

The Use of Soap and Water in Two Bangladeshi Communities: Implications for the Transmission of Diarrhea

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Efforts to reduce the incidence of diarrheal infections in which enteropathogens are endemic have focused on education about the importance of hand washing to interrupt transmission of such organisms. Since the effectiveness of health education depends on an understanding of the recipients' ideas and customs, we studied perceptions of cleanliness and the role of soap and hand washing in two poor Bangladeshi communities, one rural and one urban. We found that ideas about cleanliness generally are not based on germ theory; cleanliness is viewed in a larger, socioreligious context of purity vs. impurity. Washing serves both physical and spiritual needs and is performed according to defined patterns that may not effectively interrupt transmission of microorganisms. Soap is regarded as a cosmetic rather than an agent for removal of micro-

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ganisms.

Fecal contamination of food and water is a common problem in poor urban and rural communities in developing countries. Microorganisms are transmitted via the fingers of children and others to household objects, to food, to water that is being transported or stored, to the hands of other children, and ultimately to the mouths of other susceptible individuals [1]. This pattern of fecal-oral transmission of microorganisms plays a particularly important role in the transmission of *Shigella*, which, unlike most other enteric pathogens, has no environmental and few animal reservoirs. Regular hand washing with soap and water has been shown, under controlled and supervised conditions, to reduce the transmission of *Shigella* [2-4]. To effectively promote hand washing on a wider scale, it is necessary to address the issue raised by Aziz et al., i.e., "to understand how people may be motivated to change age-old customs and wash hands adequately after defecation" [1]. This paper addresses that fundamental issue.

To examine what motivates people to wash their hands, it is necessary to address the more general issue of how concepts are communicated cross-culturally. Practices that appear to be the result of shared beliefs may in fact be based on different ones. For instance, the apparently simple act of hand washing has a significance that depends on its social context. Even people who share the same beliefs may mean different things when they refer to this or other basic activities.

All societies define what is clean and what is dirty, but the principles underlying this classification differ. Definitions of cleanliness are closely related to the moral order that organizes

social relations. For example, we cannot understand the principles on which the caste system operates without acknowledging the important distinction between purity and impurity in the Hindu world view [5]. Douglas defines dirt as "matter out of place" and notes that defilement is "never an isolated event. It cannot occur except in view of a systematic ordering of ideas. Hence any piecemeal interpretation of the pollution rules of another culture is bound to fail" [6]. Similarly, any attempt to change behavior that does not take existing ideas and customs into account is unlikely to succeed.

When an outsider enters a Muslim or Hindu community, some of the first questions he or she asks usually concern bodily purity. By bodily purity we mean both ingestion of food and water and the disposal of bodily products such as blood, feces, urine, sperm, saliva, and sweat. In such communities these substances do not all rank equally in terms of impurity, and some, such as feces, are regarded as more or less polluting depending on the age of the person who excretes them and the context in which they occur. Ideas about purity involve both social and physiologic states; bathing is a moral concept as well as a physical act.

To be an acceptable member of a Muslim or Hindu community, one must perform bathing rituals in the correct way. Concern with cleanliness is not primarily based on a concept of hygiene derived from germ theory. Pollution and dirt, like disease, are associated with disruption of an ideal natural order that must be constantly restored and maintained through acts of purification. This paper will examine four acts that rid the body of such impurities: washing before and after meals; washing after defecation; *ozu*, which is religious washing performed several times daily by observant Muslims; and *ghosol* or *snan*, a complete bath taken daily. There are of course many other occasions when bodily impurities must be dealt with, but these four typify customs in Bangladesh and relate particularly to the fecal-oral transmission of *Shigella* and other enteric pathogens.

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Methods

Observations on the use of soap and water were made in the course of a research project on patterns of child feeding and health-seeking behavior in Bangladesh. Two sites were used: a village in the Chandpur district of Bangladesh, where one of us (SZ) lived and worked for 6 months, and an urban slum in Dhaka, the capital of Bangladesh. Fifty mothers were selected for study in each area. The rural study took place in a village with a population of 1,937, and the 50 mothers studied were chosen from a total of 16 settlements (baris) within this village. Most mothers in this area were married to landless laborers or men with small landholdings who were engaged in agricultural work. The women worked hard to process rice and complete other labor-intensive subsistence tasks. Most were not employed outside their baris and did not receive wages. In contrast, most of the mothers in the urban community received cash payment for their work, which included home production of handicrafts, food, and other items or jobs outside the home in the garment industry, in hospitals, or as domestic servants. Their husbands were employed as rickshaw pullers, laborers, street vendors, or beggars. The population density was high in the urban community, and in some cases several couples and their children shared one small room. Whereas mothers in all except one of the baris in the rural area had access to a tube well and ponds and a fairly consistent supply of clean water, mothers in the urban community had limited access to water, which flows for only a few hours a day at relatively few access points. In both settings pit latrines are used by adults. In the urban community each latrine is shared by ~45 people.

Our research consisted of the following methods: (1) intensive interviews with 100 mothers of children aged <5 years regarding the mothers' knowledge, attitudes, and practices in connection with feeding, health-seeking behavior, and decision making; (2) less-structured interviews with the mothers and other community members; (3) extensive participant observation of community life in general; and (4) structured observations of both communities, especially in regard to behaviors related to nutrition and hygiene.

Results

Water. Water is regarded as the agent par excellence for purification. Bangladeshi Hindus and Muslims use different words for water, a fact that indicates its important role in both the daily religious life and secular life of each community. Most Hindu pilgrimage sites are situated by rivers or ponds in which the waters are believed to erase sins, cure the sick, exorcise the possessed, or liberate the bather from the cycle of rebirths. Since immersion in holy water is regarded as analogous to rebirth, water plays an important part in Hindu life-cycle rites and is associated with transformation [7]. Its religious significance for Muslims is different but equally im-

portant. In Muslim religious rites, water is used exclusively as an agent of purification, especially before prayer, which an observant Muslim must offer five times daily.

The simple act of pouring water over the body or immersing the body in water is regarded by members of both religions as one of purification. Because of the inherent purifying qualities of the water, additional actions such as scrubbing are not required to achieve purification. Moreover, persons in these communities are not aware of the microbial content of the water, so water that is heavily contaminated may well be used for purification.

People in the Chandpur area regard the water that is widely available from tube wells to be suitable for drinking, but they do not use it for any other purpose; its taste, color, and temperature are considered inferior to water from ponds or rivers. In addition, as a result of their understanding of educational messages concerning the use of tube wells, inhabitants perceive them only as sources of drinking water. All cooking is done with pond water, as is nearly all washing of bodies, clothes, and utensils. Fresh fruit or a baby's bottle may be cleaned in the same pond in which the baby's soiled clothes are washed. In most houses, water from ponds and tube wells is stored for different uses. Young children frequently confuse the two kinds of water, so well water may easily become contaminated; for example, unsupervised children sometimes put unwashed hands in the drinking water. These observations support and explain Briscoe's finding that, among inhabitants of a village, the incidence of cholera is not affected by which families use water from tube wells and which do not [8].

In addition to its purifying power, water is attributed with a capacity for cooling. The term *cooling* refers not only to temperature but also to an important set of ideas that classify many substances according to inherent "hot" or "cold" qualities. This system of classification, found throughout the subcontinent and in many other parts of the world, is ancient and is an important consideration in everyday life. Advocates of this system believe that the healthy body needs to maintain a balance between heat and cold, and illnesses attributed to either extreme must be counteracted by the ingestion of appropriate foods. For this reason those suffering from diarrhea, a "hot" disease, need to eat "cold" foods such as bananas, coconut juice, or cold sugar water. However, cold temperatures are believed to cause many health problems, so people are anxious not to suddenly cool their bodies. For example, women who have just given birth and their infants are believed to be extremely vulnerable to cold. Both are fed on foods regarded as hot, such as warm water that has been boiled. Villagers in the Chandpur community never bathe in water from tube wells because they perceive it to be more cooling than pond water. Similarly, a mother whose baby has a cold will avoid drinking well water lest her breast milk becomes too cool.

Washing before a meal. Before eating in a Muslim com-

munity, one takes a glass of water and first rinses the mouth, then with the left hand pours the remainder of the water slowly over the right hand and onto the dinner plate. The plate is then wiped with the right hand, and the water is poured into a common central dish or out of the nearest door onto the ground. A similar sequence is followed at the end of the meal. When doing this one is careful not to contaminate the right hand by rubbing it with the left one, which is used to clean oneself after defecation. Keeping the left and the right hands separated is one of the ways in which purity is maintained. Nevertheless, we have observed, as have Aziz et al. [1], that people use their left hand out of necessity when preparing food and collecting drinking water. Once children are old enough to feed themselves, they are taught to wash the right hand as described above. Babies and children who are not old enough to feed themselves are discouraged from putting fingers in their mouths; nevertheless, they often do so, although their hands are rarely washed.

Washing after defecation. After defecation, water from a small pot is used to wash the anal region with the left hand. Afterward, ash or mud and water can be used to clean the hands. Aziz et al. suggest that this washing is not always thorough [1]. Nevertheless, members of these Bangladeshi communities perceive this to be the correct method of cleansing; they believe that if one does not at least perfunctorily follow this sequence of behavior, one is not pure. When the left hand is cleaned after defecation, it must not touch the right hand, although the vessel used to carry the water may come in contact with either hand.

Although many child care duties are performed by others in the community, such as siblings or other members of the extended family, cleaning a child after defecation is usually done by the mother. Some of the 100 mothers studied expected their children to clean themselves after defecation from as early as 2 years of age. However, 53% of the mothers said that they would not expect children <5 years of age to be able to clean themselves after defecation. Mothers clean their children by pouring water over their buttocks and using the left hand to clean the buttocks. As diapers are not used, it is also a mother's task to dispose of the feces if a small child defecates inside or in front of the hut. Since most women are busy with household tasks and often have to care for several children <5 years of age, the ideals regarding cleanliness for adults can rarely be applied to small children. In practice, the feces of babies are regarded as less polluting than those of adults, so the cleaning after defecation can be more perfunctory for babies than for adults.

According to the majority of mothers we interviewed, young children who are allowed to clean themselves after defecation may not be able to make the crucial distinction between appropriate use of right and left hands. Thus, while 53% of those mothers questioned believed that children at least 5 years of age could clean themselves after defecation, only 32% thought such children are capable of telling left from right.

Even fewer thought that children of this age are able to understand the concept of cleanliness; this was the opinion of both rural and urban women regardless of whether or not they had attended school. Our observations in both the village and the city indicate that children <5 years of age often have their hands in pots of water and that they indiscriminately drink from these, including the pots that hold water used for cleaning after defecation. Children also occasionally use the water from drinking vessels to clean themselves.

Ritual bathing. Muslims pray five times each day. Before prayer, ritual bathing known as *ozu* is performed. This may be done with use of water from a pond, river, tube well, or tap. If there is no water available, dust can be substituted. *Ozu* involves washing the hands and arms up to the elbows, rinsing the mouth, clearing the nose, washing the face, gargling, rubbing wet hands over the hair, rubbing the ears and neck, and washing the feet. Whether they are in a mosque, traveling by boat, or simply preparing to pray at home, Muslims try to perform *ozu* correctly. The use of soap during the performance of *ozu* is neither prescribed nor proscribed. In practice, soap is rarely used because it inhibits the speedy completion of the ritual washing.

Muslims perform *ozu* to rid themselves of the impurities of the profane world before approaching the sacred. Performance of *ozu* is not restricted to prayer times but should be done as often as possible each day; Muslims do not want to risk death and submission to God in an impure state. Thus, people who are embarking on a journey, women about to give birth, or students taking examinations may also perform *ozu*. The ritual is sometimes done after and in addition to other acts of cleansing. Ideally, clean clothes should be put on before praying. A woman who does not have a clean sari may purify her sari ritually by washing a small corner of it. If she is menstruating she may not pray and may not perform *ozu*; she is in a state of impurity that cannot be changed simply by washing. The purification ritual of *ozu* cannot be interpreted as an attempt to remove germs, although it may of course have that effect.

Daily bathing. The main daily bath is referred to as *ghosol* by Muslims and *snan* by Hindus. Hindus use the term *snan* to describe all kinds of bathing, whether it is at a holy place or in the local river. Ideally both *ghosol* and *snan* involve complete immersion in a pond or river. In the city this is rarely possible, however. Ponds are few and far between, and the water piped into the city often is available only erratically or not at all to inhabitants of the slums. Despite these difficulties, people take a daily bath if at all possible and try to store enough water to do so. Water for this purpose is carried in a bucket to an enclosed area and poured over the head before and after the application of soap. *Ghosol* and *snan* are not considered religious obligations but simply cooling, cleansing, pleasurable acts. Most Hindus and Muslims try to bathe before the midday meal, although Hindu women like to bathe early in the morning.

After working in the tropical heat at often dirty tasks, these people find the total immersion of their fully clothed bodies in cool water extremely pleasurable. Small children sometimes cry for their mothers to give them a cooling bath. Families who use soap on a daily basis are most likely to use it for daily baths. Whereas removal of worldly impurities is the main aim of *ozu*, an important function of *ghosal* and *snan* is to make a person more beautiful and auspicious by cooling the body. The term *subha*, which Hindus translate as auspicious, can mean pleasant, agreeable, propitious, favorable, better, fortunate, prosperous, desirable, beautiful, handsome, good, charming, radiant, or beneficial. It is used to describe actions that bring about well-being and is often applied to rites of passage, especially marriage. Wives can be said to be the embodiment of auspiciousness, and Hindus suggest that the act of bathing enhances or maintains this state. Auspiciousness is analytically distinct from purity, although the two states maybe closely associated in any particular event [9]. For women, the cooling properties of *ghosal* and *snan* are enhanced by the application of coconut oil (believed to be a cooling substance) to the hair following the bath. Both the bath and the coconut oil help a person tolerate heat, which otherwise could cause a "hot head" and result in confusion.

Soap. Soap is perceived as a substance that enhances the cooling properties of water. Thus, small babies and children are rarely washed with soap because its use requires too much rinsing with cold water. In fact, because of the widespread fear that use of cold water causes illness, babies are usually washed with water that has been left to warm in the sun (figure 1). Most people who use soap buy the type that is produced for washing clothes. In addition to being less expensive, this soap is harder and thus lasts longer. It is also furnished in unwrapped blocks that can be cut up and sold in smaller quantities to those who cannot afford a whole bar of hand soap. However, since this soap is harsh and dries the skin, people would undoubtedly prefer to use body soap if they could afford it.

In Bangladesh body soap is associated with luxury and beauty. It is considered an expensive, foreign item rather than an everyday necessity. This notion is enhanced by the use of words such as *international* on the wrappers. The packaging and advertisements for such soaps portray women who are fair-skinned and thus appear to be foreign. Even though advertisement posters are written in Bangla, the writing on soap packages is in English.

It is a matter of prestige to possess soap, and although people in the poorest households can rarely afford to use it, they do not like to admit that they have none. As such an admission could be humiliating for a poor person, it is difficult to gather accurate information on how many people possess and use soap. A husband is expected to provide his wife with good oil and soap, both of which are associated with femininity. A new bride is given soap by her future husband and washes with it as part of the preparation for her marriage. This prac-



Figure 1. A mother bathing her child in a Dhaka urban slum with water that has been left in a bucket to warm. She pours the water over the child's head and body but does not use soap.

tice is reflected in the advertisements for soap, which portray beautiful women and stress its cosmetic rather than its hygienic purposes (figure 2).

The association between body soap and female sexuality is linked to the fact that soap is regarded as a powerful purifying agent to be used in situations that are considered polluting. Thus, a person who visits the house of a newborn baby (a polluting act) would be expected to take a bath with soap beforehand. However, the occurrence of pollution is linked more directly with specific situations rather than with microorganisms. Soap is used for all the baths that mark major events in the life cycle. As the mother of a betrothed girl in a Dhaka slum told us in an interview, her daughter would have three special, public baths in her lifetime: one at birth, the second before marriage, and the third after death.

In the Indian subcontinent, female sexuality tends to be associated with heat and impurity as well as with auspiciousness. The restraint and control that are believed to be necessary for women of marriageable age are enforced by their seclu-



Figure 2. An advertisement for soap. Such advertisements always display the face of a beautiful woman as well as the soap to communicate the idea that soap is essentially a cosmetic product.

sion and modest dress, by the use of oil (which is considered to be cooling), and by the binding of their hair, wrists, and ankles [10]. Thus soap perfectly combines these ambivalent characteristics, simultaneously associating purification with coolness. As the institution of marriage is the ultimate means of restraint of a woman, it is not surprising that provision of soap is considered to be the husband's duty.

Discussion

Although feces are regarded as pollutants in the communities we studied, most people do not associate fecal contamination with the transmission of agents that cause diarrhea. Because feces are considered to be pollutants, hand washing after defecation is routinely done by adults; however, the methods used are unlikely to be effective in limiting the transmission of enteric pathogens. The same perceptions guide the practice of washing the hands before eating. Hand washing after defecation and before eating is usually done by pouring water over the hands, as it is believed that water alone is effective in eliminating pollution. Only when there is grossly visible soil on the hands are additional actions (e.g., rubbing or using abrasives such as mud or ash) incorporated into the washing ritual. Soap, which is promoted primarily as a luxury cosmetic item, is rarely used for hand washing. Furthermore, because of their cooling properties, both soap and water are perceived as having potentially deleterious effects, especially for children.

To change hand-washing habits so that effective cleaning occurs after defecation and before meals, perceptions and practices must be altered. This goal could be accomplished in a number of ways. Advertisements for soap, which currently are directed toward women and emphasize the cosmetic and luxury qualities of soap, need to stress the importance of soap

in hand washing. Because children play an important role in the transmission of diarrheal diseases, such advertisements should depict children using soap. The hygienic benefits of soap for children need to be linked with the glamorous aspects of the product so that consumers (especially poor people) are not led to believe that various members of the family require different kinds of soap. Educational efforts must focus on eliminating fears in regard to the effects of cold on the body. It must be stressed that only the hands need regular washing before eating and after defecation and that such washing will not cool the whole body. Although mothers have a major part in maintaining hygiene in the family, fathers play a crucial role as consumers; therefore, educational and advertising efforts need to address men as well as women.

Although soap is a relatively inexpensive item in Western countries, it is an expensive item in a developing country such as Bangladesh, where many persons cannot afford to use it on a regular basis. It is known that mechanical abrasive action alone is effective in removing microorganisms from hands [4]. However, because custom dictates that right and left hands should be kept separate as much as possible, hands are not always rubbed together during hand washing. Educators need to address this issue and to stress that contact between the right and left hands during hand washing can reduce pollution rather than increase it. As this is a matter of general concern, multidisciplinary research is needed to establish the most efficient and feasible ways of removing harmful microorganisms with respect to the material and cultural constraints that exist in particular societies.

A more difficult task—but one that is necessary if educational efforts regarding the importance of thorough hand washing are to be successful—is to help people understand how fecal contamination may promote transmission of diarrheal diseases. Such educational efforts need to emphasize the various pathways of infection and the invisible nature of contamination.

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