

## Hand-washing reduces diarrhoea episodes: a study in Lombok, Indonesia

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### Abstract

Sixty-five mothers from Balai Lua, Central Lombok, Indonesia were given soap and an explanation of the faecal-oral route of diarrhoea transmission. This very simple health message was repeated and reinforced fortnightly when mothers were also asked whether any members of their family had suffered from diarrhoea over the previous 2 weeks. Children of these mothers experienced an 89% reduction in diarrhoea episodes compared to a control period before the intervention.

### Introduction

Many million children die of diarrhoea each year. Many more are chronically debilitated and become malnourished as a result of frequent episodes of diarrhoea which leave them susceptible to other infectious diseases. Much worthwhile effort has gone into promotion of diarrhoea treatment with oral rehydration salts but the interventions required to prevent diarrhoea are less well understood. Hand-washing breaks the cycle of diarrhoea acquisition (KHAN, 1982; FEACHEM, 1984). There have, however, been few community-based investigations of the effect on diarrhoea control of encouraging hand-washing through health education programmes.

In rural Bangladesh, improved water supply combined with hygiene education reduced diarrhoea incidence by more than 40% (ALAM *et al.*, 1989), while in urban Burma hygiene education alone was as effective in reducing episodes of diarrhoea (but not dysentery) in the absence of better water and sanitary facilities (AUNG MYO HAN & THEIN HLAING, 1989).

Promoting hand-washing with soap after defaecation and before contact with food seems to be the simplest, fastest and most cost-effective method of reducing the major cause of childhood death and adult morbidity in an underprivileged society. This paper reports a very limited pilot study in Lombok, Indonesia. The work suffers from some methodological deficiencies (see BLUM & FEACHEM, 1983), but appears to have been effective in reducing diarrhoea nevertheless.

### Study area

Central Lombok has the highest infant mortality rate in Indonesia: the 1985 SUPAS (*Sensus Penduduk Antar Sensus*) supplementary census estimated the rate as 120 per 1000 live births. Most deaths were due to diarrhoea but little is known about its aetiology locally. The Sasak people of this region have poor expectations of health and survival. Since 1945 there have been 8 major famines in south Central Lombok

(JUDD, 1980) and innumerable deaths at these times have attracted foreign aid to the island.

The study was conducted as part of a rural water supply and sanitation project. Two of the seven *dusun* (village administrative units) within the *desa* (small town) of Darek in Central Lombok were selected for the study: Tanggung Luak and Balai Lua Daya. These *dusun* were in the same neighbourhood but were not contiguous. Housing types were similar in both *dusun* but varied according to the resources of the family. The richest households had tiled roofs, brick walls and concrete floors while the poorest homes were built with thatched roofs, woven bamboo walls and mud floors.

Darek had piped drinking water available for about 3 years before the study. For washing, villagers used small unprotected brackish wells close to their houses or, when these were dry, one of 3 communal bathing places each served by a deep protected well. There was a good tarmac road to Darek, a weekly market, a government health centre (*PusKesMas*) and several schools. Most people worked in the rice fields but there was also some paid employment, for example as *cidomo* drivers (communal horse cart taxis), in small shops or as government employees.

### Methods

All women in Balai Lua Daya with a live child under the age of 11 years were approached and an interview requested. A small proportion (2%) were out of the village because of trading commitments and 2 other women were too shy to be interviewed. Thus, 65 women were asked details of all children alive or dead; enquiries were also made about the mothers' knowledge, attitudes and practices relating to hygiene, breastfeeding, weaning, and also about any episodes of illness in the family over the previous two weeks. The same questions were asked of 65 mothers in Tanggung Luak.

After 2 weeks all 130 mothers were asked about any episodes of illness in the family since the last interview and how long these had lasted. This fortnightly disease review was repeated over the next 20 weeks. Diarrhoea episodes (*menceret* or *diare*) were defined as loose stools for more than 24 h. Since most women were illiterate they were unable to record disease episodes on calendars and it is possible that some disease episodes were overlooked. Certainly multiple disease episodes within one reporting period for the same child were exceptional.

Eight weeks after the start of the study, meetings were held amongst the 65 mothers in Balai Lua, the village selected for the hand-washing intervention. The women were told that diarrhoea comes from faeces getting into the mouth by way of dirty hands, contaminated food, and flies which have first landed

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on faeces. To prevent diarrhoea it was suggested that the mothers should therefore (i) wash their hands with soap before preparing food; (ii) wash their hands with soap before eating; (iii) wash their childrens' hands with soap before they eat; and (iv) wash their hands with soap as soon as possible after defaecation. Each woman was given a plastic soap dish and a bar of 'OK'® soap (the brand most readily available in the villages, costing Rp 50, equivalent to 2 UK pence). The fortnightly disease reviews continued and were used to reinforce the hygiene messages, to talk about any health issues, and to replenish the soap as necessary.

Fortnightly disease reviews also continued in Tanggung Luak (the control village). Here the women were not given soap, and information about diarrhoea acquisition was given only in response to specific questions. However, mothers were told about oral rehydration therapy and encouraged to use this to treat any childhood diarrhoea.

## Results

The survey covered 130 mothers and 315 children. The villages were similar in most indices, attitudes and hygiene practices. Many women (23%) associated dirt or poor sanitation with diarrhoea transmission and 25% thought that diarrhoea came from eating bad food. A few (2%) thought that measles was caused by poor sanitation. Maternal educational levels in the 2 villages differed somewhat (Table 1), but most women were illiterate. Childhood deaths over the previous 10 years had all been of those aged 3 years or less; child mortality rates were declining but were still about 28%. Breastfeeding was almost universal; only 3 children of 446 live births had been given formula milk from a bottle before the age of 3 months. However, solid food (mashed banana or rice porridge) was usually introduced in the first week of life. Breastfeeding usually continued until about the age of 2 years.

Mothers reported that childhood diarrhoea was commonest at the beginning of the rainy season in November.

Table 2 lists the questionnaire responses relating to hygiene before and after the intervention. All adults claimed to wash their hands with water (but not soap) after defaecation and before eating meals. About three-quarters of mothers said they rinsed their childrens' hands before they ate. Soap was rarely used but mothers knew the price and realized that it was always readily available in their village. Surprisingly, when soap was given out it was greeted with much comment, touching and smelling as if it was unfamiliar.

In the intervention village after the campaign, most women (92%) claimed to wash their hands with soap after defaecation and, although more thought soap was expensive (implying perhaps that they had now considered buying it), the proportion who considered that they had insufficient money dropped from 32% to 12%. This suggests that an attitudinal change regarding the importance of soap had been achieved.

The survey and fortnightly disease reviews provided a list of disease events in each family. There were no records of chronic diarrhoea. Each new disease episode affecting children under 11 years was classified into (i) diarrhoea and/or vomiting, typhoid,

**Table 1. Profiles of the two communities**

	Tanggung Luak	Balai Lua Daya
No. of mothers interviewed	65	65
Education		
Schools		
Primary	1	0
Middle	2	1
Secondary	1	1
Mothers with no schooling	35%	42%
Mothers with >6 years education <sup>a</sup>	3%	10%
Health		
No. of children ever bottle fed	4%	3%
Distance from health centre	300 m	200 m
No. of families using a latrine	2	2
Economic		
Approx. no. of households owning land	25%	25%
People employed or selling goods outside <i>dusun</i>		
Weavers	6	1
Teachers	7	8
Approx. no. of <i>hajis</i> <sup>b</sup>	50	30
No. of small shops or stalls	15	4

<sup>a</sup>Literate women.

<sup>b</sup>Those who had raised £2000 to visit Mecca.

**Table 2. Changes in hygiene behaviour and attitudes due to hand-washing campaign: Balai Lua Daya (intervention village) compared to Tanggung Luak (control village)**

	Tanggung Luak <sup>a</sup>		Balai Lua Daya <sup>a</sup>	
	Before	After	Before	After
Wash hands with soap after defaecation	1	3	0	92
Always wash hands before cooking	17	3	26	60
Sometimes wash hands before cooking	20	20	14	35
Rinse hands before eating	100	99	100	100
Always rinse children's hands before they eat	82	71	65	97
Soap is expensive	51	74	35	78
Not enough money to buy soap	43	51	32	12

<sup>a</sup>Figures are percentages.

etc.; (ii) other water-related disease, i.e. skin and eye infections; (iii) other communicable disease (respiratory and ear infections, measles, fever, malaria); and (iv) non-communicable disease (dizziness, toothache and one scald). The results are summarized in Tables 3-5.

## Discussion

During the short period of this study, hygiene education combined with distribution of soap appeared to induce an 89% fall in diarrhoea episodes compared to the pre-intervention phase of the study. This dramatic result must largely have been due to the very simple nature of the message and also to the intensive and personal nature of the hygiene education. Two of us (M. and J.) who were community organizers spent time discussing health issues with just 130 mothers at fortnightly intervals over 20 weeks. Whether the good effects of this campaign will be sustained once the community organizers move to other villages remains to be seen.

**Table 3. Effect of teaching hand-washing: Tanggung Luak (control village) and Balai Lua Daya (intervention village)**

Village	Survey	No. of children	No. of weeks	Disease episodes	
				Diarrhoea	Skin/eye
Tanggung Luak	Initial	179	9	36	21
	Follow-up	179	11	31	14
Balai Lua Daya	Initial	136	7	28	22
	Follow-up	136	11	5	27

**Table 4. Prevalence of diarrhoea, conjunctivitis and superficial bacterial skin disease in Tanggung Luak (control village) and Balai Lua Daya (intervention village) before and after intervention**

	Tanggung Luak	Balai Lua Daya	Total	Significance
Diarrhoea				
Initial	36	28	64	
Follow-up	31	5	36	$\chi^2=15$
Total	67	33	100	$P<0.01$
Conjunctivitis				
Initial	9	6	15	
Follow-up	6	0	6	$\chi^2=6.6$
Total	15	6	21	$P<0.05$
Skin disease <sup>a</sup>				
Initial	10	15	25	
Follow-up	8	14	22	$\chi^2=0.3$
Total	18	29	47	NS <sup>b</sup>

<sup>a</sup>Koreng.<sup>b</sup>Not significant.**Table 5. Incidence of water-related disease in Tanggung Luak (control village) and Balai Lua Daya (intervention village)**

Village	Episodes per 100 children per week		
		Diarrhoea	Skin and eye disease
Tanggung Luak	Initial	2.23	1.30
	Follow-up	1.57	0.71
	Reduction	30%	45%
Balai Lua Daya	Initial	2.94	2.31
	Follow-up	0.33	1.80
	Reduction	89%	22%

There was also a significant fall in eye disease as a result of encouraging hand-washing but the numbers of cases were too small to be conclusive. There was no significant change in the incidence of skin disease as a result of the interventions, but this is understandable:

only hand-washing was stressed, not other aspects of personal hygiene.

This dramatic fall in the incidence of childhood diarrhoea was achieved through health messages which simply encouraged people to wash their hands with soap after defaecation and before contact with food. Such simple messages seem to be appropriate for mass health education campaigns.

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