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Diarrhoea in Rural Children – Some Environmental Correlates

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Abstract

The study was conducted in Banda and Jhansi districts to evaluate the health benefits of Swajal project by comparing a set of indicators with baseline and first repeat study in the State of Uttar Pradesh, India. The 5 Swajal and 5 Non-Swajal villages were selected. Non-Swajal villages were at 5 km distant from Swajal villages. The households were systematically selected. The baseline study was conducted in 2000 and first repeat study was conducted 2002 in the same villages.

The incidence of diarrhoea was 13.6% and 9.8% in Swajal and Non-swajal villages in baseline respectively which decreased to 7.4% and 9% in the repeat study. The incidence of diarrhoea was 33% significantly lower among the respondents of Swajal villages who had practice of storing water in container than Non-swajal villages (OR=0.67, 95%CI=0.23-0.79, p=0.001). The incidence was also lower who had practice of covering water container and other health & hygiene practices and knowledge about diarrhoea & its causes.

It can be concluded that low-cost strategies can greatly improve the microbial quality of water as well as hand washing & sanitation and result in diarrhoeal disease morbidity reductions.

Keywords: Diarrhoea, Incidence, Children, Intervention

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1. Introduction

India is home to the largest number of children in the world, significantly larger than the number in China (World Prospects, 2008). The country has 20% of the 0-4 years' child population of the world. The number of live births in the country is estimated to be 27 million (UNICEF, 2010) which again constitutes 20% of the total number of live births in the world. Although the number of births is expected to gradually go down in the coming years, the relative load of India in the world in terms of child population is not going to lessen significantly for a long time to come. Therefore, the progress that India makes towards achieving the Millennium Development Goals (MDGs) and targets related to children will continue to determine the progress that the world will make towards achieving the MDGs.

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The combined effects of inadequate sanitation, unsafe water supply and poor personal hygiene are responsible for 88 percent of childhood deaths from diarrhoea. Poor sanitation and unsafe drinking water cause intestinal worm infections, which lead to malnutrition, anaemia and retarded growth among children. Sanitation is one of the biggest challenges in India as in 2008, only 31 percent (UNICEF and WHO, 2010) of the population in the country benefitted from improved sanitation.

Uttar Pradesh (UP) Rural Water Supply and Environmental Sanitation Project was commonly called "Swajal" which signifies "one's own water" in Hindi and had two main objectives: (i) deliver sustainable health and hygiene benefits to the rural population through improvements in water supply and environmental sanitation services which will increase rural incomes through time savings and income opportunities for women, test an alternative to the current supply driven service delivery mechanism and promote sanitation and gender awareness; and (ii) promote the long-term sustainability of the rural water supply and sanitation sector by providing assistance to Government of Uttar Pradesh (GOUP) to identify and implement an appropriate policy framework and strategic plan (World Bank, 2003).

The objective of this study was to evaluate the health benefits of Swajal project by comparing a set of indicators with baseline and first repeat study in the State of Uttar Pradesh, India.

2. Material and Methods

This study was conducted in the two districts Banda and Jhansi of Uttar Pradesh. The 5 Swajal villages and 5 Non-Swajal villages were selected. Non-Swajal villages were at 5 km distant from Swajal villages. The households were systematically selected. The baseline study was conducted in 2000 and first repeat study was conducted 2002 in the same villages. In the baseline study, a total of 186 households and 3307 children under 5 years of age were interviewed and assessed for diarrhoea in Swajal villages whereas 173 households and 302 children under 5 were covered in the Non-Swajal villages. A repeat study in both Swajal villages was conducted in 2002 in which only 189 households and 323 children were covered in Swajal villages as against 165 households and 302 children in Non-Swajal villages (Table-1).

A detailed questionnaire was prepared with the help of experts in the field and was pilot tested before final data collection. A team of social scientist was made and they visited each households and interviewed the head of the household or elder person in the family. The data pertaining to environmental conditions, water handling and sanitation practices as well as incidence of diarrhoea in children was collected from the selected households.

The results are presented in mean±SD and percentages. The odds ratio (OR) and its 95% confidence interval (CI) was calculated to find the change in the study parameters from baseline to repeat between Swajal and Non-swajal villages. The multivariate binary logistic regression analysis was used to find the significant factors associated with incidence of diarrhoea. The p-value<0.05 was considered significant. All the analysis was carried out by using SPSS 16.0 version.

3. Results

The incidence of diarhoea was 13.6% and 9.8% in Swajal and Non-swajal villages in baseline respectively which decreased to 7.4% and 9% in the repeat study respectively (Table-1).

The incidence of diarrhoea was 33% significantly lower among the respondents of Swajal villages who had practice of storing water in container than Non-swajal villages (OR=0.67, 95%CI=0.23-0.79, p=0.001). However, the incidence of diarrhoea was 42% significantly lower among the respondents of Swajal villages who had practice of covering water container than Non-swajal villages (OR=0.58, 95%CI=0.22-0.89, p=0.001). There was significant (p=0.001) association between incidence of diarrhoea with other health & hygiene practices and knowledge about diarrhoea & its causes (Table-2).

4. Discussion

The water, sanitation and hygiene sector-based programme component supports the implementation of the national rural water supply strategy. It will contribute to increasing capacities for such implementation, at all levels, particularly the planning, management and utilization of improved access to clean water and adequate sanitation services in rural areas and informal settlements, and in primary schools and health institutions.

Hand washing with soap at key times has been shown to reduce diarrhoeal disease and acute respiratory infection (Rabie & Curtis 2006; Aiello et al. 2008). Alongside adequate sanitation, hand washing with soap after stool contact is an important barrier to the faecal–oral spread of diarrhoea because it prevents pathogens from reaching the domestic environment and hence their subsequent ingestion.

In the present study, the incidence of diarrhoea was lower among those who had proper hand washing practices. In a systematic review of number of studies (Matthew et al, 2014), 40% reduction in the risk of diarrhoea from the promotion of hand washing with soap (RR 0.60, 95% CI 0.53–0.68) and a 24% reduction in the risk of diarrhoea for general hygiene education alone (RR 0.76, 95% CI 0.67–0.86) was reported. The promotion of hand washing (with provision of soap or where soap was used) was thus associated with greater reduction of diarrhoea than broader hygiene education ($p = 0.01$).

Hygiene practices have been proven to reduce diarrhoea rates by 30–40 percent (Curtis and Cairncross, 2003; Fewtrell et al, 2005). This level of reduction can be achieved through a comprehensive approach—promoting improvements in key hygiene practices (hand washing, treatment and safe storage of drinking water, safe disposal of feces, and food hygiene); improving access to safe water and sanitation technologies and products; and facilitating or supporting an enabling environment (improved policies, community organization, institutional strengthening, and public-private partnerships).

Hand washing prevents diarrhoea effectively when done properly and at critical times. A meta-analysis of hand washing studies conducted in developing countries concluded that hand washing can reduce the risk of diarrhoea in the general population by 42–44 percent (Luby et al, 2011). A recent observational study in Bangladesh found that diarrhoea occurred less often in households where residents washed at least one hand after defecation and before preparing food. The study suggested that washing hands before preparing food is particularly

important to prevent diarrhoea in children (Luby et al, 2011). The result of the present study is similar to the above mentioned study.

In the present study, the safe storage of drinking water was also found to be significantly associated with the incidence of diarrhoea. Similar finding had been shown in a meta analysis in which the safe storage of drinking water in the household have been shown to reduce the risk of diarrhoeal disease by 30–40 percent (Clasen et al, 2006).

5. Conclusion

Low-cost strategies can greatly improve the microbial quality of water as well as hand washing & sanitation and result in diarrhoeal disease morbidity reductions.

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Appendix

Table-1: Incidence of diarrhoea in the population surveyed

	Swajal		Non-swajal	
	Baseline	**Repeat**	**Baseline**	**Repeat**
Total no. of households	2523	2826	3830	3789
No. of households surveyed	186	159	173	165
No. of children assessed	307	323	302	321
Incidence of diarrhoea no. (%)	41 (13.6)	23 (7.4)	29 (9.8)	28 (9.0)

Table-2: Factors associated with incidence of diarrhoea

Health and Hygiene Practices	**Incidence of diarrhoea**		**Adjusted OR (95%CI), p-value[1]**
	Swajal	**Non-swajal**	
Practice of storing water in container	7.5	8.6	0.67 (0.23-0.79), 0.001*
Practice of covering water container	7.6	8.5	0.58 (0.22-0.89), 0.001*
Practice of taking water hygienically from the container	4.6	8.7	0.34 (0.11-0.69), 0.001*
Practice of daily cleaning of water container	7.3	7.7	0.89 (0.56-0.97), 0.001*
Practice of using private latrines	7.0	7.5	0.87 (0.46-0.87), 0.001*
Practice of hand washing before meals	5.0	7.9	0.68 (0.36-0.91), 0.001*
Practice of hand washing after defecation	6.1	6.9	0.79 (0.26-0.84), 0.001*
Practice of hand washing after cleaning infant's faces	7.3	7.7	0.81 (0.34-0.72), 0.001*
Knowledge about diarrhoea	7.3	7.7	0.87 (0.45-0.93), 0.001*
Knowledge about causes of diarrhoea	5.7	7.9	0.47 (0.19-0.85), 0.001*

[1]Multivariate binary logistic regression, OR-Odds ratio, CI-Confidence interval, *Significant