Technical Assistance to UNICEF:

A Study on Handwashing Practices in Urban and Rural Areas of Bangladesh

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SUMMARY

Handwashing has been universally promoted for health interventions, but it is essential that the factors related to the behaviour are understood in order to develop appropriate handwashing intervention. An earlier study by this group has reported about various components of handwashing after defecation and developed an efficient handwashing method under controlled condition. Recognizing the need for further information on existing handwashing practices and constraints in designing handwashing intervention based on available knowledge UNICEF, Bangladesh, requested the Environmental Health Program at the International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR,B) to conduct a brief study-test to: i) assess the efficiency of the current handwashing practices, and ii) examine the relevance of correct sanitation message related to handwashing and update these as necessary.

A two-month (one round) study was conducted in rural Matlab and urban Dhaka slums. The following activities were carried out during this period. A community of 100 families in South Uddamdi, Matlab and another community of 100 families in IG Gate slums, Dhaka were assigned as intervention areas. The housewives in these families received education for 2 months (April-May, 1994) on improved handwashing practices. Two similar communities; one in West Baispur, Matlab (rural comparison) and one in Agargao slum, Dhaka (urban comparison) were identified and studied as comparison population. They did not receive education on handwashing practices. Before any intervention the normal handwashing practices of the study population were recorded by interview and observation methods.

An earlier study by us had shown that under the controlled conditions washing hands using soap, ash or soil will produce similar acceptable results. The majority people cannot afford soap. Accordingly messages were updated to include several components as follows:

- Wash your both hands
- Use soap, soil or ash as a cleaning agent
- Rub both hands thoroughly at least 3 times with the agent and little amount of water
- Rinse hands properly with adequate volume of safe water
- Dry hands on a clean piece of towel/cloth, or in air

Handwashing messages were promoted by female project workers to the female member of every household in the intervention areas during a visit following baseline survey.

Fecal coliform counts of hands of about 50% of the women from each area were determined during both baseline and final surveys.

Overall, women washed hands many times over a day (on average, 18 and 11 times before intervention in rural and slum areas respectively, and 19 and 13 times after the intervention in rural and slum areas respectively). The women engaged various components of handwashing according to their perceived need for handwashing, i.e., the handwashing behaviour was influenced by their

preceding or following activities. Most women washed one hand only. An agent (such as soil, ash or soap) was used for handwashing after defecation by about 40% of the observed women. Only water was used for other occasions such as before eating, after clearing the bottom of child, etc. The effectiveness of such handwashing is questionable as studies have shown that rubbing hands together while using an agent helps to dislodge bacteria.

After the intervention, knowledge about the components of handwashing practices improved. However, the improvement in practice was marginal in post-defecation handwashing. Overall, both hands of the women were found heavily contaminated with fecal coliform bacteria, before as well as after the intervention. Probably one educational visit and a study period of only two months were inadequate to bring the behavioral changes.

It may be mentioned that the study period was originally planned to be four months. However, the study had to be curtailed to only two months because the activities had to postponed during the ,month of Ramadan (fasting) when usual domestic purposes change considerably. Secondly, the original collaborative NGO was unable to undertake activities and subsequently another NGO had to be identified and subcontracted.

This brief study clearly indicates that, (i) the existing handwashing practices were not efficient enough to remove bacterial contamination of hands, (ii) both hands were highly contaminated (fecal coliform colony forming unit/hand was more than 103 even though the women washed hands many times over a day), and (iii) the acceptance of the promoted components of handwashing varied by the perceived need for the act (that is, whether they were washing hands after defecation, before feeding, etc.). When the living environment is unhygienic, hands obviously get contaminated repeatedly. Again, there are unavailability of water, socio-economic and cultural constraints. We would like to recommend that handwashing messages should clearly state the components of handwashing and target specific behaviours such as acts after defecation and, before eating and feeding. The need for a long-term effectiveness study on the suggested promotion and the issues observed in this study is emphasized.

The study women reported the following constraints as barriers in washing hands as promoted: inadequate water supply (slum), unaffordability of preferred washing agent (rural and slum) and failure to absorb knowledge related to all the components of effective handwash practices (rural and slum).

1. INTRODUCTION

The overriding general concern of hygiene programs is to minimize opportunities for pathogenic organisms present in fecal matters to infect humans. Programs promoting handwashing as part of a personal hygiene package reported reduction diarrhoea morbidity between 14% and 40% (2-4). The WHO recommends a set of basic hygiene practices and one of those is improvement in handwashing.

Adequate handwashing after defecation assumes particular importance in the Indian Subcontinent where the traditional practice is to clean the anal region after defecation with water usually engaging the left hand, and to eat with one's fingers engaging the right hand.

Clinical and experimental studies on different aspects of handwashing practice have provided useful results. Sprunt (6) suggested that recently acquired organisms are removed from the hands by the mechanical abrasion action of rubbing, rinsing and drying on a paper towel rather than being killed by any special handwashing preparation. Thus handwashing practice may involve different components of action which contribute to the scrubbing, loosening and washing away of bacteria on hands.

Literature review on Studies of handwashing conducted at ICDDR,B

Khan (4) examined the effectiveness of a simple intervention (washing hands with soap and water) in checking the spread of Shigellosis. The study population was comprised of confirmed cases of shigellosis. These and matched controls were followed up for 10 days. Several pieces of soap and earthenware pitchers for storing water were provided to the study families and they were advised to wash their hands with soap and water after defecation and before meals. Compliance was monitored daily by observing the size of the soap and residual water. Rectal swabs of contacts of both the groups were obtained daily for cultures. The secondary infection rate was 10.1% in the study group and 32.4% in the control group. The secondary case rate was 2.2% in the study group and 14.2% in the control group. These results suggest that handwashing has a positive interrupting effect, even in unsanitary environment.

Stanton et al (2) undertook an educational intervention to improve three water sanitation behaviours empirically shown to be associated with high rates of childhood diarrhoea in Dhaka, Bangladesh: lack of handwashing before preparing food, open defecation by children in the family compound, and inattention to proper disposal of garbage and feces which increases the opportunity for young children to place waste products in their mouth. They reported that after the intervention, the rate of diarrhoea (per 100 person-weeks) in children under six years of age was 4.3 in the intervention communities and 5.8 in the control communities (26% protective efficacy; $p<0.0001$).

Recently Bilqis, Mahalanabis et al (8) conducted a pilot study to develop efficient post-defecation handwashing practices for rural Bangladesh based on existing practices. This study (funded by WHO, Geneva) looked into the details of actions/components practiced during usual post-defecation handwashing, the determinants of components of handwashing and developed

appropriate options for an efficient handwashing practice. This study consisted of an observational and an experimental phase. During the observational phase 90 women were observed washing hands after defecation. Several components of handwashing such as use of an agent, washing left or both hands, frequency of rubbing hands, quality and amount of water used to wash, and the drying of hands on worn clothes were identified. As a rubbing agent, soil was commonly used (40%); soap was used by 19% and was reported unaffordable by about 81% of the non-users. Good handwashing behaviour was positively associated with better social and economic indicators including education of the women observed. Both hands were unacceptably contaminated after traditional handwashing (the geometric mean counts of fecal coliform units/hand were 1995 for left hands and 1318 for right hands).

A subsequent experiment was conducted to assess the influence of washing hands according to various appropriate procedures designed to optimize observed existing components. After standardizing the observed components of handwashing procedures, the use of any rubbing agent, whether soil, ash or soap produced similar acceptable cleaning. Use of a rubbing agent (e.g. soil, ash or soap), more rubbing (i.e. 6 times), rinsing with more safe water (e.g. 2 liter of tubewell water) and drying with a clean cloth or in the air produced acceptable bacteriological results. This study suggested the need for field-testing and further development of the handwashing practices under real situations.

Background

All of the reviewed studies suggest potentials for handwashing practice but rarely focus on the realities in planning and implementing handwashing interventions in communities where the majority people are poor and illiterate. Supply of free soap to the people will be too costly and people are likely to use it for other domestic purposes. Soil as an alternative, is used for washing hands after defecation, cleaning utensils, polishing clay floors and for many other purposes. It is universally available and has been found to be more or less equally efficient as soap in cleaning hands under controlled conditions. Ash has been also found to be more or less equally efficient as soap and soil. Clinical and experimental studies have shown that cleanliness of hands is a function of scrubbing action which is influenced by the components of handwashing such as rubbing, volume of water and drying. We hardly know about the details of handwashing (at component level) practiced in relation to different domestic activities and/or the potentials for an appropriate handwashing intervention for the poor people of Bangladesh.

Considering the potentials of handwashing behaviour in the control of infectious diseases and its little improvement over the decades (in spite of extensive campaign for handwashing in Bangladesh), the Water and Environmental Sanitation Section of UNICEF, Bangladesh, requested the Environment and Health Sciences Programme at the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) for technical assistance in the development of sanitation messages on handwashing practices by studying related behavioural information.

An earlier study on development of handwash messages was conducted with funding from WHO. The present study was initiated following the interesting results generated by the WHO study. The

results of the WHO study are presented here under separate sub-heading as they are directly related to this study.

Pre-Intervention Baseline Assessment

Observational phase

Of the 90 women observed to wash their hands outside defecation sites, 40% used mud/ash (38% used mud and 2% used ash), 19% used soap, and 41% used water only and no rubbing agent. Those who used mud either rubbed fingers and palms on the ground or scooped out a small amount of soil and rubbed it between fingers and palms. Mud from different locations was used: near their kitchen, defecation site or the dwelling house. Altogether, 81% of the non-soap users reported that they might use soap but could not afford it.

A total of 44% washed both hands and 56% washed only their left hands; 74% rinsed their hands with 0.7 litres of water or less: 48% used tubewell water and the rest used surface water. During 62% of all washing events, fingers were rubbed three times or more. The majority of women who used soap rubbed their fingers more than three times. About 78% of the women dried/wiped their hands on their clothes and the rest let them dry in the air.

A positive association was demonstrated between better socio-economic indicators of water-sanitation practices, and good handwashing behaviour. The women's age, education of family head, and family size were not associated with the quality of handwashing.

Faecal coliform counts of hands before handwashing were 8,511 and 977 units per hand for left and right hands respectively. Although the counts of left hands were reduced significantly ($P<0.01$) after the observed (usual) handwashing practices, they were still high (geometric mean: left hand = 1,995 and right hand = 1,318 faecal coliforms/hand).

Experimental phase

When each of the components of hand cleaning was adequately executed they favourably influenced the reduction of faecal coliform counts. All the controlled handwashings showed statistically (at 95% level) as well as substantially (more than 80% reduction except for rubbing on ground) reduced faecal coliform counts of hands over traditional post-defecation handwashing.

Under experimental washing conditions, all local washing agents - soil, soap and ash - showed similar results (Table 1). Although faecal coliform counts in soil varied according to the location of the soil (geometric mean counts in soil near kitchen, soil near latrine and wet soil near latrine were 3,877, 4,000 and 7,010 of faecal coliforms/gm of soil, respectively), their quality did not significantly affect the efficiency of the handwashing. It is, however, likely that dry soil from a clean place produces better results. The counts of faecal coliform of hands after handwashing by rubbing hands on ground (geometric mean of left hands = 971 and of right hands = 562) were significantly higher than every other handwashing practice. Lower faecal coliform counts of hands were observed with increased rubbing frequency. Increased volume of water showed lower faecal

coliform count and the difference was statistically significant between rinsing with 2 litres and 0.5 litres of water. Compared with tubewell water, the use of pond water showed significantly higher counts for right hands. The quality of water, however, varied significantly also; the geometric mean of the count of tubewell water was 32 faecal coliforms/100 ml and that of pond water was 17,330 faecal coliforms/100 ml. Drying the hands on clothing being worn tended to contaminate the hands.

2. OBJECTIVES

1. To document the handwashing behaviours as practiced by rural and urban slum women during a day.

2. To quickly conduct a pilot handwashing intervention for poor and majority population based on available knowledge and document the experiences gained.

3. METHODOLOGY:

3.1. Development of Handwash Messages

The study was conducted in two phases in Uttarkhan, a village near Dhaka, Bangladesh. First, we observed the current handwashing practice and identified its different components. We also determined the efficacy of current handwashing practices by determining faecal coliform counts of hands. Then in the experimental phase, we tested the identified components of the existing practices under standard conditions and developed biologically plausible and practical options for efficient handwashing practices. This part of the study was funded by WHO, Geneva.

3.1.1 Observational Phase

In rural Bangladesh, people usually defecate in some rudimentary latrines or behind the bushes. Although we knew that people commonly wash their hands outside the defecation facilities because it is inconvenient to wash them at the sites, we reconfirmed it by discussion with a few local women. Ninety rural women (housewives) from 90 randomly selected households were observed washing their hands after defecation (between 5:30 a.m. and 9:00 am) by trained local women workers. This sample size was determined based on available logistics only. The faecal coliform counts of the subjects' hands, after washing, were estimated using a special hand sampling technique which is described later. We did not mention that we were observing handwashing; these women were informed that their routine activities were being observed to help us identify diarrhoea risk behaviour. They were told that if they had any objection they would not be observed. We attempted to observe 100 women and 10 of them objected to this. The information was recorded in pre-tested semi-structured forms.

3.1.2 Experimental Phase

We studied the effectiveness of the more common components of handwashing recorded in the observation phase, i.e., cleaning agents, rubbing frequencies, quality and quantity of rinsing water and drying technique, by comparing the faecal coliform counts of hands after washing, in various ways. The impact of varying each component on the faecal coliforms of hands was estimated while keeping the other components constant.

During this phase, visits were made by the same trained women workers to every household between 5:30 a.m. and 9:00 a.m. Any women of the same area (including the 90 in phase I) who were seen coming out of the defecation sites and who had not yet washed their hands were requested to take part in the experiment by washing hands according to one of our instructions. The instructions were designed to progress through a logical model of starting with the comparison of effects of locally available cleaning agents. A handwashing activity is often referred to by the type of cleaning agent used since it appears to play the main role in producing the scrubbing action necessary to loosen bacteria from hands. Washing hands using water only has been found to produce unacceptable results under controlled field trials. The effects of other observed common components were then tested by incorporating them into washing of hands by

using the tested biologically acceptable, yet cheapest and most available, agent, which in this case is soil. The soil-using groups washed with a teaspoonful of soil collected from specific locations.

One control sample, i.e , a handwashing sample of a woman who had not washed hands (in the usual or experimental way) after defecation, was collected twice a week throughout the sampling period.

3.1.3 Sampling and microbiological technique for determining the faecal coliform count of hands, soil and water

Each hand was sampled separately for faecal coliform using a slightly modified finger-tip count technique. Briefly, every woman washed two hands separately into two plastic bottles containing 100 ml of Ringers solution with 10% v/v of Tween 20. They made washing movements inside the container by rubbing the fingers up onto their palms at least 10 times, with their hands immersed up to the palm in the solution. The containers were then tightly closed and stored chilled in insulated boxes. During the drying test they were sampled after instructed standardized handwashing and again after drying of hands.

Soil samples were collected every day from the same location as was used during the handwashing experiments. Water samples were also collected from the same source as the one used during standard rinsing according to instruction. The faecal coliform count of these samples was determined at the ICDDR,B laboratory within 2-3 hours of collection.

Tenfold dilutions of water, soil and handwash samples were prepared in phosphate buffer saline (PBS) and then plated onto membrane filter coliform (MFC) agar. The plates were then incubated at 44°C for 18-24 hours. The characteristic blue colonies were counted as faecal coliforms. The dilution chosen for counting was that which contained 30-300 colonies per plate. When the coliform count in a sample was very low, 10 or 100 ml of the sample was passed through a Millipore membrane filter (pore size 0.45 μm) and then the filter paper was placed on MFC agar media and incubated at 44°C for 18-24 hours. After incubation, the characteristic colonies were counted as faecal coliforms and further identification was carried out following standard procedures.

3.2. FIELD-TEST OF UPDATED HANDWASH MESSAGES

The study was conducted in rural Matlab and urban Dhaka slums. A community of 100 families in South Uddamdi, Matlab and another community of 100 families in IG Gate slums, Dhaka were assigned as intervention areas. This sample size of 100 families was estimated assuming that post-defecation handwashing practice will improve from 20% to 40% having 95% Confidence Interval and 80% power. These households were selected using systematic random sampling; every fifth family in Uddamdi and every third family in IG Gate. The housewives in these families received education for 2 months (April-May, 1994) on improved handwashing practices. Two similar communities; one in West Baispur, Matlab (rural comparison) and one in Agargaon slum, Dhaka (slum comparison) were identified and studied as comparison population. They did not receive education on handwashing practices.

3.2.1 Hypothesis

(i) before the handwashing education intervention, knowledge and practices in relation to handwashing behaviours by females will be similar in intervention and comparison population and, ii) after the intervention the knowledge and practices related to handwashing will improve in the intervention population compared to the comparison population.

3.2.2 The intervention

The messages were updated based on the findings of "Development of Handwash messages under controlled conditions". The conventional message was to wash hands using soap or ash and there was no mention of other components such as washing both hands, rubbing and quantity/quality of water.

The components observed to have association with bacteriological counts under controlled conditions were included to formulate the following message:

- **Wash your both hands**
- **Use soap, soil or ash as a cleaning agent**
- **Rub both hands thoroughly at least 3 times with the agent and little amount of water**
- **Rinse hands properly with adequate volume of safe water**
- **Dry hands on a clean piece of towel/cloth, or in air**

In order to plan the delivery of this handwashing message to the intervention communities, nine focus group discussions were carried out with males and females from other similar areas (Gonoktuli, Dhaka and North Uddamdi, Matlab). The contents and sequence of information to be included during the communication between targeted women and project workers were decided based on those discussions. Drawings (sketches) on steps and options in the handwashing message to be promoted were done according to our suggestions by an advertising firm which was selected by UNICEF (enclosed as Annex 2). The set of drawings on improved handwashing practices was tested and revised according to the suggestions made by focus group members.

It was decided that the health and religious benefits of improved handwashing practices will be included in discussion with the targeted women to open the dialogue between project workers and community women and to develop/strengthen the basis for basic personal hygiene practices.

The NGO which had earlier agreed to collaborate in this project was unable to undertake the activities due to their technical problems. At that stage another NGO was identified and sub-contracted as proposed earlier. This was one of the main causes that delayed the study.

Handwashing messages were promoted by female project workers to the female member of every household in the intervention areas. Originally it was planned that the messages will be repeated thrice over 4 months of field activities: after baseline survey, 2 months after baseline survey and before final survey (after another 2 months). As the religious month of Ramadan

(fasting) coincided with the base-line data collection and message development phase, the activities had to be postponed for about one month. Because it was observed that during that month the usual domestic practices changed (including handwashing and water use) and it was felt that it will be inappropriate to develop the messages based on practices during that period. Besides, the household members were less cooperative during Ramadan. This loss of a month and earlier mentioned problem with the NGO compelled us to reduce our activities in order to complete the project within agreed period as UNICEF could not extend the study beyond this period. The reduction in study period was finalized in consultation with UNICEF. This led to the subsequent reduction of promotional activities to one visit and two surveys only; one educational visit following base-line survey and a final survey 2 months after that intervention. This means that the surveys, that is, the presented data really compared the impacts of one educational visit only.

Data collection and management:

Information was collected through questionnaire surveys, focus group discussion with targeted females and observation on handwashing practices by randomly selected women in intervention areas. Every sampled household was assigned an identification number. Socioeconomic, water use and existing handwashing practices related data was collected during baseline survey. During final survey only handwashing related data was collected. Females (housewives) in all households of intervention and comparison areas were interviewed during base-line and final surveys. Baseline surveys were conducted before the educational intervention and final survey after the intervention. Nine women from each of the rural and urban slum intervention areas were observed washing hands over a day during both base-line and final surveys. These households were selected randomly (every tenth household). Under the given logistic conditions nine was the maximum number of households which could be observed over a day.

All data were entered in a personal computer using FoxPro database management software. For data analysis SPSS package was used. Attempt was made to study the existing and improved handwashing practices and the constraints to improve the practices.

Fecal Coliform Count of hands:

Fecal coliform count of hands of about 50% of the women from each area were determined during both baseline and final surveys. Fund was made available to sample 50% of the women. Sampling and tests were carried out as mentioned under 'Development of Handwashing messages'.

4. RESULTS

The results are presented in two sections. The first section shows the results of pre-intervention activities undertaken to develop handwashing messages. The second section shows the results of the community intervention.

4.1 The Community Intervention

4.1.1 Socioeconomic and demographic characteristics of the studied communities:

Table 2 shows the comparative demographic, socioeconomic and water use profiles of 100 intervention and 100 comparison families in the two communities in Dhaka slums. Family size, education, occupation, possession of an asset and water use practices were similar.

Table 3 shows the comparative socioeconomic, demographic and water use practices of the intervention and comparison families in rural communities. They were similar in regard to the socioeconomic, demographic and water use practices.

4.2.2 Handwashing practices:

Tables 3 - 10 presents the reported handwashing practices at baseline (pre-intervention) and final (post-intervention) surveys in rural and slum communities. We have presented observational results in Table 12 to more or less reflect the real practices. We believe the reported results are important because it at least reflects the change in their knowledge and perceptions. The merits and demerits of reported as well as observational methods may be debated, but discussion on methodological issues is beyond the scope of this report.

Handwashing practices after defecation was similar in rural intervention and comparison areas before the intervention (Table 4). About 40% of the women reported no use of agent in handwashing. Only 22% rinsed hands with tubewell water. During post-intervention significant improvements were reported for both handwashing, use of an agent, tubewell use and drying of hands in air or on a clean piece of cloth. Although in slums washing both hands was significantly lower in the intervention and comparison area (Table 5) than the same in rural areas (Table 4), it improved more or less to the same levels in the final survey. In slum also improvements were reported for washing both hands, use of an agent, use of tubewell water, and drying of hands in air or on a clean piece of cloth. In both areas significantly more improvement was reported for soap use than for soil use or use of water only.

Handwashing practices before eating and feeding were similar in rural (Table 6 and Table 8) and urban slum (Table 7 and Table 9) communities. The use of an agent or washing of both hands were low. After intervention there was improvement in all components of handwashing. Few washed both hands before eating and feeding at pre-intervention period compared to changes in post-defecation practice. There was more reluctance to wash both hands before eating and

feeding. Even after the intervention, a substantial proportion of women (>40%) did not wash both hands and did not use an agent in washing hands before eating and feeding. Similar lower compliance was also reported in washing both hands after cleaning children after defecation (Table 10 and Table 11).

Nine women in each of the rural and urban slum areas were observed over a day washing hands in the intervention areas. The maximum number of handwashing observed over a day was 25 times by a rural woman during post-intervention survey. The minimum frequency of handwashing was 4 and observed during pre-intervention survey in slum. On average a female washed 9 times (slum) and 18 times (rural) times in pre-intervention and 13 times (slum) and 19 times (rural) over a day in the post-intervention observational surveys. Although women in rural areas washed hands more than the women in slums, there was an overall increase in handwashing practices after the intervention.

The data on handwashing behaviours as observed are presented in Tables 12 through Table 15. The behaviours which could be differentiated have been presented. Overall, the observed handwashing behavioural results were similar as in reported results from surveys. The highest improvement for handwashing practices was observed after defecation and the lowest before feeding. As in the reported data, the observed data also showed that the ways women wash their hands are related to their perceived need for the handwashing behaviour.

4.2.3 Stated difficulties in compliance to the promoted handwashing behaviour

During the final survey the women in intervention areas were asked to state difficulties in following the promoted handwashing behaviours. Overall not remembering about the promoted practice was the major stated factor behind the non-compliance (Table 16). In urban slum areas non-availability of adequate volume of water was an acute problem in proper handwashing. They clearly said that more rubbing of both hands or use of an agent require more volume of water. As there was acute shortage of water they preferred to use water according to their perceived priorities.

Contamination of hands:

The geometric mean of fecal coliform count of hands were found to be similar in the intervention and comparison areas (Table 17). Left and right, both hands showed high fecal coliform counts. The intervention hardly made impact on the counts, when we compare the results between intervention and comparison areas.

5. DISCUSSION

This was a quick and brief attempt within the available time and resources to derive some initial guidelines and recommendations for handwashing intervention. It is obviously difficult to change one's behaviour and although handwashing sounds like a single act it is a complex behaviour.

Women washed hands in various ways following/before different activities. They have accepted the promoted handwashing behaviour according to their perceived need for handwashing and certain existing constraints, like availability of water, affordability of soap, etc. This study used two months of field data and therefore there will remain the need for a handwashing intervention study over a longer period of time.

It shows that overall improvement was more impressive in rural community than in slum community. People reported more change towards soap than soil or ash. This indicated preference for soap which is costly but with similar efficiency as soil and ash. The highest improvement was recorded for handedness. It also pointed out that people are more willing to improve their handwashing behaviours related to fecal matters than those related to other behaviours which they do not see having contamination risk, such as before feeding and eating. In general, improvement was also reported in comparison area and it is difficult for us to specify the reasons. During our following visit women responded in a way that we liked to hear because probably they are aware of desirable behaviours. It is also possible that some had adopted those desirable behaviours when they realized that they are being studied.

The coliform counts at the final survey were found to have increased in both intervention and comparison areas. This could be due to change in season and/or variation in activities which the women had performed before the sampling. It may be also recalled that the magnitude of improvement in various behavioural components of handwashing was low and it varied by different activities, for example, after defecation the acceptance was higher. Over a day, hands may become contaminated from all kinds of normal acts because the environment, in general, is contaminated. To reduce the general contamination level would require proper handwashing practices many times (we do not know how many) over a day and practicality of such behaviour may be debated. It may be also pointed out that the level of literacy was higher among comparison population than among intervention population in slums.

6. ACHIEVEMENTS

1. Preliminary health education messages on handwashing practices were developed by: (a) reviewing the previously conducted studies, (b) focus group discussions, (c) making drawings on steps involved in the practices and (d) field-testing of messages and drawings.

   The updated messages are as follows:

   - **Wash your both hands**
   - **Use soap, soil or ash as a cleaning agent**
   - **Rub both hands thoroughly at least 3 times with the agent and little amount of water**
   - **Rinse hands properly with adequate volume of safe water**
   - **Dry hands on a clean piece of towel/cloth, or in air**

2. A short-term (one round) intervention, with the instrument developed, was carried out successfully in slums (urban) and rural poor.

3. Even a short-term one round intervention led to substantial improvement in specific handwashing behaviours or in its components, e.g., handwashing after defecation improved, use of soap increased, washing of both hands increased, etc.

4. The intervention revealed direction for further studies and the issues which will need emphasis to increase effectiveness of handwashing interventions.

7. LESSONS LEARNED

1. Women washed hands many times over a day and the components of handwashing varied by the activities carried out before or after the washing, irrespective of the intervention. The acceptance of the promoted handwashing messages varied according to the need perceived by the study women. For example, there was higher acceptance for handwashing components after defecation than other handwashing.

2. Both hands were highly contaminated. Under the existing poor environmental conditions hands will get contaminated frequently, so frequent proper handwashing would be ideal. In reality, it may be difficult. Therefore, improvement of certain handwashing behaviours such as after defecation, before eating and before feeding may be targeted as one of the immediately potential attempts to contribute towards reduction of faeco-oral transmission of bacteria by hands.

3. Women washed hands many times over a day but, overall, important variation were noted in relation to specific handwashing behaviours only.

4. The people in slums faced acute shortage of water and that affected the proper washing of hands.

5. The people in slums were slower than rural ones in accepting the promoted practices.

6. People tended to forget the messages and/or were reluctant to try the promoted behaviour for no specific reason.

7. People had strong preference for soap use.

8. People complained that frequent washing of hands with ash makes the skin rough. The choice of ash or soil may be left to the users.

9. The use of sketches on handwashing was helpful for explaining proper handwashing practice.

10. The study does not preclude the likelihood that with more sustained intervention, desirable changes could also occur in all aspects of handwashing behaviour.

11. There is need and scope for further development of communication materials.

8. RECOMMENDATIONS

8.1. Long-term intervention study should be conducted to investigate:

a. Whether related education leads to increased level of effective acceptance and if so, which aspects of the behaviours are influenced most, and how frequent the repetition is necessary.

b. Whether or not washing hands with polluted water is acceptable when there is acute shortage of tubewell/tap water.

c. Why the compliance is low in slums; the barriers should be identified and attempts should be made to counter those.

d. Whether the people who were motivated and cannot afford soap would use soil, ash or both as felt appropriate by them (even though they felt that frequent use of ash made the skin rough).

e. Whether targeting of specific handwashing behaviours, such as before feeding, after defecation, before eating; is a better strategy than targeting general handwashing practices to achieve effective results and reduce faeco-oral transmission of pathogens.

8.2. Further tests and development of handwashing messages and its communication method should be attempted

Different sets of messages should be developed and different communication techniques should be utilized and behavioral improvements should be measured.

REFERENCES

1 WHO Report SEA/EH/466 on "New Directions for Hygiene and Sanitation Promotion", New Delhi, 19-21 May 1993.

2. Stanton B.F. and Clemens J.D. An educational intervention for altering water-sanitation behaviours to reduce childhood diarrhoea in urban slum Bangladesh II A randomized trial to assess the impact of the intervention on hygiene behaviours and rates of diarrhoea. Am. J. Epid. 1987; 125: 292-301.

3. Feachem R.G. Intervention for the control of diarrhoeal diseases in young children: Promotion of personal and domestic hygiene. Bull WHO, 1984, 62: 271-279.

4. Khan M.U. interruption of shigellosis by handwashing. Trans of the Royal Soc. of Trop. Med. and Hyg. 1982; 83: 164-168.

5 Azim K.M.A., Hasan K.Z., Patwary, Y. A study of the interpersonal spread of Bangladesh. Proceedings of an International Conference. Shigellosis: A continuing global problem 1983: ICDDR,B Special Publication No. 20: 238-249.

6. Sprunt K., Antibacterial effectiveness of routine handwashings. Paediatrics 1973; 52: 264-271.

7. Lowbury E.J. Lilly H.A., and Bull J. P. Disinfection of hands: removal of transient organisms. British Medical Journal 1984; 11: 230-233.

8. Bilqis A. Hoque, D. Mahalanabis, M.J. Alam and M.S. Islam. Post-defecation Handwashing in Bangladesh: Practice and Efficiency Perspectives. Public Health (1994) Accepted.

Table 1. Comparison of faecal coliform counts of hands under various experimental conditions

Experimental Conditions	Geometric Means	
	Left Hand (P values, 95% CI)	Right Hand (P values, 95% CI)
Reference washing: 6 rubbings with soil, rinsed with 2 litres of tubewell water (N=83)	129	89
Testing of agents		
Ash (N=84)	98 (P=0.50, 0.33,1.74)	54 (P=0.23, 0.26, 1.38)
Soap (N=60)	195 (P=0.25, 0.74,3.02)	112 (P=0.52, 0.63, 2.45)
Testing of soil		
Soil from near latrine (N=75)	132 (P=0.97, 0.48, 2.19)	110 (P=0.57, 0.60, 2.45)
Soil, wet (N=65)	240 (P=0.07, 0.95, 3.72)	159 (P=0.09, 0.91, 3.47)
Rubbing hands on ground (N=65)	977 (P=0.001, 3.63, 13.18)	562 (P=0.001, 2.88, 13.49)
Testing rubbing frequencies		
3 times (N=73)	200 (P=0.20, 0.79, 3.02)	132 (P=0.30, 0.71, 3.09)
Testing volume of water used		
0.5 litres (N=75)	269 (P=0.50, 1.01, 4.37)	234 (P=0.02, 1.23, 5.25)
1.0 litres (N=64)	128 (P=0.99, 0.48, 2.04)	79 (P=0.71, 0.44, 1.74)
Testing type of water		
Pond (N=75)	288 (P=0.01, 1.23, 4.17)	263 (P=.000, 1.62, 5.25)

Thus, the handwashing was found efficient if a standard procedure was followed, i.e., (i) using an agent, e.g. soap, soil or ash; (ii) thoroughly rubbing both hands more than three times; (iii) rinsing of hands with 2 litres of tubewell water; and (iv) drying of hands using a clean cloth or in the air. Accordingly, the existing handwash messages were updated and promoted during the Field-test.

Table 2. Comparison of intervention and control families for selected socioeconomic and demographic characteristics in slum.

Variables	Slum	
	Intervention n = 98	Comparison n = 106
1. EDUCATION OF THE TARGETED FEMALE:		
0 year	83(84.7)	88(83.0)
1-3 years	7(7.1)	4(3.8)
>3 years	8(8.2)	14(13.2)
2. EDUCATION OF FAMILY HEAD:		
0 Year	80(81.7)	75(70.8)
1-3years	7(7.1)	4(3.8)
>3 years	11(11.2)	27(25.5)
3. FAMILY SIZE:		
<=5 person	61(62.2)	69(65.1)
6-8 person	34(34.7)	28(26.4)
>8 person	3(3.1)	9(8.5)
4. OCCUPATION:		
Agriculture	0	0
Service and Business	16(16.3)	22(20.8)
Others	82(83.7)	84(79.2)
5. Possessed a Radio:	10(10.2)	9(8.5)
6. Possessed a Watch	16(16.5)	16(15.1)
7. Uses tubewell/Tap water for:		
Drinking	98(100)	106(100)
Cooking	98(100)	106(100)
Washing	79(80.6)	105(99.7)
Bathing	68(69.4)	100(91.3)

Table 3. Comparison of intervention and control families for selected socioeconomic and demographic characteristics in rural Matlab

Variables	RURAL	
	Intervention =100	Comparison = 100
1. EDUCATION OF THE TARGETED FEMALE:		
0 year	51(51)	51(51)
1-3 years	11(11)	18(18)
>3 years	38(38)	31(31)
2. EDUCATION OF FAMILY HEAD:		
0 Year	36(36)	29(29)
1-3 years	5(05)	6(06)
>3 years	59(59)	65(65)
3. FAMILY SIZE:		
<=5 person	45(45)	30(30)
6-8 person	42(42)	52(52)
>8 person	13(13)	18(18)
4. OCCUPATION:		
Agriculture	23(23)	33(33)
Service and Business	42(42)	46(46)
Others	35(35)	21(21)
5. Possessed a Radio:	27(27)	26(26)
6. Possessed a Watch	51(51)	56(56)
7. Uses tubewell/Tap water for:		
Drinking	94(94)	97(97)
Cooking	2(02)	9(09)
Washing	2(02)	8(08)
Bathing	1(01)	2(02)

Table 4. Comparison of Rural intervention and control women for reported handwashing after defecation during pre-and post intervention.

VARIABLES	INTERVENTION		COMPARISON	
	Pre (%) n=100	Post (%) n=90	Pre (%) (n=100)	Post (%) n=88
HANDEDNESS:				
Both hand	78(78)	88(97.78)	83(83)	79(89.8)
Single hand	22(22)	2(2.22)	17(17)	9(10.2)
AGENT USED:				
Soap	15(15)	35(39.9)	20(20)	40(45.4)
Soil	42(42)	41(45.6)	30(30)	26(29.5)
Ash	6(6)	9(10)	1(1)	2(2.3)
No Agent	37(37)	5((5.6)	49(49)	20(22.7)
WATER SOURCE:				
Tubewell	24(24)	37(41.1)	22(22)	23(26.1)
Surface water	76(76)	53(58.9)	75(75)	65(73.9)
DRYING OF HANDS:				
Worn cloths	45(45)	3(2.3)	2(2)	23(26.1)
Towel	41(41)	56(62.2)	0(0)	59(67.1)
Air	14(14)	31(34.4)	98(98)	6(6.8)

Table 5. Comparison of Slum intervention and control women for reported handwashing practices after defecation during pre and after intervention.

VARIABLES	INTERVENTION		COMPARISON	
	Pre (%) (n=98)	Post (%) (n=92)	Pre (%) (n=106)	Post (%) (n=100)
HANDEDNESS.				
Both hand	24(24.5)	88(95.7)	18(17.0)	78(78)
Single hand	74(75.5)	4(4.4)	88(83.0)	22(22)
AGENT USED:				
Soap	21(21.4)	52(56.5)	27(25.5)	53(53.0)
Soil	39(39.8)	29(31.5)	40(37.7)	24(24)
Ash	6(6.1)	6(6.5)	7(6.6)	9(9)
No Agent	32 (32.7)	5(5.4)	32(30.2)	14(14)
WATER SOURCE:				
Tubewell/Tap	7/71(79.6)	4/74(84.8)	0/103(97.2)	03/97(100)
Surface water	20(20.4)	14(15.2)	3(2.8)	0
DRYING OF HANDS:				
Worn cloths	30(30.6)	7(7.6)	40(37.7)	25(25)
Towel	42(42.9)	68(73.9)	45(42.5)	63(63)
Air	26(26.5)	17(18.5)	21(19.8)	12(12)

Table 6. Comparison of Rural intervention and control women for reported handwashing before eating during pre and post intervention

VARIABLES	INTERVENTION		COMPARISON	
	Pre (%) n=100	Post (%) n=90	Pre (%) (n=100)	Post (%) n=88
HANDEDNESS:				
Both hand	05(05)	68(75.6)	08(8)	39(44.3)
Single hand	95(95)	22(24.4)	92(92)	49(55.7)
AGENT USED:				
Soap	0	40(44.4)	6(6)	25(28.4)
Soil	0	0	0	1(1.1)
Ash	0	3(3.3)	0	0
No Agent	100(100)	47(52.2)	94(94)	62(70.5)
WATER SOURCE:				
Tubewell	92(92)	87(96.7)	91(91)	74(84.1)
Surface water	08(08)	03(3.3)	09(09)	14(15.9)
DRYING OF HANDS:				
Worn cloths	0	01(1.1)	0	2(2.3)
Towel	2(2)	0	1(01)	2(2.3)
Air	98(98)	89(98.9)	99(99)	84(95.5)

Table 7. Comparison of Slum intervention and control women for reported handwashing practices before eating.

VARIABLES	INTERVENTION		COMPARISON	
	Pre (%) (n=98)	Post (%) (n=92)	Pre (%) (n=106)	Post (%) (n=100)
HANDEDNESS:				
Both hand	08(8.2)	52(56.5)	10(9.4)	30(3)
Single hand	90(91.8)	40(43.5)	96(90.6)	70(7)
AGENT USED:				
Soap	10(10.2)	27(29.4)	6(5.7)	13(1)
Soil	1(1.0)	02(2.2)	0	02(2)
Ash	1+2(3.1)	03(3.3)	0	0
No Agent	84(85.7)	60(65.2)	100(94.3)	85(85)
WATER SOURCE:				
Tubewell/Tap	06/88(95.9)	4/85(96.7)	0/105(99.1)	02/98(100)
Surface water	04(4.1)	03(3.3)	01(0.9)	0
DRYING OF HANDS:				
Worn cloths	03(3.1)	0	0	02(2)
Towel	03(3.1)	2(2.2)	01(0.9)	06(6)
Air	92(93.9)	90(97.8)	105(99.1)	92(9)

Table 8. Comparison of rural intervention and control for reported handwashing practices before feeding family members

VARIABLES	INTERVENTION		COMPARISON	
	Pre (%) (n=100)	Post (%) (n=90)	Pre (%) (n=100)	Post (%) (n=86)
HANDEDNESS:				
Both hand	8(8)	77(85.6)	8 (8)	41(47.7)
Single hand	92(92)	13(14.4)	92 (92)	45(52.3)
AGENT USED:				
Soap	1(1)	42(46.7)	8 (8)	18(20.9)
Soil	0	0	0	0
Ash	0	3(3.3)	0	0
No Agent	99(99)	45((50.0)	92 (92)	68(79.1)
WATER SOURCE:				
Tubewell	90(90)	84(93.3)	92 (92.9)	75(87.2)
Surface water	10(10)	6(06.7)	7 (7.1)	11(12.8)
DRYING OF HAND:				
Worn cloths	1(1)	0(0)	2 (2)	2(2.3)
Towel	3(3)	1(1.1)	0	6(7.0)
Air	96(96)	89(98.9)	98 (98.9)	78(90.7)

Table 9. Comparison of slum intervention and control women for reported handwashing practices before feeding family members

VARIABLES	INTERVENTION		COMPARISON	
	Pre (%) (n=87)	Post (%) (n=38)	Pre (%) (n-92)	Post (%) (n=47)
HANDEDNESS:				
Both hand	04(4.6)	19(5)	04(4.4)	10(21.3)
Single hand	83(95.4)	19(5)	88(95.7)	37(78.7)
AGENT USED:				
Soap	4(4.6)	11(20.0)	1(1.1)	07(14.9)
Soil	2(2.3)	0	1(1.1)	0
Ash	3(3.5)	0	0	0
No agent	78((89.7)	27(71.1)	90(97.8)	40(85.1)
WATER SOURCE:				
Tubewell/Tap	7/76(95.4)	03/35(100)	0+91(98.9)	0+47(100)
Surface water	04(4.6)	0	01(1.1)	0
DRYING OF HANDS:				
Worn cloths	03(3.5)	0	01(1.1)	0
Towel	0	03(7.9)	01(1.1)	2(4.3)
Air	84(96.6)	35(92.1)	90(97.8)	45(95.8)

Table 10. Comparison of rural intervention and control women for reported handwashing practices after cleaning their defecating children

VARIABLES	INTERVENTION		COMPARISON	
	Pre (%)	Post (%)	Pre (%)	Post (%)
	(n = 77)	(n = 60)	(n = 68)	(n = 49)
HANDEDNESS:				
Both hand	35(45.5)	57(95.0)	33(48.5)	37(75.5)
Single hand	42(54.6)	03(5.0)	35(51.5)	12(24.5)
AGENT USED:				
Soap	8(10.4)	26(43.3)	8(11.8)	22(44.9)
Soil	22(28.6)	25(41.7)	11(16.2)	11(22.5)
Ash	3(3.9)	4(6.7)	0	0
No Agent	44(57.1)	05(8.3)	49(72.1)	16(32.7)
WATER SOURCES:				
Tubewell/Tap	18(23.4)	21(35.0)	12(17.7)	15(30.6)
Surface water	59(76.6)	39(65.0)	56(82.4)	34(69.4)
DRYING OF HAND:				
Worn cloths	37(48.1)	01(1.7)	34(50.0)	20(40.8)
Towel	24(31.2)	35(58.3)	23(33.8)	26(53.1)
Air	16(20.8)	24(40.0)	11(16.2)	03(6.1)

Table 11. Comparison of slum intervention and control women for reported handwashing practices after cleaning their defecating children

VARIABLES	INTERVENTION		COMPARISON	
	Pre (%) (n=44)	Post (%) (n=43)	Pre (%) (n-66)	Post (%) (n=45)
HANDEDNESS:				
Both hand	01(2.3)	39(90.7)	04(6.1)	33(73.3)
Single hand	43(97.7)	04(9.3)	62(94.0)	12(26.7)
AGENT USED:				
Soap	4(9.1)	32(74.4)	5(7.6)	16(35.6)
Soil	14(31.8)	07(16.3)	19(28.8)	12(26.7)
Ash	1(2.3)	02(4.7)	2(3.0)	04(8.9)
No Agent	25(56.8)	02(4.7)	40(60.6)	13(28.9)
WATER SOURCE:				
Tubewell/Tap	04/31(79.6)	05/32(86.1)	0/65(99.0)	0/46(0)
Surface water	09(20.5)	06(14.0)	01(1.5)	0
Drying of hands:				
Worn cloths	17(38.6)	05(11.6)	30(45.5)	14(31.1)
Towel	16(36.4)	30(69.8)	20(30.3)	25(55.6)
Air	11(25.0)	08(18.6)	16(24.2)	06(13.3)

Table 12. Comparison of Slum intervention and rural intervention women for observed handwashing practices after defecation

Variables	Slum		Rural	
	Pre (n=7)	Post (n=18)	Pre (n=12)	Post (n=15)
Handedness:				
Both	1	10	9	12
Single	6	8	3	3
Agent Used:				
Soap	1	8	1	7
Soil	3	1	3	6
Ash	0	2	0	0
Water only	3	7	8	2
Water Source:				
Tubewell/Tap	7	18	1	2
Surface	0	0	11	13
Drying of hands:				
Towel	0	4	0	6
Air	6	11	9	8
Worn cloths	1	3	3	1

Table 13. Comparison of Slum intervention and rural intervention women for observed handwashing practices before eating

Variables	Slum		Rural	
	Pre (n=19)	Post (n=17)	Pre (n=37)	Post (n=35)
Handedness:				
Both	0	2	9	9
Single	19	15	28	26
Agent Used:				
Soap	0	1	0	4
Soil	0	0	2	1
Ash	0	0	0	1
Water only	19	16	35	29
Water Source:				
Tubewell/Tap	19	17	32	32
Surface	0	0	5	3
Drying of hands:				
Towel	0	1	1	4
Air	16	12	34	29
Worn cloths	3	4	2	2

Table 14. Comparison of slum intervention and rural intervention women for observed handwashing practices before feeding

Variables	Slum		Rural	
	Pre (n=10)	Post (n=3)	Pre (n=19)	Post (n=20)
Handedness:				
Both	0	1	6	4
Single	10	2	13	16
Agent Used:				
Soap	0	0	0	3
Soil	0	0	0	0
Ash	0	0	0	0
Water only	10	3	19	17
Water Source:				
Tubewell/Tap	10	3	17	16
Surface	0	0	2	4
Drying of hands:				
Towel	0	0	1	3
Air	10	3	17	17
Worn cloths	0	0	1	0

Table 15. Comparison of slum intervention and rural intervention women for observed handwashing practices after washing children's anus

Variables	Slum		Rural	
	Pre (n=4)	Post (n=5)	Pre (n=9)	Post (n=11)
Handedness:				
Both	4	4	7	11
Single	0	1	2	0
Agent Used:				
Soap	1	2	1	5
Soil	1	1	2	6
Ash	0	0	0	0
Water only	2	2	6	0
Water Source:				
Tubewell/Tap	4	5	3	3
Surface	0	0	6	8
Drying of hands:				
Towel	0	0	2	4
Air	2	4	7	5
Worn cloths	2	1	0	2

Table 16. Reasons stated by the respondents for not following the promoted handwashing messages

Reasons stated	After defecation		Before eating	
	Slum n = 92	Rural n = 90	Slum n = 92	Rural n = 90
Soap not available	4	0	16	0
Bad feeling	17	1	2	0
Water not available	86	6	77	3
Not possible	12	7	7	2
Forgot/No habit	46	28	42	11

Table 17. Fecal coliform count of hands of rural and slum women at baseline and final surveys

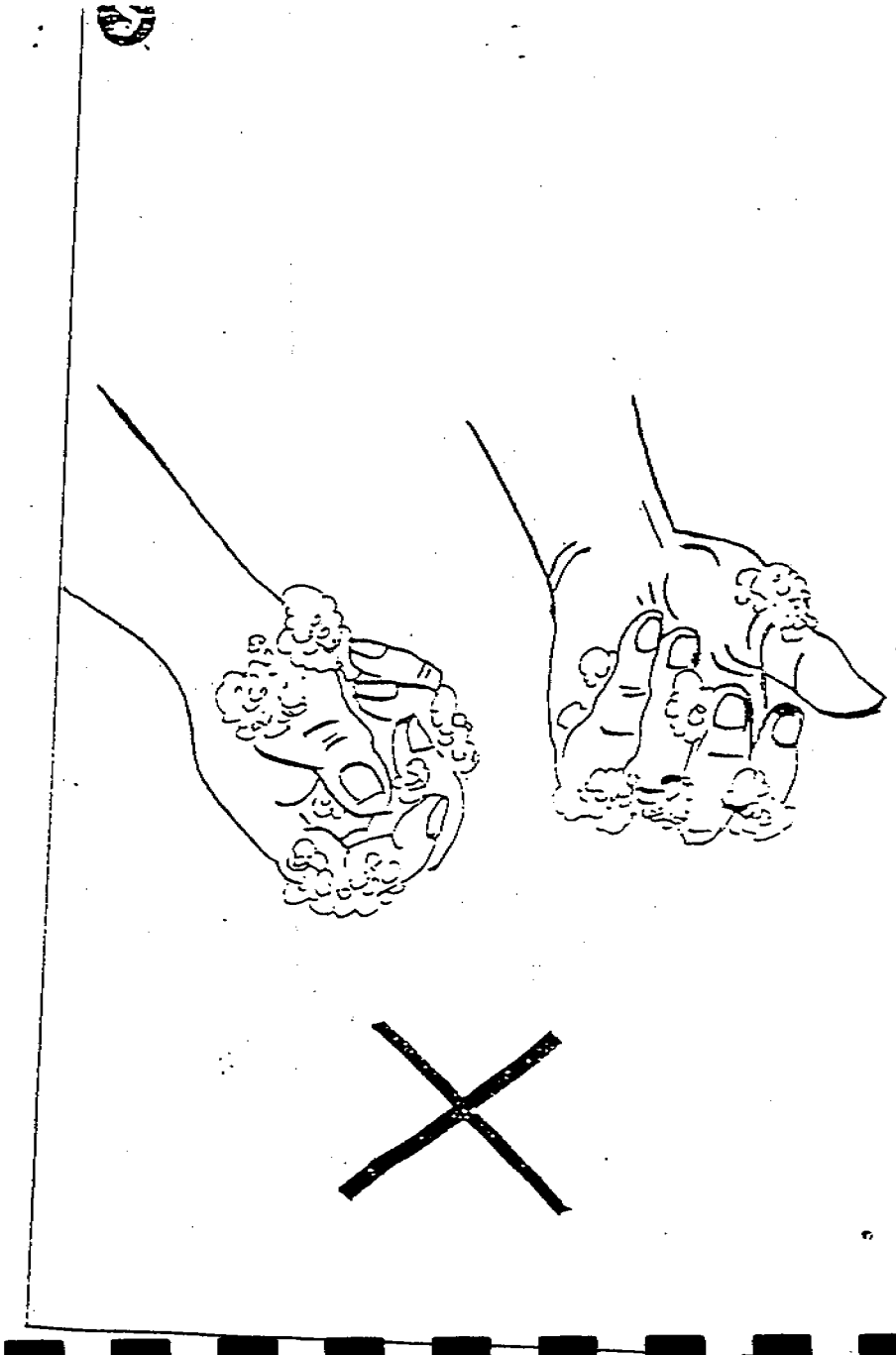
Surveys	Areas	Geometric Mean of Fecal Coliform Counts/hand			
		Left hand		Right hand	
		Intervention	Comparison	Intervention	Comparison
Pre-Intervention:	Rural n=50 Slum n=50	678 11,121	837 9,421	3,331 10,715	1,794 14,120
Post-Intervention:	Rural n=70 Slum n=70	2,132 12,341	3,102 14,321	1,834 11,231	2,432 17,231

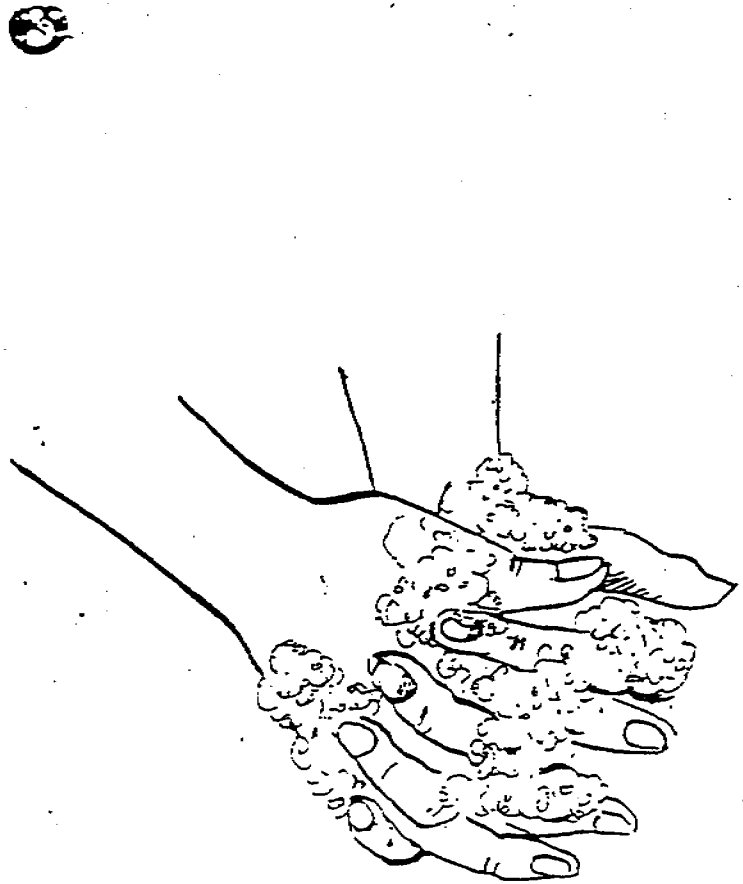
Annex 1

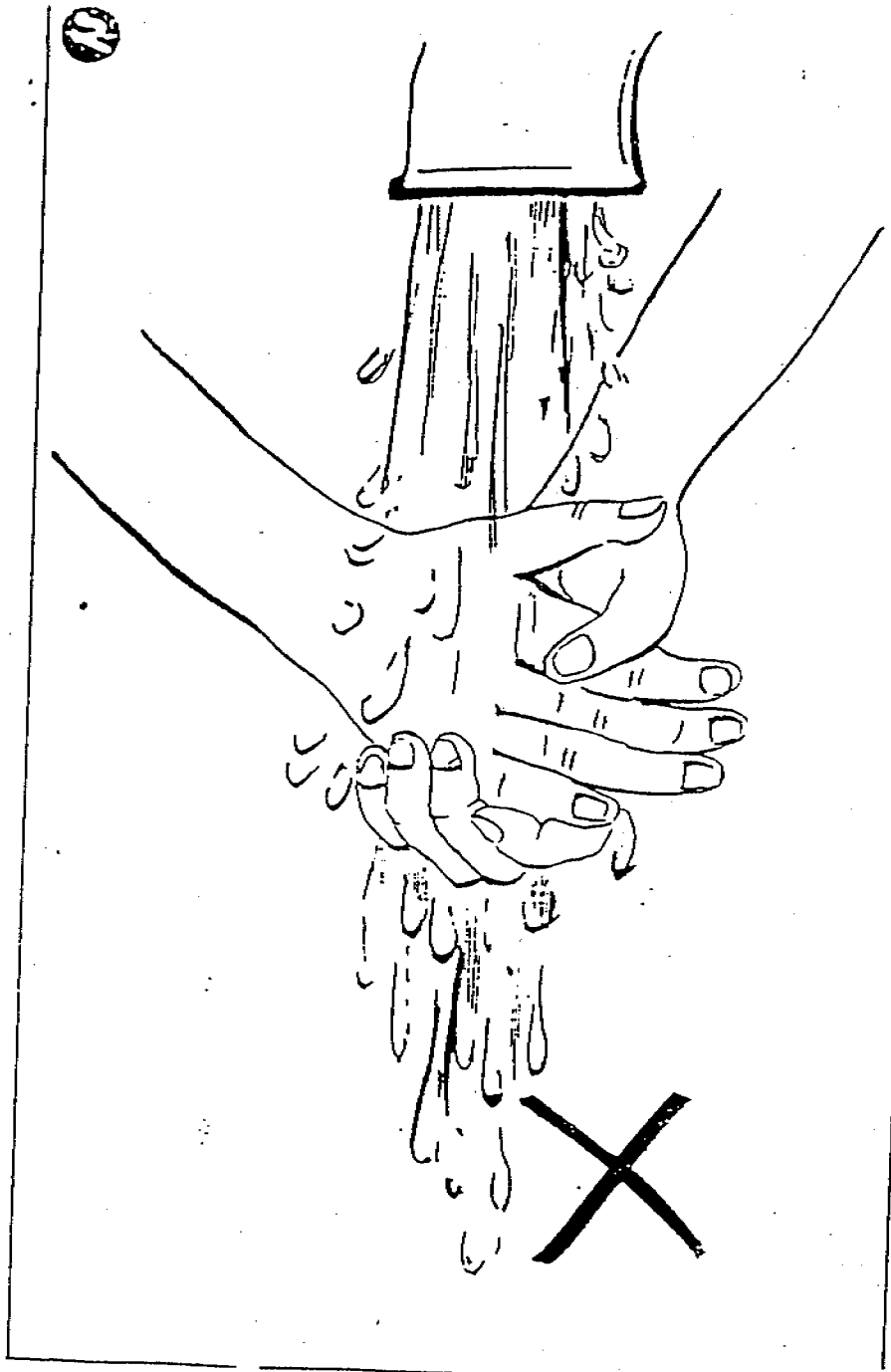
International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B)

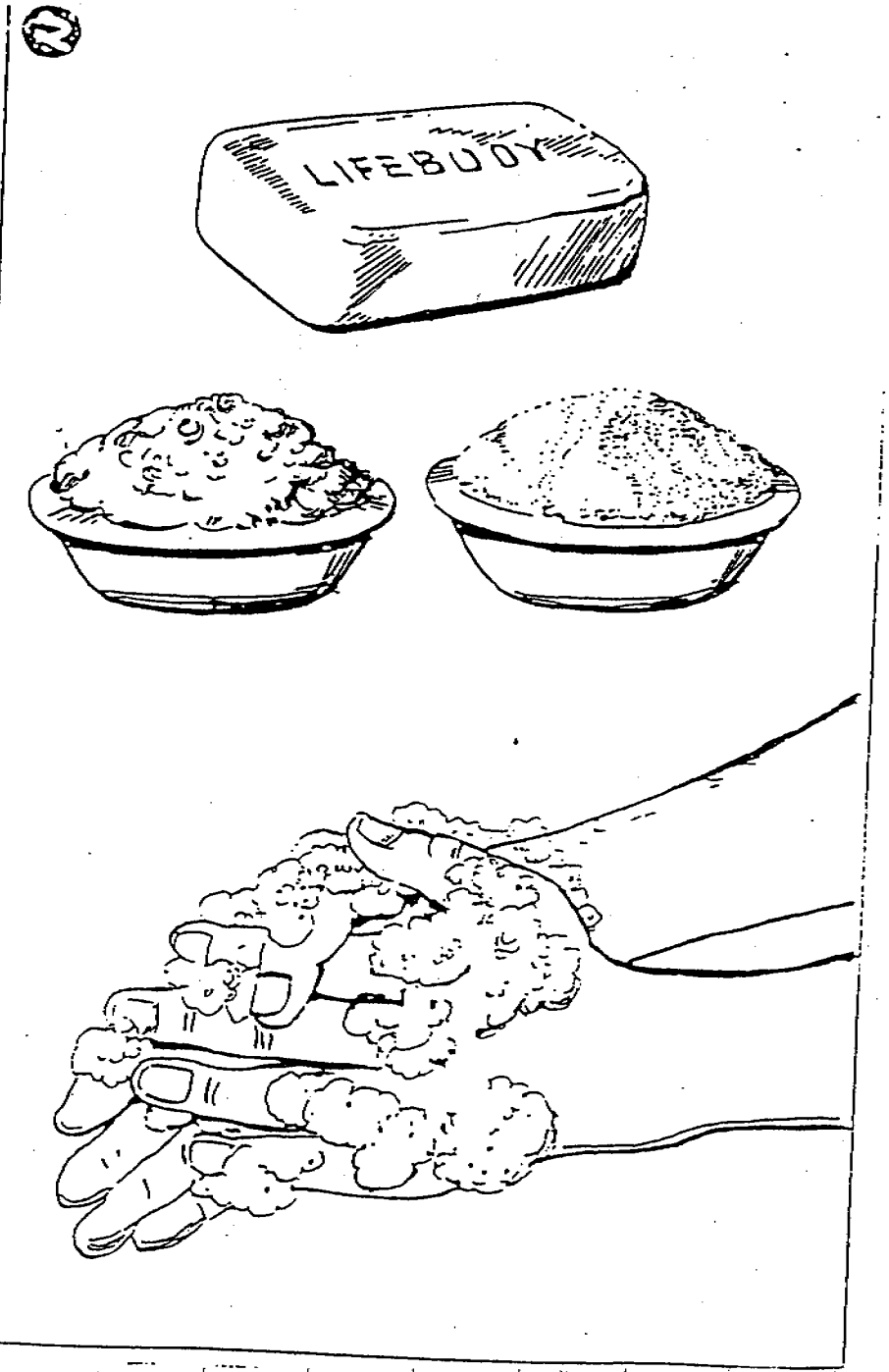
The ICDDR,B is supported by countries and agencies which share its concern for the health problems of developing countries. Current donors include: the aid agencies of the Governments of Australia, Bangladesh, Belgium, Canada, China, Denmark, Germany, Japan, the Netherlands, Norway, Republic of Korea, Saudi Arabia, Sweden, Switzerland, the United Kingdom and the United States; international organizations including the Arab Gulf Fund, Asian Development Bank, International Atomic Energy Centre, the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP), the United Nations Population Fund (UNFPA) and the World Health Organization (WHO); private foundations including the Ford Foundation, Population Council, Rockefellar Foundation and the Sasakawa Foundation; and private organizations including American Express Bank, Bayer A.G. and CARE, Helen Keller International, the Johns Hopkins University, Swiss Red Cross and the University of California Davis.

Annex 2





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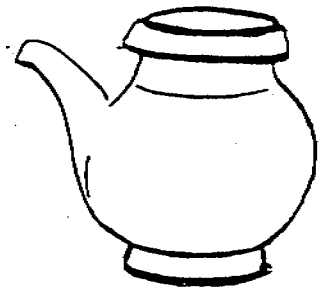

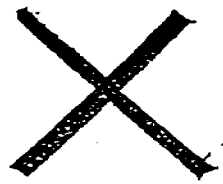

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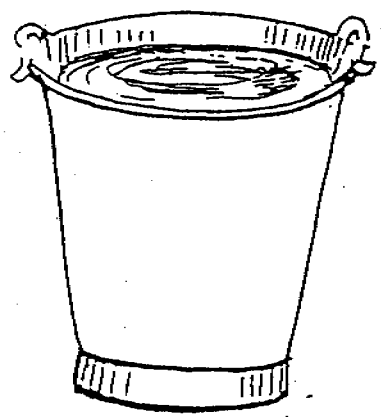

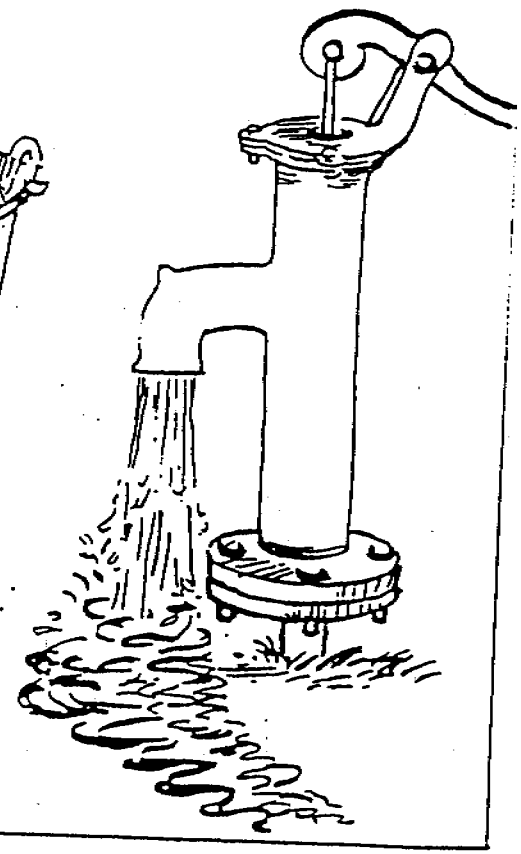

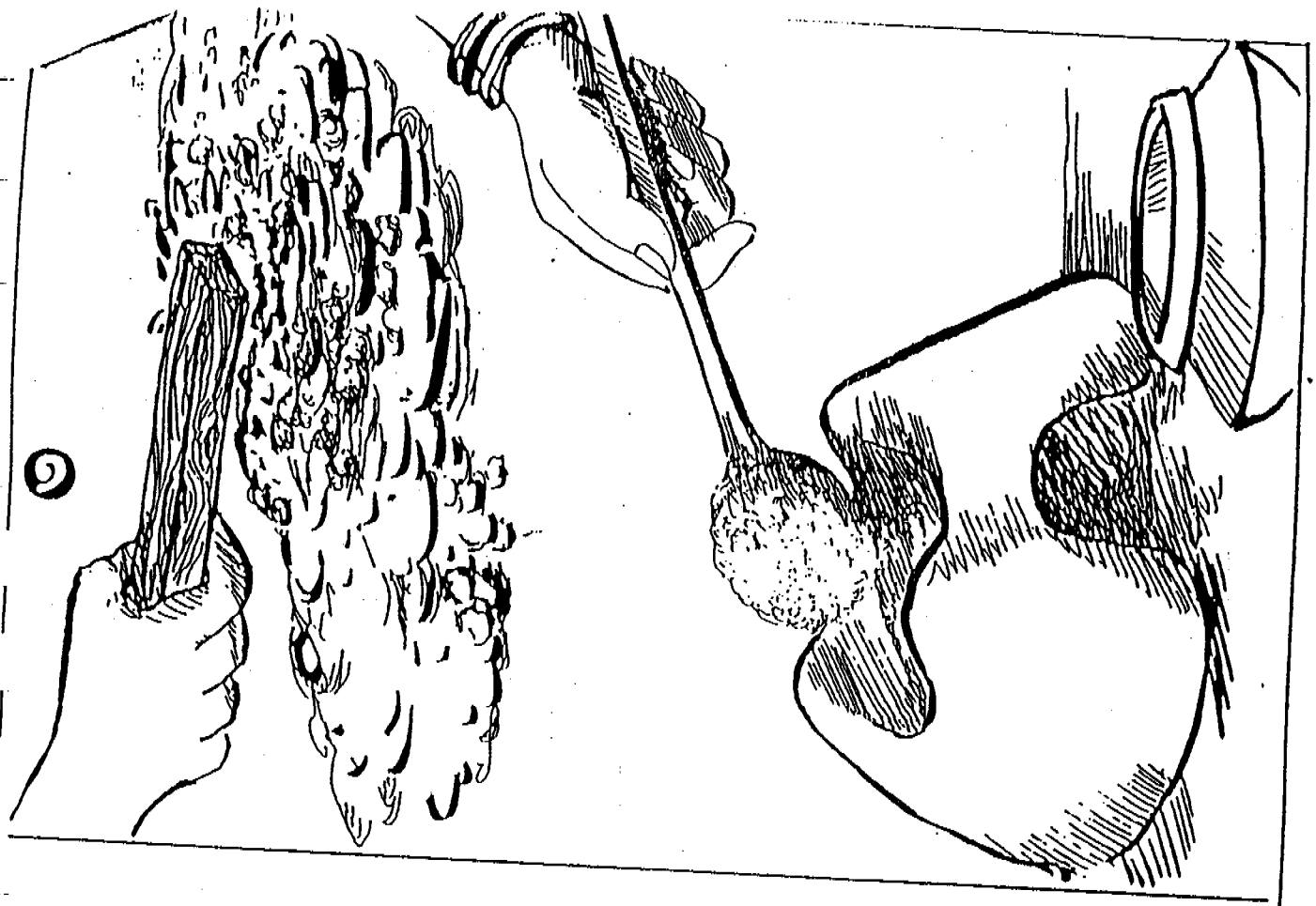

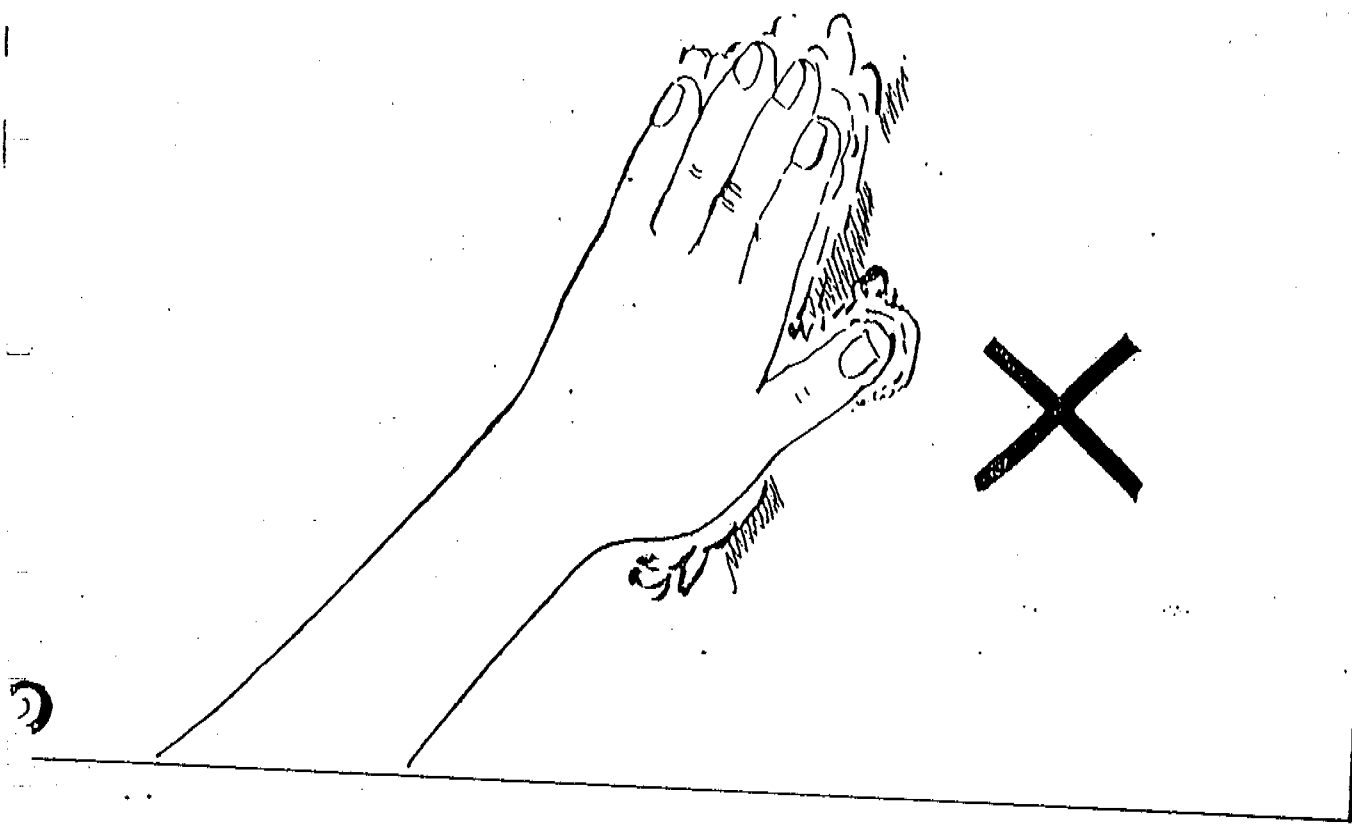

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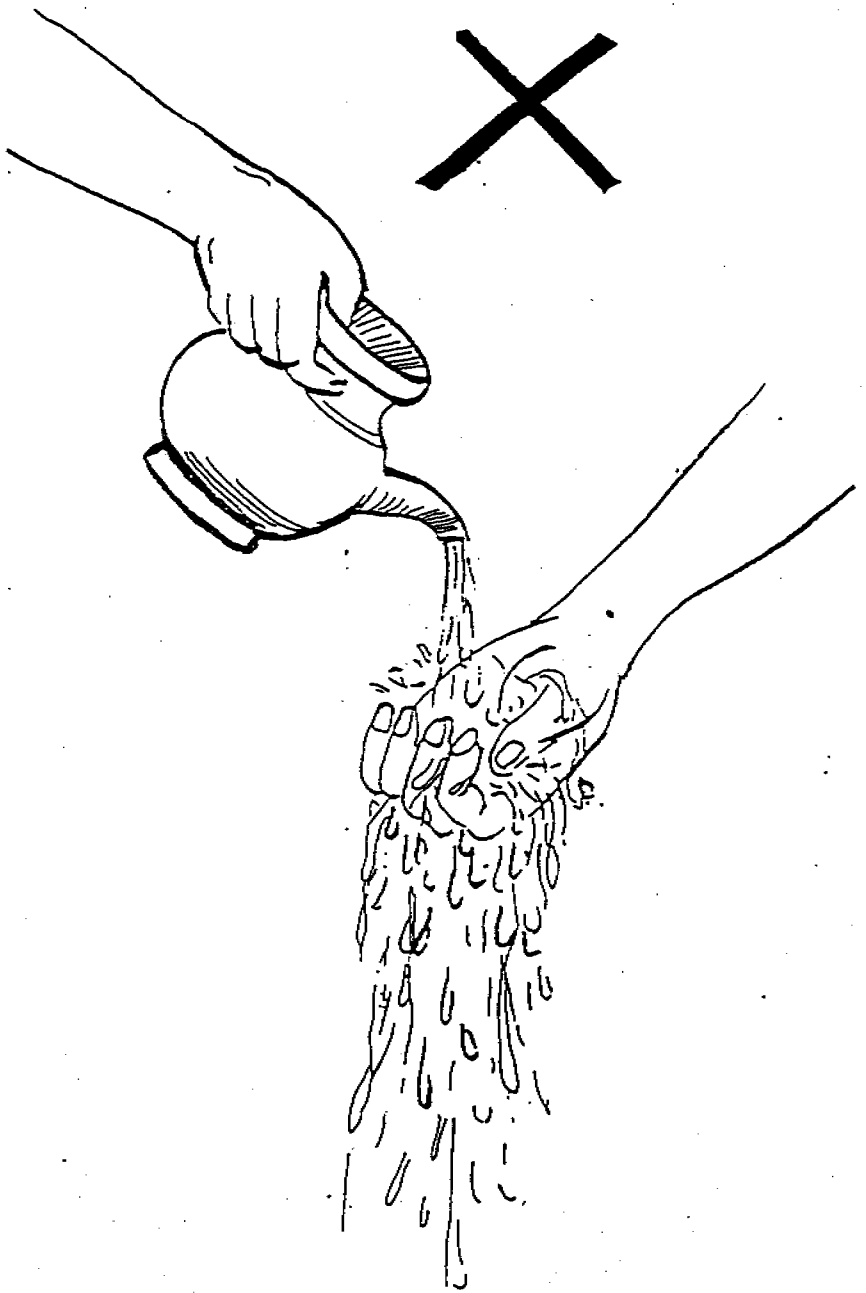

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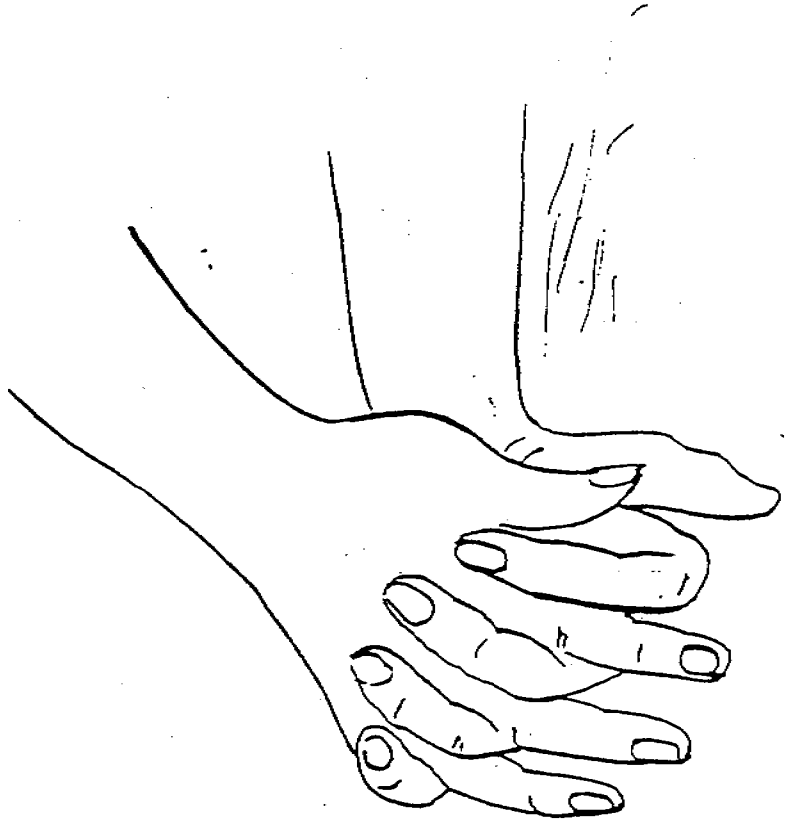

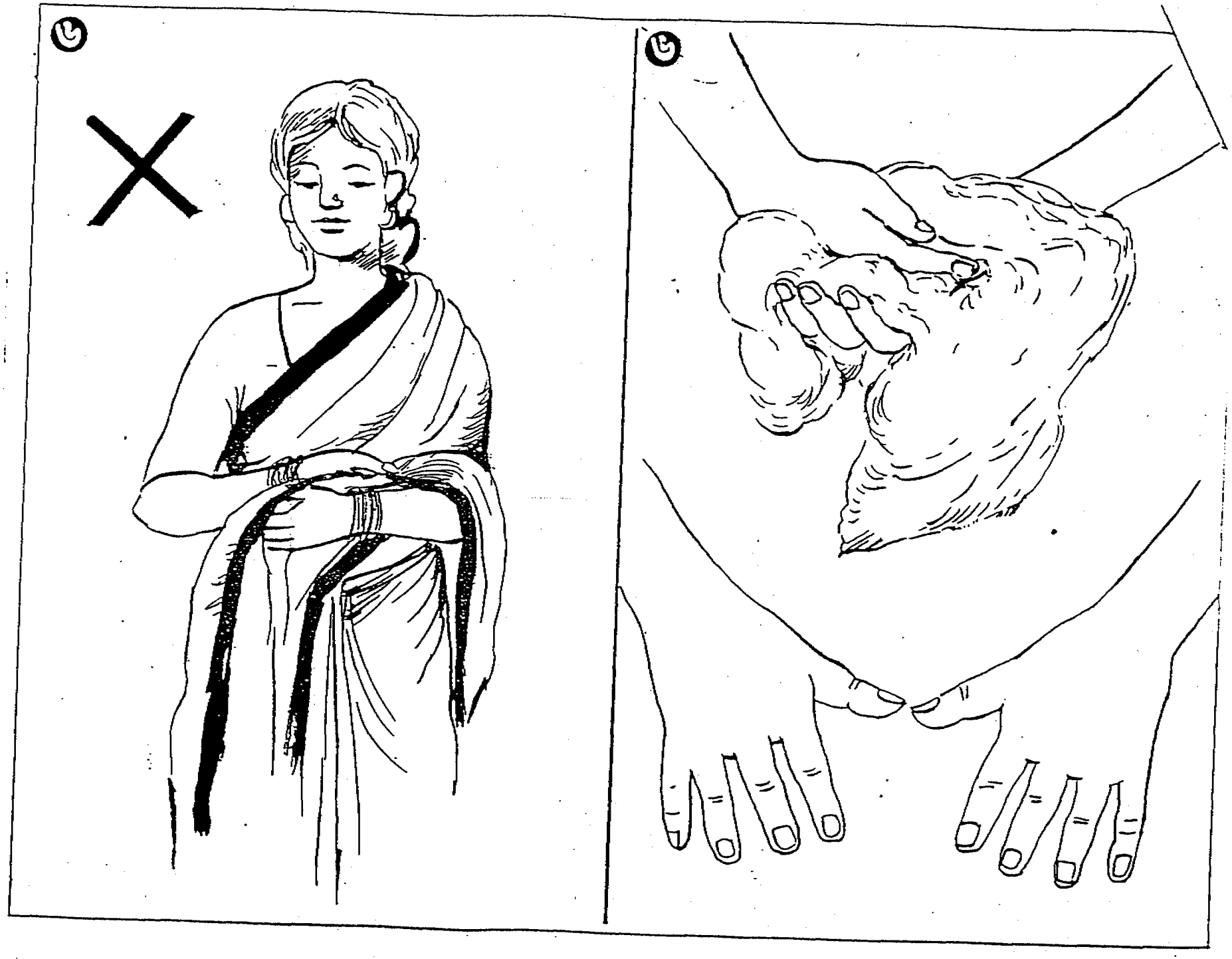

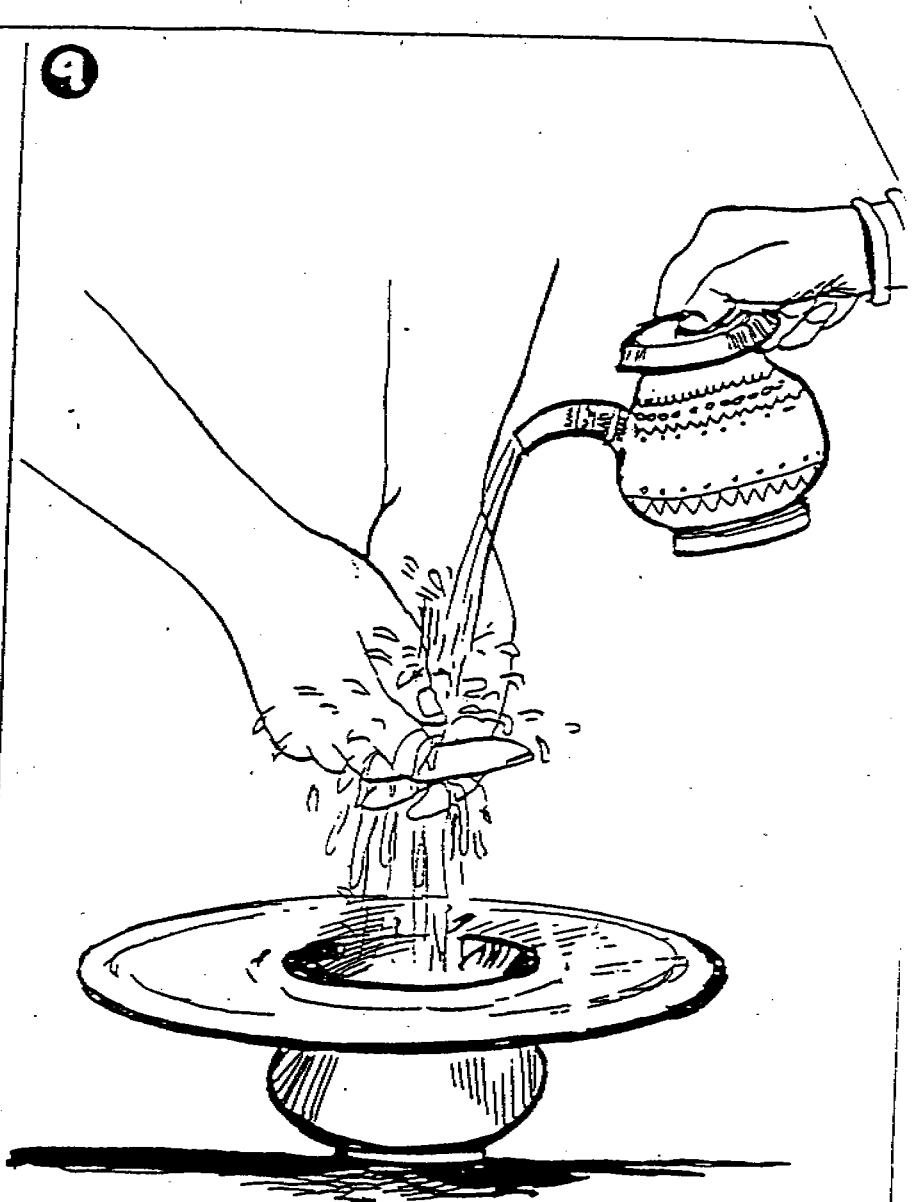

UNITED NATIONS CHILDREN'S FUND (UNICEF) (Annex A)

Terms of Reference for Consultants and Contractors

Purpose of Assignment : Attach background documents, if necessary.

To update sanitation messages on handwashing practice; home management of water, and ingestion of safe water.

Duty Station : DHAKA

Supervisor : Ms. Ayesha Hossain

Major tasks to be accomplished : (Estimate the time requirement to complete each task. Attach additional sheets if necessary to describe assignment).

(a) Determine the sample methodology with a view to updating sanitation messages, assess home management of water, and the ingestion of water from polluted sources.

(b) Assess the efficiency of the current handwashing practices using different detergents/materials.

(c) Examine the relevance of correct sanitation message related to handwashing and update as necessary.

(d) Examine the methods of collecting domestic water at source and storage/ management at home.

(e) Review methods of improving the current practices in order to improve quality of the water ingested.

(f) Examine the practices of the community having access to tubewell water, but still using other non-protected water for their needs, which requires ingestion.

(g) Analyse reasons for behavioural practice under (f).

(h) Provide recommendations to address the ingestion of safe water.

End Product : (e.g. final report article, document, etc.) Deadline : 15 July, 1994

Final report.

Qualifications or specialized knowledge/experience required :

Extensive experiences in the field of environment, communication and social science (anthropologist).

Prepared by : (Name and Title) Ayesha Hossain, Project Officer Date : 19-05-1993

Approved by :

Section Chief/Sr. Programme Coordinator Date : 22.11.93

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Annex - A

As discussed with Dr. Bilquis the issues have been clarified and noted.

KAP of the community regarding handwashing practice, home management of water and ingestion of water will be observed.

Ingestion of water in different ways like bathing, washing plate etc will be observed.

doc : \All\mi\annex-A