed for childcare. In many cases, mothers first inform their husband of items that need to be purchased. Mothers who were living in in-laws' houses (21 of 32) reported that their husbands make the final decision about which things are needed for the child's care.

Mothers reported that usually when a child becomes sick, the father or grandparents of the child make the decisions about treatment. When a woman stays at her father's house, her parents make the decision about her child's treatment. Sometimes mothers who do not live with extended family seek advice from elderly neighbors or relatives regarding the child's treatment.

Mothers noted that they mostly seek treatment for their child's illnesses from allopathic doctor. One mother said she prefers taking her child to the doctor when the illness is at the moderate stage. Otherwise, if the child is taken for treatment after the condition becomes severe, the treatment cost becomes high.

However, for less severe colds or coughs, some mothers preferred homeopathic treatment for their child. But if the child does not recover, mothers then seek treatment from allopathic doctors.

Primiparous versus multiparous mothers

In our study, 14 mothers who had more than one child said that they were very busy from morning to night with their daily household activities and caring for children. They said that sometimes they have to feed the neonate while serving food or cleaning the bottom of an older child who has defecated, and they forget to wash hands after each task. They also have other responsibilities, such as washing clothes and utensils, sweeping the floor, and cooking for their family. The mothers of neonates who had multiple children (10 of 20 mothers) noted that sometimes they could not get adequate rest during the neonatal period of the second or third child, compared to that of their first child. They said that, typically, the age gap between their children is minimal and older children also expect their mother's attention. In such hectic times, it becomes difficult for multiparous mothers to perform the desired behavior for nurturing a newborn. To manage this situation, some mothers who live in a single family request their close female relatives to support them during the neonatal period, especially with cooking or looking after the elder children.

Umbilical cord care

All participants in the group discussions and more than half of the mothers in in-depth interviews who delivered at home said a new blade was used for cutting the umbilical cord. In most cases the blades were boiled beforehand. In some cases the traditional birth attendant cut

the cord. In a few cases (six of 32 mothers), mothers cut the cord themselves as a ritual after the dai tied the cord with thread. One mother who cut the cord on her own noted that after she cut the cord, her sister-in-law put the part of the cord that is joined with placenta into the baby's mouth to clean the tongue; this practice is believed to prevent the development of a white layer (*mukher sada sada jeno na hoy*) in the baby's mouth. In her view, it is a common practice in her area. In only a few cases, relatives cut the cord. One mother of a neonate stated,

The body of the person who cut the umbilical cord remains impure (napak) up to 40 days. So the dai did not cut the umbilical cord . . . the dai said to my sister to cut the cord.

Mothers and female caregivers said usually the dai or relatives did not wash their hands before cutting the cord; rather, they wiped their hands with a piece of worn cloth. Two mothers reported that they washed their hands with soap and water before cutting the cord. And one mother noted that the dai washed her hands with soap before cutting the cord. A few mothers (six of 32 mothers) shared their more negative view of cutting the cord without handwashing. These mothers said dirt or germs might remain on the hands; if hands were not washed before cutting the cord, the child might have problems in the umbilicus area. For example, the area might not dry, might develop bleeding, pus or gangrene/putrefaction (*pochon*, a term indicating infection), or might get swollen (*paka, gola*). As one mother said:

Umbilical cord might get dirt, so it is necessary to wash hands . . . otherwise, it [umbilicus] might have some problems. . . . The umbilicus area would not dry for long time [longer than the expected duration], which is painful for the baby.

Handwashing materials such as water and soap are reportedly not typically stored in the delivery room. However, some mothers reported that birth attendants washed their hands with soap (12 mothers) or with plain water (6 mothers) before entering the delivery room.

In most cases, nothing was applied to the umbilical cord immediately after cutting. In a few cases, facility health care providers or dais put medicine or Dettol on the umbilicus, but after the cord was removed, a number of mothers reported applying a variety of materials, primarily with the intent of drying the area quickly (Table 5). Many of the mothers reported that they or their family members did not wash their hands before handling the umbilicus because they perceived no dirt on their hands. One mother said:

If the hands were dirty, then I would wash . . . all the time I was on the bed and under mosquito net during that period . . . I was on the bed and did not do any work . . . my hands were clean, body was clean.

But some mothers (11 of 32) reported washing their hands with soap before cord care in order to remove dirt from their hands and to prevent any problems with the umbilicus. These mothers perceived that when taking care of umbilicus without washing one's hands, dirt or germs might enter the umbilicus and create problems such as swelling, decomposition/ putrefaction, or pus. The fathers of the young infants have a similar perception. The mother of one infant said:

I washed [my] hands before caring for it because there might be germs or sand or dust in the hands that enter into the umbilicus and could make it unhealed or swollen. That's why I washed my hands with soap.

In some cases mothers cleaned the umbilicus area first with a piece of cloth, boiled neem leaf water (suggested by a doctor), or soap during bathing and then put medicine on with cotton/cotton buds. Mothers perceived that they should clean the umbilicus area; otherwise, it would itch, bleed, and be filthy.

Table 5: Materials applied to the umbilical cord or umbilicus, and purpose of application

APPLIED TO THE CORD BEFORE REMOVAL	
Material Applied	Purpose
Hot fomentation with cloth and fingertip (process described on page 16)	To dry and remove the cord quickly
Mustard oil	
Homeopathic medicine	To dry the cord quickly
APPLIED TO THE UMBILICUS AREA AFTER CORD REMOVAL	
Material Applied	Purpose
One of the following: hot fomentation, mustard oil, dried ground goat feces mixed with coconut oil, or boric powder	To dry the umbilicus area quickly, remove the pain, remove abdominal pain, prevent diarrhea, and prevent bleeding
Medicine, ointment, nebalon powder (neomycin sulfate and bacitracin zinc), hexagon (chlorhexidine gluconate and isopropyl alcohol), or homeopathy medicine	To recover from pain and to dry quickly (recover from infection)

A few mothers also said that breastfeeding mothers were advised to follow some restrictions in their diet during the neonatal period, including drinking warm water, avoiding drinking too much water, and avoiding eating sour foods; otherwise, the child's cord stump would not dry.

Existing handwashing habits

Mothers in our study area do a variety of activities in their households from early in the morning to when they go to bed at night. They are usually responsible for preparing and cooking foods, serving foods, washing cloths and utensils, sweeping, taking care of the child or children, feeding domestic animals (cows, goats, chicken), cleaning animal feces, and making fuel from cow dung. Mothers' handwashing practices during their daily activities, as they were described in in-depth interviews and group discussions, are outlined below.

Handwashing before holding/touching baby

When mothers were asked about the necessity of handwashing before holding or touching a child, only a few (eight of 32 mothers) said that one *should* wash their hands before holding a baby. But even those mothers indicated that they could not do this all the time because of how busy they are with their household duties, or sometimes because of laziness. Mothers perceived that dirt is not visible on their hands all the time, but when hands are soiled with any visible dirt, or after cutting vegetable or fish, they wash their hands with soap. If mothers do not wash their hands with soap at these times, the child's body would have a bad smell. Mothers also said that in a rural area, when they are involved in household chores during which their body or clothes come into contact with mud or dirt (e.g., coating the floor/wall with mud, sweeping, preparing cow dung fuel, using biomass fuel during cooking, handling chilies or spices, and after defecation), mothers need to wash their hands with soap. Otherwise, germs might create problems. Mothers further explained that if their hands are not washed with soap after meals, curries' acid (of spices) can go into the baby's eyes or body and he might feel a burning sensation.

However, some of the mothers (10 of 32) perceived that handwashing is not important for mothers or others before holding the baby; rather, it is more important before feeding the child. These mothers also explained that neonates and young infants are always wrapped with clothing or cloth diapers, and thus they do not come into direct contact with others' hands when they are taken in the lap. They also perceived that elders usually do not hold a child when their

hands are dirty. When we asked mothers about the necessity of washing their hands before holding the baby, one mother of a neonate said:

Why should I wash my hands? I do not have anything in my hand; I do not have any dust or dirt. Moreover, if I [had] contact with water more frequently, I would catch a cold. That's why I touch water less frequently [avoid frequent handwashing or tasks which typically involve in water contact]. No one except my mother takes him in the lap now [neonate]. My mother's hands are always washed [clean]. Mother knows [how to handle baby]; I do not know anything. If anyone likes to hold him, [they] would not take with dirty hands; because there are angels with babies. So no one likes to hold him in dirty hands.

Although some mothers mentioned the importance of handwashing before holding a baby and some mothers not, all of them stated the consequence of getting diseases. A large portion of mothers said that if one's hands are not washed before holding/touching a baby, the child might get diseases like diarrhea, scabies (*fut-fechur*), prickly heat, itching, or fever. However, mothers could not explain the specific route of transmission for these different diseases, except for skin problems. Mothers explained that a child's body is soft, so if anyone holds the child without washing their hands, the child could get dirt that causes scabies or itching.

The majority of mothers said that, in their culture, it would not be possible to remind elders to wash their hands before holding the baby, particularly when their hands are not visibly dirty. However, it might be possible to remind the younger people. They explained that usually elders do not hold a child with dirty hands. If they tried to remind their elders, the elder people would take it negatively and react with anger or tease them and laugh (see related quotations in Table 6).

Table 6: Mothers' perceptions of handwashing before holding a child

ISSUES	RELATED QUOTES FROM MOTHERS
Handwashing is important before feeding a child, not before holding a child	"Before holding my child, sometimes I wash my hands, but sometimes I forget. It is not necessary to wash hands before holding baby, but before feeding child I must wash my hands because child would not get any germ from my hand since he is wrapped with clothes. Germs could get into clothes [from hands], not from child's body."
Hands are not visibly dirty before holding baby	"[I] cannot remind [other/elders] to wash hands if hands are not visibly dirty. If I say to her [when hands are not visibly dirty], she will be angry and say, 'Nothing is in my hands; I would like to hold your son and you are telling me to wash hands for that!' Now, if I tell them [this] good thing, they will take it negatively."
People will tease if I ask them to wash their hands before holding baby	"If my hands are dirty, I need to wash hands before holding the child; otherwise, child would get itching in skin. Even if I say others [for hand washing], they will not wash their hands. This is not the practice in our rural area. If I say them, they will reply, 'Can I afford extra soap that I would wash hands before holding your baby?' I can say older children if their hands are dirty but not elder people. If I remind them for washing hands in one word they will reply in three more (negative) words."

After cleaning respiratory secretion

More than half of the mothers reported that they wiped up their own or their child's nasal secretion or cough with a piece of cloth, tissue paper, or a handkerchief or towel. A few mothers also responded that they used their (bare) hand for wiping nasal secretions from their or their child's nose (we also observed this practice). If their hands are soiled with nasal secretions or a cough, they wash their hands with water or soap because of a "disgusted" feeling. Mothers said nasal secretions also give their hands a slippery feeling, so they feel dirty for touching foods or

anything with these hands. Only two mothers mentioned that if their hands are soiled during cleaning respiratory secretions, germs might remain on their hands and could go into the stomach and cause diarrhea or other stomach illness. One mother of a neonate said she washes her hands after cleaning respiratory secretion because illness would be transmitted to others from her hands:

Because from my [nasal secretion or cough], it can spread to others; or my illness could not improve. That's why I wash my hands.

A few mothers noted that they do not wash their hands after cleaning respiratory secretions; one of them said that due to frequency of coughing she does not perform handwashing. A few of the mothers did not know whether they should wash hands after contact with respiratory secretions. One mother noted that she does not wash hands after contact with respiratory secretions even though she knows that the dirt will go to stomach and could cause illness. Another mother said it would not be any problem if one's hands are not washed after cleaning respiratory secretions.

Before eating

All respondents said that they habitually wash their hands before eating; they indicated that this is a general practice. The practice of handwashing with plain water or soap varies. Mothers perceived the need to use soap for washing their hands before eating when their hands are visibly dirty. According to the mothers, hands are considered dirty after defecation, after handling mud, dust, animal feces, and *kali* (black carbon/soot produce by burning bio-fuel), and after cutting fish. However, some mothers reported that when they eat immediately after taking a bath, they wash hands with water alone. This is because, during bathing, they use soap and clean the body, including the hands, well. So they do not need to use soap again. A few mentioned that they usually wash their hands and face with soap before taking a meal; after finishing work, they wash their hands and face with soap and then take food.

Handwashing before and after breastfeeding

Many mothers in our study area perceived that it is necessary to wash their hands before breastfeeding because dirt or germs might go into the baby's mouth or stomach through dirty hands and cause a stomach disease or diarrhea. A few mothers mentioned that handwashing before breastfeeding for cleanliness prevents the child from acquiring diseases. One of the mothers of a neonate stated:

If dirt remains in my hands and if it [the nipple] gets that dirt, [it] can go inside the child through sucking during breastfeeding. If the dirt go inside the stomach, child could get stomach illness.

Most of the mothers reported that they wash their hands with plain water before breastfeeding when they are engaged in cooking or sweeping and after defecation and washing clothes. A few mothers perceived that handwashing before breastfeeding is only necessary when hands are soiled with dirt; otherwise, when they are not engaged in household work and their hands look clean (visibly), they do not need to wash their hands.

A few mothers indicated the necessity of washing one's hands with soap or plain water after breastfeeding. Otherwise, the mothers' breast milk could go into their own stomachs from their hands; milk flows could be reduced and the child could become deaf (lose hearing) and even could die.

Before feeding a child

Mothers of infants that had started eating foods such as rice, barley, cereal, *khichuri*, biscuit, and banana reported that they wash their hands with plain water or soap before feeding their children with their hands. Some mothers said they wash their hands with soap when their hands are soiled with dirt or a bad odor because they believe germs can be transmitted from their hands to a child's stomach and can cause diseases like diarrhea.

Before preparing and serving foods

Mothers reported that they usually do not wash their hands before starting preparation for cooking. They believe that their hands get clean when they are washing rice, fish, or vegetables. But mothers reported that when their hands are dirty and after defecation, they wash their hands with soap and then prepare foods.

Mothers commonly reported that after using their bare hands for preparing/cooking items such as mashed foods (Table 7), egg omelet, *rotti* (one kind of chapatti), or traditional cake, they wash their hands with plain water. Only a few mothers stated that if they do not wash their hands before preparing foods with their bare hands, dirt could go into their family members' stomach. One mother mentioned that if they use soap, the mashed item would get a soapy smell. A few mothers said they wash their hands with soap after preparing mashed items to prevent chilies' acid from getting into the baby's mouth or body and create a burning sensation.

Some mothers also noted that after cutting or processing food for cooking, they must wash hands with soap to remove the bad smell from their hands. After cooking they also use soap for removing the soot of fuel, dirt, or dust.

Some mothers said that to prevent diarrhea, they usually wash their hands with plain water before serving foods. They said it looks odd to serve food to anyone without washing their hands. According to these mothers, when they wash plates and spoons before serving foods, their hands get washed. But a few mothers said that their hands do not come into contact with food when they serve it with a spoon and thus handwashing is not needed.

Table 7: Preparation of different types of mashed foods (as reported by Mothers)

CATEGORY	FOOD ITEM	PREPARATION
Vegetable	Potato, green banana, green chili	First boil the vegetable and peel off skin with bare hands. Then cut the onion and brown it with oil. Then mash the potato/other boiled vegetable with bare hands or by using a spoon/spatula and mix it with onion, salt, and potato.
Seeds	Jackfruit seeds, nuts, sesame	First brown in the pan (without oil). Then paste on the stone slab with a stone pestle, mostly with chili and onion (it may vary). Then add salt and mix with bare hands.
Fruit	Green mango, local acidic fruits	Wash the fruit with plain water, peel off the skin, slice in small pieces and mix with chili, salt, and sugar with bare hands.
Fish	Dry fish	Lightly brown (without oil) on the fry pan. Then paste on the stone slab with a stone pestle along with onion and chili. After that, add salt and mix with bare hands.
	Fresh fish	For fresh fish, first boil the fish and then remove the bone. After that add salt, oil, chili, and sometimes coriander leaf and mix with bare hands.

After defecation

All the respondents in the interview and group discussions mentioned that they wash their hands after defecation, mostly with soap, since they perceive feces as dirty. Some respondents said that they feel “disgusted” by the foul smell of stool, and only a few mentioned that stool contains germs. So after defecation they need to wash their hands to remove dirt, the foul smell, and germs and to prevent stomach illnesses such as diarrhea.

After contact with child’s feces

Many of our study respondents noted that they do not feel any disgust about a child’s feces since they are primarily responsible for cleaning it. As one mother of neonates stated in this regard:

I do not feel any disturbance; as he is my baby, I have to do this [i.e., clean the child’s feces].

Mothers perceived that because neonates and young infants take only breast milk, their feces do not have a bad smell. Mothers mostly wipe the child’s bottom with a dry piece of cloth or sometimes with a wet cloth when the child defecates. However, mothers also avoid frequent use of a wet cloth for wiping because they perceive that the child could catch a cold. Mothers explained that adults eat fish, rice, meat, and other foods, which can give a bad smell to feces. Likewise, when the child grows up a bit and starts eating additional foods, their feces will also smell foul. One mother of infant responded:

I do not feel disgust about my child’s feces. I only feed him my breast milk, no additional food . . . he is very young and does not eat fish and meat like me . . . his stool is not very dirty.

After cleaning their child’s bottom, some mothers (13 of 32) mentioned that they wash their hands with soap, and some specified washing with water alone. A few mothers said that after cleaning their child’s anus, they breastfeed the child and then go to wash the stool- or urine-soiled cloth diapers. While washing the clothes, they use soap and their hands are washed (Table 8). However, a few mothers stated that because their neonates and young infants defecate very frequently, it is not possible to wash their hands after every time they clean the baby.

Table 8: Quotes from mothers about practice of handwashing after cleaning child stool

ISSUES	RELATED QUOTES FROM MOTHERS
Baby may catch cold	“[I] clean the feces from his anus with a [dry] cloth. I do not use water; otherwise he will catch a cold.”
Usually wash hands when washing baby’s cloths	“After defecation, she does not have anything in her stomach; no food in the stomach . . . after cleaning her sometimes I feed her first . . . sometimes I take her [into my] lap and feed and walk and wash my hands with water. After that if I do any cooking-related work, wash hands with soap . . . sometimes when I wash her clothes with soap, my hands are washed.”

In contrast, only a few mothers of neonates and infants (five of 32) perceived that a child’s stool also contains germs; these mothers considered the child’s stool to be dirty and reported feeling disgust. Thus, after cleaning the child’s bottom and before eating or feeding the baby, it is necessary to wash their hands; otherwise, germs would go into the child’s stomach and cause diarrhea.

Mothers reported that if the child defecates during the nighttime, mothers do not wash their hands after cleaning child’s anus because of laziness or because of postnatal proscriptions against going outside at night. Reportedly, even if a female caregiver other than the mother cleans the child’s anus at night, she does not go outside to wash her hand because the water source for handwashing (e.g., a tube well) is not usually very close to the bedroom.

In the case of infants, if their stool falls on the ground, mothers or other family members use different things to clean it up (e.g., a spade, straw, cloth, trowel, or broom). A few mothers said that they do not need to wash their hands when stool does not contact their hands during cleaning; but if their hands get soiled, they wash their hands with soap or plain water.

After handling animal feces

Mothers who need to clean animal feces from the ground/cowshed commonly use a spade, trowel (*cheni/kubari*) or some pieces of cloth. Mothers noted that because they use these things for cleaning, their hands do not come into contact with feces and thus they do not wash their hands. But when they make fuel from cow dung with their bare hands, their hands become soiled with cow dung and they wash their hands with soap since they become “impure” (*napak*) and foul smelling. Some mothers also indicated that dirt from animal feces could cause diarrhea and a stomachache if it enters into the child’s stomach.

Visible dirt

Mothers commonly mentioned that it is necessary to wash hands with soap when dirt is evident on their hands. Visible dirt typically consists of feces (from oneself and a child), animal feces (from cleaning or preparing fuel from cow dung), *kali* (soot produced by burning biomass fuel), mud, dust, and oily substances.

During menstruation

Mothers commonly reported that they must wash their hands with soap during menstruation because it is impure and dirty, and spreads a bad smell; they reported feeling disgust for menses. A few of them explained that they considered menstruation blood a “most dirty” thing, so they use separate soap for washing the cloth napkins they use during this period. Only a few mothers said they use water and mud for washing their hands during this time. Some mothers believe that if their hands are not washed during menstruation, they or their family members would get illnesses such as diarrhea if they eat with this “disgust” feeling.

Bathing

Mothers generally said they use soap during bathing to clean their whole body and to prevent germs, dirt, and scabies or itching. One mother mentioned:

Without soap no dirt can be removed from body.

Material for handwashing

Soap for handwashing

In our study area, respondents used different brands of beauty or antibacterial soap (e.g., Lux, Lifebuoy, and Dettol) for bathing. In the interviews and group discussions, a few mothers and female caregivers informed us that they use Lux or Dettol soap for bathing and taking care of their baby. Many of the mothers and caregivers considered Dettol soap the best for bathing their babies because it removes germs and prevents scabies. Mothers said they wash their hands with Lux, Bangla Saban, Dettol, or Lifebuoy soap after defecation. Mothers also use powder detergents for washing their child’s clothes (particularly cloth diapers/wrappers). Mothers commonly said they use soap for cleanliness. They wash their hands with soap to remove dirt, germs, and bad smells. Mothers said they use soap to wash their hands before and after different activities (Tables 9 and 10). They perceive that many illnesses, such as diarrhea, dysentery, stomachache, itching, scabies, fever, and cough and sneeze, can be prevented by using soap. One mother of infant said:

Bad smell can be removed by soap. Hands get soap's fragrance if hands are washed with soap . . . it removes dirt.

Another mother said:

Soap can remove the dirt quickly . . . if I do not use soap, dirt remains on the hands; hands would not be clean then . . . germs are removed from hands if soap is used.

Some mothers reported that they wash their hands with soap after defecation, cleaning child feces, respiratory secretions, and menstruation before cooking, feeding, eating, and preparing foods (Table 9).

Table 9: How important is soap for handwashing during different situations?

SITUATIONS FOR USING SOAP	MOTHERS' PERCEPTIONS OF LEVEL OF IMPORTANCE
After cleaning menstrual blood, after defecation, for removing <i>kali</i> (soot), during bathing	Critical
After cleaning child's feces, for washing child's cloth, after cutting a fish, when hands are soiled with animal feces or dust	Appropriate
After handling spices (chilies) or oily substances, before eating, before breastfeeding, before taking care of umbilicus	Useful

Table 10: Purposes and occasions for using soap, and how soap works

WHY USE SOAP	WHEN TO USE SOAP	RESPONDENTS' OBSERVATIONS ABOUT WHY SOAP IS NEEDED
To remove dirt	When hands are visibly dirty: <i>kali</i> (soot), mud, dust, greasiness of oily substances, agricultural work-related dirt (from male group discussions)	- Dirt/dust can go into stomach and baby or other family members can get diarrhea, dysentery, stomachache, fever, sneeze, cough, vomiting - After cleaning baby's feces, it looks odd if hands are not washed with soap before eating and serving foods
To remove germ	After defecation, after cleaning child's feces, if hands are soiled with animal feces	Removes germs and prevents stomachache, diarrhea, dysentery
To remove odor	After cutting fish, after defecation, after cleaning child's feces-soiled cloths, after cleaning menstrual blood, if hands are soiled with animal feces	- Otherwise, they smell very bad - Feel disgust (<i>ghinnakore</i>)
To get fresh	In the morning and after finishing daily activities	Clean face and hands after waking up and after finishing daily activities
	While taking a bath	For removing bad smell of sweat from body
For nurturing the child	While bathing child	Using soap during bathing prevents baby from itching and scabies and makes him/her healthy
	To keep the baby clean	A good mother keeps her baby clean with soap

Ash and mud for handwashing

Some mothers reported that they do not use ash or mud for washing their hands. They said mud could not clean their hands properly or remove dirt; it is not active at preventing diseases. A few stated that if they use ash or mud they feel that something is still on their hands. They said ash or mud does not clean their hands; instead, hands are soiled with more dirt. They use ash for cleaning utensils but not their hands. One mother of infant responded:

Ash cleans hands but not like soap. It can't prevent diseases as soap can.

Another mother stated:

I tried once or twice for using ash to wash my hands but it cannot make any foam . . . I felt something remained in my hands as it does not produce any foam . . . I do not feel anything but greasy when washing hands with ash.

Only a few (eight of 32) mothers said they use mud or ash after defecation. These mothers perceived that after defecation, using mud or ash cleans hands, removes dirt or germs, and prevents diarrhea or dysentery. One of them said:

It is better to wash hands with ash or mud than use only water.

Two mothers of neonates mentioned that they came to know through television that diseases can be prevented by using ash or mud.

The few mothers who sometimes use ash or mud after defecation said that mud is available near the tube well so it is easy to use in a hurry when soap is not nearby. However, although they sometimes use mud, they perceived that soap is better than using ash or mud for removing dirt and that it cleans hands swiftly. Only one mother who uses mud said that mud cleans hands and soap removes bad odor.

However, although a few mothers reported using ash or mud, during the data collection period the research team commonly noticed that older children and adults at the interview households or neighboring households washed their hands with mud after different activities and when coming from toilet. The team also observed this informally when they were in study area.

Postnatal practices

Generally mothers in our study area considered the postnatal period (called *chotti ghar*) to last until 40 days after delivery. Although practices vary, during the first five to six days after childbirth, a temporary bed is commonly prepared for the mother with mats, jute sacks/bags, and worn cloths placed on the floor. Mothers perceived that they remain impure due to vaginal bleeding after delivery (akin to menstrual bleeding); if they sit or lay on a bed, blood could stick on the bed and the bed would be impure too. As a result a person who performs prayer could not sit on that bed. Some (10 of 32) mothers reported that they stayed with their newborn on this mat temporarily during this period. However, some mothers also noted that they stayed on their bed with their newborns to avoid cold, ant biting, and "disgust feelings." Mothers generally followed some rituals or restrictions during this period.

Restrictions followed during first six days postpartum

During the first six days, burning *dhup* (coal with husk and/or coconut shell in a clay pot) in front of the postnatal room is a common practice, according to many of our respondents (23 of 32 mothers). Family members of a neonate especially considered burning *dhup* during midday and/or after dusk as a measure to drive away any evil spirit. Mothers believed that the smell of the burning *dhup* would prevent the evil spirit from entering into the postnatal room. However,

only a few mothers (four of 32) who either had had a facility delivery or made frequent visits to a doctor reported that they did not burn any *dhup* because the doctor advised them to not keep any smoke-creating *dhup*, fire, or mosquito coil near the child. Such smoke could suffocate the child and the child might develop a breathing problem. A mother of a young infant said:

No, I did not burn any dhup. I saw other people burn dhup . . . smoke [from dhup] is harmful for child . . . the child cannot breath properly . . . I heard from doctor about the disadvantage [of smoke].

The rest of the mothers reported that burning *dhup* is not a custom of their village now; it is an out-of-date practice.

Mothers informed us that during this period they avoided eating gravy dishes. They eat fried potatoes, fried vegetables, and fried turmeric because these dishes are believed to help the mother and help the child's cord dry quickly. A few mothers also said they took less water so that the child would not have loose defecation.

Usually mothers in our study area are strictly forbidden to perform any household chores for up to six days after childbirth because they perceived that a woman remains impure due to her postpartum bleeding. A few mothers specifically explained that they could not touch any cooking pots and family foods during this period. Their family members (mother, mother-in-law, husband, sister-in-law) helped them with household activities during this period. However, only a few mothers reported that the betterment of mother's health was a reason to follow work restrictions during this period. To avoid lifting any weight, out of fear of developing a prolapsed uterus or catching a cold, these mothers said they did not perform cooking, fetch water in a vessel, or take the elder child on their lap. One mother of a neonate described the restriction on performing household chores from the perspective of concern about impurity and health:

During those five days I did not take my meal or water by [myself]; did not perform any household work; did not take my younger daughter in lap . . . I heard that if I took her in lap or lifted up any heavy weight, I would have prolapsed uterus. That's why I did not bring water or perform any heavy work . . . My mother-in-law and husband perform prayer; my body is impure at that time; if I took food from the cooking pot by my hand, it [rest of food in the pot] would be impure."

Protecting newborns from evil spirits

Some mothers reported that they usually keep the windows of their baby's bedroom closed for the first 40 days to avoid evil spirits or bad air. They also restricted movement of visitors into the neonate's room for the first six days. Some mothers mentioned that during these first days, anyone who enters into the postnatal room, including the mother when she comes from the toilet (or outside), has to warm their hands over fire. One mother explained that people have to warm their hands over fire before entering the room to keep the baby away from contagious diseases. The mother stated:

Sometime we do have "contagious" things in our body; I have period (menstruation) . . . there are other "contagious" diseases. If the child gets any contagious disease, child would not recover.

Mothers said that a neonate should not be alone and at least one person has to stay with the baby. Mothers perceived that evil spirits could enter into the postnatal room and kill the baby, or sometimes the baby would develop a lack of interest in feeding, have stomach pain, or cry at

night. Mothers said that the mother of a neonate was restricted from going out of her room, particularly at night. They believed that a neonate should never be unattended at night.

Mothers also kept iron metal, fish nets, and a small branch of a tree with thorns (such as a plum tree) in front of the door and windows. All these practices are perceived to protect the baby from evil spirits/evil eyes or bad air. One mother of a neonate said:

Elder people used to say for closing windows of postnatal room . . . because if the baby is alone at room, evil could enter in the room . . . once a baby of my brother-in-law was killed [by evil]. At his 12-day age, his mother went to tube well side keeping him alone at room. After coming back she saw the baby died. It [evil] killed the baby by pressing its foot. The baby should not be unattended at room until 40 days . . . because there are evils behind.

Moving mother and newborn to bed

On the sixth day after birth, a program is arranged for the ritual when the newborn's head is shaved (a few mothers also mentioned 21 days) and the baby is bathed, and family members name the baby. There is a common ritual of feeding mothers with 12 different items of food, including fishes, egg, leafy vegetables, meat and lentils; however, the number of items might vary according to the ability of mother's family. At that time the temporary bed is taken out and the mother and newborn are moved to their regular bed.

Maternal intent to improve handwashing behaviors

Motherhood increased handwashing

A majority of mothers (16 of 20 mothers of neonates and eight of 12 mothers of infants) indicated that they had increased their handwashing behaviors because of their new responsibilities of motherhood. These responsibilities centered on childcare—specifically, cleaning the child's anus after defecation and urination (frequent events), bathing or sponging the child, and washing the child's clothes before feeding the baby and sometimes during household work—and sometimes necessitated handwashing before holding the baby. Handwashing after cleaning a child who defecates or urinates reportedly occurs specifically when hands are soiled in the process of cleaning.

Some mothers of neonates and infants believed that hands should be washed after breastfeeding. If the mother's hands are soiled with milk, the milk could go into the mother's stomach and the child would be in danger of loss of hearing (deafness), mental impairment, or even dying. Mothers of infants wash their hands before feeding the child supplementary foods in order to prevent child illnesses such as diarrhea or stomachache. A mother of a neonate gave an example that explains the severity of this perception:

Mother's milk is for babies; how could a mother ingest her own breast milk? Doctors also warn us to be careful about this . . . once a neonate mother in our area mistakenly consumed her own breast milk from her hands during eating betel leaf; she breastfed her baby and did not wash hands before eating [betel leaf]. Due to this reason the child became lethargic and after four days he expired.

Perceived barriers to handwashing

Lack of importance

During the in-depth interviews, observations, and group discussions, when participants described their handwashing practices, they mostly emphasized washing with plain water, not with soap. Most of the mothers stated that they usually wash their hands if they cook, sweep, cut vegetables, or clean cow dung from the cattle shed, or when their hands are visibly dirty.

Mothers mentioned that during their leisure time, particularly when they are only involved in taking care of the baby and not other house work, they do not wash their hands before any critical times (e.g., holding/touching the baby, eating, serving or preparing foods, breastfeeding, and umbilical cord care).

Workload and new role of motherhood

Some respondents who had become a mother for the first time said the new responsibilities of nurturing a newborn hindered them from washing their hands during critical times. They said that when a child starts crying and the mother is engaged in cooking or other household chores, or is coming from the toilet, she cannot wash her hands or sometimes can only wash with plain water. Rather, she must prioritize first soothing the baby by breastfeeding. In that case, mothers noted, they do not have enough time to wash their hands. As one of the mothers of infant said:

Sometimes I can wash, sometimes not. Babu [child] cries a lot. I cannot give him to anyone [attendant] even for going to toilet because it takes a long time in toilet. Then if he cries more, I hurry and come from toilet without washing hands.

Moreover, mothers indicated that breastfeeding newborns defecate or urinate very frequently, and need to be held or touched frequently; it is not possible for the mother to wash her hands every time. One mother responded:

If hands are not soiled [feces or urine], then is it possible to wash hands every time? I need to hold the baby for 100 times; is it feasible for washing hands all these times?

Lack of attendant support

A few mothers mentioned that they are mainly responsible to attend the neonate or young infant; they do not have any attendant support. As a result, when their child cries, they cannot wash their hands during critical times. A mother of a neonate said that during sneezing/coughing when her child is in her lap, she cannot go outside for a handwash; but before childbirth she could wash hands.

Motherhood fear

Mothers perceived that neonates are very vulnerable and catch a cold easily if mothers touch water frequently. Out of this fear they sometimes avoid handwashing. This fear has become a social norm in their rural area.

Social norms: restriction in postnatal period

Mothers of neonates are always advised not to go outside, keeping their baby alone in the room until 40 days, especially at midday and after dusk. Mothers said they follow this restriction up to 40 days to save themselves and their neonates from bad air (*alga batash*) or evil eyes. As a result, if there is no one in the room to attend to the child, they do not go outside for handwashing during this period. One neonate mother said:

Sometimes [during 45 days] I saw no one available in the room. I would not get down from this bed for first nine days; when no one was at the room, if needed I did not go for a hand wash . . . people said that keeping a newborn alone in the room is bad; it is harmful to keep the baby alone until it stays in the postnatal room.

Another mother remarked:

Keeping the newborn alone in the room, I cannot go outside for a hand wash. It could be mid noon or during dusk . . . I afraid whether the baby gets any sickness if it keeps alone in the room . . . anything can enter into room and affect the baby with bad eyes or evil eyes.

A few mothers explained that it is forbidden for mothers to get down from bed or go out from the room until 40 days after delivery. Therefore, if there is nobody to help the mother by bringing water, she cannot wash her hands with or without soap or she might end up waiting to wash her hands until someone else can attend to the baby. Moreover, mothers follow the restriction of doing less household work (than normal) until 30–45 days after childbirth; during this time, handwashing is not always important.

Social norm: handwashing is not a culture

Some mothers of neonates indicated that infrequent handwashing is a social norm in their rural area. One of them stated:

We do not buy so many soap . . . we do not use soap here [rural area] so much; we do not use soap so frequently.

Another mother said:

I do not wash hands all the times; if hands are dirty, I wash my hands. If it is less dirty, we wipe on the door [smiling]. We are living in rural area, we cannot do like you [urban] people; even if you give me so many advices!

Sometimes mothers mentioned:

We do not wash hands out of laziness.

Responsibility for multiple children

Respondents noted that mothers who have more than one child have to attend to older children and household activities, and they feel bothered by the need to wash their hands before holding their neonate during their busy times. Mothers said that most of the time multiparous mothers are in a rush to complete their regular household chores and take care of their elder children. In such situations these mothers consider handwashing after each task to be impossible. It is noteworthy that the age difference between the elder children and the neonate may be minimal, and mothers have to give much attention to them. Sometimes elder siblings play a role as attendant of the newborn; these siblings frequently come from playing and hold or touch the neonate and then go back to their play. Sometimes mothers want to remind the elder children to wash their hands but do not have that opportunity because they are busy with other work. This is a very common scenario.

Affordability of handwashing materials

A few mothers said that they could not afford the required quantity of soap due to their financial situation. Two mothers of neonates said that when they use too much soap, their husbands scold them because they cannot afford it.

Fathers of young infants and family caregivers also mentioned that although they know soap is important to keep the baby clean, they cannot always afford the required quantity of soap for their young children.

Availability of handwashing materials

Sometimes mothers cannot keep soap inside the latrine due to lack of space or out of concern that it will be stolen.

Mothers said that during the neonatal stage, when mothers cannot go outside very frequently, they might store water and soap inside the room; but when the water is finished, it requires time to refill from the distant water source.

A few mothers reported that if they buy the required quantity of soap in a month, other family members (in a context where extended family are present) use up the soap instead of buying some for themselves. For this reason, they buy less soap than the required quantity.

Presence of others hinders handwashing

Only a few mothers said that when someone comes home and they have an important conversation, the mother might not go wash her hands at some critical times.

Opposition from elder family members

Two mothers reported that if they wished to adopt improved handwashing practices during the neonatal period, their mother-in-law would scold them. One mother commented:

When my baby cries and I make delay to take it [baby] into my lap due to handwashing, [my] mother-in-law scolds me.

Another mother said:

I cannot perform [handwashing] for my household works . . . my mother-in-law scolds me; that's why I cannot do it [handwashing]. The time I would spend for handwashing, she [mother-in-law] wants me to perform another task by that time!

Avoiding soap smell in food

One mother said that before preparing food and cooking, if she washed her hands with soap, the smell of soap would be in the food. For this reason, she avoids washing her hands with soap at those times.

Perceived motivators of handwashing

Handwashing for removing visible dirt and as habit

“Visible dirt” on hands prompts mothers to wash their hands. However, some mothers of infants and neonates said that since their childhood, they were taught to wash their hands at critical times, no matter whether their hands are visibly dirty or not (e.g., handwashing with or without soap before eating, before feeding, before serving foods, and after defecation). In particular, they mentioned, “*Before eating, handwashing is a rule.*” One Hindu mother said:

Before holding cooking pot for preparing, I have to wash my hands first . . . this is a religious rule . . . I cannot touch anything without a hand wash . . . handwashing before eating, before cooking and serving food is rule in our Hindu religion.

Cleanliness and removing odor and germs

Mothers considered it essential to wash their hands when they are in contact with their own feces, or the feces of a child or animal, or after cutting a fish to remove odor from hands. They said that during this period sometimes they must wash their hands with soap for cleanliness since because they feel disgust and also to remove germs.

Family and other reinforcement

Some mothers said that elders (mother, mother-in-law, husband, aunt, sister-in-law, and dai) remind a new mother during the neonatal period to wash her hands before and after breastfeeding, before eating a meal, before holding a child, and after defecation. Some mothers explained that elders remind a new mother during the neonatal period to wash her hands if she eats after breastfeeding. They believed that a mother's breast milk can go into her own stomach and cause harm to the baby.

All of the mothers of infants and most of the mothers of neonates reported that usually no one reminds them to wash their hands; when needed, they do it on their own.

Many of the mothers noted that they sometimes remind their other family members (elder children, husband, mother-in-law, sister-in-law, grandmother-in-law, neighbors) to wash their hands at critical times such as before eating, after defecation, after cutting fish, and when they see that their hands are dirty.

Availability of handwashing materials

A sizable number of mothers (19 of 32) reported they could wash their hands when required due to availability of soap, close proximity to water sources (tube well, ponds), and easy access to soap when they need it. Two mothers of infants specifically said that they keep their soap near the tube well, which makes their handwashing convenient because then they do not need to go outside the room or far away for bringing soap.

According to the respondents, generally mothers of a neonate or young infant do not go outside for handwashing at night; thus some of them keep soap and stored water in a bucket or small water pitcher (*badna*) near the door to use for washing their hands after cleaning child feces. During winter nights a few mothers keep hot water on the stove to use for handwashing. A few mothers also noted that they keep water in a jug or a bowl inside the room until 40 days after childbirth and use it to wash their hands at night after cleaning the child's feces.

Perceived benefit of handwashing for prevention of child illness

Some mothers said that after cleaning their child's feces, they need to wash their hands with or without soap, and subsequently they can feed their baby. Mothers said that they wash their hands with or without soap for cleanliness to prevent diarrhea. One mother of an infant explained that many diseases might be spread through the germs remaining on her hands if she does not wash them after cleaning her child's feces.

Some mothers also perceived that before eating, feeding, serving, and preparing foods, they should wash their hands with or without soap to remove germs and keep their children away from illness; otherwise, their child might get sick from their dirty hands. A few mothers also said that soap prevents itching and cleans the body. Another mother of an infant reported that dirt causes worms and removing dirt could prevent it.

Information as a motivator

According to a few mothers, they learned from television and clinics (MAMONI) about handwashing before breastfeeding and eating. One mother particularly mentioned that she learned from television that handwashing could reduce illness.

Attendant support

A few mothers of neonates said that they have someone (elder daughter, mother-in-law, husband, brother-in-law) to attend the child when they are involved in another task, and in this context they can perform handwashing when necessary. During the neonatal period, when mothers are at their parental home, their family members sometimes support them by bringing a washing station (full water bucket or jug) or soap for washing hands when required. For multiparous mothers, other family members sometimes take care of the elder children, so mothers get time for caring for the neonates and are able to wash their hands at critical times.

Social norm: Postnatal practices

Generally, mothers reported that they do not need to perform any household work during the neonatal period as it is socially forbidden to do anything other than take care of the neonate until 40 or 45 days after childbirth. During that period, mostly other female family members cook and serve food to the family. In some cases, if mothers do not have any attendant support or live in a single family, mothers call their younger sister or another close female relative from their parental family to perform the regular household activities and look after the elder children temporarily. However, eight mothers (seven of them multiparous) of a neonate who live in a nuclear family and do not have a helper to assist them with their work had to start working a week after giving birth. Only one new mother who gave birth at her parents' house mentioned getting moral and physical support. This mother also said that due to "dirty feelings" of having vaginal blood until 45 days (similar to menstrual bleeding), she washed her hands when she fed her baby to prevent diarrhea:

I did wash hands; I was not occupied in any work . . . I had water here [at bedside] all the time. My body was dirty [menstruation bleeding] during that time . . . my clothes were impure and got into my hands. I was [breast]feeding my baby . . . shouldn't I wash my hands during that time? . . . if he [child] got any illness? If dirt go [into mouth], the child must have diarrhea.

Information desired

During interviews and group discussions, when asked which information mothers wish to receive regarding child and mother care, generally mothers expressed their desire to get information about children's feeding, what things should be maintained for nurturing a child, children's illnesses and treatment, and how to keep children away from illness. Participants in all group discussions and interviews remarked that all the information/advice and medicine they received from the government hospital and MAMONI health workers came during the antenatal period; they did not receive any information on care after childbirth. Thus, mothers noted their desire for information on complementary feeding from the age of 6 months, including items/ingredients and quantity of food and how to improve feeding/consumption. One mother of a neonate responded:

We can learn if you people inform us . . . say, my understanding about a specific matter [of childcare] may differ from you . . . and it would be better than me . . . if I do not know from you otherwise I would consider my way best.

One mother said she wanted to know which type of dirt causes child illness. A few mothers wanted to know a better way to be clean and what problems they would have if they did not clean. As one neonate mother said:

I would like to know how illness can occur and how I could keep [the child] well. I need to know what which hygiene practices make us better.

Another mother said:

It is important to know how dirtiness could cause an illness.

When asked about the best time to receive the information, a few mothers said the best time would be right after the birth of the child (in the neonatal period); otherwise, mothers might forget the information. Mothers who have more than one child said if they received information after their first delivery, they could recall it for their next children.

Communication channels

Mothers said that they are interested in receiving information through door-to-door visits, small group meetings with other mothers, television programs, billboards/signs along the road, or telephone calls. However, a few mothers indicated that when a woman is at her marital home, she cannot go out because this is not allowed in this area of Bangladesh. Thus, mothers can face difficulty accessing information outside the home.

Who else should receive information about childcare?

Mothers noted that it is necessary to give information to their husbands who are the main income earners and decision-makers in the family and who buy necessary items for child or mother care. However, other family members (mother-in-law, sister-in-law, and even father-in-law) should also receive information so that they can remind/advise mothers when they are taking care of the baby.

FINDINGS FROM THE TRADITIONAL BIRTH ATTENDANT COMPONENT

Demographic Information

The traditional birth attendants (TBAs) in our study areas are commonly known as *dais*. All 10 dais interviewed were female, and their median age was 57. Three had received a small amount of training related to conducting deliveries, with all training received more than 10 years before the interview.

The median length of experience performing child delivery was 16 years. On average the dais in our study area attended one delivery per month (Table 11). However, sometimes they conducted two or three deliveries in a month, and other times they might not conduct any deliveries in six months. Dais in our study area do not ask for any money for conducting deliveries.

Table 11: Demographic information about the traditional birth attendants (dais) who participated in the in-depth interview in Habiganj, 2011

CATEGORY	TBA (N=10)
Number of TBAs	10
Sex	
Female	10
Male	0
Median age	57 years
Received any training	
Yes	3
No	7
Median length of working experience	16 years
Median number of deliveries conducted per month (IQR=1-2)	1
Income from delivery	None reported getting payment
Income of TBA's family	
5,000 Taka (< US\$63)	1
10,000–20,000 Taka (< US\$125–250)	5
> 20,000 Taka (> US\$250)	1
Do not know	2
Missing	1

In total, 14 dais participated in group discussions, seven in each group. None of the group discussion participants had had any training related to conducting deliveries.

Training of Dais

Three dais received training from government and nongovernmental organizations. When asked about the content of the training, one dai said that the training was mainly about the function of different vitamins and the diseases that might occur due to vitamin deficiencies. She also shared that trainers showed a video on conducting a delivery, but she could not watch it properly because of shyness in the presence of two male officials. However, she mentioned that from this training she learned to use a blade for cutting the umbilical cord. Another dai said that she learned from the training how to make a baby cry if the baby would not cry after birth. Only one dai noted that she learned how to check the position of the baby before birth and how to wash and wipe her hands before delivery. One of the dais received a bag, a book on conducting delivery, thread for tying the cord, and seven pairs of hand gloves from the training.

A few of the dais who did not receive any training said that a trained dai knows everything about delivery and can do everything, whereas an untrained dai only does the things that her mind says. They perceived that through training a person can learn the modern methods for conducting deliveries. They also conveyed their desire to receive training on conducting deliveries, so that they can serve better and provide mothers more information and advice. Some group discussion participants reported that, in some cases, they have accompanied their patient to the hospital and stayed until the delivery of the child. When they went to the hospital, sometimes they learned some contemporary practices from nurses or hospital workers. For example, previously they would put hair into the mother's mouth to make her vomit for

delivering the placenta, but they learned from hospital workers that this is a harmful practice and now they abstain from it.

All of the participants in the in-depth interviews and group discussions said that they had not received materials such as posters, leaflets, or delivery kits that describe safe delivery from any health worker or organization in their locality. One participant mentioned that she got some advice from a MAMONI volunteer about how to conduct a safe delivery, and another said she learned about safe delivery from watching television.

How a Dai Becomes a Dai

Some of the informants who had not had any training mentioned that the first time they attended a delivery it was because there was no dai available to conduct the delivery. The mother's family called them for help and they conducted their first delivery successfully. After that, neighbors and relatives started calling them to conduct deliveries and gradually they became a dai. Others reported that they learned to conduct deliveries from their elder female family members (mother, grandmother, mother-in-law, or aunt). One dai mentioned that her mother was a dai, and when her mother got older and her sight became weak, she started assisting her and later became a dai herself. One of the dais mentioned that during the birth of her own child the dai wounded her cervix with her fingernail and it became infected (ulceration). After this experience she wished to become a good dai and serve people until her death. All of the dais believed that conducting deliveries is a sacred job and that they have gained God's blessing for helping people. They said that since they also had the delivery experience, they know women's pain; thus, whenever they get a call, even if they are busy cooking, they rush to the mother's place without finishing what they were doing.

Antenatal Care

Usually the dais in our study do not provide antenatal care to pregnant women. Only two dais said that sometimes if mothers ask, they will go to the mother's house every month to check on the baby's position and confirm the due date. They said that if they see that a baby's position is in the lower abdomen, they massage the mother's abdomen with oil.

However, dais commonly advise pregnant women to visit doctors when they feel sick, such as when they have frequent vomiting, swelling in their palms and feet, fever, headache, stomachache, or dizziness. They also suggest to mothers that they take proper meals that include vegetables, egg, meat, fruits, and *khichuri* (rice cooked with lentils, different vegetables, and oil); rest or take a nap during the day time; walk in their room and not sit down for too long; avoid heavy work; avoid pressing the tube well and holding a pitcher full of water; and avoid bending the body to pick something up from the ground (to prevent injury or miscarriage). Some of them also forbid mothers to go outside at night to protect them from evil spirits or bad air, which could attack the mother and cause the child's death. To protect the baby (fetus) from the effect of evil spirits, they suggested that the mother wear an amulet. Some also suggested that, to protect themselves and the baby in the womb from cold, mothers should avoid water-related work, avoid drinking cold water, wear shoes, and avoid lying on the cold floor.

One dai mentioned that usually doctors suggest that pregnant women eat grapes and apples for the baby's health and the mother's energy, but dais forbid them to eat this kind of energetic food because the baby can gain more weight in the womb and might require delivery by cesarean section. Instead, she suggested, mothers should eat more rice and curry. Dais said mothers' families perceive that they need to spend a lot of money for a cesarean section delivery. Moreover, hospital delivery is not desired in this area; mothers feel ashamed when they are in the presence of male doctors in the hospital and when other people are informed of when the delivery is taking place. This is not expected in their culture.

Conversely, dais in one group discussion reported that mothers usually do not take advice from them; they take it from doctors.

Dai as a Traditional Healer

Among the study respondents, three dais reported that they also serve as traditional healers. One of them gave a spiritual blessing with holy words on a betel leaf, especially at five months of pregnancy. This dai also gave a spiritual blessing in oil and blessed a pregnant woman's husband's *lungi* (one kind of male garment) when the woman felt sick, for the safety of her fetus. Another dai blessed pieces of thread and jute rope and gave them to a mother two wear around her waist and/or arm during the first, third, and sixth month of pregnancy for the safety of the fetus. It was believed to ward off bad spirits.

Calling a Dai for Delivery

Dais said that usually a mother's family calls a dai formally when her labor pain starts or her water breaks and/or blood comes out. In many cases, the mother's family communicates with the dai at three to five months of pregnancy, or at least one month before the due date. Because mothers sometimes do not know the right date of conception, they inform the dai in advance. Only a few dais said that, in contrast to multiparous mothers, primiparous mothers call them in advance out of fear that they do not know what to do.

Half of the dais we interviewed noted that they work within a close neighborhood or village. Only three dais said they go to distant places or outside of their village to perform deliveries. Among them one dai reported that, about a decade ago, she received a seven-day training on conducting deliveries, and after that people began calling her more; now she performs deliveries in six neighboring villages. This dai stated:

They [mothers' families] have been calling me more for last 10/11 years. They called other less frequently. They [mothers/mothers' family] said, "That lady has done training [on delivery]. That lady knows everything."

Some dais in our group discussions also mentioned that they sometimes conduct deliveries for their relatives or known persons who live in other villages. However, some dais reported during interviews and group discussions that sometimes their husband will not allow them to go for a delivery with an unknown male because they have to maintain *purdah* (veil).

Instruments Used During Delivery

Blade

Dais reported that they commonly use new blades, threads, hand gloves, soap, pieces of torn clothes, and Savlon or Dettol (antiseptic) for conducting deliveries. They said that the mother's family usually buys the new blade and boils the blade and thread before delivery. Only a few dais said that the blade is boiled to make it germ-free; otherwise, it might cause diseases in the mother and baby. Dais said that before 10 years ago, they used a bamboo slide (*basher patla konchi*) for cutting the cord, but now they all use blades. They learned about using blades from training and other people.

A few dais said that if they go to a neighboring place for delivery and do not find a blade or thread available, they will go back and take a blade and thread from her own home. One dai noted that she uses the same thread for tying bags at her poultry farm since it is strong and white. However, before using it, she boils the thread for an hour.

Hand gloves

Dais mostly reported that they conduct deliveries with their bare hands. A few dais use gloves occasionally; they purchase the gloves themselves and take them from home before going to a delivery place. Those who do not use gloves said they would use gloves if they were made available. Only one group discussion participant reported that she uses hand gloves during delivery; she gets the gloves from her neighbor who is a family welfare visitor. Dais explained that if they use gloves, their hands will not get soiled with “dirty blood” and nothing can stick on them; also, the mother’s cervix and the child’s head will be protected from their fingernails, which might otherwise cause bleeding, swelling, or ulceration/infection (*gha*) in the umbilical cord.

Delivery kit

When the dais were asked whether they use or had heard about delivery kits, four of the 10 dais and a few group discussion participants responded that they do not use but had seen or heard about delivery kits. They said that the delivery kit bag contains a new blade, thread, scissors, clips, and soap and that it is useful. They explained that the hand gloves would save the baby from any problem from their fingernails; the clips could be used to hold the umbilical cord; and the blade and thread could be used without boiling. Only one dai reported that she had used a delivery kit for eight to nine deliveries and in each case it was given by the mother’s family. This dai perceived that it is good to use the kit because then she would not need to worry about germs and disease transmission from the instruments. She explained:

It was good to have the kit . . . because I do not need to worry about germs. I do not worry about any disease entering [from any instrument].

Then the interviewer asked how the germ could enter and the respondent replied:

Germ or disease could enter [in the body]; germ could not be seen [with the eyes]. It [germ] is very small and can enter into the body easily. I could not see when it [germ] enters . . . but the instruments remain[ing] in the [safe delivery] kit contain some medicine . . . I think for this medicine germs cannot enter [during delivery when these instruments are used].

Using oil

A few dais (three of 10) noted that sometimes they use coconut oil or mustard oil on their hands to make their hands greasy. One dai explained that when the baby’s head comes to the cervix, she sometimes puts oil on her hands and enters her greasy finger into the mother’s cervix to facilitate the delivery. Because of the grease, the baby’s head and the mother will not experience any pain.

Handwashing Perceptions and Practices

Dais reported that usually other women are present in the delivery room. The women could be the pregnant woman’s mother, mother-in-law, sister, sister-in-law, aunt, or another close relative or neighbor. Including the dai, typically there are two to four persons available in the delivery room. Dais did not know whether the other people in the delivery room wash their hands before entering.

Before the delivery

Dais perceived that handwashing before delivery is important; otherwise, dirt or germs on their hands could infect the mother’s cervix or umbilical cord. They explained that during delivery the dai’s fingernails could scratch or abrade the mother’s cervix or the umbilical cord, which could cause ulceration (*gha*) or swelling or pain in the mother’s cervix or in the umbilical cord. One dai said that if the dai’s hands are not washed before conducting a delivery, the child might get scabies on his/her head. The dais reported that because of this perception, they wash their hands,

face, and legs before entering the delivery room. For the same reason, they usually cut their fingernails beforehand to avoid the risk of injuring the mother and baby during delivery. A few dais also added that, because they eat betel leaf with lime very frequently, they need to wash their hands well before conducting any delivery. They explained that they use their bare fingers for putting lime into their mouth, and if they did not wash their hands, lime could come into contact with the umbilicus area, which could cause bleeding or *gha* (infection/ulceration) in that area, or come into contact with the child's eyes and face, which could result blindness. In a few cases dais reported doing ablutions for performing prayer before entering the delivery room. When asked how they wash their hands, most of them (seven of 10 dais) reported that they use soap for washing their hands. They said that when a mother's family calls them, if they are engaged in house work such as cooking or handling straw or cow dung, their hands are soiled with dirt and dust. They wash their hands with soap before leaving home to go to the mother's place. In this regard, one dai said:

Disease-germ can remain in hands . . . this [understanding/perception] come from my mind . . . that if any germ enter into child's umbilical cord, then it would get stomach pain with cramping.

However, while most of the dais in one group discussion reported that they wash their hands with soap before entering the delivery room, in the other group discussion most dais said they wash their hands with plain water before the delivery. One of the participants stated:

We hold so many things with our hands . . . now I will conduct delivery of this woman; it is a holy place [cervix], it is a miracle place. After staying 10 months in the womb, now I would deliver the baby by my hand; so I wash my hands. I do put my hands into her vagina for the delivery; I wash my hands so that the child would not have any disease.

Delivery place

While some dais reported that they conduct deliveries on the floor, some said they do it on the bed so that the mother and child will not catch a cold, fever, or cough from the muddy floor. Dais who conduct deliveries on the floor use jute bags, straw, rice husks, torn quilts, and plastic sheets for protecting the mother from the cold. One dai mentioned that she conducts deliveries on the bed only during the winter.

During the delivery

After entering the delivery room, dais commonly give blessed water and recite holy words from the Quran to bless the mother. Dais reported that they sometimes massage mustard or coconut oil on the mother's head and abdomen to position the baby. To check the progress of labor, dais check the baby's position and examine the mother's back and abdomen by hand. When the birth canal opens to three to four finger widths they know that it is time for delivery. If there is no pain they call for a pharmacy doctor to administer a saline IV and/or injection of other substances, and/or homoeopathy (for increasing pain).

In interviews and group discussions dais commonly said that they do not wash their hands again during the course of a delivery. They perceived that since they are handling "dirty blood," there is no need for handwashing. As one dai mentioned:

Soap is not required during that time. I do handle dirty things during that [delivery] time, I do not contact with other dirt during that times. That dirt [bleeding during delivery] would not make any harm to the baby; but earlier dirt [which was at hand before starting the delivery] could cause harm to the baby.

Dais reported that they wipe up their blood-soiled hands with a piece of worn cloth when they need to insert their hand in the birth canal or before tying the knot for the umbilical cord. Only if the dais eat any food or betel leaf during delivery would they wash their hands with or without soap. Otherwise, during delivery, if the dais go to the toilet, they wash their hands with soap due to the feeling of disgust and because they consider feces to be poisonous to the mother during delivery.

Releasing the baby and cutting the cord

After releasing the baby, dais reported that they first tie up the cord with thread and then cut the cord. Before tying the cord, if the dais' hands are soiled with blood, they wipe their hands with a piece of cloth and do not wash their hands separately before cutting the cord. A few dais said that sometimes they hold the cord with a piece of cloth (from old clothes), which is sometimes clean and sometimes not. Mothers who prepare for delivery in advance may make small pieces of cloth from an old dress, wash them, and keep them at hand. Otherwise, the dais have to use whatever is readily at hand during delivery, but handwashing is not necessary before cutting the cord. The cord is usually cut after delivery of the placenta.

More than half of the dais reported that they usually do not cut the cord because they believe that the person who cuts the cord remains impure until 40 days after delivery and cannot perform prayer. For this reason, dais ask the mother or a female relative/family member to cut the cord. Dais usually do not remind the person who cuts the cord to wash his or her hands before touching the blade. Only one dai said that she told the mother to wash her hands with warm water and soap before cutting the cord.

Wiping/bathing baby

Dais reported that after tying the cord, they wipe up the baby with a piece of clean dry cloth, wrap the baby with another piece of cloth, and give the baby to the mother for breastfeeding. All but two dais noted that, after the birth, they wipe up rather than wash the baby so that the baby will not catch cold or develop breathing problems, fever, or cough. Participants in a group discussion mentioned that they do not bathe the newborn because doctors forbid it nowadays because the newborn could get pneumonia.

Delivery of placenta and dai's cleanliness

After tying the cord and wiping the baby, dais deliver the placenta. Dais noted that most of the time they deliver the placenta before cutting the cord, but three of the 10 dais said that if they observe that both the child's and the mother's condition are good, they first cut the cord and then deliver the placenta. Moreover, in cases in which delivery of the placenta is delayed, they also cut the cord first and then try to deliver the placenta. Dais said that for delivering the placenta they usually massage the mother's lower abdomen tenderly, giving a little push and gentle traction to the cord (mother's side). A few dais reported that when the placenta does not deliver spontaneously, they remove it manually. If it is delayed, dais feed the mother unboiled water (supply water or pond water), touch cow dung to the cord (on mother's side), and put hair into the mother's mouth so that she feels nausea and delivers the placenta. Sometimes dais pull out the placenta with their own hands. Only one dai reported that she transfers the mother to the hospital if the placenta does not deliver.

After delivery of the placenta, dais consider their work finished and wash their hands with or without soap. Sometimes they take a bath to clean and make the body pure because they perceive that they have touched "dirty things" during delivery. If soap is not available at the mother's house, the dai washes her hands with plain water and/or mud and then, after returning to her own home, washes with soap. Dais noted that after a delivery they must wash

their hands with soap before eating anything; otherwise, they would feel disgust from touching dirty things during delivery.

Prolonged labor

Half of the dais reported that when labor pain continues for a long time, they refer mothers to the hospital. But some of them said they do not send the mother to the hospital; rather, they wait for the labor to progress.

Some participants in in-depth interviews and group discussions said they first examine the mother to see if the mouth of the uterus is open one or two finger widths; then they go back to their own house and finish household chores and/or take food or betel leaf; and then again they go back to the mother's place. After coming back to the delivery place they usually wash their hands with or without soap before conducting the delivery. Sometimes they call the local village doctor/homeopathy doctor and push a saline IV and/or injection of other substances, or homeopathy medicine. Some mentioned that they do not eat anything during prolonged delivery as they feel disgust (*sok kore*). One said:

I feel disgust because I am handing the dirty things. I am handling [the dirty things] until the baby is delivered.

Only one dai said she does not wash her hands again during a prolonged delivery.

Cleaning mother after delivery

Dais reported that after the delivery mother is sometimes given a bath or washed up to the waist with warm water, with cold water poured onto her head.

First feeding of the child

Dais reported that they suggest that the mother feed the baby colostrum first. They tell the family members that before the mother breastfeeds for the first time, the family should wash the mother's breast with warm water and soap or with water that has been soaked with gold and silver jewelry; alternatively, they can wipe it with a cloth soaked with water, to remove dirt and sweat. Dais perceived that otherwise the child could get stomach problems from the dirt on the breasts. One dai mentioned that even this dirt can cause a child's infection.

Signs of a healthy newborn at birth

Some dais mentioned in the in-depth interviews and group discussions that a healthy baby cries immediately after delivery. They also noted that if the baby does not cry instantly, they pour water onto the umbilical cord and massage it tenderly; then the baby will cry. Some dais also reported in group discussions that they blow into the baby's mouth and ear to supply oxygen; and sometimes they take the placenta (the cord is usually not cut at this time) on a spade and put it on a fire to warm it; then the baby gets his or her life back. Some dais also said that a healthy baby moves its hands and legs and sucks a good quantity of breast milk; on the other hand, a sick baby wants to take breast milk but cannot suck. A few dais said that after birth healthy babies open their eyes and breathe freely. Some of the dais also that if a baby is sick after birth, they refer the child to the hospital.

Umbilical cord care

Dais mentioned in the group discussions that if the blade is not boiled before the cord is cut, the newborn will get tetanus. They added that during cord cutting, if dirt goes into the umbilicus area through hands or any other way, it will cause *septi* (sepsis) or *gha* (infection). One dai

mentioned that if the thread is knotted loosely onto the cord, the newborn might get an infection on the umbilicus area.

Dais reported that, in most cases, they do not do anything with the cord immediately after cutting it. They said that usually the mother and her family members take care of the cord. One dai mentioned stretching the cord with her hands and giving a spiritual blessing to stop the bleeding immediately after cutting it.

Dais said that elders in the mother's family usually know the common practices of umbilical cord care and sometimes dais also advise them before leaving the delivery place. Dais said that until the cord falls off, members of the mother's family commonly use mustard oil or hot fomentation with the tip of the thumb or a cloth to dry the cord quickly and lessen the navel pain; but in case of any inflammation (infection) in the umbilicus, mothers use medicine (Nebanol and boric powder) or seek a doctor's advice on their own.

However, a few dais noted that if the cord does not fall off by the third or fourth day after birth, sometimes the mother's family consults with them. Then the dais suggest applying mustard oil and Nebanol powder or giving hot fomentation on the cord.

Dais said that after the cord falls, if the umbilicus area looks damp, sometimes mothers apply vermilion powder to prevent insects from sitting on it and to promote early drying. A few of the dais mentioned that caring for the cord in this way is part of the culture in their village. Some dais who participated in the group discussions perceived that if the baby's urine were to fall into the umbilicus area, the cord could develop an infection.

When dais were asked whether the mothers wash their hands before caring for the cord, a few dais said that they were not sure and a few said that mothers do not wash hands before cord care.

Barriers To and Motivators of Handwashing during Delivery

Barriers

- Most dais reported that after getting a call for a delivery, if they are engaged in any household work in which their hands become visibly dirty, they wash their hands with soap in their own home and then go to the delivery house. In such cases, after arriving at the mother's place, they do not wash their hands again before entering the delivery room.
- Dais who cut the cord did not consider it necessary to wash their hands beforehand. They argued that because their work is not finished yet (their hands are soiled with the mother's "dirty blood" and they still need to wipe, wrap, and deliver the placenta), they wait to wash their hands until after completing their duties. One dai commented in a group discussion:

That time our hands are soiled with blood, till then I have not cleaned the [delivery] dirt, I have not cut the cord; I have to contact with that blood again; why should I wash my hands?

- Some (three of 10) dais remarked that during the delivery they remain very busy, so it is not possible to wash their hands during this process.
- Only three dais reported that sometimes there is no soap available at the delivery home so they cannot use soap for handwashing.
- One dai reported that she reminds the family to wash their hands with warm water and soap before cutting the cord and holding the baby, to protect the baby against infection or sepsis, but family members often ignore her suggestion.

Motivators

- Dais generally said that if hands are not washed before the delivery, dirt remaining on their hands could abrade the cervix or umbilical cord and cause *gha* (infection). Based on this perception, dais always wash their hands with or without soap before conducting a delivery.
- Dais informed us that they usually get water inside the delivery room and thus they can wash their hands whenever they perceive it is needed (e.g., if they eat something). One dai noted that if it is not already available, she insists that the mother's family bring soap and Savlon to the delivery place.
- In a few cases dais said that if they know from earlier that there might not be soap at a mother's home/delivery place, they will carry soap and sometimes a blade and thread from their own home. If the soap is new, they bring it back home after finishing the delivery.

Advice on Postnatal Care

After childbirth, dais make several suggestions to the mothers of newborns:

- Dais reported that after a delivery they usually advise the mother to breastfeed her baby. They commonly instruct the mother to wash her areola with gold-silver soaked water before the first breastfeeding to remove dirt and "bad eyes." They also tell the mother to wash or wipe her breasts with soap to remove any sweat and dirt that might have gotten on them from the floor during delivery. They advise the mother to wash her hands and wipe her breasts before each breastfeeding; otherwise, dirt, sweat, or germs might get into the child's mouth and could cause stomach problems for the child. One dai advises the mother to feed the baby liquid (glucose) with a dropper if the flow of breast milk is not adequate. The dais also tell mothers to give their babies boiled water for drinking.

Some dais also suggest that mothers should eat fish, meat, eggs, and milk after delivery to increase breast milk and should continue exclusive breastfeeding for five months. If the baby does not get enough breast milk, some dais advise mothers to let the baby suck the breasts more.

Some dais suggest mothers give the child additional foods (e.g., rice with egg yolk, fried fish, and *khichuri*) after five months.

- As part of postnatal care, a few dais recommend that mothers wash their hands with warm water before caring for the cord, to avoid any swelling or ulceration (infection) in the umbilicus.
- One dai reported advising mothers to wash their hands with soap if they hold the baby after washing dishes or cleaning cow dung and household dust; however, she said that not all mothers follow this advice. She stated:

They are rural people; they do not follow much [her advice about handwashing]. People who are from educated family obey it [advice]. . . . Many of them follow the old practices, they thought and said that we did not wash our hands and legs [as suggested] in previous times and we did not have any problem. Then we replied that you do not follow these [behaviors] but you may sometimes hear mothers or children get sick. If they get sick it required money [for treatment]. [We ask them] which one is good—you would not follow these practices and spend money when get sick or you would follow the practices and stay save from spending money?

- Three of the dais mentioned that they advise the mother's family about bathing the baby. One suggests first bathing the baby five or six days after birth to protect the child from cold;

another advises the family to bathe the baby at the same time every day (such as at noon or 1:00 p.m.); and another suggests bathing the baby regularly.

- One dai said that she suggests that mothers change the baby's soiled cloth diaper as soon as possible; otherwise, the baby will catch a cold. She said that some mothers do not believe that a urine-soiled cloth should be washed; rather, they dry it under the sunlight. For this reason, she advises mothers to wash urine- or feces-soiled cloths and then dry them in the sun.
- Some dais advise the mother's family members to take care of the mother after delivery—for example, by providing good food (fish, chicken, sweets, and so on); avoiding giving her rotten foods; and encouraging her to drink more water, especially warm water. They also advise family members not to involve the mother in household chores and to let her sleep and keep herself clean.
- One dai said that she visits the baby every two to three days until 40 days after delivery. She considers it her responsibility to visit the baby and ask how the mother is taking care of her child. If the baby is sick, she advises them to go to a doctor.
- One dai noted that mothers usually want to know about family planning methods from her.

Perceptions of Neonatal Illness

Some dais perceived that babies commonly are affected by cold, pneumonia, jaundice, diarrhea, green defecation*, cholera, stomach pain, fever, sneeze, cough, measles, white layer in baby's mouth, itching/scabies, tetanus, and umbilical infection during the neonatal period (that is, within 1.5 months of birth).

Pneumonia

Dais commonly said that pneumonia is the most dangerous disease for newborns as it can lead to death. They said that the symptoms of pneumonia are that the baby cannot breathe properly or fast, cannot suck breast milk, and seems to have chest in-drawing. They said that if the mother of a neonate handles water very frequently or bathes the baby too often, the baby might get pneumonia and fever.

One dai said that if the baby is given a bath in the *chotti ghor* (postnatal room) immediately after birth, the baby will contract pneumonia. Another said that if a mother breastfeeds without wiping her breast, the baby will have breathing problems.

Cold

Some dais said that if a lactating mother handles water too much, she might catch a cold, and her newborn can catch her cold from her breast milk. That's why dais often advise mothers to avoid handling excess water, to wear sandals, and to avoid sleeping on the floor. One dai said that if a mother does not dress her baby, the baby will catch a cold.

Tetanus

Some dais said that if a newborn gets tetanus, the baby will shiver and would sound like “*ay ay*,” and blood would come out through the baby's mouth. Some said that if an old blade is used during delivery or any dirt goes through the umbilical cord, the child will get tetanus.

* When a child has frequent loose stool (yellow color), it is called diarrhea. But if the child has green feces, it is called “green defecation” or “green diarrhea.” In one study (Shahana Parveen, personal communication), mothers perceived that only young children get this problem from breast milk. This type of feces might not be very loose; it can be semi-loose. The frequency of defecation during this type of episode may be less than with general diarrhea.

Jaundice

Four dais mentioned that the signs of jaundice are yellow eyes and/or yellow skin, and that sometimes the baby will also get a fever. They suggest to mothers that they keep the baby in the morning sunlight as a treatment for jaundice. One of them remarked that sometimes a baby can get jaundice and pneumonia from the mother's womb; in these cases, the baby might die.

Diarrhea

One of the dais said that if a mother of a newborn looks at a patient with diarrhea, her baby will get diarrhea from the mother's breast milk. Another said that after doing household chores, if a mother with dirt and dust on her body breastfeeds her child, the child will get diarrhea. If the baby has diarrhea, sometimes the dais suggest that mothers feed oral rehydration solution to the baby and avoid breastfeeding during this period because breast milk will make the baby vomit very frequently.

Other

One dai said that, before breastfeeding, a mother should clean her breast to remove the layer of dirt on it; otherwise, the child might get a disease like fever or stomachache. Another said that if dirt remains on the mother's hands and clothes, the baby might get sick.

Recommendations for Care Seeking

Dais said that people in their area do not like to go outside for delivery; they try to deliver at home, if possible. If there is a serious problem, only then will they go to a hospital or doctor. Dais reported that mothers prefer delivery at home because they are poor and hospital delivery requires money. Moreover, they believe that in the hospital, doctors want to conduct cesarean sections, even when the mother does not have any complications. Dais noted that mothers also feel shy about delivering in the hospital in the presence of many people. One commented:

We are not doctors; they [mothers] are not required to pay us money. We do conduct delivery at home; [they] do not give us any money [for that]. If they pay, they only give 10 or 20 taka. But in the hospital, a lot of money is required.

Dais reported that if they see that they cannot conduct a delivery at home and it is a complicated situation such as malpresentation, anemia, or prolonged labor, or if the baby is big but the birth canal is narrow, they refer mothers to the hospital out of fear that the child or mother will die.

Responsibility for Illness or Death of a Newborn or Mother

We asked dais whether a dai could be responsible for a mother's or child's death during delivery. Dais said that, during delivery, if a dai places her hands in the mother's cervix, the cervix could be injured by the dai's hands and the mother could get an infection. Two dais stated that some dais do not understand the proper position of the fetus (malpresentation) and try to deliver the baby following a process that could cause a child's death. Only one participant mentioned that if both the mother does not maintain cleanliness during pregnancy and the dai does not ensure cleanliness during delivery, the mother or child could have convulsions during delivery as well as severe fever and headache. They said it is important to be a good dai. One dai shared her own experience:

During my second delivery the dai [who conducted the delivery] put her hand in my vagina very frequently . . . [During that time] her nails wounded my cervix . . . for that reason my condition was very bad . . . I had ulceration [infection] on my cervix . . . [for this problem] I had to seek treatment from several doctors.

Perception of a “Good Dai”

When we asked dais about the characteristics of a good dai, they responded that a dai who conducts deliveries properly is a good dai. A good dai does not hurt the mother or child during delivery, does not give the mother pain in the cervix, does not frequently put her hands in the birth canal, and when necessary, suggests going to doctor. A good dai should have good manners and give the mother courage, making the mother happy by chatting during delivery. They added that no mother’s or child’s death would occur at the hands of a good dai during delivery; thus people call such a dai more often. Two of the informants said that a good dai also makes mothers and herself neat and clean before the delivery. Only one respondent said a trained dai is a good dai. One dai noted that because she has had the experience of conducting deliveries of malpresenting fetuses, people call her more; people then would not need to spend so much money in the hospital for delivering the child.

Social Status of a Dai

Dais said that everyone in the society respects a dai. They believe that people consider their work important to their society. Sometimes a bond develops between a dai and the mother’s family. Dais do not claim any payment for a delivery; on the contrary, the mother’s family usually offers the dai a *saree* (traditional garment), perfume, soap, and food, and invites the dai to visit the baby and mother afterward and sometimes to attend the baby’s naming ceremony. In a few cases, the mother’s family gives the dai cash. Sometimes very poor families cannot give the dai anything. One dai shared her experience with this:

People consider [me] good . . . they say, “If you died, to whom we will go?” If the lady [dai] died, what will I do?”

Another said:

I do it [delivery] for goodness . . . if I ask for money, I destroy the blessings I have gained.

Only one aged dai mentioned that if she conducts a complicated delivery successfully, such as a malpresenting baby or stillbirth, the mother’s family pays her money. Dais also reported there the choice of a dai does not depend on religious affiliation.

Discussion

MOTHER COMPONENT

Our findings from the mother component suggest that there are sizable opportunities to improve handwashing behavior among mothers in the neonatal and infant periods in Habiganj, Bangladesh. Our theoretical model has captured many of the motivators and barriers among mothers of neonates and infants. Mothers perform certain handwashing behaviors during the postnatal period and also in their daily life.

Important barriers to handwashing behavior among mothers of neonates and young infants in Habiganj include the following:

- New responsibilities of nurturing a neonate, such as frequent feeding and frequent cleaning after defecation and urination
- Increased workload when nurturing a newborn in addition to rearing other children and performing regular household work
- Social norms that restrict going out during the postnatal period, particularly after dusk
- Maternal fear of excessive exposure to water
- Infrequent handwashing as a social/cultural norm in rural area during the newborn period and at other times
- Inadequate support from elders (within family or neighbors) for maternal behavior change
- Lack of affordability of handwashing materials for frequent use during newborn period or at other times, linked with decision-making power since mother is not the primary decision-maker; she has to rely on husbands or in-laws to purchase items for childcare
- Lack of handwashing materials in the locations where mothers and newborns spend most of their time

Important motivators of handwashing behavior include the following:

- Mothers' perceptions of good motherhood, including maintaining cleanliness of both the child and the mother, and plans to nurture the child
- Perception that soap is necessary to clean hands, particularly for visual dirt and improving the smell of hands
- Social norms regarding doing less work during postnatal period
- Attendant support in an extended family structure or on a temporary basis during postnatal period, allowing mother to be less involved in work and perform required handwashing
- Support from husbands and other family members in making water available to mother during neonatal period
- Availability of soap and close proximity of water and a handwashing station
- Mothers' intent to improve handwashing behavior (e.g., before and after feeding child) during the neonatal period
- Perceived benefit of handwashing for prevention of child illness, primarily diarrhea and other stomach problems
- Verbal cues from elders regarding handwashing before and after breastfeeding

Several studies carried out in Bangladesh found that handwashing with soap is infrequent after critical events, including fecal contact, which community members cite most often as requiring handwashing. Mothers of neonates and infants, as members of this social structure, also perform infrequent handwashing with soap. Our informal observations also demonstrate that although mothers have knowledge of washing hands with soap, the use of mud as handwashing material after toileting may still be prevalent in this area. Promotion of handwashing, particularly in this area, should focus on increasing awareness of the importance of using soap. While mothers indicate intent to improve handwashing behavior, that intent is counterbalanced by the substantial increase in workload for a woman with a newborn and no support from her elder family members for implementing neonatal care behaviors that go against the social norm. Moreover, the workload is multiplied for women with other children in addition to a newborn, creating an even more difficult situation for mothers within this social structure. Encouragingly, a number of mothers already associate handwashing with soap with prevention of diarrhea; this understanding should be enhanced by increasing awareness of the importance of handwashing with soap for reduction of other morbidities, such as pneumonia/sepsis and omphalitis, which are unique to the neonatal period. Furthermore, some mothers already can correlate handwashing before cord care with preventing infection, which could also leverage awareness of other neonatal morbidities.

In many cases our observational findings, as well as the mothers' self-reports, emphasize the importance of having handwashing materials in the location(s) where the baby and mother spend most of their days and nights. Handwashing materials may also provide a visual cue to prompt handwashing behavior; if the mother and baby spend most of their day in a bedroom located indoors, but soap is only available next to the tube well, the mother does not benefit from the visual cue. Moreover, due to restrictions on her movement during the first weeks of the baby's life, the mother is not always able to access the handwashing materials when she needs them. This barrier can be addressed by providing a portable handwashing station (with an additional bowl/bucket/container for disposing of water) that can easily be kept in the mother's bedroom or other living space. But this simplistic approach might not overcome this barrier entirely; there will be resistance from elders who may scoff at the notion of handwashing before holding the baby, or who may deride the mother for obtaining materials to facilitate her child nurturing.

Our study findings repeatedly highlight the critical role played by elders during the neonatal period and child rearing. In Habiganj, irrespective of parity, mothers commonly have their delivery at the marital home. Thus, for the first few days after delivery the mother has to follow the rules and restrictions suggested by her elder in-laws. Mothers might also believe that these behaviors are for the betterment of her baby and herself. While they wish to improve their handwashing behavior, they have to depend on the in-laws to allow and provide the handwashing material—for example, by bringing water in a bucket/container, refilling the water, or bringing soap. In-laws are supportive of providing the handwashing materials, if they feel handwashing is required at certain times during this period. Mothers also indicated that verbal cues from elders motivate them for handwashing. These findings suggest that engaging elders in the behavior change process is critical and may be quite effective for improving handwashing behavior. Messaging targeted at elders should highlight the threat of neonatal disease and emphasize the elders' role in protecting the newborn. Yet, it is important to strike a balance between engaging the elder and contributing to adverse power dynamics between the mother and her elders.

Although intra-household power dynamics vary from culture to culture, one important dynamic that presents a barrier to handwashing is likely a global concern: the increased workload faced by the mother of a newborn. We found that mothers living in an extended family structure get support from their family in various ways, including assistance with bringing water from a tube well or a distant water source and attending to the baby so that the mother can do other tasks such as handwashing, as needed. For multiparous mothers, family members sometimes attend to the older children so that the mother can nurture her newborn. Still, the increased workload

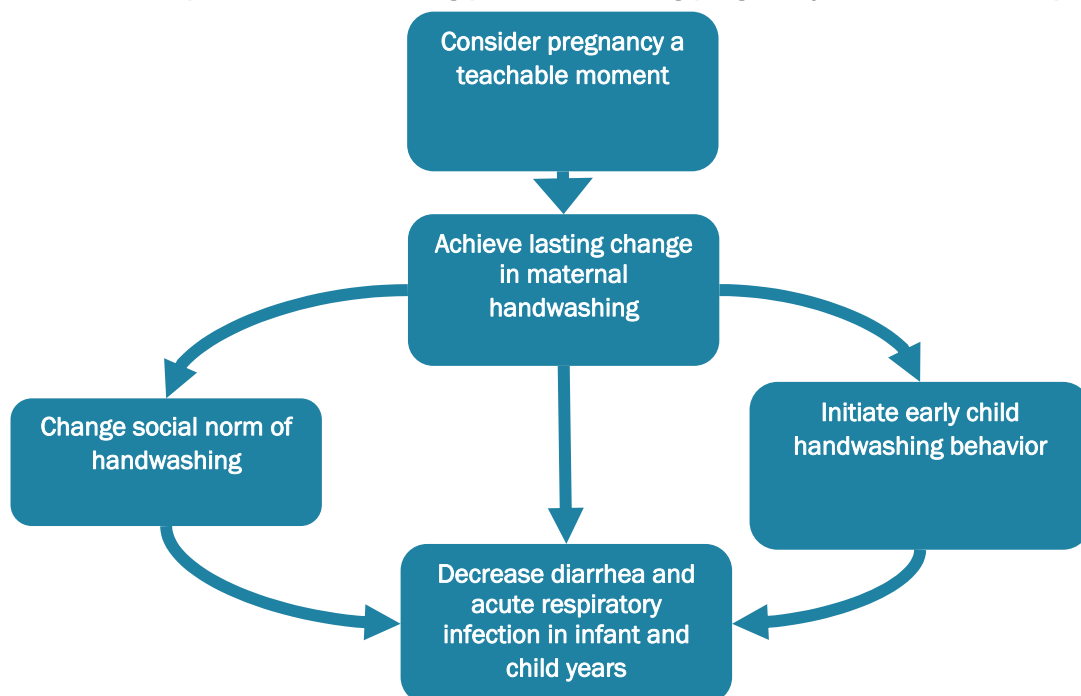
cited as a barrier by many mothers makes waterless hand cleansing a more efficient option than handwashing with soap and water.

Our findings suggest that mothers commonly do not believe that neonates are at risk of morbidity or mortality from any infection or disease. Rather, the perceptions of a neonate's vulnerability are culturally embedded; mothers in Habiganj believe that a child's exposure to an "evil spirit" could even kill the child. Mothers perceive that children are more vulnerable in later infancy because during that time a child's exposure to "dirty surroundings" or "dirty hands" could result in diarrhea or stomach problems. Remarkably, mothers do not see a high-level health threat for neonates or infants. Based on these findings we propose that promotion of handwashing during the perinatal period should leverage culturally based perceptions of vulnerability in order to drive home the message that children in the neonatal period can die from infections that may be prevented through improved handwashing behavior.

Another important culturally ingrained barrier to handwashing is the concern about excessive exposure to water and the potential risk of exposing the neonate to cold, either directly or indirectly (through the breastfeeding mother). Handwashing promotion programs should consider promoting waterless options for hand cleansing, such as the use of waterless hand sanitizers. Waterless options might also be useful in addressing other barriers; for example, hand sanitizers are portable and elders might be more easily convinced of their unique benefits during the neonatal period.

A number of factors identified in our study could be leveraged to improve handwashing during the neonatal period, including maternal drive to nurture, maternal intent to improve handwashing behavior, and the perceived threat of the neonatal period. These motivating factors suggest that pregnancy is truly a "teachable moment." This period in a woman's life is characterized by enhanced risk perception, increased outcome expectancies, emotion-based behavioral responses, and a transforming vision of one's role.⁸ We hypothesize that late pregnancy and the neonatal period serve as a unique opportunity to make deeper and more sustainable improvements in maternal handwashing behavior than might be made later (Figure 3).

Figure 3. Potential impacts of handwashing promotion during pregnancy and the neonatal period



However, given the cultural and social context of mothers in Habiganj, this teachable moment may be most profound for primiparous women, who are undergoing greater changes than multiparous mothers in terms of their role as mothers. Further investigation is needed to understand the impact of handwashing promotion in the perinatal period, including health outcomes among neonates and infants as well as potential long-term gains in improving maternal handwashing behavior and stimulating early adoption of handwashing behavior by children.

TBA COMPONENT

Our findings from dais offer insight into their handwashing behaviors before, during, and after delivery. Several barriers and motivators for handwashing behaviors were revealed in our in-depth discussions with dais.

Important barriers to handwashing behaviors before and during the delivery include the following:

- Lack of perception of a need to wash hands immediately before entering the delivery room
- Perception of a feeling of being “impure” restricts dais from cutting cord
- Perception of handling “dirty blood” during delivery discourages handwashing during delivery
- Lack of transfer of knowledge regarding the importance of handwashing when the mother or another family member cuts the cord
- Lack of soap at some homes
- Family members’ ignorance regarding the dai’s suggestion to wash hands during delivery or before cutting the cord

Important facilitators for handwashing behavior are as follows:

- Perception that dai’s dirty hands or fingernails could infect mother’s cervix or child’s umbilical cord
- Availability of water at delivery room

Dais in our study area typically wash their hands before entering a delivery room, and most reported using soap, to prevent any infection of the mother’s cervix or the child’s umbilicus cord from dirt on their hands. But there may be a gap between when dais wash their hands at their own home and when they enter the delivery room. One study in Nepal found that the risk of newborn deaths was 19% lower when birth attendants washed their hands with soap before assisting a delivery.⁴ Similar to rural communities in Nepal, in Habiganj dais usually do not cut the cord.⁹ Dais in Habiganj avoid cutting the cord and instead encourage the mother or a female family member to cut the cord. But they do not transfer their knowledge about the risk of infection from dirt on the hands when a mother or her family member cuts the cord. Our study findings also could not confirm the handwashing practices of family members who cut the cord before entering the delivery room, and these may need to be identified through further investigation. We did confirm the strong role of family members during home delivery, and future hand hygiene interventions for dais could include the importance of reminding family members about hand hygiene. Dais can play an important role in reminding family members who cut the cord to wash their hands.

Dais’ perceptions of handling “dirty blood” during delivery discourage them from handwashing before knotting or cutting the cord. In addition to lack of handwashing, the household environment or materials used during the delivery process (e.g., a piece of an old cloth used for

wiping blood from the cord) could contaminate the cord. Although dais reported that they wrap the newborn immediately with a piece of cloth, their typical practice of cutting the cord after delivering the placenta may sometimes delay thermal management of the child and place the child in danger. Our study findings are based on self-report, which does not provide sufficient information on dais' exact practices during delivery. These practices could be precisely identified by observing delivery in real home settings.

In Habiganj, we found only a few cases in which dais suggested that caregivers wash their hands before cord care to reduce the risk of sepsis or infection.¹⁰ Hence, dais could provide a casual explanation to mothers and their families about the risk of infection from contaminated hands and the importance of prevention through improved hand hygiene before cord care.

Remarkably, dais in Habiganj reported facing very few obstacles to washing their hands during delivery. In many previous studies we found that lack of availability of materials such as soap was one of the major barriers to handwashing.^{11, 12} In Habiganj we found only a few cases in which dais' handwashing before, during, or after the delivery was hindered due to water or soap availability. Because the understanding we gained from this study about dais' hand hygiene behaviors is based on their self-reporting, we still need to know their practices in real situations. Observations of home delivery by dais could be conducted to determine the barriers they face in maintaining hand hygiene in the home. The evidence gained from direct observation could help to refine intervention messages and target strategies more accurately for dais.

Our study also identified several risky practices during delivery, including entering oily fingers into the cervix to release the baby painlessly, warming the placenta (without cutting the cord) on a fire to retrieve the baby's life, and touching the cord with cow dung for delayed delivery of the placenta. These practices could introduce infections or other complications and increase the risk of morbidity and mortality for both mothers and newborns. One study in Bangladesh found that training TBAs in clean delivery alone did not prevent postpartum infection, if traditional practices were not also addressed in the intervention.¹³ Future programmatic initiatives should inform dais about the risk of infection transmission to the newborn during critical events of delivery and how abstaining from risky practices in addition to practicing handwashing can help to reduce risk.

Dais' responses about newborn vulnerability and illnesses demonstrate the understanding of signs and symptoms of diseases and modes of transmission they have gained over the years from their professional experiences. Their intent to serve women during pregnancy and the postnatal period along with conducting delivery make them interested in further relevant training. Moreover, the characteristics they listed of a "good dai" also demonstrate their interest in receiving training on good hygiene practices and safe delivery.

Conclusion

This formative study identified several important barriers to and motivators of handwashing among mothers and other family caregivers and among dais assisting delivery in one area of Bangladesh. In order to improve neonatal health, it is important to consider dominant social norms in further handwashing behavior change communication initiatives, both for mothers and traditional birth attendants, in order to motivate handwashing among those most likely to impact the health and well-being of newborns.

References

1. National Institute of Population Research and Training, Mitra and Associates, ORC Macro. 2008. *Bangladesh Demographic and Health Survey 2007*. Dhaka, Bangladesh, and Calverton, Maryland: National Institute of Population Research and Training, Mitra and Associates, ORC Macro.
2. Bryce J, Boschi-Pinto C, Shibuya K and Black RE. 2005. WHO estimates of the causes of death in children. *Lancet* 365: 1147–1152.
3. Luby SP, Agboatwalla M, Feikin DR et al. 2005. Effect of handwashing on child health: A randomised controlled trial. *Lancet* 366: 225–233.
4. Rhee V, Mullany LC, Khatry SK et al. 2008. Maternal and birth attendant hand washing and neonatal mortality in southern Nepal. *Arch Pediatr Adolesc Med* 162: 603–608.
5. Glanz KRB and Lewis FM. 2002. *Health Behavior and Health Education*. San Francisco: Jossey-Bass.
6. Pajares F. 2002. Overview of social cognitive theory and of self-efficacy. Retrieved February 18, 2014, at: <http://www.uky.edu/~eushe2/Pajares/eff.html>
7. Curtis VA, Danquah LO and Aunger RV. 2009. Planned, motivated and habitual hygiene behaviour: An eleven country review. *Health Educ Res* 24(4): 655–673.
8. McBride CM, Emmons KM and Lipkus IM. 2003. Understanding the potential of teachable moments: the case of smoking cessation. *Health Educ Res* 18(2): 156–670.
9. Falle TY, Mullany LC, Thatte N et al. 2009. Potential role of traditional birth attendants in neonatal healthcare in rural southern Nepal. *J Health Popul Nutr* 27: 53–56.
10. World Health Organization. 1998. *Care of the Umbilical Cord: A Review of the Evidence*. Geneva: WHO.
11. Scott B, Curtis V, Rabie T and Garbrah-Aidoo N. 2007. Health in our hands, but not in our heads: Understanding hygiene motivation in Ghana. *Health Policy Plan* 22: 225–233.
12. Zeitlyn S and Islam F. 1991. The use of soap and water in two Bangladeshi communities: Implications for the transmission of diarrhea. *Rev Infect Dis* 13 S259–S264.
13. Goodburn EA, Chowdhury M, Gazi R, Marshall T and Graham W. 2000. Training traditional birth attendants in clean delivery does not prevent postpartum infection. *Health Policy Plan* 15: 394–399.

