

Effect of Handwashing Agents on Bacterial Contamination

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Abstract : In order to assess the effect of handwashing agents like soap and ash on the control of bacterial contamination, the study was carried out in two villages of Rajendranagar mandal of Rangareddy district, Andhra Pradesh. Twenty households belonging to high income group and twenty households belonging to low income group having 1-2 years age children were randomly selected for the study handwash samples. Before feeding the child handwash samples after washing with different agents were collected and analysed for bacterial contamination. The study revealed that use of soap or ash for washing hands before feeding the child reduced hand contamination significantly. (*Indian J Pediatr* 1999; 66 : 7-10)

Key words : Hand washing agents; Bacterial contamination.

Hands are contaminated with pathogenic agents and therefore efforts to promote handwashing especially before feeding can reduce contamination. Studies on hygiene associated with the use of handwashing with water have shown an impact in reducing diarrhoeal rates even upto 50 per cent¹⁻³.

Micro-organisms are transmitted via fingers of children and other household objects through food. Improving hygiene is potentially one of the effective ways to reduce the spread of diarrhoea and thus washing hands with agents is important, because most episodes of diarrhoeal contamination are due to contaminated hands. As there is a need to have a thorough understanding of the level of contamination

of hands of mothers, the present study was undertaken to know the bacterial counts of handwashing of mothers using different agents before feeding the child.

METHODS AND MATERIALS

The study was conducted in two villages of Rajendranagar mandal of Rangareddy district of Andhra Pradesh, 15 kms away from Hyderabad city. Twenty households belonging to low income group (LIG) and twenty households belonging to high income group (HIG) having 1-2 year old children were randomly selected from the rural areas. Families with an income of Rs. 1500 and below per month were considered as LIG and families above Rs. 5000 as HIG using the classification given by the National Council of Applied Economic Research (1994)⁴.

Household survey was conducted in all the selected houses by interviewing the

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mothers. The data on education, occupation of family members, personal hygiene, drinking water facility, handwashing practices and excreta disposal facilities were collected.

The handwashing practices of mothers before feeding the child were observed at the houses of the selected families. Just before feeding the child, hands of mothers were wiped with sterile swab kept in 2 ml of peptone water and the swab was dipped back into peptone water. These handwashing samples were collected from all the 40 selected households and examined for total bacterial counts. Dilutions of 1 gm of the sample in quarter strength Ringer solution was plated on Mac-conkey and nutrient agar in duplicates. The non-mucoid lactose fermenting colonies were picked up and cultures purified by plate streak method. The purified cultures were identified on the basis of gram staining and specific biochemical test. Classification of

bacteria was done based on Baker's and Breech procedures⁵. T-test was applied to know the difference in HIG and LIG families with regard to bacterial contamination of hands of mothers with usage of agents.

RESULTS

The results of the socio-economic data collected from HIG families revealed that their monthly income was around Rs. 5001-8000. The parents of the children were well educated i.e., above graduation. They lived in well built homes and had toilet facility and drinking water facility at home. Seventy per cent of families had the habit of washing hands before feeding the child and their food hygiene habits were satisfactory.

In contrast to this, in the LIG families, 60 per cent of the families monthly income ranged from Rs. 1001-1500 and the rest had less than this income. Most of the parents

TABLE 1. Bacterial Contamination of Hands of Mothers in HIG and LIG Families

Agents	No	Total# bacterial counts of handwashings	't' value
Soap			
HIG	6 (30)	55 ± 32.52	0.124 ^{NS}
LIG	2 (10)	61.6 ± 70.63	
Ash			
HIG	0 (0)	NA	NA
LIG	8 (40)	219.62 ± 87.37	
Plain water			
HIG	10 (50)	529.00 ± 181.23	0.9330 ^{NS}
LIG	3 (15)	655.00 ± 351.0	
Did not wash hands			
HIG	4 (20)	972.25 ± 109.07	1.8730 ^{NS}
LIG	7 (35)	1224.0 ± 251.06	

Values in parenthesis are percentages; NA-Not applicable; NS - Not significant

Total bacterial counts of handwashings per ml. or CFU per ml

were illiterate or had only primary education. Though the source of water was same as in HIG families, none of the LIG families had their own taps at home and they were collecting water from a municipal tap located at a distance of around 20-30 mts from their houses. None of the families had toilet and sewage facility. The food hygiene habits were not very satisfactory.

The bacterial contamination of hands of mothers in HIG and LIG families is given in Table 1. Thirty per cent of mothers in HIG families used soap to wash their hands and none of HIG family mothers used ash to wash their hands before feeding the child. In LIG families 10 per cent used soap and 40 per cent used ash to wash their hand before feeding the child. From HIG families, 50 per cent of mothers used plain water to wash their hands and 20 per cent of them did not wash their hands. From LIG families, 15 per cent of mothers used plain water to wash their hands and 35 per cent of them did not wash their hands (Table 1).

Mothers of HIG families who used soap to wash their hands had total bacterial counts of 55 ± 32.52 and in LIG families it was 61.6 ± 70.63 , whereas mothers of HIG

families who used only water to wash their hands had total bacterial counts of 529 ± 189.23 and in LIG families it was 655 ± 351.0 . The total bacterial counts were high for those mothers who did not wash their hands i.e. 972.25 ± 109.07 in HIG families and 1224.6 ± 251.06 in LIG families (Table 1). These differences were not found to be significant between the two groups. The mothers who used ash to wash their hands had lower bacterial counts than the mothers who used plain water to wash their hands and the mothers who did not wash their hands had higher bacterial counts than the mothers who used soap. Mothers of HIG families who did not wash their hands before feeding the child had lower bacterial counts than mothers of LIG families. This difference was not found to be significant between the groups (Table 1). It could also be seen from table 1, that mothers of HIG and LIG families who did not wash their hands before feeding the child had higher bacterial counts compared to the mothers who used other agents to wash their hands.

Table 2 shows the effect of different handwashing agents and compares the proportion of contaminated hands of the

TABLE 2. Bacterial Contamination of Hands of Mothers with Usage of Ash or Soap

Agents	Type of families				P values against the mothers who did not wash their hands	
	HIG		LIG			
	n	%	n	%	HIG	LIG
Soap	6	30	2	10	< 0.01	< 0.01
Ash	0	0	8	40	NA	< 0.01
Water	10	50	3	15	NS	NS
Did not wash hands	4	20	7	35		

Differences between groups were not significant : Significant at 1 per cent level

NS - Not significant; NA - Not applicable.

mothers who did not wash their hands. Soap reduced the hand contamination significantly whereas the reduction of hand contamination by water alone was not significant. The proportion of positive bacterial counts was less in soap. The positive counts were high for ash and slightly higher for water compared to mothers who did not wash their hands. None of these differences were statistically significant.

DISCUSSION

The results suggested that under controlled conditions, all the locally available washing agents, i.e. ash and soap were more or less equally effective in reducing faecal coliform hand contamination. Washing hands with plain water was apparently less effective than washing with agents but nevertheless reduced contamination. Similar findings were reported by a study in Bangladesh and found that the proportion of contamination among those using soap was lower than those who did not wash their hands or who used only water, mud or ash⁶.

Handwashing after defecating or handling babies faeces, before preparing food, before feeding children or eating is crucial to reduce the transmission of diarrhoea

germs. To remove faecal contamination, hands must be washed with an agent such as soap or ash. The health education programmes could aim at increasing women's awareness regarding the need for handwashing using an appropriate agent to lessen the bacterial contamination and to protect the child from diarrhoea.

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