

A hygiene intervention study in rural north-east Thailand

by John Pinfold, John Hubley and Duncan Mara

Hygiene education is reinforced by the provision of a simple plastic container with a tap for hand washing. The appropriate hygiene practices for this study were identified in the last issue of *Waterlines*.

MANY LOW-COST WATER supply and sanitation projects are designed to help prevent faeco-oral disease transmission, particularly of diarrhoeal diseases. Human nature tends to make it easier to identify with hardware components such as wells and latrines, than with software components such as the adoption of these facilities, users' practice, and behaviour. Personal and domestic hygiene is perhaps the most neglected aspect of all software components, which is understandable as it is difficult both to change peoples behaviour and to measure whether a change has occurred. If appropriate hygiene practice can successfully reduce disease, however, then it can provide a cost-effective intervention, complementing hardware initiatives.

Devising an intervention

Studies from urban Bangladesh suggest that a hygiene intervention would be most likely to succeed if it consisted of relatively few messages whose prescribed behaviours already occurred in the community.¹ If little or no extra effort is required to adopt an identified behaviour, and messages are kept simple, then the problems of acceptability are minimized.

Measurement of the extent to which hygiene practices have been adopted within a given community is also very difficult. Direct observation is usually only possible when these practices take place in the

open, and this requires field evaluators to be in the community and to observe for long periods of time. Indirect measurement, such as asking people to report on their practices, can provide inaccurate data. It is therefore helpful to have simple and objective indicators of practices in order to assess the means of delivering a hygiene intervention.

As methodological problems are inherent when measuring the level of diarrhoea, we used *E.coli* contamination of water samples and fingertips to provide information on the potential risk of disease transmission. We used the results from the case study in neighbouring

village Ban Sahart to help us identify the sort of hygiene practices that would be appropriate for an intervention study.² Fingertips were more likely to be contaminated when sampled after activities associated with child care, food and water. Stored water was contaminated much more often than water sources and, in particular, water used for washing dishes and cooking-related activities was usually highly contaminated. Dirty utensils from cooking and eating were often left to soak, thereby providing the necessary ingredients for the growth of faecal bacteria.

Reducing risk

Bacteria can also multiply on food, particularly at high ambient temperatures. It was not thought that householders would readily change the practice of storing prepared food, however, as this would re-



Handwashing was encouraged by providing a plastic container with a tap.

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quire more cooking time and food wastage. Instead, emphasis was placed on reducing the risk of contamination to prepared food and the subsequent risk of cross-contamination around the kitchen and to other areas. The two main activities selected for the intervention were as follows:

Washing dishes immediately after use. The practice of soaking dishes or utensils directly increased the number of potentially dangerous bacteria in and around the kitchen area. As a further precaution householders were also asked to rinse the dishes and put them out to dry, thereby promoting bacterial desiccation.

Handwashing before cooking and eating, and after going to the latrine or cleaning a baby. This was designed to reduce the risk of transferring bacteria onto food and utensils. Handwashing was not frequently observed during the case study, although it was more likely to occur when hands were visibly dirty (e.g. after eating). As the method of handwashing may directly contaminate stored water, or vice versa, a 20-litre translucent plastic container with a tap was developed to assist in this practice. This also served as a visible reminder of these hygiene messages, and the presence of waste-water under the tap gave an indirect indication of its use.

Compliance indicators

The development of simple and, as far as possible, objective methods to ascertain whether a behavioural

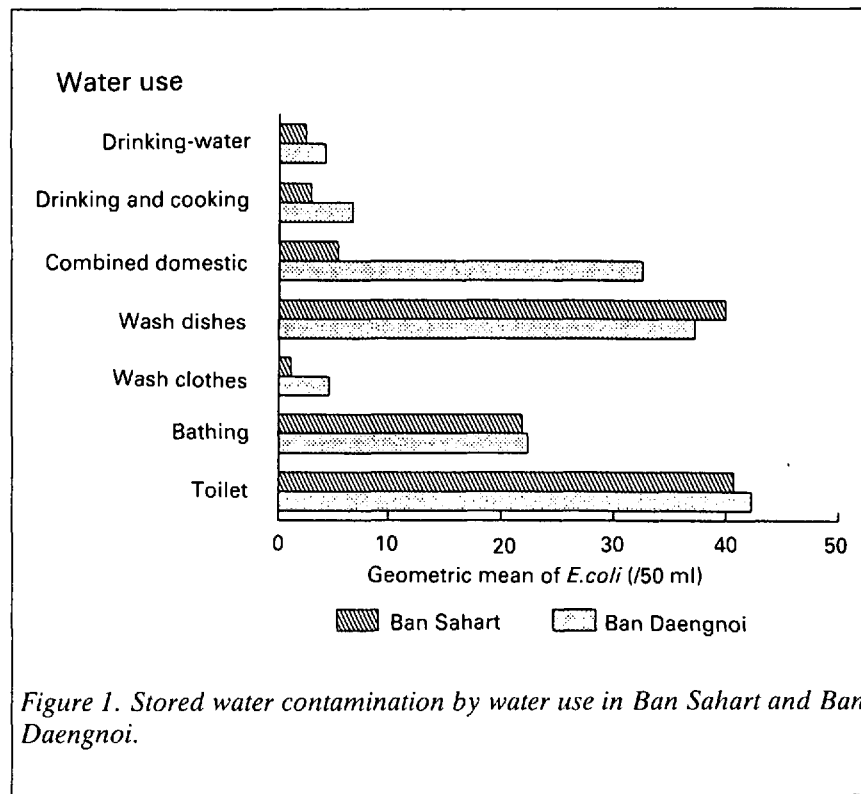


Figure 1. Stored water contamination by water use in Ban Sahart and Ban Daengnoi.

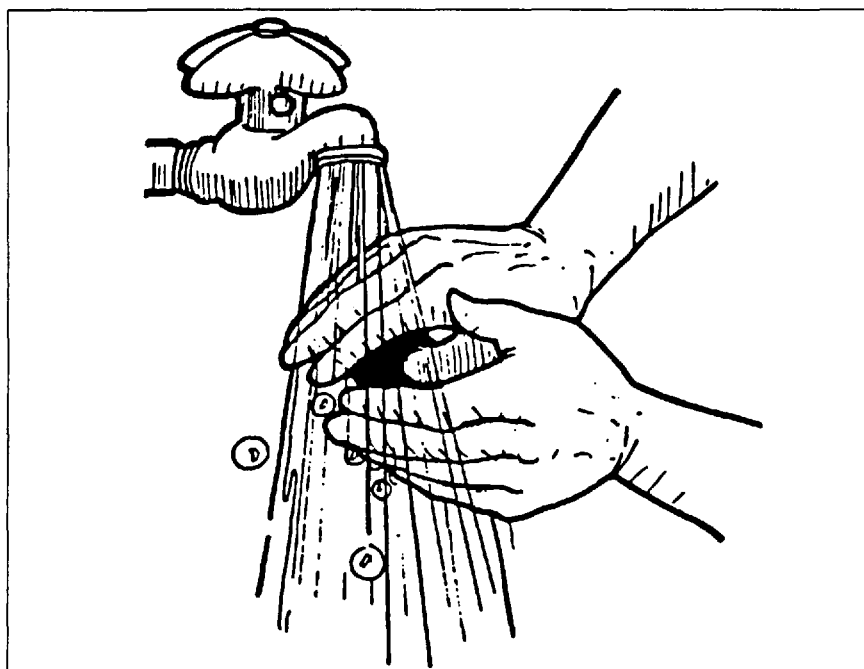
change has occurred was important. To this end, the presence of soaking dishes in the households gave a quick and simple indication that dishes were not being washed immediately after use. An indication of handwashing practice provided a greater challenge. A microbiological method which involves taking a fingertip-rinse from people's hands and testing for the same faecal bacteria commonly used in water quality analysis was being developed.³ The presence of *E.coli*, however, is largely influenced by activities conducted immediately before the fingertip test because it can only

survive for a short period of time on the skin. Faecal streptococci, on the other hand, survives much longer on the skin and this provided a better indicator.

The intervention study

Ban Daengnoi ('little red village') was chosen for the intervention study. The village comprised 422 households with a total population of 2110. Farming was the main source of income and the level of education was very uniform, with most completing only four years. About 95 per cent of householders had access to a pour-flush toilet. Water sources (shallow well, tubewells, ponds, and rain) were similar to that found in Ban Sahart but this study took place during the rains, which greatly improved rainwater availability.

Sixty households containing children under six years were randomly selected by stratified sampling. Water samples and fingertip-rinses from each household were taken on four separate occasions, twice before the intervention took place and twice after. After the first visit the households were divided into three groups of 20 so that each had similar levels of contamination. On the second visit, the maternal heads in the 'Education only' group were asked to follow the two hygiene messages, and feedback was obtained to make sure the advice was understood; this procedure was repeated on each subsequent visit. In



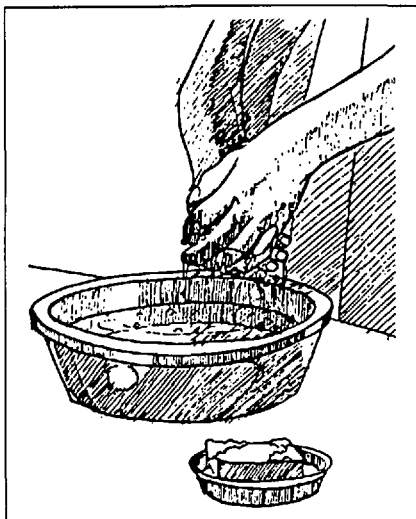
The use of a tap prevents stored water from becoming contaminated.

addition to being provided with advice, householders in the 'Education and tap' group were also loaned a translucent plastic container with a tap, and this was used to demonstrate the hygiene messages. No such messages were given to the third group, which acted as the 'Control'.

Water quality

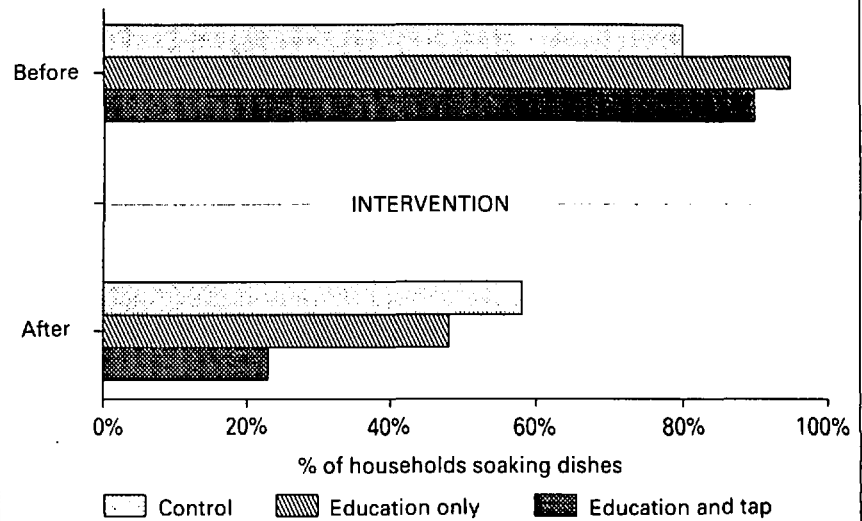
As with Ban Sahart, most of the contamination occurred after water collection and the contamination of stored water was primarily a function of water use. Figure 1 compares *E.coli* contamination of stored water by water use for Ban Sahart and Ban Daengnoi prior to intervention. With the exception of the category 'Combined domestic' the similarities between the two villages are remarkable. Moreover, the case study showed that the households with the least contamination were, coincidentally, the main ones in the 'Combined domestic' category.

There were similar levels of the two indicators of compliance and contamination of stored water for each group before the intervention took place (Figures 2 and 3). After the intervention the number of households leaving dishes to soak declined in *all* groups. A gradual improvement to the control was expected and may be attributed to the dissemination of the message through friends, neighbours and relatives, but there was a stronger impact of the hygiene messages on the intervention groups. The 'Education and tap' group was significantly better at adopting these messages and their stored water was significantly less contaminated than



Proper handwashing facilities like this are not always available; the tap is easy for everyone to use.

Observation of the presence of soaking dishes in households.



Faecal streptococci in fingertip-rinses

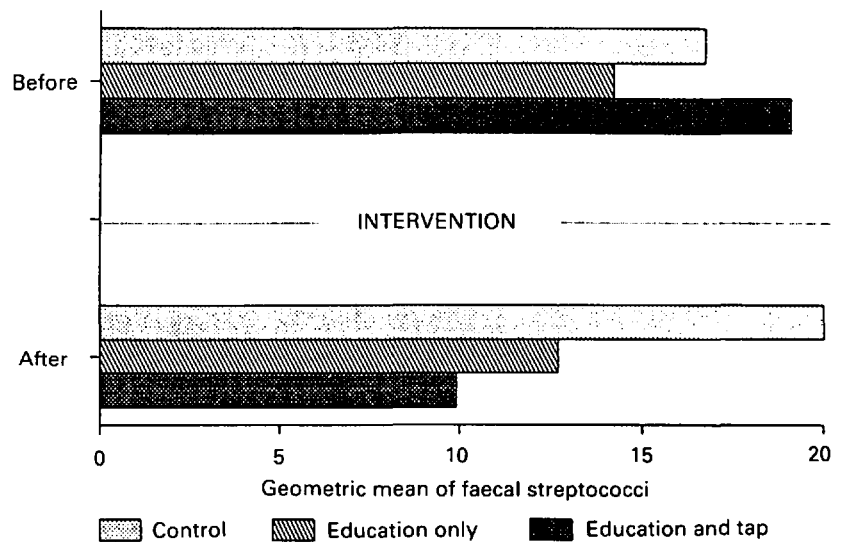


Figure 2. Indicators of compliance to the intervention.

the control, whereas the 'Education only' group was only slightly better than the control.

The study was not large enough to test different means of communication, but the provision of a plastic container with tap did appear to reinforce the hygiene messages. Such was its impact on stored water and fingertip contamination in the 'Education and tap' group, that it is reasonable to suppose that the container itself improved the hygiene practices. The use of a tap in

this study was designed to make it easier to practice good hygiene without affecting water quantity. Water samples drawn from these taps were the least contaminated of all stored water because the plastic containers were well protected from water handling.

Indicators

The faecal contamination of stored water and fingertip-rinses have been used to identify hygienic be-

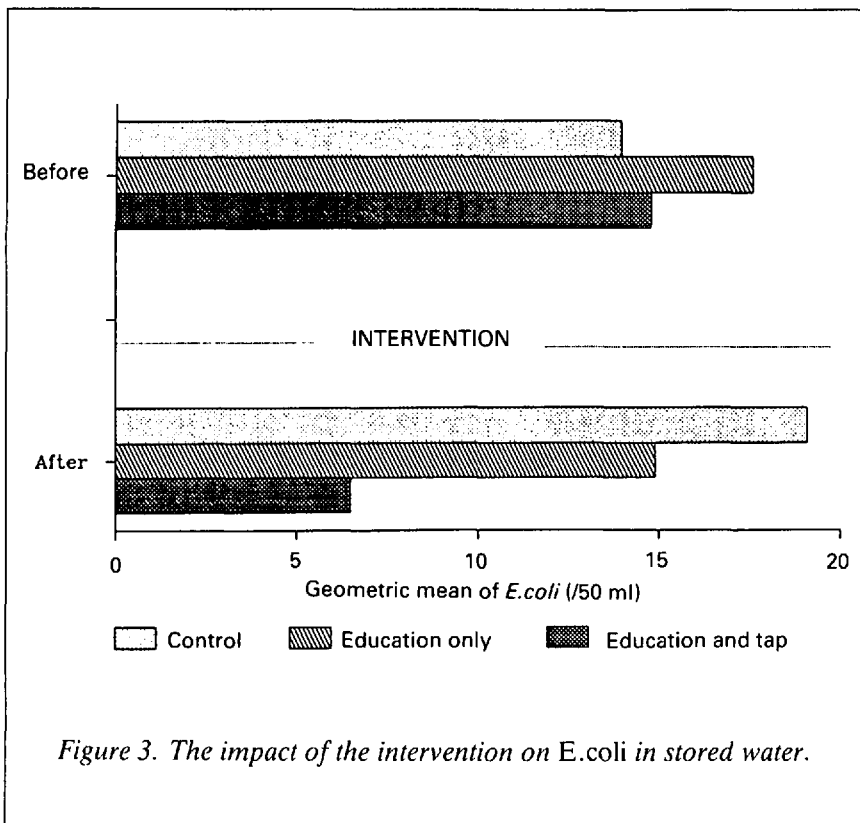


Figure 3. The impact of the intervention on E.coli in stored water.

haviour and measure the outcome of a hygiene intervention. The advantages of using this rather than diarrhoeal disease are twofold:

- Health indicators are inherently difficult to measure because of the problems of definition and recall. In addition, indicators such as diarrhoeal disease require a large sample size as it is a relatively rare event.
- Many other activities apart from water supply and sanitation can affect disease (e.g. child-rearing practices). These variables are difficult to control where health indicators are used.

Water supply and sanitation initiatives directly affect the ingestion of pathogenic micro-organisms, so indicators of faecal contamination should be more specific to these activities.

Although no attempt was made to measure diarrhoea in either study, we did look at the reported cases of diarrhoea in this region to check whether there was any link with our results. The seasonal pattern of reported diarrhoea shows peaks in the hot season and the first half of the rainy season, with a dramatic reduction around the middle of the rains. This pattern fits in well with levels of contamination found within the household. In particular, a significant positive correlation was found between fingertip contamination and humidity for both villages studied. A similar

pattern emerged between reported diarrhoea and humidity around the beginning of the rainy season (Figure 4).

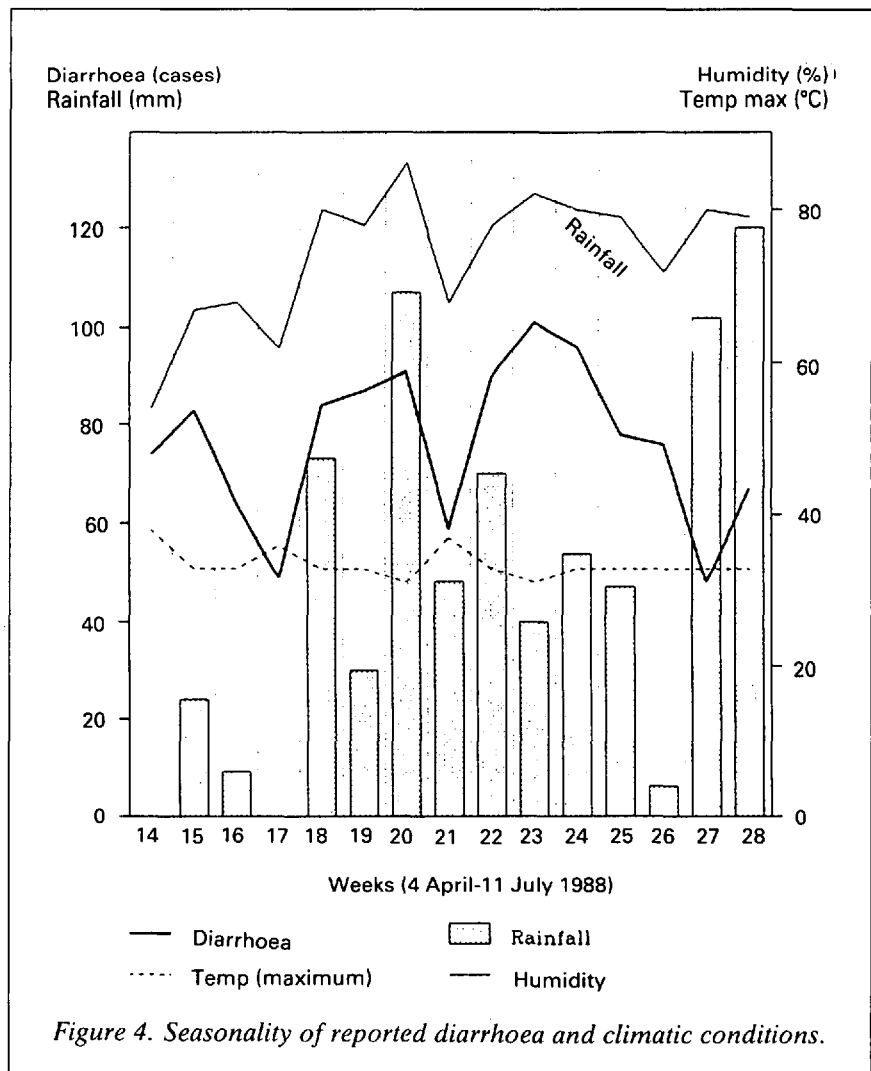


Figure 4. Seasonality of reported diarrhoea and climatic conditions.

Data from our small study shows the limitations of relying simply on exhortations to change behaviour. The provision of a simple plastic container with a tap not only reinforced the hygiene messages, but also made it easier to practice good hygiene. We now hope to use these findings to instigate a larger study and evaluate the different means of communicating hygiene messages by using the fingertip test. ●

References

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