Neonatal Handwashing Study, Serang, Indonesia

Hygiene Centre, London School of Hygiene and Tropical Medicine for Hindustan Unilever, Save the Children, and USAID's Maternal and Child Health Integrated Program

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Acknowledgments

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Abbreviations and Acronyms

DHO	District Health Office
DHS	Demographic and Health Survey
HWWS	Handwashing with Soap
MCHIP	Maternal and Child Health Integrated Program
MOH	Ministry of Health
TBA	Traditional Birth Attendant
USAID	U.S. Agency for International Development

Executive Summary

Background: Almost 4 million newborns die each year in low- and middle-income countries. A third of the deaths are attributed to infection. The partnership between the Maternal and Child Health Integrated Program and the U.S. Agency for International Development has the common goal of reducing neonatal mortality by increasing the practice of handwashing with soap (HWWS) among new mothers, health care workers and caretakers. Indonesia is one of three countries in which an intervention will be piloted before it is rolled out at a large scale. Conducting formative research in Indonesia informs decision-making for the design of the intervention.

Objectives: This study aimed to answer questions around the context and practices of handwashing among those who come into contact with newborns in Indonesia, with the objective of learning how to introduce and strengthen the practice of handwashing among new mothers, caregivers and birth attendants.

Methods: Twenty-seven mothers participated in the formative research study, 15 living in urban Serang and 12 from rural areas in Serang District. Qualitative data were collected from participants using several methods: mothers were videoed going about their daily activities; and in-depth interviews were conducted that enquired into mothers' opinions on birth attendants, knowledge about the risks their newborns face, handwashing practices and ways in which their life has changed since giving birth. In addition, focus group discussions were conducted among midwives (urban and rural) and traditional birth attendants. Data analysis involved parsing videos to identify sequences of activities. This information was used to document when handwashing (with soap) occurred on critical handwashing occasions (after defecation, before eating and serving food) and to track other occasions on which handwashing with soap occurred. Thematic analysis of interview transcripts and focus group discussions was also done.

Results: Women believed that breastfeeding is the main way in which they can keep their babies healthy. They also changed their diet for the health of their babies and themselves. Women did not associate handwashing with illness. HWWS was observed on at least one occasion in half of the households under study. It was seen after sweeping, doing laundry and returning home (in urban areas). It was rare before meals and occasional after meals. HWWS after changing the baby's napkin was observed in several households. The availability of water and soap was not seen to be a barrier to handwashing. HWWS was most frequent in households in urban areas, and among better educated and more affluent women. Women were found to trust midwives more than traditional birth attendants, although both types of birth attendants have important roles and influence over new mothers.

Conclusions and recommendations: A foundation of handwashing exists on which handwashing messages can be built in this community. The intervention should focus on convincing mothers that handwashing at critical times benefits the health of their babies. Many important messages are delivered to mothers before and after childbirth. It is suggested that messages about handwashing be delivered shortly after the birth and should be targeted at first-time mothers. First-time mothers are particularly concerned about the welfare of their children and most likely to be receptive to advice. To help mothers develop the habit of handwashing after their babies defecate, the intervention could combine handwashing messages with information on how to dispose of/wash napkins after the baby defecates. It is suggested that midwives have both the opportunity and the skill to take a leading role in delivering the intervention once developed.

Background

Almost 4 million newborns die every year in low- and middle-income countries. A third of these deaths are attributed to infections (www.mchip.net). Current evidence suggests that low-cost, high-impact infection prevention and management interventions could reduce the death rate significantly. Handwashing has been demonstrated to reduce the risk of gastrointestinal infections, pneumonia and nosocomial infections among children under five {Curtis, 2003; Rabie, 2005}. Yet few studies have measured the effect of maternal and birth attendant handwashing practices on newborn survival.

A recent study in Nepal {Rhee, 2008} found that the risk of death among newborns born at home was reduced by good handwashing practices. Researchers observed the newborns during the first 28 days of life through a series of 11 home visits. The mothers of the infants were questioned about their own handwashing practices and the birth attendants' handwashing practices. Fifty-three percent of birth attendants reported washing their hands with soap and water prior to delivery, while 15% of mothers reported washing their own hands prior to handling their infants. Newborns whose birth attendants washed their hands prior to assisting with delivery had a 19% lower risk of death compared to newborns whose attendants did not. Newborns whose mothers washed their hands before handling their infants had a 44% lower risk of death compared to those whose did not.

Evidence suggests that the proportion of under-five deaths occurring among neonates is increasing {Black, 2003}. Substantial efforts are needed to tackle neonatal mortality if the Millennium Development Goal to reduce child mortality by two-thirds by 2015 is to be achieved.

USAID-MCHIP PARTNERSHIP

The Maternal and Child Health Integrated Program (MCHIP) and Unilever-Lifebuoy share a common vision, which aims to reduce neonatal mortality. They have formed a partnership to achieve this goal by increasing handwashing with soap (HWWS). The vision of the partnership is to educate birth attendants, new mothers, health workers, and caretakers about the importance of handwashing with soap to reduce neonatal mortality.

The objectives of the partnership are to:

(a) Increase knowledge of handwashing with soap before a mother, birth attendant, health facility worker, or newborn caretaker handles a newborn baby during the first 28 days of life.

(b) Increase the practice of handwashing with soap before a mother, birth attendant, health facility worker, or newborn caretaker handles a newborn baby during the first 28 days of life.

(c) Create and implement a low-cost strategy to reduce neonatal mortality through improved handwashing that is scalable and can be adapted and reproduced in various contexts and can be linked to broader maternal, newborn and child health programs.

(d) Establish and utilize a monitoring and evaluation system to determine the effectiveness of the intervention and to inform and improve ongoing implementation.

This initiative is being piloted in Indonesia, Bangladesh, and Kenya. The U.S. Agency for International Development (USAID)-MCHIP and Unilever-Lifebuoy jointly commissioned a formative research study to be carried out in Indonesia to inform the design of the intervention.

Previous formative research studies of handwashing in many countries have provided detailed information about common drivers of handwashing behavior {Curtis, 2009}. They have

concluded that although most people have good knowledge about germs, disease, and the importance of HWWS, it is not widely practiced. The main reasons are: because it is not habitual, it is not a part of the daily routine, it is not a local social norm, people do not feel that their hands are contaminated because they see no evidence of it, and people feel that water is sufficient as a purifying agent. Handwashing also takes place in a variety of contexts, most importantly after defecation, cleaning a child's defecation, and before preparing and serving food (handwashing "occasions"). We concluded that people are likely to respond best to messages about norms; good manners, especially for their children; loving and caring for children; avoiding disgust; and enjoying the comfort of clean hands.

A National Handwashing Alliance (part of the Global Public-Private Partnership for Handwashing) also exists and is active in Indonesia. However, none of the partners are currently focusing on the specific need to improve handwashing to reduce neonatal mortality. Unilever has entered into a Global Development Alliance agreement with USAID and MCHIP to strive toward reducing neonatal mortality in a number of countries, including Indonesia.

At the national level, MCHIP will provide technical assistance to the National Handwashing Alliance to develop communication tools for improving the understanding and practice of HWWS for newborn survival. This will include handwashing for newborn survival for all maternal and newborn health activities. At the district level, MCHIP will support the Global Handwashing Day activities in all three target districts. Based on material review and formative research, MCHIP will adapt training and information, education, and communication materials to improve handwashing practices for the newborn. Handwashing will also be included in all related standards and trainings at the district and community levels.

INDONESIA BACKGROUND

Indonesia consists of approximately 17,000 islands and is the fourth most populous country in the world. According to the 2007 Indonesian Demographic and Health Survey (DHS), neonatal mortality in the period 2003–2007 was 44 per 1,000 live births. Neonatal mortality now accounts for the majority of under-five deaths in Indonesia (IDHS Report 2007).

Approximately 73% of births in Indonesia are currently attended by a skilled provider (doctor or midwife). This high national figure masks great disparities among provinces. Jakarta has 97% of births attended by a skilled provider, while Maluku has only 33%, the lowest in the nation.[1] While skilled attendance at birth is high compared with other USAID priority countries, maternal mortality also remains stubbornly high. The 2007 DHS data estimate the maternal mortality ratio at 228 deaths per 100,000 live births. At the current rate of decline, Indonesia will not meet its goal of 107 per 100,000 live births by 2015. Reasons for high maternal mortality appear to be rooted in the unchecked quality of the rapidly proliferating midwifery schools, the continued high proportion of deliveries taking place at home (almost 53%), and a flawed referral system.

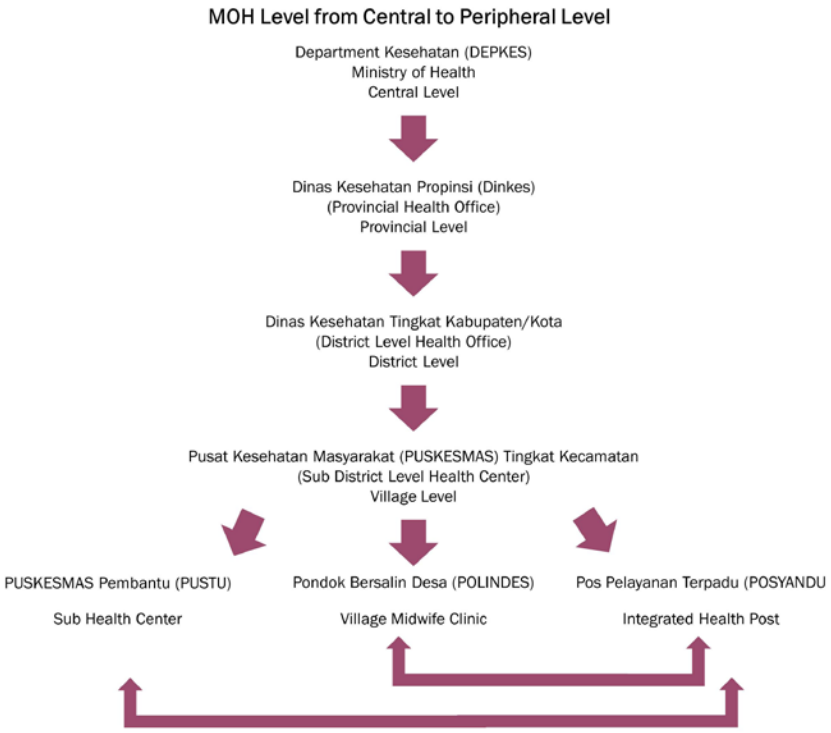
The infant mortality rate is currently around 39 per 1,000. The major causes of infant mortality are perinatal problems (36%), respiratory infection (28%), and diarrhea (9%). One-third of under-five mortality rate is highly attributable to poor nutrition. Proven methods to safeguard infants, exclusive breastfeeding, and rehydration for managing acute diarrhea have actually deteriorated.[2] Neonatal mortality is still high, with the neonatal mortality rate between 15 and 29 deaths per 1,000 live births; and neonatal mortality still represents 56% of the infant mortality rate in the country. The major causes of neonatal mortality in Indonesia are asphyxia (35.9%), prematurity (32.4%), and sepsis (12%)[3].

[1] "And Then She Died," Maternal Health Assessment. World Bank, November 2009.
[2] USAID Indonesia Strategy 2009 – 2014; December 2009.
[3] Riskesdas 2007, MOH.

Structure of the Health System

Indonesia comprises 33 provinces, each of which is divided into districts and sub-districts. At district level there is a DHO and perhaps a general hospital. Each sub-district has at least one *puskesmas* (community health center at sub-district level), which is headed by a doctor and also staffed by public health workers, nurses, midwives, sanitarians (associated with the "healthy house" program), and nutritionists. These officers are responsible for programs on health promotion, family planning, maternal health, environmental health, disease control (e.g., diarrhea, TB, dengue, leprosy), treatment, and nutrition. The sub-district health centers are usually supported by two to three *puskesdes* (sub-centers, village health posts), the local health care delivery units. Figure 1 depicts the organizational structure of the health system.

Figure 1: Organizational structure of the Indonesian Health System *(Source: WHO)*



Indonesia's health system is neatly structured from the national down to the village level. The Ministry of Health (MOH) sits on the highest level in the structure with responsibility to develop regulations and policies and issue decrees, leaving the implementation to the provinces, districts, and village levels. In this era of autonomy, the district has the authority to adjust MOH policies according to the local situation and condition. Currently, the District Health Office (DHO) plays an important role in determining policy with reference to the MOH's policy. For instance, the DHO can determine the placement and needs of village midwives without waiting for a decision by the MOH.

Birth and post delivery services

According to the 2007 Indonesia DHS, 93% of pregnant women receive antenatal care and 66% receive the recommended four or more visits. In the last five years, 46% of women delivered in a health facility and 79% of deliveries were attended by a skilled person (mainly a midwife). Of the women who delivered outside the health center, 83% report receiving postnatal care. This care comes from midwives or traditional birth attendants.

There are three types of midwives (known as *bidan*): a *bidan puskesmas* is attached to a health center; a private *bidan*, who often has t her own clinic; while a *bidan desa* (village midwife), cannot have a private clinic (but after 10 years' experience, can apply to be *bidan puskesmas*).

In the health system, midwives can be found at any of the health facilities, such as the health centers (*Puskesmas*) and village health post (*PosKesDes*). Midwives who are in the health centers are referred to as midwife coordinators, while those in the village are referred to as village midwives. Midwife coordinators supervise village midwives in the catchment area of the *puskesmas*. These midwives meet regularly every month to discuss health issues in the *puskesmas*.

Village midwives are responsible for providing maternal and child health services. Maternal services cover the premarital, pre-pregnancy, antenatal, postnatal, and breastfeeding periods; child health services cover the neonatal, infancy, childhood and pre-school periods. In general, each village midwife is usually responsible for one village, but sometimes two villages.

Traditional Birth Attendants (TBAs), known as *dukun,* were not previously an official part of health system. But people asked the TBAs, originally experts in massage, to assist with delivering their babies. The TBAs thereby gained experience with childbirth and, since 2008, due to the national partnership, have been brought into the health system as partners of *bidans*.

Midwife and TBA partnership

A partnership between midwives and TBAs was developed as an effort to improve coverage and quality of skilled birth attendance. The 2007 Indonesia DHS showed that 27% of deliveries in rural area were attended by TBAs. Most women and families in the rural areas still believe in and trust TBA to deliver babies. Therefore, midwives should be able to attend labor and deliveries in the rural communities by developing partnerships with TBAs; the TBA would then refer them to a midwife. In this partnership program, midwives and TBAs have different roles and responsibilities.

The partnership program started in 1990 and is still found in some places in Indonesia. In a delivery, the TBA's tasks is to provide supporting services for the midwife after delivery is completed, including massaging the mother, helping her bathe, and providing care for her baby. In some parts of Indonesia, this program contributes to the reduction of maternal mortality.

Posyandu and health *Cadre*

PKK (Family Welfare Program) is a community organization that was established by the government. A group of women in a village forms a PKK, which is led by the wife of the village chief. A PKK focuses on 10 activities including health development. To provide health education to the community, PKK members established the Health Integrated Post (*posyandu*). *Posyandu* exist in every village and are run by health *Cadres*, voluntary public health assistants assigned to represent a certain number of households or a neighborhood. A *posyandu* provides five services—immunization, nutrition, family planning, maternal and child health, and diarrhea control. *Posyandu* hold local meetings led by *Cadres*, often with the help of a *bidan*, and often at someone's house. It is open once a month during which all women in the village bring their children for health check or just to have counseling on health, nutrition and family planning.

Posyandu Cadres received training from the DHO, non-governmental organizations or the PKK itself to improve their knowledge and skills. They are selected to do the work because they live in the village and know the people well. Women, families and the community are welcome to contact *Cadres* about health issues. They are recruited by the head of village, so their identity

can change, although a particular individual can remain in the position for a long time because often no one else wants the job (it is voluntary, but the *Cadre* receives 5K for every delivery).

New mothers go to a *posyandu* meeting to get their baby weighed, or to receive an immunization, extra food (no one comes if there is no food), or free Pampers or formula. In many areas, women go to *posyandu* because they are concerned about their baby's health and hope to acquire useful information. *Posyandu* help rural women because access to health facilities is not the same over all of Indonesia. Most of the time, *Cadres* can lead *posyandu* activities by themselves, because their knowledge of family health issues is good. Often, they work in a village for many years and live in the same village as those people they help. In this meeting, pregnant women can also be weighed and receive iron pills and vitamins. Children have complete immunization by the end of their first year, so many mothers do not bring their children to a *posyandu* after that (although it is meant to provide health services for children up to five years old).

A neighborhood chief can also be active and help with provision of medical services in some instances, but this depends on the office holder, and the office holder changes every five years.

Objectives

By answering questions around the context and practices of handwashing among those who come into contact with newborns, this formative research study highlights opportunities to introduce and strengthen the practice of handwashing among caregivers and birth attendants.

The objectives of this study were to:

- Learn how to increase handwashing with soap among Indonesian women undergoing the life-changing event of giving birth (to their first child), as well as among birth attendants and caregivers of mothers with young children
- Identify factors that facilitate and/or hinder proper handwashing with soap among caregivers of newborn children.
- Identify the channels of information-seeking behavior among caregivers, especially regarding child health issues.

Note that it is likely that giving birth introduces not only major new opportunities (a concern with hygiene to promote the baby's health) but also major new barriers (e.g., fatigue from lack of sleep, disruptions in activities by the presence of the new baby) to handwashing with soap that need to be identified.

To fulfill these objectives, we conducted a formative research study in Serang District, Indonesia, during the first two weeks of April 2011.

Methods

STUDY SETTING

Serang District was chosen as the setting for the formative research because of its proximity to Jakarta (allowing easy access for the researchers). Serang District, which includes Serang city and surrounding sub-districts, has a population of 1.4 million spread across 30 sub-districts. In addition, MCHIP, the sponsoring agency, has an office there and was able to provide logistical support. It has the highest population growth within Banten province. BPS (Badan Pusat Statistik) data in 2010 showed that 34% of the total population were in agriculture and the rest in trade and industry. Average family income per month is Rp 1.189.000, with an average family size of 3.9 people per house (see Table 1 below).

Table 1: Serang District Background Data

NO	DATA	SERANG	
		URBAN	RURAL
1	Population	497,910	1,402,818
2	Family Size	4.5	3.9
3	Public Health Service	379 facilities	273 facilities
4	Private Health Service	967 facilities	231 facilities
5	Delivery by Health Care Provider	68,66	22,821 (77% from total pregnant women)
6	Delivery by TBA	31.34%	52.51%
7	Economic Wages	3,433,047/year	1,189,000/year
8	Availability of Water	24.275%	60.26%
9	Availability of Soap	No data	No data

Sources: Serang Statistics Office 2010 and DHO Serang 2010.

The sub-districts of Kramatwatu (urban) and Pamarayan (rural) within Serang were selected because they were areas where MCHIP already operates. These districts are also representative of two other MCHIP areas in personal hygiene practices in urban and rural areas, education, ability to buy soap, and water availability. They also include urban and rural areas, each of which have high or moderate access to clean water supply. Areas with poor supply of clean water were avoided as they would require infrastructure work prior to a communication-based intervention.

SELECTION OF PARTICIPANTS

The study was conducted among 27 new mothers, 15 in Kramatwatu and 12 in Pamarayan. Participants were recruited by local community health centers using written selection criteria as follows:

- Preference for a first child less younger than three months of age; if not possible, then under one year; if that was not possible, then a second child of young age
- Easy access to water supply (though not necessarily inside the house)
- Husband/wife willing to be filmed

Informed consent was obtained from all participating women (and where possible their husbands). Very few families that were approached and met the basic criteria refused to

participate Those who did refuse did so primarily because they felt they did not have sufficient facilities for the video girls to stay overnight (although some husbands were not asked permission because they worked in Jakarta).

DATA COLLECTION

Qualitative data were collected using three primary data collection methods:

- Video recording of daily routines
- In-depth interviews of primary participants
- Focus group discussions with midwives and traditional birth attendants

Three young women from Serang were trained to do the video recording. Two members of the Hygiene Centre conducted interviews and focus group discussions, together with two Indonesian researcher/translators hired by MCHIP.

Participant household visits

The video recording and interviews took place in the 27 participating households over a period of two days. On the first day, the new mothers (usually the primary caretakers) were filmed continuously during two periods of their days:

- From when they woke up (about 4:00 a.m.) for about six hours
- From about 4 p.m. until (after) their evening meal

Videographers were instructed to pay close attention to all interactions with infants. They also queried participants about the activities that they did not wish to be filmed (e.g., breastfeeding, own toileting). The videographers respected the mothers' wishes at all times by turning their cameras to the ground when requested to maintain privacy. Videographers did not follow participants when they left the household compounds, nor did they film visitors who had not previously consented to being filmed.

On the second day, participants were interviewed. Interviews were structured and included questions about occasions when they wash their hands, motivations for handwashing, concerns/expectations concerning child care, ways in which their lifestyle has changed since having children, relationships with birth attendants and other health care workers doing neonatal work, where they have learned the most about caregiving and their access to media (to determine likely touch points for advertising contacts). The interview guide is provided in Appendix 1.

Where the respondents agreed, they were also filmed carrying out mock episodes (referred to as demonstrations) of handwashing after their own defecation and their babies defecation and prior to feeding their babies. They were asked about their experience of trying to incorporate soap into their handwashing routines.

Focus Group Discussions

Three focus groups were conducted (two with midwives, one urban and one rural; and one with TBAs in a rural location). Each focus group discussion had approximately eight participants. The discussions, led by one of the Indonesian researchers, aimed to ascertain the frequency and timing of visits made to pregnant/postnatal mothers, their responsibilities during each visit, their activities, hygiene practices, attention to issues surrounding the umbilical cord, breastfeeding, and other standard practices and information imparted to the mothers. The focus group guide is provided in Appendix 2.

DATA ANALYSIS

Video Parsing

In the field, a member of the study team parsed the videos (approximately eight hours from each participant to ensure that no events went un-interpreted. The detailed sequence of events and the time at which they took place were recorded on a video parsing form (Excel). When the nature of activities taking place was uncertain (e.g., when the view was inside a dark house), multiple members of the team would check the video and audio portions. Few portions of video were left un-interpreted.

Handwashing Occasions

All video parsing forms were reviewed to identify handwashing *occasions* (times when handwashing should occur from a public health perspective), and additional *observations* when handwashing was actually observed. The occasions when handwashing would have been expected are: after own defecation, changing the baby (particularly when it has defecated), and before serving others food or eating oneself. However, it was not possible to record handwashing related to defecation of the mother as these events took place out of sight of the camera. Handwashing was also observed on a variety of other kinds of occasions that have less relevance to public health or commercial interests: after returning home, after preparing food, or after sweeping the house. As bathing the baby was never associated with handwashing, these occasions are excluded from the analysis.

All of these events (occasions and other observations taken together) have been noted in a database. For each handwashing event, an entry was made describing: the situation when handwashing occurred (e.g., after doing laundry, after sweeping, after eating); whether or not soap was used; the location of the handwashing, the water source, and the location of the soap; whether the participant needed to change rooms in order to wash hands; and the events that occurred before and after the handwashing took place.

For occasions in which handwashing could have been expected but did not occur, an entry was made indicating the event, the location of the participant at the time of the event, and the events that occurred before and after the potential handwashing event. For the sake of brevity, if the same event occurred many times in the same household without handwashing—for example, eating—a single entry was made to indicate no handwashing in relation to eating.

It was not always easy to determine the purpose of handwashing. In such cases, the event is recorded using question marks or words to the effect of "unknown reason."

Thematic Analysis

Interview transcripts were used to identify common issues/topics raised by participants during the interviews (see the Data Collection section for details of interview topics), to support other kinds of analysis.

Results

CHARACTERISTICS OF STUDY POPULATION

Twenty-seven households with young children were investigated (see Appendix 3 for a table of their characteristics). Participants were aged between 18 and 39. Some mothers were first-time mothers, while others had several children. All mothers were literate but the level of education they had received varied from basic schooling to university. Houses from a range of incomes were investigated.

In the general Indonesian population, 12% of women have never been to school, while all of the participants in this study had at least some schooling. Banten Province (where Serang is located) is one of the richest in Indonesia (Indonesia DHS 2007). In Indonesia, 88% of urban and 70% of rural households have water on their premises, 21% and 5% of which (urban and rural respectively) have a piped water source. All of the interviewed households had easy access to water (as this was one of the criteria used during the selection process). Urban households more frequently had private sanitary facilities with a septic tank (66% vs. 33% in rural areas). Thus, the set of women investigated for this report were probably slightly better off and better educated than a truly representative sample would have been, although these biases are slight and probably do not affect our interpretations or recommendations.

KNOWLEDGE/AWARENESS OF HEALTH RISKS

Women in Serang had a wide range of beliefs concerning health risks to their infants. Risks the baby faced include sprains, fever, diarrhea, and infection from the cord and from other children. Most, if not all, mothers mentioned sprains as their main concern about infants' health risk. Their babies were still weak, so mothers were afraid that the babies would get sprains or fractures when they handled them; therefore, some young mothers asked for assistance in taking care of their babies (especially to bathe them) to avoid an accident. Mothers were thus often concerned about bathing their babies and enlisted the help of family members or the TBA when the child is very young.

> *[I'm] afraid to bathe the baby because of floppy neck. (HH21)*

Birth caregivers attempted to assuage these fears about risks by providing advice. Mothers received a lot of advice on child care: from the midwife, TBA, their mothers, and many other female relatives. The majority of participants reported following this advice, mainly when they felt the advice was good and useful. First-time mothers were more nervous about caring for their children alone. One woman said:

> *It is different from my first child as I didn't know anything, I'm not so nervous now. (HH2)*

However, one mother said that she has no information about the risks the child faces, but she

> *"… prays to God for protection and tries to live in a clean house." (HH1).*

Many mothers reported being advised by the midwife (and other sources) on breastfeeding. Mothers believed that breastfeeding exclusively for six months is the best way to keep their babies healthy. (Please note that all of quotations in this document are at best paraphrases of what was actually said, as this English record has passed through both translation and summarizing by the Indonesian researchers during in-house interviews.) (Note also that the Indonesian government initiated a campaign on exclusive breastfeeding beginning around 2000,

supported by non-governmental organizations and donor agencies. This campaign falls under the nutrition directorate program (directed by the Ministry of Health) that is part of the message delivered by posyandu and bidans. So exposure of mothers to the message is very high.)

> *"[You] keep the baby healthy by exclusively breastfeeding." (HH19)*

Some reported that formula can give the baby diarrhea (if it is made in advance and not given within the recommended two hours, because it goes sour). Jamu (an herbal drink for new mothers) is drunk to keep the mother healthy.

> *If you are not breastfeeding exclusively the baby can get diarrhea…. I gave formula for a while, baby got diarrhea. (HH14)*

> *The most important advice is to drink Jamu and stay healthy and through breast milk baby stays healthy too. (HH18)*

There was little knowledge on how to prevent diarrhea or other infections and no association is made between handwashing and diarrhea. Quite different causes of diarrhea were given:

> *Any time a child develops a new skill [like sitting up], it gets diarrhea. (HH5)*

It is thought that the knowledge about germs is lower in rural areas than in urban areas. When asked why they use soap, no rural participants mentioned germs, while urban women often knew something about germs causing disease, probably due to their higher average level of schooling. While removing germs/bacteria was a reason given for handwashing by a few women, the link between handwashing and illness was rarely made. Yet women were aware that ill people (including other siblings/children) can pose a risk to the baby. When asked whether or not washing your hands could be a risk for the baby, one woman said:

> *No, that won't make the baby sick. If I am sick, the baby could get sick (e.g., flu) through my breast milk. (HH14)*

One piece of advice frequently given by the midwives was how to clean the cord to prevent infection:

> *From the cord, you can get infection if not careful. You need to cover it. Bidan [TBA] helped bath baby until cord off. (HH3)*

> *[You need to] cover the umbilical with cotton and alcohol until the cord comes off (2 times a day). (HH13)*

HANDWASHING PRACTICES

When interviewed, women reported handwashing (with soap) at a variety of times: before and after cooking; after washing dishes, doing laundry, sweeping or coming in from outside; after defecation; after the baby defecated; and before handling the baby or breastfeeding.

> *[I HWWS] before touching the baby, before and after eating, after cooking, after cleaning house and hanging out laundry. (HH14)*

The most commonly mentioned events for handwashing were before eating (10 women), after cooking (nine women), before handling the baby (nine women), and after defecating (eight women). Several women said they forget to wash their hands, especially before touching the

baby. Handwashing after doing dishes or cooking seemed more automatic (probably something they had always done, whereas the baby was novel in their lives).

These reports are similar to the range of events in which HWWS was actually observed, but not particularly close to the proportion of times in which hand rinsing or handwashing was observed. Handwashing with soap was done by half of the participants (14/27) on at least some occasions. From the video records (Appendix 4: Handwashing Occasions and Events; Appendix 3: Characteristics of Participating households), it appears that handwashing, whether with soap or not, is more of an urban phenomenon, as the proportion of washers and rinsers was higher in the urban than in the rural sub-district (urban: 10 out of 15 washers, only three avoiders; rural: five out of 12 washers, four avoiders). Handwashing (in the sense of using soap) seems to be associated with being urban, a good education, a higher income, and special issues (e.g., having a mother in the health system, or a particularly forceful and hygienic husband). Handwashing is also correlated to a lesser degree with age: older mothers were more likely to be washers, probably because rural mothers in our sample tended to be younger, and hence less likely to wash their hands. Though there are clearly differences between the urban and rural samples in some respects (e.g., availability of toilets, overall income levels), types of occupation were not that different (there were no farmers in our sample at all, for example), so the occupation of the husband was not clearly associated with handwashing.

Handwashing was not observed to be limited by water or soap availability, nor was it determined by the water source (handwashing occurred in houses at the kitchen sink, and using water stores in the kitchen and the bathroom).

The handwashing occasions and events database (Appendix 4) shows the occasions on which handwashing occurred or should have occurred. The resulting "handwasher" status of each participant is given in the column "HW type" of Appendix 3, Characteristics of Participating Households. The events when handwashing occurred can be divided into three main categories: food-related events, baby–related events, and household hygiene events. Observations of handwashing practices on each of these occasions are reported in turn.

Food-Related Events

There were many observations of meals; the recurrent picture is one in which there was no hand rinsing before eating, but many episodes of handwashing (including with soap) after the meal. This was often because people were removing food particles and/or oil from their hands, which had often been used to eat the food. There may have been less handwashing after eating when a spoon has been used (although this needs confirmation).

Washing hands typically required a special trip into another room (either the kitchen or bathroom).

Concern for hand hygiene was seldom seen during food preparation or serving. All cooking-related events of handwashing were urban, did not always involve soap, and occurred in just two households. Cooking was seen as a "dirty" activity because it could leave visible bits on the hands. Serving food never involved hand rinsing or soap in the videos.

A considerable proportion of before eating handwashing occasions did not involve any hand hygiene. The few cases of handwashing before eating occurred in four households, three of which were urban. Why should these women wash their hands with soap before eating? Unfortunately, the reason is not clear: most of these households lived with extended family in their house; all had at least high school-level education and very young babies (under three months of age), although it was not always their first. However, which, if any, of these factors is crucial is hard to judge because they are not uniquely associated with this practice.

Baby-Related Events

Handwashing with soap after a baby's defecation is an urban phenomenon, or performed by the rural woman with a university education. When HWWS occurs, it is often done in the same way each time, e.g., immediately following scrubbing of the dirty napkin. One mother had a handwashing stand in the bedroom where she tended to change the baby. Underneath the stand she had a napkin laundry bin. Every time she disposed of the napkin, she washed her hands (not always with soap). Other practices (no hand hygiene or hand rinsing only) were more broadly distributed among both urban and rural mothers. Mothers seldom washed their hands after changing a baby's napkin for other reasons (e.g., after urination), although hand rinsing occurred in some households whenever a baby's napkin is changed. Babies appeared to be changed in a wide variety of places.

The few episodes of handwashing prior to breastfeeding (a common piece of advice from midwives, which does not appear to be well-followed) occurred among urban women, with one exception—the rural woman with a professional husband who herself had a university education. Women said they forgot or simply did not have the time, as the baby was crying, to wash their hands with soap at this time.

It is part of MCHIP advice to women to wash their hands before handling their babies, and many women reported handwashing on this occasion yet are not observed doing it. It is possible that they believed they should do it (having gotten the message from MCHIP materials), and therefore told us about it, but this advice has not yet had a significant impact on practice.

Household Hygiene

Women were also observed washing their hands after completing household chores (i.e., after doing laundry or washing dishes, sweeping or cleaning the floor, or taking out rubbish). This is most likely because house cleaning was seen as a dirty activity (interacting with rubbish). Handwashing on these occasions was almost exclusively an urban phenomenon, as was handwashing after returning home (the one exception in this case being a woman with a university education who lived in a rural area). In the urban setting, these behaviors also tended to take place in the kitchen, often at a sink. Soap was very often used in these events as well. (They are not considered proper handwashing *occasions*, as they don't have significant public health importance.)

Several times in interviews, urban women expressed the sentiment that going into town (the "outer world") often involved coming into contact with a number of dirty things. This could be because such women travel (e.g., by motorcycle) to many places. It may be the case that rural women don't make the same kinds of journeys away from home, or have such a range of contacts, so they don't appear to get the same sense of contamination.

The large number of cases of handwashing after dealing with laundry or dishes (including with soap) is interesting because women chose to wash their hands with soap after touching clothing or dishes which had just been cleaned. This could be due to the fact that they saw powdered laundry soap (also used on dishes) as leaving a certain feeling on their hands—residues that made them feel slippery at first and then dry later (if they did not wash their hands with bath soap or hand soap). It is also the case that some women rinsed or washed their hands only on these types of occasions—the 'dirt' washers or rinsers—and not at times when their hands may have been contaminated but not visibly dirty (e.g., after defecation). However, there were not enough of these "dirt" rinsers and washers to isolate a clear pattern that distinguishes them from other types. Women reported washing their babies' clothing separately from adult clothing because adult clothing was perceived to be "dirty" (adults engage in many more activities, including away from the home).

Handwasher Types

Using video evidence and the handwashing occasions database, participants' handwashing practices can be classified into five broad categories as follows:

- **Washer**: washes hands with soap (at least once) on a handwashing occasion (e.g., after baby defecation, before eating)
- **Dirt Washer**: washes hands with soap (at least once) at a non-essential time (e.g., after sweeping, after eating)
- **Rinser**: washes hands without soap (at least once) on a handwashing occasion (e.g., after baby defecation, before eating)
- **Dirt Rinser**: washes hands without soap (at least once) at a non-essential time (e.g. after sweeping, after eating)
- **Avoider**: does not wash hands at all or only rinses hands after eating

MOTIVATIONS FOR HANDWASHING

The general belief in Indonesia (as in most other places in the world) seems to be that "If my hand looks OK, and feels OK, it is OK." Some people know about bacteria, and tend to use soap, but often this use is linked to a special situation (e.g., their mother is a health worker). Even if a woman uses soap, she typically does not know the critical times (from a public health perspective), using soap after eating only to get rid of stickiness on the hands.

Women most frequently washed their hands to remove bad smells after cooking, eating, or defecating. To prevent rice from sticking was the primary reason for handwashing before eating (although not with soap) and was often offered as the most important handwashing moment. These actions were presumably motivated by disgust or discomfort directed at their hands. There was also concern about touching the child after cooking. These reasons for handwashing corresponded with the times that women reported they washed their hands:

> *… after baby defecates so as to remove the smell. (HH19)*
> *I wash hands with soap after eating and defecating to remove the bad smell. (HH27)*
> *The dirtiest is cooking because you touch chili, then can't touch the baby, make its skin hot. (HH8)*

These comments also reflect mothers' elevated concern for the health of their children.

Handwashing with soap (at least around mealtimes) also seems to be a "modern" behavior.

> *"When I got a tap at the sink, I began to hand-wash with soap before and after eating; earlier, I just used a small bowl to wash my hands with water." (HH20)*

Having a sink simply facilitates performance of handwashing with soap by making it easier to access water and soap (which is often left at the sink as well). A sink makes HWWS more practical because people can just open the tap without getting wet. In addition, the sink is usually located in the kitchen near the dining room, so little travel is involved at mealtimes.

However, having a sink did make people wash their hands before eating. One possible implication is that having this new convenience in the home is seen as "modern," and that having a sink inspires the "modern" behavior of hand hygiene with soap around meals. Of course, having a sink is also an urban phenomenon, but it is also presumably aspirational, because (at least at first) only richer families can afford to have sinks in their kitchens. As

mentioned, having a sink replaces or augments the traditional practice of having a bowl of water during mealtimes for keeping hands less sticky from touching rice. This handwashing with soap at the sink is an additional behavior that some families with sinks have added to mealtime routines.

LIFESTYLE CHANGES

Mothers were asked about the ways in which their life changed after having a baby in order to find out how readily they adopted new habits at this time. Young motherhood is quite explicitly seen as a period of change and openness to new experiences. Young mothers go home (i.e., to their natal house) to learn how to take care of their babies; the babies' grandmothers can be quite explicit about techniques (e.g., the video of HH26 shows the grandmother preparing the bath water and verbally instructing an uncertain young mother about how to bathe her baby—bathing is something many mothers seem to feel anxious about).

Indeed, postpartum women in this study reported a number of significant changes to their everyday behavior, mostly caused by receiving advice from significant others about what is likely to protect their health and that of their newborn. These reported changes included (in rough order of frequency of being reported):

- Eat more vegetables and fruit (often despite not liking these foods, to be healthy for baby)
- No longer eat spicy foods (the 'heat' gets into breast milk and causes diarrhea in the baby)
- Drink milk (often despite not liking milk, to increase breast milk) but not soda
- Take the baby into sunlight for half hour (to keep the baby strong, protect from jaundice)
- Put feet up for long periods (to avoid thrombosis)
- Avoid too much work
- Avoid pineapple juice (as it causes abortion)

Behaviors on this list are self-induced (and socially reinforced) changes associated with cultural beliefs that become relevant during this period of life. Not on this list are the unavoidable behaviors also associated with new babies. These include waking up often during the night, breastfeeding, and having other interactions with the baby, as well as the direct consequences of no longer going out to socialize or eat meals, and changes in the types of housework undertaken, sometimes due to a maid being taken on, and perhaps giving up a job. These other but necessary behaviors were also commonly reported by mothers.

The first few of the changes on the list above are the most fundamental, but also the most often reported. However, there are also more subtle changes to these women's lives as well, but which are at least equally important when considering how to approach them at this point in their lives. Having a baby makes young women "grow up"; they feel more responsible:

> *I was a big procrastinator before, now I'm more diligent; when the baby is asleep, I have to do everything in a rush; now sympathize with my mother, who goes to sell vegetables in the market every day; I try to have everything ready for her. (HH26)*

Life for these new mothers was very centered around the baby—large amounts of time were spent breastfeeding, carrying the baby around until the baby fell asleep, or dressing and undressing the baby. These women even seem to eat alone, including dinner, for a reason that has not been determined. So they did not experience much of a social life anymore—outside their contact with the baby—a complaint often repeated in interviews as a major and unfortunate aspect of their new life.

Before the baby, I was young and care-free; I could go out, do many activities. Now I'm afraid to go out with the child, meet too many people, and fear the polluted air outside. Now I have more things to do around the house, which I have to do while child sleeps; I can't ask husband to help, he's too tired from his work. (HH05)

TBAS AND MIDWIVES

Findings from Focus Group Discussions with TBAs and Midwives

Midwives consider themselves an option for middle-class women. Midwives charge less than the hospital and are women, which they feel is an advantage they have over male doctors. Clients who have more money, insurance, or birth-related complications go to the hospital for treatment. Midwives believe that people in the villages prefer using TBAs, but that they are smarter and know more about medical matters than TBAs. TBAs, however, can offer the mother more time and assistance post-delivery. The midwives provide post-delivery checkup services but these occur at the clinic and not in the mothers' homes so not all mothers go to receive these postnatal services. Midwives have similar beliefs as the participants about the critical times for HWWS (after cooking, after going out, before breastfeeding, after defecating, and before handling the baby), but say they often forget to wash their hands with soap during care and do not promote HWWS specifically, although it is mentioned in other advice they give.

Participants' Perceptions of TBAs and Midwives

Interviews with our respondents were rich in opinion about their caretakers during pregnancy and delivery. Most women who had an opinion on TBAs found them "scary":

TBAs are 'scary' and irresponsible because the minute you have a problem they send you to a midwife or doctor; they're not hygienic, don't have same equipment, and no special education; only met one, socially; also have relative who used one; she couldn't help, the baby died. (HH8)

The primary reasons for preferring midwives were because they have equipment, they give pain relief and other medication, they sew, and have more medical knowledge.

Midwives are *"more experienced." (HH1)*
A TBA is more scary; midwife more healthy, educated, TBA cheaper but no certificate, is only assistant to midwife. (HH 16)

The few women who preferred TBAs over midwives did so because they are less expensive.

Urban women generally did not know that much about TBAs, suggesting that they saw TBAs as being associated with an old, out-of-date way of life:

TBAs are not around here, never seen one, don't know about them, they're only rural; I wouldn't risk using one. (HH6)

Many respondents mentioned the partnership between TBAs and midwives and liked their different roles: midwives help with delivery and are generally recognized to be more knowledgeable. TBAs give massages (which are very popular), wash the mother's clothing, help bathe the baby, and support the mother more after the birth.

I prefer the midwife as they are smarter, and have instruments for delivery. I like having both together as they have different roles – my friends like having both at birth too. (HH19)

TBA and midwife work together, delivery by TBA alone would frighten, doesn't have instruments. (HH25)

It generally appears that midwives are more respected than TBAs, but the role of the TBA is still an important one, at least in rural areas.

Key Findings

HANDWASHING PRACTICES

Close observation of the patterns of behavior in the videos suggests the following conclusions concerning current practice of handwashing with soap in this population:

- HWWS was observed to be practiced to some extent in this population, particularly among more educated/affluent individuals and those in urban areas, although it was not always on handwashing occasions of public health importance.
    - HWWS around meals was rare, occurring mainly after eating to remove food from hands.
    - HWWS after a baby's defecation also occurred infrequently, mainly in urban households. Changing the baby occurred in many locations. When a napkin change was followed by HWWS, the sequence of events was often the same every time.
    - HWWS also occurred when women believed that their hands were unclean: after sweeping, doing laundry, or coming in from outside.
- HWWS was not limited by availability of water or soap availability—both were plentiful.

BARRIERS TO HANDWASHING WITH SOAP

Through in-depth interviews, close examination of videos, and our prior knowledge on this subject, the following items are believed to be the key barriers to handwashing with soap in the study population:

- Most women believe that soap is necessary only if their hands are visibly dirty, oily, or smelly. People generally know they need to wash their hands but don't know the critical times (from a public health perspective), and while some have heard they need to use soap, others have not.
- Most current handwashing is not around the critical occasions, but tends to be more associated with household hygiene (cooking, cleaning). Use of soap to clean hands before serving food is non-existent; after own defecation it is probably infrequent (a supposition based, somewhat poorly, on demonstrations of behavior at the time of interview); after baby's defecation it is hit-and-miss, sometimes involving nothing, sometimes a rinse, sometimes use of soap (probably due to haphazard timing of this event). Thus there are no current social norms to use soap on the hands.
- Handwashing is not currently a priority for the health system (including midwives); even in the "pink book" that is regularly given to pregnant women, handwashing does not appear; it is only one of 10 messages in other pamphlets produced in Serang and available at health centers.
- Handwashing with soap is not seen as a priority by most young mothers either, as they are coping with a considerable range of changes to their lifestyle simultaneously.
- Being seen by many as an upwardly mobile, urban phenomenon, HWWS may be thought to be "not something we do around here" by rural women.
- Some women are so poor (earning only 5K Rp/day as manual laborers) that buying soap could be an economic problem. (They were very happy to receive souvenir of soaps.) However, this is not thought to be a major issue.

OPPORTUNITIES FOR HANDWASHING WITH SOAP

Overall, handwashing with soap can be most strongly linked to relatively unalterable social variables—urban life, education, and wealth. However, unlike other countries, in this

population there was at least a certain level of handwashing with soap already evident, which means that there is a foundation on which to build. We see many opportunities for introducing handwashing:

- Considerable disruption to old routines takes place when a woman becomes a mother, meaning that new habits have to be formed.
- Women with young babies are very willing to try new things that might help their babies flourish (mostly centered around diet); they are dedicated and highly motivated at this time of their lives.
- Young mothers experience considerable social support that allows them to focus their efforts and time more exclusively on their dependent offspring.
- Handwashing with soap may be seen as "modern" behavior, especially when it is not just about "dirty hands" (e.g., before eating, after defecation, after being away from home).
- Soap is very generally available, and not generally perceived as being expensive; all of the participating women had water easily accessible, often within the house (although this appears to have been used as a selection criterion by the local health authority during recruitment).
- Having a kitchen sink (i.e., inside tap) makes handwashing more likely because it reduces the time and effort required to do it.
- People who are tired—like young mothers who can't get enough sleep due to the constant demands of their infants—have less cognitive control. {Baumeister, 2012} This could make them more amenable to messages that don't make rational appeals, but rather target fundamental motivations.

KNOWLEDGE/AWARENESS OF HEALTH RISKS

- Women generally know that breastfeeding is the best way to keep the baby healthy.
- Diarrhea is associated with events other than contamination with germs: developmental milestones, spoiled formula, or *masuk angina* (nausea).
- Knowledge of how to prevent diarrhea and other infections is otherwise poor.
- No association is made between handwashing and illness, but women are aware that ill people can make their baby sick.

Thus, women do not currently appreciate that handwashing can benefit their babies' health, yet diarrhea is perceived to be a risk to the child. Messages could aim to increase this knowledge. Women could be receptive to hearing that HWWS is another way they can prevent their babies from getting diarrhea.

LIFESTYLE CHANGES

- Women report changing their diet for their own health and the health of the baby.
- Women have a lot of support from family members and can concentrate on caring for the baby.

Women would likely form a new handwashing habit if an intervention convinced them that handwashing would be important for the health of their child.

TBAS AND MIDWIVES

- Midwives are seen to be more knowledgeable and better trusted than TBAs, yet TBAs assist the mother more after the birth and their traditional role is still important in rural areas.

This information feeds into our discussion of the appropriate avenue for delivery of the intervention (see Recommendations).

Recommendations

The prevalence of women's willingness to change fundamental behaviors such as eating habits at this time of life bodes well for the possibility of incorporating other kinds of changes to their daily routines. But a mechanism must be found to convince women of the importance of such changes, or alternatively, convince significant others to exercise their authority in getting new mothers to change their lives—particularly, to wash their hands with soap. It is to that task that we now turn.

DELIVERY OF THE INTERVENTION: AVENUES OF CONTACT

Many contact persons/groups could be used to deliver a handwashing intervention to new mothers. The ways in which each group could be used are listed below in order of preference. Reasons are provided for our preference.

Midwives: They are the primary contact with the health system at time of delivery for the widest range of families; they are seen as progressive and authoritative, and traditionally give advice about child care. They also conduct post-delivery checkups. However, use of midwives would mean that the message content or frequency of delivery cannot be directly controlled.

Note that part of the kit delivered by midwives or doctors is a book about pregnancy and child care; this too is seen as authoritative, and can provide a consistent message, as well as background health information. (It is also taken to *posyandu* or clinic visits to record a baby's weight.) A few women told us that their only source of information related to childbearing and childrearing was these books. The problem is that women tend not to read them once they have given birth (no time), and they may sit on the shelf at home without ever being read (especially by rural women), so that even though this information is widely available, and even present in the home, this does not ensure that it is an effective channel of communication.

Traditional Birth Attendants: TBAs have contact at the right time (around the time of pregnancy and post-delivery), but not with the widest possible target population (more rural than urban, and even in rural areas they are giving way to midwives); they are not seen as authoritative or modern/high status as midwives. Focus group responses suggest that TBAs are passive, only responding to questions, unless the TBA sees something wrong, and are less forthright than midwives. In particular, TBAs won't say anything about handwashing unless a woman asks about it. TBAs also think many people don't wash their hands, but are healthy, so therefore handwashing can't be important. TBAs themselves wash their hands only after delivery, not before (although they may wear gloves like midwives). However, traditionally, TBAs have greater contact with women post-delivery than midwives.

Mass media: Just about everyone has a television set, which is on most of the day. Few households have radios. A few women can remember having heard advice about childbirth or child care on television, but this appears to be relatively rare.

Doctors/hospitals: have access at the right time, and are seen as authoritative, but very expensive so are restricted to the wealthier families or those with insurance from their jobs (e.g., factory workers). They are also not a standard source of advice (doctors are essentially just delivery technicians). Midwives are always present at hospital births.

Cadres: They are local to their audience, but have a voluntary role. *Cadres* have limited contact with women, and not at the precise time of birth (because women don't go out much when they have just given birth).

Neighborhood Koranic groups: Women may not be active in these groups, and the group may not be active in many neighborhoods. Their primary focus is not on health messages, but on religious issues.

We believe that the single most powerful potential influence on young mothers in Indonesia is midwives. They are authoritative figures with an appropriate role and frequent contact with a wide variety of young mothers. They are by far the most frequent contact in our sample (excluding the women's own mothers). Mothers might be an even better source of information, but they are less likely to be uniformly and significantly influenced by a campaign, whereas midwives will likely take it on if it is couched as a professional requirement as part of "best practice," with sound scientific underpinnings. Involving midwives directly in MCHIP's Global Handwashing Day activities might also be advisable.

INTERVENTION STRATEGY

If midwives are to be used at scale, they must be approached in their professional capacity by someone in a position to change their standard practices. This would presumably be someone higher up in the hierarchy of the medical system. For the sake of uniformity at scale, it would be best if this authority was able to influence practice nationwide.

The intervention should be targeted at all young mothers as there is no readily identifiable features that can be associated with people who wash their hands. HWWS, when it occurs, is not always on critical occasions. It is primarily done to remove dirt, smell, or food from hands on occasions that the mother deems to be important; the intervention should focus on convincing mothers of the importance of HWWS at key times. The handwashing message could also include advice on how to change babies' napkins and when/how to clean them. Simple ways of setting up a handwashing stand combined with a napkin bin in the bedroom or living area could also be suggested to help mothers develop a new handwashing habit around babies' defecation events.

Presumably, any intervention would include new materials that are inspiring both to midwives (so that they will actually use them) and their target audience (young mothers). Effective messages must be surprising (to attract attention in the first place), simple (to be comprehensible, not confusing, and not exhaust the patience of potential audience), motivating (to inspire initial efforts at change), and rewarding (to facilitate continued practice). For this reason, we believe the messages should be restricted to information about the need to wash hands using soap at the critical junctures (from a public health perspective) of own defecation, babies' defecation, and before serving food. Information about how to wash hands (e.g., how long, which parts of the hand to concentrate on) is much less important.

We also believe that use of two motivational drivers—*disgust*, the natural motive to protect oneself from disease, and *nurturing* of offspring, a motivation that is naturally heightened in importance at this stage of life—would be the most natural focus of a campaign targeting this population. (However, mothers are taught not to get disgusted easily when handling babies, for example, when changing diapers, and the like, so disgust may be dampened during this time.) As noted above, it also appears that HWWS is currently linked with "modern" urban lifestyles. This aspirational aspect could also be manipulated by a campaign to make it more effective.

MCHIP and Unilever could assist this effort by providing creative materials in line with these recommendations to the Department of Health. Emphasis could be put on activities during Global Handwashing Day, around which MCHIP has already conducted campaigns in Indonesia. (MCHIP may have held a Global HWWS Day event in Kramatwatu in 2010 [focus group discussion with urban midwives]).

Advice about handwashing could also be added to the "pink book" that is currently distributed to pregnant women by the local health centers. While a media-based campaign is possible, it does not seem that women are used to getting advice about child care from television.

Currently, it appears that midwives prefer not to transmit information about child care until the baby is born; they are more concerned with dispelling fears about childbirth while their clients are still pregnant. It seems likely that handwashing messages will be heard with greater attention once the child is born, as being more relevant, and because the disruptions to life have begun. However, midwives are not as actively involved with young mothers after they have given birth—often they make just a couple of visits in the first week to ensure that both mother and baby are in healthy condition. But the limited role of midwives as information transmitters at this point could be easily augmented to include messages about handwashing.

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Appendix 1: Interview Topic Guides

Mothers of Young Children

- *Script elicitation*: Ask participant to describe what they do on a typical day between getting up and going to bed, in order from morning to night, with questions concerning how groups of activities might be "chunked" together (e.g., defecation and subsequent hygiene activities), and how regularly performed (e.g., daily, weekly).
- *Repeat scripting exercise*, but with respect to daily routine *prior to being pregnant*. Ask what the most important changes to routine have been before and after, and why.
- *Narrative about birth experiences*: open-ended description of their experience, where it took place, who was in attendance, whether anyone washed their hands with water and/or soap at the event.
- *Perceptions toward newborn health*: What risks does their infant face? What can be done to prevent or limit those risks?
- *Health advice*: Who has talked to them about keeping infants healthy (neighbors/friends/TBAs)? What advice was given? Did they like the advice? What did they do differently as a consequence of this advice?
- *Post-defecation picture exercise*: Show a picture of woman leaving latrine/toilet and going past handwashing facilities without using them; ask participant to describe the woman, what she would do in the same situation and why; repeat exercise with picture of woman cleaning up after child defecation without washing her hands.
- *Social relationships*: To other family members (e.g., fathers, grandmothers) and primary health care providers (e.g., traditional birth attendants): What adjectives would they use to describe these relationships? Do any of these people help with caring for their child?
- *Social life*: Participation in any activities outside the house (shopping, women's groups, religious ceremonies, visits to neighbors); ask for their prevalence and importance.
- *Social comparison exercise*: Show participants 5 pictures of different Indonesian women (age, social class); ask them to describe each woman and then choose which one she feels most similar to and why, then which she would most like to resemble and why.
- *Media access* (printed/audio/televisual materials): Which is most trusted/liked/frequently experienced? Have any of them provided advice on how to care for infants? If so, how did they respond to such advice?
- *Handwashing with soap demonstration*: Ask the participant to go through the motions of washing her hands with soap after defecation, after a child's defecation, and before serving food to her baby. Video these demonstrations; then ask questions about how easy/hard it was to do, and what factors would keep her from doing it regularly.

Appendix 2: Focus Group Discussions with TBAs and Midwives

- *Job description*: What is the primary objective of their work? What is the most important thing they do in a typical day at work?
- *Perceptions toward newborn health*: What risks does an infant face? What can be done to prevent or limit those risks?
- *Health advice*: Who do they talk to about keeping infants healthy (patients, young mothers)? What advice is given? Where did they learn to give this advice? Do they think the recipients like the advice? Do they think recipients act differently as a consequence of this advice? In what ways? What other sources of health information are young mothers exposed to? Do those sources provide contradictory information to them? Which source do they think young mothers listen to?
- *Handwashing advice/practice*: Does handwashing with soap figure in their advice-giving? What is its relative importance? Do they demonstrate HWWS to young mothers? When do they wash their own hands with soap on a typical day at work? At home?
- *Post-defecation picture exercise*: Show a picture of woman leaving a latrine/toilet and going past handwashing facilities without using them; ask the participant to describe the woman, what she would do in the same situation, and why; repeat the exercise with a picture of a woman cleaning up after her child's defecation without washing her hands (this last point was used only during the first few interviews).

Appendix 3: Characteristics of Participating Households

HH	INTERVIEW DATE	VIDEO DATE	DEMO	HW TYPE	NAME	AGE	EDU-CATION	LITERACY	ORIGIN	NO. OF KIDS	AGES (OLDEST/ YOUNGEST)	OTHER OCCUPANTS	HER/ HUSBAND OCCUPATION	HH OWNER	MONTHLY INCOME
Kramatwatu (Urban)															
1	06-Apr	05-Apr	Y	Washer	Entin	38	NA	NA	Elsewhere	3		No	None/factory	Y	3-4 m
2	06-Apr	05-Apr	Y	Rinser	Meva	35	BA (uni)	Y	Elsewhere	3	7/2 mo	No	None/factory	N	2-3 m
3	06-Apr	05-Apr	Y	Avoider	Beti	35	High school	Y	Elsewhere	2	8/21 days	Mother	None/factory	N	1-2 m
4	07-Apr	06-Apr	Y	Dirt rinser	Yayah	32	High school	Y	Elsewhere	2	8/2 mo	Yes	None/private company	Y	2-3 m
5	07-Apr	06-Apr	Y	Avoider	Nunung	23	Junior high	Y	Elsewhere	1	3 mo	No	None/factory	N	1-2 m
6	07-Apr	06-Apr	Y	Washer	Deswanti	37	High school	Y	Elsewhere	3	15/2 mo	No	None/ construction	Y	6-7 m
7	08-Apr	07-Apr	Y	Washer	Sahro	21	High school	Y	Local	1	1.5 mo	Father, brother	None/bank guard	N	1-2 m
8	08-Apr	07-Apr	N	Dirt washer	Yuni	22	High school	Y	NA	1	4 mo	Mother-in-law, Father-in-law	Salesgirl/factory	Y	2-3 m
9	08-Apr	07-Apr	Y	Dirt washer	Aishah	29	Junior high	Y	NA	1	9 mo	No	None/trader	Y	1-2 m
10	09-Apr	08-Apr	Y	Washer	Hesti	22	High school	Y	Local	1	2 mo	No	None/factory	N	3-4 m
11	09-Apr	08-Apr	Y	Washer	Melani	26	High school	Y	Elsewhere	2	3.5/ 3 weeks	No	None/factory	N	1-2 m
12	09-Apr	08-Apr	Y	Avoider	Suryawati	34	Elementary	Y	Local	3	13/ 2 weeks	No	None/factory	N	1-2 m
13	10-Apr	09-Apr	Y	Washer	Diah	33	Academic	Y	Elsewhere	3	13/2 mo	No	None/ engineering	Y	4-5 m
14	10-Apr	09-Apr	Y	Dirt washer	Kamsini	32	Academic	Y	Elsewhere	2	7/17 days	No	None/army	Y	4-5 m
15	10-Apr	09-Apr	Y	Washer	Pudi	38	High school	Y	Elsewhere	4	15/2 mo	No	None/clerk	N	1-2 m
Pamarayan (Rural)															
16	11-Apr	10-Apr	Y	Rinser	Liah	20	Elementary	Y	NA	1	1 mo	Parents, brother, sister	None/trader	N	1-2 m

HH	INTERVIEW DATE	VIDEO DATE	DEMO	HW TYPE	NAME	AGE	EDU-CATION	LITERACY	ORIGIN	NO. OF KIDS	AGES (OLDEST/ YOUNGEST)	OTHER OCCUPANTS	HER/ HUSBAND OCCUPATION	HH OWNER	MONTHLY INCOME
17	11-Apr	10-Apr	N	Dirt washer	Nengsih	25	High school	Y	Local	2	5/1 mo	No	None/store(JK)	N	<1 m
18	11-Apr	10-Apr	?	Rinser	Irma	18	Junior high	Y	Local	1	1 mo	No	None/trader	N	<1 m
19	12-Apr	11-Apr	Y	Avoider	Rodiah	18	Elementary	Y	Local	1	2 mo	Mother, father, sister	None/factory	P	3-4 m
20	12-Apr	11-Apr	Y	Washer	Madihah	39	University	Y	Local	4	12/ 13 days	No	Teacher/gvt	Y	8 m
21	12-Apr	11-Apr	Y	Avoider	Juminah	23	High school	Y	Local	2	7/45 days	Parents	None/worker	P	<1 m
22	13-Apr	12-Apr	N	Dirt rinser	Lina	19	Elementary	Y	Local	1	2 mo	Mother-in-law	None/driver	P	<1 m
23	13-Apr	12-Apr	Y	Washer	Ida	25	High school	Y	Local	1	3 mo	Mother, father, brother	None/mining	P	2-3 m
24	13-Apr	12-Apr	Y	Dirt rinser	Ila	18	Elementary	Y	Local	1	3 mo	Mother	Mattress maker/ J'ta factory	P	<1 m
25	14-Apr	13-Apr	Y	Dirt washer	Parti	18	Junior high	Y	Local	1	1 mo	Parents	None/J'ta market	P	<1 m
26	14-Apr	13-Apr	N	Avoider	Evina	23	High school	Y	Local	1	1 mo	Parents, brother	None/fisherman	P	<1 m
27	14-Apr	13-Apr	N	Avoider	Inah	25	Elementary	Y	Local	1	1 mo	Grandfather, grandmother, brother	None/fisherman	P	<1 m

Appendix 4: Handwashing Occasions and Events

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Returned Home	1	Part 2 1	00:00:30	Yes, right-handed only (R)	Yes	Kitchen	Kitchen sink	Kitchen sink	Yes	Came in from collecting child from school	Puts baby down	38	NA	3-4 m	Urban
Returned Home	1	Part 2 B	00:00:28	Yes	?	Kitchen	Kitchen sink	Kitchen sink	Yes	Came in from outside	Talking with family	38	NA	3-4 m	Urban
Returned Home?	1	18	00:00:20	Yes	No	Kitchen	Kitchen sink	Kitchen sink	Yes (sort of, start of video and comes into room)	Came into kitchen (start of video)	Washing dish	38	NA	3-4 m	Urban
Returned Home	20	4	00:08:56	Yes	Yes	Kitchen sink	Bucket in kitchen (carries in ladle to sink)	Kitchen sink	No	Brings shopping into kitchen after coming home with it	Eats banana	39	University	8 m	Rural
Household Hygiene															
After Sweeping	1	1E	00:00:31	Yes (R)	Yes	Kitchen	Kitchen sink	Kitchen sink	Yes	Picking up sweepings with hands	Serving food using spoon and hands	38	NA	3-4 m	Urban
After Sweeping	4	1	01:51:38	Yes	No	Kitchen	Kitchen sink	Kitchen sink	Yes (came in from sweeping yard)	Swept yard	Checks on baby, then washes dishes	32	High school	2-3 m	Urban
After Sweeping	7	4	00:53:04	Yes	Yes	Bathroom	Bathroom	Bathroom	Yes	Sweeping inside and outside	Carries out empty water containers, sits to drink jamu	21	High school	1-2 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
After Sweeping and Taking Out Rubbish	7	1	01:32:35	Yes	Yes	Bathroom	Bathroom	Bathroom	Yes	Sweeps kitchen and takes rubbish out	Puts laundry in drier	21	High school	1-2 m	Urban
Unknown (after hanging out laundry?)	7	2	00:06:30	Yes	No?	Bathroom	Bathroom	Bathroom	Yes	Puts water on to boil (few min. after hanging out laundry)	Bathing	21	High school	1-2 m	Urban
After Sweeping	14	2	00:36:40	Yes	Yes	Bathroom	Bathroom	Bathroom	No	Rinsing mop in bathroom	Putting away dishes	32	Academic	4-5 m	Urban
After Dusting	14	3	01:06:30	Yes	No	Kitchen	Kitchen (not sink)	NA	Yes (from outside)	Dusting furniture	Sweeping	32	Academic	4-5 m	Urban
After Sweeping	14	3	01:23:50	Yes	Yes	Bathroom	Bathroom	Bathroom	Yes	Sweeping	Cleaning baby pee	32	Academic	4-5 m	Urban
After Throwing Out Rubbish Bag	6	1	00:47:40	Yes	Yes	Bathroom	Bathroom	Bathroom on soap stand	Yes, from outside to bathroom	Serving tea/drinks, then collecting rubbish from sink into rubbish bag	Takes baby from maid	37	High school	6-7 m	Urban
After Sweeping/ Putting Out Vegetable Rubbish	24	2	00:31:10	Yes	?	Kitchen in bathing area	Bucket/ ladle	Too dark to see if soap used (but soap is kept there)	Yes	Sweeping area outside where prep veg, put out veg for chickens	Moves laundry outside to more sunny area	18	Elementary	<1 m	Rural
After Cleaning Bathroom Floor	7	4	00:27:40	Yes	Yes	Bathroom	Bathroom	Bathroom	Yes (sort of, walked out bathroom and then back in again)	Washing bathroom floor after washing dishes	Putting water on to boil	21	High school	1-2 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
After Scrubbing Floor	9	3	00:24:05	Yes	Yes	Bathroom	Bathroom	Bathroom	Yes	Scrubbing floor by bathroom where cleaned dishes	Goes into bedroom and closes door	29	Junior high	1-2 m	Urban
After Using Washing Machine	6	2	00:02:40	Yes	No	Kitchen	Kitchen sink	NA	No, but different part of kitchen	Putting on washing machine	Doing something in bedroom	37	High school	6-7 m	Urban
After Laundry	4	1	01:28:00	Yes	No	Kitchen	Kitchen sink	Kitchen sink	No	Laundry/ Scrubbing husband's dirty clothes	Washes dishes	32	High school	2-3 m	Urban
After Laundry	11	1	01:18:48	Yes	No	Bathroom	Bathroom	Bathroom?	No	Scrubbing clothes	Goes to wash hands in kitchen	26	High school	1-2 m	Urban
After Laundry	11	1	01:19:10	Yes	Yes?	Kitchen	Kitchen sink	Kitchen sink	Yes	From bathroom (laundry, see previous entry)	Picks up baby	26	High school	1-2 m	Urban
After Laundry	14	1	01:50:30	Yes	No	Kitchen	Kitchen (not sink)	NA	No	Putting soap on dirty laundry in bucket in kitchen	Breastfeeds	32	Academic	4-5 m	Urban
After Laundry	23	3	00:10:00	Yes	Yes	Kitchen sink	Kitchen tap	Kitchen sink	Yes (first removing dishes from sink)	Washing and hanging laundry, clearing sink of dishes	Gets water to drink	25	High school	2-3 m	Rural

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
After Hanging Out Clothes	14	2	00:31:37	Yes	No	Kitchen	Kitchen (not sink)	NA	No (brought empty bucket back to kitchen too)	Hanging out laundry, then brings bucket to kitchen to rinse	Sweeping/ cooking	32	Academic	4-5 m	Urban
After Hanging Out Clothes/ Before Eating	14	3	00:48:45	Yes	No	Kitchen	Kitchen (not sink)	NA	Yes (from outside)	Hanging out laundry	Eating breakfast with hands	32	Academic	4-5 m	Urban
After Washing Dishes	11	2	00:48:36	Yes	No	Kitchen	Kitchen sink	Kitchen sink	No	Washing dishes	Serving cooked food into bowls (with spoon)	26	High school	1-2 m	Urban
After Washing Dishes	15	1	00:16:50	Yes	Yes	Kitchen sink	Kitchen sink	Kitchen sink	No	Dealing with rice	Making tea	38	High school	1-2 m	Urban
After Washing Dishes	15	4	01:26:40	Yes	Yes	Kitchen sink	Kitchen sink	Kitchen sink	No	Washing up	Tidying kitchen	38	High school	1-2 m	Urban
After Wiping Table?	14	2	00:45:15	Yes	No	Bathroom	Bathroom	NA	Yes	Wiping table	Bathing	32	Academic	4-5 m	Urban
Food-Related Events															
Food Preparation	1	8	00:05:15	Yes (R)	Yes	Kitchen	Kitchen sink	Kitchen sink	No	Prep food for cooking	Prep food for cooking	38	NA	3-4 m	Urban
Chili Preparation	8	3	01:13:35	Yes	Yes	Bathroom	Bathroom	Bathroom	Yes (from outside to bathroom)	Cutting chilli, feeding rabbits	Picks up baby	22	High school	2-3 m	Urban
Before Cooking?	6	1	00:20:21	Yes	Yes	Bathroom	Bathroom	Bathroom on soap stand	Yes (from kitchen to bathroom)	With husband and baby in living area	Cooking	37	High school	6-7 m	Urban
While Cooking	6	2	00:52	Yes	No	Kitchen	Kitchen sink	NA	No	Cooking	Cooking	37	High school	6-7 m	Urban
After Cooking	6	2	00:54:13	Yes	?	Kitchen	Kitchen sink	NA	No	Cooking	Talking on phone in bedroom	37	High school	6-7 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
After Cooking/ Sweeping	10	4	00:56:00	Yes	Yes	Kitchen	Tap in corner of kitchen	Bathroom (just behind kitchen wall)	No	Cooking/ sweeping chores	Picks up baby	22	High school	3-4 m	Urban
After Cooking	17	5	00:32:11	Yes	Yes	Kitchen	Kitchen sink	Kitchen sink (liquid)	No	Cooking	Washing dishes	25	High school	<1 m	Rural
Serving/Eating Food	1	2F	00:02:00	No	No	Kitchen	NA	NA	NA	Serving rice	Eating	38	NA	3-4 m	Urban
Serving Food/Eating (w/Spoon)	3	14	00:00:00	No	No	Kitchen/ Living area	NA	NA	NA	Serving food at start of video	Still eating at end of video	35	High school	1-2 m	Urban
Serving Food to Kids	2	6	00:01:40	No	No	Living area on floor	NA	NA	NA	Video starts serving food so don't see if washed hands before	End of serving food	35	Ba (uni)	2-3 m	Urban
Serving Food (into dishes, put under net on table)	4	4	00:41:18	No	No	Living area on table	NA	NA	NA	Cooking	Cooking	32	High school	2-3 m	Urban
Serving Food to Husband	5	1	00:57:30	No	No	Living area	NA	NA	NA	Changing baby's nappy	Prepares drinks/food	23	Junior high	1-2 m	Urban
Serving Food/Eating (with hands)	21	3	01:18:30	No	No	Kitchen	NA	NA	NA	Getting baby to sleep	Puts away dishes	23	High school	<1 m	Rural
Serving Food/Eating (with hands)	21	4	00:45:00	No	No	Living area	NA	NA	NA	In bedroom changing clothes after baby pee	End videos for day	23	High school	<1 m	Rural
Serving Food to Husband/ before Eating	19	5	00:00:00	No	No	Kitchen	NA	NA	NA	Start video	Eating with hands	18	Elementary	3-4 m	Rural

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Before Serving?	1	25	00:00:00	Yes	?	Kitchen	Kitchen sink	Kitchen sink	No	Start of video	Getting dishes (to serve food)?	38	NA	3-4 m	Urban
Before Serving?	7	1	01:18	Yes	Yes	Bathroom	Bathroom	Bathroom	Yes (from kitchen)	Cooking/ chopping veg/ washing up	Serves rice into bowl	21	High school	1-2 m	Urban
Before Handling Baby after Eating	22	1	01:28:50	Yes	Yes	Bedroom	Bowl of water on table	Soap dish next to bowl in bedroom	No	Eating, goes to bedroom to baby (HW before touching baby)	Holding baby	19	Elementary	<1 m	Rural
Feeding Baby (medicine, finger in mouth)	9	2	00:20:00	No	No	Outside	NA	NA	NA	Walking around	Give baby bottle of water	29	Junior high	1-2 m	Urban
Before Eating	4	1	01:33:22	No	No	Living room floor	NA	NA	NA	Washing dishes	Washes dishes	32	High school	2-3 m	Urban
Before Eating	5	1	01:03:00	No	No	Living area on floor	NA	NA	NA	Spoon feeding water to baby	Clearing dishes	23	Junior high	1-2 m	Urban
Before Eating	26	4	00:07:00	No	No	Floor in living area	NA	NA	NA	With baby	Clears dishes, HW	23	High school	<1 m	Rural
Before Eating	27	3	00:09:00	No	No	Living room on floor	NA	NA	NA	Gone to get food from vendor	Eating with spoon	25	Elementary	<1 m	Rural
Before Eating (with hands)	27	6	00:08:00	No	No	On side in kitchen	NA	NA	NA	Serving food	End of clip	25	Elementary	<1 m	Rural
Before Eating	27	9	00:04:43	Yes (R)	No	Kitchen	Bucket/ ladle	NA	No	Serving food	Gets drink	25	Elementary	<1 m	Rural
Before Eating	5	5	01:00:00	No	No	In living area on floor (using hands)	NA	NA	NA	Serving food	End of video and end of filming; unknown	23	Junior high	1-2 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Before Eating	6	*Many*	*She doesn't wash hands or use soap (but usually eats with spoon)*									37	High school	6-7 m	Urban
Before Eating	14	6	00:01:35	No	No	Kitchen	NA	NA	NA	Getting food out packaging	Eating	32	Academic	4-5 m	Urban
Before Eating	15	4	00:03:00	No?	No	Na	NA	NA	NA	Video begins with her serving (so not sure if miss HW before); she washes ladle with soap	Eating with spoon at kitchen table	38	High school	1-2 m	Urban
Before Eating	17	6	00:00:00	No	No	Kitchen	NA	NA	NA	Serving food (start of video)	Eating	25	High school	<1 m	Rural
Before Eating	19	1	01:46:41	No	No	Living area	NA	NA	NA	Out of camera, camera was on kitchen area where they bathe and clean after defecation	Washing dishes	18	Elementary	3-4 m	Rural
Before Eating	19	6	01:30:00	No	No	Living area	NA	NA	NA	Prep/ serving food	Eating with hands	18	Elementary	3-4 m	Rural
Before Eating	22	1	00:17:13	No	No	Living area	NA	NA	NA	Holding baby, someone brought her food	Goes to crying baby in bedroom	19	Elementary	<1 m	Rural
Before Eating	22	1 (2)	00:08:00	No	No	Living room table	NA	NA	NA	Sitting with baby, someone brought the food	Taking dirty plate out, hw	19	Elementary	<1 m	Rural

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Before Eating	22	2 (2)	01:00:35	No	No	Living room table	Na	NA	NA	Breast-feeding, then brought food	Doesn't finish eating, puts baby down, walking around a bit	19	Elementary	<1 m	Rural
Before Eating Breakfast	23	1	01:24:00	No	No	Living area on floor	NA	NA	NA	With baby	Clears dishes	25	High school	2-3 m	Rural
Before Eating/ Feeding Child	20	2	00:27:10	No	No	Living area at table	NA	NA	NA	Sweeping floor	Feeding child, then prepare baby bath	39	University	8 m	Rural
Before Eating	24	5	00:04:30	No	No	Living area on floor	NA	NA	NA	Serves food into bowls (using spoon)	Clears dishes and rinses hand (*see next entry*)	18	Elementary	<1 m	Rural
Before/after Eating	24	2	00:05:12	No	No	Living area	NA	NA	NA	Bathing	Clears dishes, goes outside to prepare corn on cob	18	Elementary	<1 m	Rural
Before Eating	13	3	00:20:00	?	?	Living room dining table	NA	NA	NA	Dark in kitchen, maid serves food	Clears table	33	Academic	4-5 m	Urban
Before Eating	7	2	00:28:31	Yes	Yes	Bathroom	Bathroom	Bathroom (seemed to get soap from different place?)	Yes	Serves food	Sits to eat with spoon	21	High school	1-2 m	Urban
Before Eating	7	6	00:05:29	Yes	Yes?	Bathroom	Bathroom	Bathroom	Yes	Serves food into bowls	Eats with husband	21	High school	1-2 m	Urban
Before Eating	11	4	01:10:40	Yes	Yes	Kitchen	Kitchen sink	Kitchen sink	Yes	Tidying up clothes	Serving/ eating	26	High school	1-2 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Before Eating	13	4	00:19:55	Yes	Yes-liquid	Kitchen sink	Kitchen sink	Kitchen sink	No	Serves herself food	Eating at table	33	Academic	4-5 m	Urban
Before Eating (after Serving)	23	4	00:54:55	Yes	Yes	Kitchen sink	Kitchen tap	Kitchen sink	No	Serving food, wiping surfaces in kitchen	Serves more food, eats with hands at table	25	High school	2-3 m	Rural
After Eating	1	1D	00:07:11	Yes (R)	Yes	Kitchen	Kitchen sink	Kitchen sink	Yes	Eating	Fills saucepan with water	38	NA	3-4 m	Urban
After Eating	6	2	00:40:35	Yes	Yes	Bathroom	Bathroom	Bathroom on soap stand	Yes - kitchen to bathroom	Eating (with spoon) takes dish to sink then straight to HW	Breast-feeding	37	High school	6-7 m	Urban
After Eating	8	3	00:23:10	Yes (R)	No?	Bathroom	Bathroom	Bathroom	Yes	Eating	Socializing	22	High school	2-3 m	Urban
Eating/Bathing Baby	8	Many	*No handwashing observed for eating/serving or bathing baby*									22	High school	2-3 m	Urban
After Eating	9	2	00:41:30	Yes	No?	Bathroom	Bathroom	Bathroom?	Yes	Eating	Doing things in bedroom	29	Junior high	1-2 m	Urban
After Eating	7	5	00:25:00	Yes	?	Bathroom	Bathroom	Bathroom	Yes	Eating while watching TV	Breast-feeding	21	High school	1-2 m	Urban
After Eating	10	2	00:31:46	Yes	Yes	Kitchen	Tap in corner of kitchen		Yes	Eating	Folding baby clothes	22	High school	3-4 m	Urban
After Eating	14	3	00:01:20	Yes	Yes?	Kitchen	Kitchen (not sink)	Kitchen (if used)	No (brought empty dish to bucket where washing hands)	Eating, then clearing dish to kitchen	Clearing out rice/ rice cooker	32	Academic	4-5 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
After Eating?	17	1	01:36:27	Yes	Yes	Kitchen (area with buckets)	Kitchen (area with buckets)	Bathroom	Yes	Eating, quickly sweeps porch (10 seconds)	Sitting with baby/breastfeeding	25	High school	<1 m	Rural
After Eating	17	6	00:05:19	Yes	Yes?	Bathroom	Bathroom	Bathroom	Yes	Eating	Close bathroom door	25	High school	<1 m	Rural
After Eating	19	5	00:15:38	Yes (R)	No	Kitchen	Bowl of water on table	NA	No	Eating	Picks up baby	18	=	3-4 m	Rural
After Eating	20	5	00:02:13	Yes	No	Kitchen sink	Bucket in kitchen (carries in ladle to sink)	Kitchen sink	No, different part of room	Eating in kitchen using hands and spoon	End videos for day	39	University	8 m	Rural
After Eating Banana	20	4	01:18:00	Yes	No	Kitchen sink	Bucket in kitchen (carries in ladle to sink)	Kitchen sink	No	Sitting with baby eating banana	Carrying baby	39	University	8 m	Rural
After Eating	21	3	01:27:30	Yes	No	Kitchen (over bucket with dirty dishes)	Bucket and ladle	NA	No	Putting dirty dishes in bucket	Getting a drink	23	High school	<1 m	Rural
After Eating	22	1 (2)	00:19:17	Yes	No	Kitchen	Kitchen (bucket and ladle)	NA	No (or yes depending - take dirty plate out to kitchen)	Eating, then brings dirty plate to kitchen	Back to baby	19	Elementary	<1 m	Rural
After Eating	23	1	01:31:40	Yes	Yes - liquid	Kitchen sink	Kitchen tap	Kitchen sink	No (cleared dishes)	Eating, clearing dish	With baby	25	High school	2-3 m	Rural
After Eating	25	1 (2)	00:00:30	Yes	Yes	Kitchen	Bucket/ ladle	Kitchen	Yes	Eating	Changing clothes	18	Junior high	<1 m	Rural
After Eating	26	4	00:16:40	Yes	No	Kitchen?	Kitchen (don't see)	NA	Yes	Eating, clear dish to kitchen	Breast-feeding	23	High school	<1 m	Rural

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
After Feeding Puree to Baby	24	4	00:02:45	Yes, left-handed only (L)	No	Kitchen in bathing area	Bucket/ ladle	NA	Yes (sort of, brought empty dishes in then rinsed hand)	Feeding puree, then changed napkin (but hw probably because of puree, I think)	Sits outside with baby (sunbathe?)	18	Elementary	<1 m	Rural
After Eating	24	5	00:09:53	Yes (L)	No	Kitchen in bathing area	Bucket/ ladle	NA	Yes (sort of, brought empty dishes in then rinsed hand)	Eating, clear dish to kitchen	Goes to baby and puts napkin on	18	Elementary	<1 m	Rural
After Eating	25	4	00:36:30	Yes	Yes	Kitchen	Bucket/ ladle	Kitchen	Yes	Eating	Going to toilet (wee)	18	Junior high	<1 m	Rural
Baby care															
Baby Defecation/ Baby Bath	1	23	00:06:11	No	No	Bathroom	NA	NA	NA	Preparing baby bath	Dries/ dresses baby	38	NA	3-4 m	Urban
Baby Defecation/ Baby Bath	1	21	00:02:10	No (but bathing baby so wet anyway)	No (but using soap on baby)	Bathroom	NA	NA	NA	Picks up baby to change nappy	Dries/ dresses baby	38	NA	3-4 m	Urban
Baby Defecation	4	1	00:08:00	No	No	Bedroom	NA	NA	NA	Breast-feeding	Gets baby toys, walks around for a couple of min., then ritual wash	32	High school	2-3 m	Urban
Baby Defecation	4	7	00:00:00	No	No	Bedroom	NA	NA	NA	Start of video (playing with baby end of last video)	Playing with baby/ talking with family	32	High school	2-3 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Baby Defecation	5	3	00:41:00	No	No	On baby mat in living area	NA	NA	NA	Tidying dishes	End of morning videoing, unknown	23	Junior high	1-2 m	Urban
Baby Defecation	6	3	00:08:50	No	No	Bedroom	NA	NA	NA	Breast-feeding	Hands dirty napkin to maid and undresses baby for baby bath	37	High school	6-7 m	Urban
Baby Defecation	8	1	00:26:56	No	No	NA	NA	NA	NA	Praying	Playing with baby	22	High school	2-3 m	Urban
Baby Defecation	14	3	00:01:13	No	No	Bedroom	NA	NA	NA	Out bathroom after bathing?	Baby bath	32	Academic	4-5 m	Urban
Baby Defecation	17	5	00:39:50	No	No	Outside	NA	NA	NA	Putting dishes in living room for lunch	Breast-feeding	25	High school	<1 m	Rural
Baby Defecation	22	3	01:34:51	No	No	Living area on floor	NA	NA	NA	Watching baby, changing napkin	Holding baby	19	Elementary	<1 m	Rural
Baby Defecation	24	1	00:33:14	No	No	Living area	NA	NA	NA	Preparing baby and baby bath for baby bath	Bathing baby	18	Elementary	<1 m	Rural
Baby Defecation	25	1 (2)	01:15:45	No	No	Bedroom	NA	NA	NA	Baby change	Washes dirty napkin	18	Junior high	<1 m	Rural
Baby Defecation	2	5	00:15:45	Yes	No	Kitchen	Kitchen sink	NA	No (nappy thrown in laundry in kitchen, turns and washes hands)	Dresses baby after a bath	Clears away baby bath	35	Ba (uni)	2-3 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Baby Defecation	20	4	00:30:00	Yes	No	Bedroom	HW stand in bedroom	HW stand	No	Was dressing baby when it defecated	Cleaning/ dressing baby	39	University	8 m	Rural
Baby Defecation	20	1 (2)	00:52:48	Yes	No	Bedroom	HW stand in bedroom	HW stand	No	Changing baby (throws dirty cotton in bin below HW stand, then HW)	Continues changing baby and cleaning baby	39	University	8 m	Rural
Baby Defecation	6	5	00:08:00	Yes	Yes	Bathroom	Bathroom	Bathroom on soap stand	No	Scrubbing dirty napkin in bathroom	Tidying bedroom	37	High school	6-7 m	Urban
Baby Defecation	6	5	01:40:39	Yes	Yes	Bathroom	Bathroom	Bathroom on soap stand	No	Scrubbing dirty napkin in bathroom after baby change in living area	Playing with baby	37	High school	6-7 m	Urban
Baby Defecation	6	7	00:28:20	Uses wet wipe as breastfeeding, husband wipes carpet		Living area	NA	NA	NA	Breast-feeding	Changes baby's clothes and wipes baby using wet wipe, then cleans napkin (see next entry)	37	High school	6-7 m	Urban
Baby Defecation?	6	7	00:37:20	Yes	Yes	Bathroom	Bathroom	Bathroom on soap stand	No	Scrubbing dirty napkin in bathroom (using different soap) after baby change in living area	Goes into bedroom and changes clothes	37	High school	6-7 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Baby Change (defecation?)	20	1	01:23:40	Yes	?	Bedroom	Hw stand in bedroom	Hw stand?	No	Comes into bedroom from somewhere else to change baby	Continues changing baby and cleaning baby	39	University	8 m	Rural
Baby Defecation	11	1	01:24:28	Yes (L)	Yes (L)	Bathroom	Bathroom	Bathroom	No	Cleaning baby defecation napkin in bathroom	Goes to baby (dries hands on towel on baby cot)	26	High school	1-2 m	Urban
Baby Defecation	20	3	00:29:10	Yes	Yes?	Bedroom	Hw stand in bedroom	Hw stand	No	Cleaning baby's bum with wet wipe	Putting talc, cream etc. On baby	39	University	8 m	Rural
Baby Defecation	23	4	00:08:12	Yes	Yes	Kitchen sink	Kitchen tap	Kitchen sink	Yes (from baby change, takes napkin out then to kitchen to hw)	Baby change and re-dress	Cooking	25	High school	2-3 m	Rural
Baby Change (pee)	3	E	00:00:00	No	No	Bedroom	NA	NA	NA	With baby on bed	Puts on new napkin	35	High school	1-2 m	Urban
Baby Change (pee)	6	5	01:24:30	Yes	Yes	Kitchen	Kitchen sink	Kitchen sink	Yes (changed room to throw baby napkin in laundry in kitchen too, so not just for hw)	Baby change, put napkin in laundry in kitchen	Make coffee	37	High school	6-7 m	Urban
Baby Change (pee)	19	4	00:20:11	No	No	Living area	Na	NA	NA	With baby	Washing baby napkin	18	Elementary	3-4 m	Rural

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Baby Change (pee?)	22	2	01:00:00	No	No	Bedroom	NA	NA	NA	Watching baby, changing napkin	Dressing baby	19	Elementary	<1 m	Rural
Baby Change (pee?)	27	3	00:20:00	No	No	Living room on floor	NA	NA	NA	Eating	Sit with baby	25	Elementary	<1 m	Rural
Baby Change (pee?)	27	2	01:24:00	No	No	Living room on floor	NA	NA	NA	Hanging laundry	Breast-feeding	25	Elementary	<1 m	Rural
Baby Change	20	4	00:17:03	Yes	No	Bedroom	Hw stand in bedroom	HW stand	no	Changing baby	Cleaning baby bum	39	University	8 m	Rural
Baby Change	20	4	01:30:35	Yes	No	Bedroom	Hw stand in bedroom	HW stand	no	Changing baby (throws dirty cotton in bin below HW stand then HW)	Dresses baby	39	University	8 m	Rural
Baby Change	23	4	00:27:10	Yes	No	Bathroom	Tap	NA	Yes	Cooking in kitchen	With baby/ change napkin	25	High school	2-3 m	Rural
Cleaning Dirty Napkin	23	2	00:18:00	Yes	No	Area with buckets at back of house	Bucket	NA	No	Scrubbing dirty napkin and putting other baby clothes in soapy water	Washing more clothes	25	High school	2-3 m	Rural
After Rinsing out Baby Bath?	10	1	01:26:00	Yes (R)	No	Kitchen	Tap in corner of kitchen	NA		Rinses out baby bath	Cleans out baby bottle	22	High school	3-4 m	Urban
Before Baby Bath	15	1	01:03:50	Yes	Yes	Kitchen sink	Kitchen sink	Kitchen sink	Yes	Undress baby for baby bath	Bath baby	38	High school	1-2 m	Urban
Before Handling Baby?	1	13	00:00:20	Yes (R)	Yes	Kitchen	Kitchen sink	Kitchen sink	No	In kitchen (start of video clip)	Picks up baby	38	NA	3-4 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Before Breastfeeding	6	3	00:01:40	Yes	Yes?	Kitchen	Kitchen sink	Kitchen sink (bar soap)	Yes	Talking with baby/maid	Breast-feeding	37	High school	6-7 m	Urban
Before Breastfeeding	11	2	00:22:53	Yes	No	Kitchen	Kitchen sink	Kitchen sink	No	Preparing food/veg	Breast-feeding	26	High school	1-2 m	Urban
Before Breastfeeding	15	4	01:37:36	Yes	Yes	Kitchen sink	Kitchen sink	Kitchen sink	No	Sweeping but not directly before, continues to fill water container in kitchen; only HW when hears baby cry	Breast-feeding	38	High school	1-2 m	Urban
Before Breastfeeding	20	2	01:00:20	Yes	Yes	Bedroom	HW stand in bedroom	HW stand	No	Clears dirty dishes, then walks into bedroom and takes mosquito net off baby	End of video, start of next is breast-feeding	39	University	8 m	Rural
After Peeing	25	4	00:37:00	No	No	Kitchen (behind wall)	NA	NA	NA	HWWS	Watch TV	18	Junior high	<1 m	Rural
Other															
Unknown Reason	10	1	01:00:30	Yes (R)	No	Kitchen	Tap in corner of kitchen	NA	No (changed rooms anyway)	Rocking baby to sleep	Preparing baby bath	22	High school	3-4 m	Urban
Unknown Reason	10	3	00:14:00	Yes	No	Kitchen	Uses the tap this time instead of the buckets	NA	Yes	Puts sleeping baby down	Sits to watch TV	22	High school	3-4 m	Urban

HW OCCASION TYPE	HH NUM	CLIP	TIME ELAPSED	HAND RINSE*	SOAP USE	LOCATION	WATER SOURCE	SOAP LOCATION	CHANGE ROOMS TO HW	EVENT BEFORE	EVENT AFTER	ACTOR AGE	ACTOR ED	ACTOR INCOME	URBAN/ RURAL
Unknown Reason	11	3	00:09:50	Yes	No	Kitchen	Kitchen sink	Kitchen sink	Yes	[Camera was on maid (bathing we think)]	Preparing baby bath	26	High school	1-2 m	Urban