

Observations on Handwashing and Defecation Practices in a Shanty Town of Lima, Peru

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ABSTRACT

Following a two-year cohort study of diarrhoeal diseases in children aged 0-35 months from a shanty town in Lima, 62 families were chosen for detailed observation of hygiene practices. All handwashing and defecation episodes which occurred during a 10-hour observation period (8am-6pm) were recorded. The youngest child in each family was selected as the index child for observation. Handwashing was seen on 483 occasions with 71% of the index children and 80% of mothers observed at least once. The use of clean water, soap and the thoroughness of the handwashing varied according to the purpose, with "better" behaviour observed more frequently when the person was preparing to go out. Forty-five index children (72%) were observed to defecate at least once. Infants defecated in their diapers or clothes; toddlers defecated more indiscriminately around the home area. Handwashing after defecation was rare (11% of occasions) and usually without soap. Faeces were often left accessible to children and animals (42% of occasions), especially when defecation occurred around the home/yard, and the data suggested this occurred more frequently in "higher" diarrhoea households. Stools deposited on the floor were usually just swept aside, covered with earth or eaten by dogs. Those deposited outside the home were frequently left untouched during the observation period or similarly cleared. Soiled clothes were usually left or washed separately, and stools in potties were thrown in latrines. These results suggest hygiene interventions might focus on clearance of stools from home surroundings, increased utilisation of potties and separate washing of soiled clothes.

Key words: Diarrhoea; Hygiene; Sanitation; Structured Observations; Water supply.

INTRODUCTION

Despite the efforts of the International Drinking Water and Sanitation Decade (1981-1990), there remain approximately one billion people unserved by improved water supplies and 1.7 billion unserved by adequate sanitation (1). The improvement of water supply and sanitation facilities has been identified as one of the major preventive strategies against diarrhoeal diseases in young children of developing countries (2). Furthermore, there is evidence that improvements in water quantity have more impact on diarrhoea than improvements in water quality alone and it has been suggested that this is linked to better personal and domestic hygiene (3). As a consequence, the

promotion of hygienic behaviours is receiving increased attention as a preventive measure against diarrhoeal diseases. Such promotion should complement improvements to sanitary hardware.

The World Health Organization has recently endorsed three key water-related behaviours for promotion. Generally, these are the sanitary disposal of faeces, cleansing of hands, and maintenance of drinking water free from faecal contamination. To date, most attention has focused on handwashing and surprisingly little is known about faecal disposal practices. Such information is essential for the formulation of effective behavioural interventions to combat diarrhoea.

As a preliminary stage to developing a hygiene intervention in the shanty towns of Lima, Peru, we present data on hygiene behaviours collected through detailed observations of young children and their families.

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The results give a description of some key hygiene practices which can guide us for further study of behaviour determinants and intervention formulation.

MATERIALS AND METHODS

The study was conducted in the community of Canto Grande, a densely populated peri-urban community of low socioeconomic status in Lima, the capital city of Peru (4,5). Households are usually built of straw or brick with dirt floors, and most houses have electricity. There is no rainfall in Lima and in the shanty towns water is purchased mainly from cistern trucks. The water is stored in cement tanks (83% of households) or 200-litre metal cylinders (17%); from 29% of the tanks the water is removed by way of a tap, and from the remaining tanks and all cylinders it is removed by dipping buckets. The estimated median water use for all purposes is approximately 20 litres per person per day, with laundry requiring a large part of this. Hygiene-related water use is estimated to be less than 1 litre per person per day (unpublished observations). About half the households have a simple shallow pit "latrine", although this is not used frequently because of odours or insects. Defecation by adults and older children in the nearby hills or open ground is common. There is no organized garbage collection; most refuse is collected in central areas in the proximity of households, where it is burned.

A longitudinal study of diarrhoea in children 0-35 months of age was conducted between January 1985 and March 1987 with approximately 350 followed up each month. The mean incidence rate of diarrhoea was nine episodes per child per year (6). In May-July 1987 a household survey was conducted in all study households to seek possible risk factors for diarrhoea incidence. Children reported to defecate outside the home or to have been seen eating faeces experienced higher rates of diarrhoea (5).

At the conclusion of this study, a pilot study to observe hygiene behaviours and water utilization was planned in a sub-sample of households selected from the surveillance population. Following institutional ethical approval, an initial selection of 80 households was made based on the incidence of diarrhoea seen in the children under surveillance during the two years of study, aiming at a range of "diarrhoea experiences". Households were invited to take part in an observational study lasting 10 hours to record the child's activities. The particular focus of the observation was not revealed to the parents. Parental consent was obtained and a day was selected for the observation to take place. Sixty-two (78%) of the 80 selected families were studied. The remaining 18 either refused participation or experienced difficulties in setting a day for observation. Several preliminary visits were made to the families for acquaintance purposes before the observations were conducted. All fieldwork was carried out by two local anthropologists (HG and IA) between July and October 1987.

Since the main focus was on young children, the youngest child in each of the 62 selected households was identified as the index child; sometimes this was the child who had been under diarrhoea surveillance, otherwise it

was a younger sibling. A single 10-hour observation period (8am-6pm) was carried out in each household. A pre-coded form was developed for the observations, made up of several components:

1. A checklist of practices was drawn up for both the index child and the mother. During each half-hour time period those practices observed were recorded for each mother and index child. In addition, spot observations of those practices occurring actually on the half-hour or hour were noted separately.
2. Details were recorded of all episodes of handwashing and defecation which were carried out by any family members present.
3. All water utilization and feeding-related activities were also recorded, and observations made on environmental conditions.

The forms, codes, and observation practices were field-tested before the study.

In entering the data on the microcomputer, the detailed observations of the mother and index child were not included and only the half-hourly spot observations were entered. All details on handwashing and defecation were entered and it is these results which we report here. It should be noted that these data were event-based. That is, details were recorded for each event when it occurred but information is not available on the "opportunities" for an event occurring. For example, it cannot be determined on what percentage of occasions that a mother's hands were soiled with cooking residue did she wash her hands. In addition, households were classified into four equal-sized groups according to the diarrhoea incidence rate of the child in the longitudinal study. All analyses were conducted using SPSS PC+.

RESULTS

The ten-hour observation period was completed for all 62 households, except one where 5 hours of observation was done. In two households the mother was not observed and a guardian was observed as the child's caretaker. The half-hourly spot observations showed that on average mothers/guardians spent two thirds of their time with the index child and otherwise were usually nearby. The median age of the index children was 2 years (range 0-4).

Handwashing. Handwashing was observed on 483 occasions, for 10 of which the identification of the person was unknown. At least one episode of handwashing was observed for 48/60 (80%) mothers and 44/62 (71%) index children. Handwashing among the index children or their siblings usually occurred in association with eating or simply because the hands were dirty, whereas almost 50% of episodes among mothers were for cleaning cooking residue from their hands. As might be expected, most handwashing took place during the middle part of the day (11 am-2 pm), especially for mothers.

Aspects of the handwashing episodes varied according to their purpose and when disaggregated in this way,

results were similar for adults and children. In this community water is used over and over due to its scarcity and expense (unpublished observations). Clean water, i.e., that which was not used previously for other purposes, was more likely to be used for washing hands before eating (46% of occasions), after eating (46%), or when preparing to go out (63%). By comparison, clean water was used less frequently after changing a child's diaper (20% of occasions) or cleaning cooking residue from the hands (17%). The use of soap also varied according to the handwashing purpose (Table I), being used more frequently when preparing to go out or for cleaning off kerosene. Handwashing was more thorough (in terms of how much of the hand was washed) when preparing to go out or before eating (Table II). Drying of the hands appeared to be most closely related to how thorough the handwashing was; no drying was done for 97% of finger-washing occasions, 74% of palms-only washing and 51% of occasions when the whole hand was washed. Towels or clothes were the most common drying implements.

Table I. Items used for handwashing episodes according to the purpose (% of occasions).

Purpose of handwashing	n	Items used		
		Water only	Soap water	Damp cloth
Before eating	87	77	21	2
After eating	39	51	5	44
Cleaning cooking residue from hands	105	82	0	18
Cleaning kerosene from hands	23	52	44	4
Hands dirty	92	67	26	6
Preparing to go out	51	47	53	0
After defecation	14	79	21	0
After changing diaper	11	64	27	9

Fifteen mothers were observed to wash their hands on at least five occasions and we attempted to see if there was any consistency in their handwashing behaviours. Regardless of purpose, several (5) of these mothers were never observed to use soap, a few (3) always washed their hands thoroughly, and about half (8) never dried their hands.

Table II. Type of handwashing according to the purpose of the handwashing (% of occasions).

Purpose of handwashing	n	Type of handwashing		
		Whole hands	Palms only	Fingers only
Before eating	87	70	23	7
After eating	39	44	51	5
Cleaning cooking residue from hands	105	17	57	26
Cleaning kerosene from hands	23	48	44	9
Hands dirty	92	63	36	1
Preparing to go out	51	80	20	0
After defecation	14	43	57	0
After changing diaper	11	46	36	18

Defecation. Defecation was observed on 124 occasions, for one of which the person was not identified. Forty-five out of the 62 index children (72%) were observed to defecate at least once, and only nine out of the sixty mothers (15%) were observed to do so. There was no particular time pattern for the defecation of young children, but all adult defecation took place after 2 pm. Since so few mothers were observed, the following results pertain only to 72 defecation episodes by index children and 39 episodes by their siblings (median age 4 years, range 1-12 years).

Table III shows that, although infants were observed to defecate in their diapers or clothes, older children defecated more indiscriminately around the home area. Among children aged 12-35 months potties were used on only 14% of occasions, but for more than half of the defecation episodes among those aged ≥ 3 years either a potty or a latrine was used. It should be noted that many children in this latter age group would have gone to the nearby hills to defecate and therefore were not recorded. Anal cleansing occurred on about 90% of occasions, usually with paper or, for younger children, a cloth or diaper. On 42% of occasions the observer considered the stool had been left accessible to children. This was more frequently observed for defecation done on the floor (75%) or in the yard (60%) than for that done in clothes (44%), the surroundings (36%) or a potty (25%).

Table III. Place of defecation according to age of the child (% of occasions).

Place of defecation	Age of child (months)			
	<12 n=8	12-23 n=34	24-35 n=28	≥ 36 n=41
Clothes or diapers	100	59	29	2
Potty	0	15	14	27
Pit latrine	0	0	4	27
Floor	0	21	14	3
Backyard	0	0	21	24
Surrounding area	0	6	18	17

Handwashing was done after only 13 (12%) of the 111 defecation occasions. Clean water was used on 43% of these occasions, only the palms of the hand were washed on 43%, and soap was not used on the majority of occasions. Handwashing by the mother after changing a young child's diaper was seen only on 11 occasions and also showed low levels of using clean water, soap, and handwashing thoroughness (Tables II and III).

The "final destination" of the stools was recorded and is shown in Table IV according to where the defecation initially took place. The final destination was not seen before the end of the observation period for many stools, particularly those done in the child's diapers/clothes or in the surrounding area. When defecation occurred around the floor or yard, stools were frequently just swept aside, covered with earth or eaten by dogs. Soiled clothes were sometimes washed with other clothes though more often done separately. Stools done in potties were mainly (79%) thrown in a latrine.

Data from the household survey were available for 53

of these study households and 30 (57%) of these had access to a latrine. For the 54 defecation occasions observed among children in these households, the child either defecated in the latrine or the stools were later thrown there on 23 (42%) occasions.

Table IV. "Final destination" of stool according to the initial place of defecation (% of occasions).

Final destination of stool	Initial place of defecation				
	Clothes n=36	Potty n=19	Floor n=12	Yard n=16	Surroundings n=13
Not seen during observation period	53	16	8	38	77
Covered with earth	6	0	33	31	23
Eaten by dog	0	5	17	19	0
Washed soiled item separately	31	0	0	0	0
Washed soiled item mixed	11	0	0	0	0
Swept away	0	0	42	6	0
Put in latrine	0	79	0	6	0

Association with diarrhoea. The above aspects of handwashing and defecation behaviours were investigated according to the household's diarrhoea classification (see Methods). Due to the small number of observations available, two groups (below and above the median diarrhoea incidence rate) rather than four were compared for most variables. There were no differences between the diarrhoea groups with respect to the purpose of handwashing occasions, the handwashing practices and the site of defecation. However, stools were less likely to be left accessible in "lower" diarrhoea households (23%, 32%, 46%, 52%; χ^2 test for trend in proportions; $p=0.04$). Despite the small number of observations, it was also seen that in "low" diarrhoea households (below the median) all eight stools done in potties were thrown in the latrine, and soiled clothes (four) which were washed were all washed individually. In the "high" diarrhoea households, however, stools done in potties were not thrown in the latrine on 4 of 11 occasions and soiled clothes were washed with other clothes on 4 of 11 occasions.

DISCUSSION

Relatively few hygiene behaviour intervention studies have been conducted; yet, results indicate their potential as successful preventive strategies against diarrhoeal diseases. A review of six studies has shown a median reduction in diarrhoea morbidity of 33% (7). Three of these studies focused specifically on handwashing, whereas the other three involved combinations of hygiene behaviour. Unpublished results from Lima suggest that of several hygiene intervention strategies undertaken (including improvement of water quality, promotion of handwashing, provision of playpens for young children and cages for chickens), handwashing was the only one to have a significant impact on diarrhoea incidence.

An essential component of any hygiene behaviour intervention is a description of prevailing practices and

their determinants in a community, and assessment of the feasibility for change. The data presented here could prove useful for development of a hygiene intervention in this community, indicating foci for assessing behaviour determinants and feasibility for change. The main objective of the study was to provide descriptions of hygiene behaviour. However, the data also permitted an exploration of behaviour associated with diarrhoea, although it is difficult to draw firm conclusions for three main reasons. Firstly, the small sample sizes preclude control of potential confounding factors. Secondly, behaviours are variable within an individual as well as between individuals and it is therefore difficult to assign "behaviour status" on an individual basis for such an analysis. Thirdly, it is possible that some key behaviours (which common sense tells us are "risky") are practised by most of the population, and it is therefore difficult to detect an association with diarrhoea.

Handwashing practices varied, especially according to their purpose. The thoroughness of the handwashing (i.e. whether palms or fingers only or the whole hand) might be an area to focus on in developing a behavioural intervention. Perhaps some of the "best" behaviour was seen when the person was preparing to go out. This suggests that factors besides a concept of germ theory, such as value of personal appearance, motivate handwashing. Zeitlyn and Islam (8) reported similar findings from a study in Bangladesh. This result could be linked to messages promoting better handwashing. Another area for attention is handwashing after defecation which was rarely seen to occur.

The results on defecation-associated behaviour suggest that clearance of stools is a key factor. Many stools were left around the home environment, often accessible to children, and there is a suggestion that this occurred more frequently where diarrhoea was more common. This association between risk of diarrhoea and the clearance of children's faeces has been observed in other studies, even after control for confounding factors (9-11). The use of potties with subsequent disposal in a latrine or other "safe" place might be encouraged. Also, separate washing of soiled clothes merits attention. Another interesting feature is that children, especially young children, rarely used latrines. However, more frequently their stools ended up in the latrine after defecating in a potty. This shows that studies asking about the whereabouts of child defecation should consider indirect routes to the latrine. The simple question "Does - use the latrine?" might be misleading.

The measurement of hygiene behaviours is receiving increased attention (12). Some methodological issues are raised by this study, the main one being the limitation of having only one day's observation and we must recognize that this may not be representative. Changes in behaviour as the result of an observer's presence must also be considered. Even so, "good" behaviours were not often seen; handwashing after defecation was very rare, stools were often left lying around the home environment and soap was used infrequently. Despite 10 hours of observation, defecation was not frequently seen, especially for adults. It is likely that some occurred before the observer's arrival at 8am or after departure at 6 pm, even

so it emphasizes the difficulty of collecting information on such events.

Despite the limitations of the method used, we feel the study has provided useful information that would be difficult to obtain by other methods. The reliability of questionnaires for collection of data on behaviour has been challenged (13,14). Spot checks are not useful for observing infrequent behaviour. The data from our half-hourly observations of mothers and children showed that defecation occurred on less than 1% of these spot observations. Thus, with careful planning, continuous observations play a useful role in the study of hygiene behaviours.

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