

participatory extension were compared: Model 1 represented a "limited model" working through community meetings organized by tubewell caretakers; and Model 2 represented an "expanded model" working through caretaker groups plus school programmes, child to child activities, and key community persons. The baseline and final surveys took place in May 1993 and May 1994 respectively. Baseline and final cross-sectional survey data were compared in the two intervention areas and two contiguous control areas. Subjects for this analysis were from 720 households in 120 tubewell-user areas (180 households in each of the 4 study areas), respondents (mothers), and other family members as reported by the respondents. The main outcome measures were observed, demonstrated, and reported hygiene behaviours of the respondent and other family members. Reported two-week and 24-hour diarrhoea prevalence rates in children of less than 5 years were also used.

Results: The baseline survey of the four study areas showed that there was initially no significant difference between the intervention and the control areas. Access to hygienic latrines and latrine use was poor, knowledge of the causes of diarrhoea and of prevention was low, and hand-washing behaviour was poor. Environmental contamination with faeces and diarrhoea rates in children of less than 5 years were high. The final survey, after nine months of SAFE intervention, showed dramatic effects of the SAFE Pilot Project in the intervention areas on the improvement in latrine use, water use, hand-washing behaviour, and environmental sanitation. There was little change in the control areas. Two-week and 24-hour diarrhoea prevalence rates in children below 5 years of age decreased by almost two-thirds in the intervention areas compared to the control areas.

Conclusions: These results show that the SAFE approach to hygiene behaviour change can have significant beneficial effects on knowledge and behaviour, as well as on risk of diarrhoea in children. Where prevention of diarrhoea is the concern, programmes and policies should focus on the identification of locally important risk behaviours and locally developed, and locally appropriate, interventions, rather than general messages and hardware targets.

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Factors Influencing Birth Weight in a Rural Community of Bangladesh

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Objective: Describe the characteristics of birth weights of children in rural Bangladesh.

Methods: A cohort of newborn children with respiratory infections and diarrhoea was studied. A census was conducted in 10 villages of Mirzapur, and over 2,200 prospective mothers were listed. Pregnant women were identified and followed up by a female health worker. Women were encouraged to have an antenatal check-up and hospital deliveries. Home deliveries were reported either by the traditional birth attendant or family members. A group of 288 children was enrolled at birth. Birth weights were measured with a Salter scale and recorded from 280 newborns. Most weights (71%) were recorded within 36 hours of birth.

Results: Forty-one percent of the newborns had weight below 2.5 kg. Weights taken at different intervals after birth varied. The mean weight was 2.84 kg (\pm SD 0.50) for those taken in less than 1 hour of birth. Averages of those recorded within 1-24 hour(s) were: 2.47 kg (\pm SD 0.44), and 2.31 kg (\pm SD 0.41) for the time interval between 24 and 36 hours. There was a significant difference ($p < 0.04$) in the mean weights between male (2.6 kg \pm SD 0.5) and female infants (2.4 kg \pm SD 0.5). A highly significant difference ($p < 0.003$) was also observed in respect of birth weights of children and years of schooling of mothers. The average birth weight of infants whose mothers had 6 or more years of schooling was higher (mean 2.83 kg \pm SD 0.5) than those with 5 or less years of schooling (mean 2.48 kg \pm SD 0.5). The difference in the birth weights of infants of mothers with no schooling compared to those with less than 5 years of schooling was not significant. Infants born before full term had significantly ($p < 0.001$) lower birth weights than those born at full term.

Conclusions: In underprivileged communities, many children are born with low birth weights. Except births in hospitals, however, very few studies describing birth weight in Bangladesh have been carried out. Findings of this

study suggest that low birth weight is still a problem, and that lack of mothers' education and spontaneous premature delivery are associated with low birth weight in rural Bangladesh.



Effects of Age, Duration of Illness and Infecting Species on the Pathology of Fatal Childhood Shigellosis

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Objective: Understand the pathogenesis of the complications and the pathophysiologic mechanisms involved in the persistence of the diarrhoeal illness, and determine the severity of colitis associated with infection due to different species of *Shigella*, on the basis of results from the recent series of autopsies.

Methods: At the ICDDR,B's Dhaka-based hospital, the Clinical Research and Service Centre, over 100,000 diarrhoea patients are seen annually. At the histopathology laboratory, autopsies are conducted on a sub-sample of patients who die in the hospital.

Results: Infants with infection due to *Shigella flexneri* more often presented with watery stool and bacteraemia than did the older children. Large areas of deep ulceration of the colonic mucosa and even ulceration involving the entire colonic mucosa were common in infantile *S. flexneri* infection. Hypoproteinaemia and bacteraemia in such cases may be the consequences of exudation of proteins through the denuded colonic mucosa and loss of the protective mucosal barrier. Cases with a prolonged course of diarrhoeal illness were found to have persistent mucosal abnormalities, including large areas of deep ulceration of the colonic mucosa. In contrast to *S. flexneri* infection, *S. dysenteriae* type 1 infection was generally associated with higher instances of shock, leukocytosis, azotaemia, severe hypoproteinaemia, intestinal obstruction associated with transmural inflammation of colon, and disseminated intravascular coagulation. They also had significantly higher frequencies of pseudomembranous inflammation of the terminal ileum and colon, severe necrotizing haemorrhagic colitis, microvascular thrombosis of the mucosa and submucosa of colon, and glomerular capillary thrombosis. An association of infantile *S. dysenteriae* 1 infection with severe necrotizing haemorrhagic colitis, leukaemoid reaction, and development of glomerular capillary thrombosis with or without haemolytic-uraemic syndrome was apparent.

Conclusions: A routine programme of autopsies helps clinicians better understand the underlying complications associated with fatal cases of diarrhoeal illnesses.

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Awareness of Transmission and Prevention of Sexually-Transmitted Diseases Among Rural Women in Bangladesh

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Objective: Study the awareness of sexually-transmitted diseases (STDs) among rural women and family planning field workers.

Methods: The MCH-FP Extension Project of ICDDR,B works with the Government of Bangladesh, conducting operations research to improve health and family planning service-delivery. A sample of over 6,000 married women of reproductive age in three project sites was surveyed during 1994 to examine their awareness of STDs. Both bivariate