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## SHORT COMMUNICATION

### EFFECT OF HANDWASHING ON THE INCIDENCE OF DIARRHOEA IN A CALCUTTA SLUM

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#### Abstract

A prospective community based study was conducted to evaluate the effect of handwashing on the incidence of diarrhoeal diseases in Calcutta slums. Handwashing was implemented in one slum and the other nearby slum, without handwashing programme, served as control. The difference in the incidence of watery diarrhoea during the thirteen-month period, between the study and control groups was not significantly different. However, the incidence of dysentery in individuals above 5 years of age in the control group was significantly higher as compared to those in the study group ( $p < 0.05$ ). The results of this study indicate that handwashing with soap may reduce the incidence of dysenteric cases in the community by interruption of transmission of the pathogens from one person to the other.

*Key words:* Handwashing; Dysentery; Watery diarrhoea; *Shigellae*.

#### Introduction

Diarrhoeal diseases pose a major threat to the health of people living in developing countries, particularly where there is poverty and a poor environment. The lack of effective intervention strategies make control of this scourge difficult. Since diarrhoeal pathogens are most often spread by the faecal-oral route, the hands of people play a vital role in transmitting infection. A hospital-based study in the U.S.A. showed that nosocomial infections could be prevented by washing hands with soap and water (1). The effect of handwashing in reducing the incidence of diarrhoea in day-care centres has been reported recently by Black *et al.* (2). A study in Bangladesh on the effect of handwashing with soap showed a reduced transmission of *Shigella* infections within the families of confirmed cases (3). However, reports on the efficacy of this method when routinely used, based on long-

term prospective community studies, are few. The present study was undertaken to determine the effect of handwashing on the incidence of diarrhoeal diseases amongst slum dwellers in Calcutta.

#### Materials and methods

##### *Subjects and study area*

The study was conducted between July 1982 and July 1983 in two nearby slums with similar features. The study and control areas, both located in the eastern part of Calcutta, were about 2 kms apart. There were 370 families in each area, with a population of 1810 and 1858 respectively. Children under five years of age comprised 10.1 and 8.5% respectively of the population in the study and control areas. There was no difference between the two groups with regard to economic status, educational level and water supply sources. Most of the families in both areas did not have piped or tube well water within their premises and they had to store water

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for drinking and cooking in buckets and pitchers. The monthly family income of the families in the two areas ranged between Rs. 450.00 and Rs. 500.00. The educational level was less than primary school standard for 41 and 33% of households in the study and control areas, respectively. About six to ten families were living together in clusters of houses having mud floors and tiled or tin roofs. A family lived in only one room and used a portion of a small corridor for storing water, cooking, eating and keeping utensils. In the study areas, there was no disposal arrangement for garbage nor any sewer system. Most houses were located close to ponds which are used very often for bathing and washing. Usually, a common pit latrine was used by all families of the household cluster.

An initial survey in the two areas was conducted, and the ages, sexes, family size, socio-economic status, educational level, sanitation facilities and hygienic practices, including the use of soap, were recorded for each of the 740 families.

Handwashing was introduced in the study slum. Each family was provided with two cakes of soap every two weeks. The subjects were advised to use one cake after defaecation and the other before eating or handling food. The dimensions of the soap cakes were checked every week for evidence of use. Surprise visits to randomly selected study families were also made.

At three-month intervals, our medical and paramedical field staff met the slum dwellers to improve awareness about the importance of handwashing with soap. During these home visits adults as well as older children were told about the benefits of handwashing and its impact on diarrhoeal diseases. No posters, slides or visual materials were used. It was intended to assess the overall impact of long interval health education. Intensive health education was not possible in view of the limited resources. Families in the control slum were neither provided with soap nor given any health education.

#### *Surveillance*

Families living in the study and control areas were visited by physicians once a week to record cases of watery diarrhoea and dysentery occurring during the seven days preceding their

visit. Those with a history of loose stools with blood and mucus were classified as dysentery and those who reported only watery motions were classified as watery diarrhoea. During the initial survey mothers were asked to recall episodes of diarrhoea up to two weeks previously. Because it would have been difficult to remember the actual number of stools passed, a simple report of diarrhoea was considered sufficient. For the rest of the study, diarrhoea was defined according to criteria used by the World Health Organization: 3 or more loose stools in 24 hours. No bacteriological culture of stools was done. In both communities, diarrhoea was treated by oral rehydration salt (ORS) solutions administered by local volunteers trained in preparation and use of ORS. These volunteers also acted as depot-holders for ORS packets. They were instructed to refer cases of severe diarrhoea to the nearby Infectious Diseases Hospital.

### Results

Table I shows the results of the initial study. Very few people actually used soap after defaecation (15.4% – 16.2%) or before handling food (1.1% – 4.4%). However, it was observed that in almost every household soap

TABLE I — SOME FINDINGS FROM THE INITIAL SURVEY

Variables	Groups	
	Study	Control
No. of families	370	370
Population :		
All ages	1810(100%)	1858(100%)
< 5 years	183(10.1%)	158(8.5%)
Average number of persons per family	4.9	5.0
Illiteracy rate (%)	41.0	33.0
Existing habit of using soap (%)		
–after defaecation	16.2	15.4
–before handling and eating food	1.1	4.4
Drinking tap and tubewell water (%)	100.0	100.0
Diarrhoeal incidence (%)*	1.3	1.3

\* During two previous weeks.

TABLE II – EFFECT OF HANDWASHING ON INCIDENCE OF WATERY DIARRHOEA AND DYSENTERY

Clinical condition	Age < 5 years		Age ≥ 5 years	
	Study group	Control group	Study group	Control group
Watery diarrhoea	51 (27.9)	39 (24.7)	134 (8.2)	127 (7.5)
Dysentery	25 (13.7)	32 (20.3)	28* (1.7)	49* (2.9)

Figures in parentheses indicate percentages (n=100%).

\* Difference statistically significant at 5% level ( $\chi^2=4.965$ )

was available and was being used for bathing and washing clothes. The incidence of diarrhoea was similar in both groups.

Table II shows the attack rates for acute watery diarrhoea and dysentery amongst two sub-groups (< 5 years and ≥ 5 years) in the study and control groups. A statistically significant difference in the incidence of watery diarrhoea and dysentery was not observed in those below 5 years of age, as well as for the incidence of watery diarrhoea amongst patients aged above 5. However, a significant difference ( $p < 0.05$ ) was observed in the incidence of dysentery cases amongst those over 5 years old in the study and the control groups.

### Discussion

In the present study the final incidence of diarrhoea in both the groups during the 13-month period were found to be more or less comparable.

In contrast to the studies conducted in day-care centres (2,4,5) this did not demonstrate any difference in the overall incidence of watery diarrhoea cases between the study and control groups.

However, the exercise of handwashing with soap appeared to be an effective measure in reduction of dysentery cases among those aged over five years. This finding further corroborates the results of a Bangladesh study (3) which demonstrated reduction in the occurrence of secondary clinical cases of shigellosis in the study group of houses with index shigellosis cases as compared to controls. A reduction in dysentery cases was not observed in this study in children aged less than 5 since handwashing practices could not be effectively enforced in this younger group. In spite of the initial higher usage of soap before handling (and eating) food (Table I) in the control group, the incidence of dysentery was higher in them as compared to subjects of the study group. This study has shown that a simple measure like washing the hands with soap was effective in reducing dysentery, but not watery diarrhoea cases in a metropolitan slum population.

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