



## 2 Community Based Studies

### 2. Community Based Studies

#### 2.1 Acute Lower Respiratory Tract Infection (ALRI) and Diarrhoea in rural children below two years in relation to feeding practices with particular reference to breast feeding: A community based study.

*Investigator :*

S.K. Mondal

Acute lower respiratory tract infection (ALRI) and Diarrhoea are two leading causes of mortality and morbidity in children below five years of age in the developing countries. There is a lack of community-based information on the disease burden caused by different pathogens responsible for causing ALRI, and the epidemiological information regarding their magnitude in the community is also scanty. Breast feeding, particularly exclusive breastfeeding in infants up to 6 months and complementary feeding along with proper weaning are known to protect infants from diarrhoea as well as ALRI. However there is very little information regarding extent of exclusive breast feeding in children <6months / complementary feeding as well as weaning feeds given to children. This community based study was undertaken with the objective to know the prevalence of ARI and Diarrhoea in rural children, to see the impact of exclusive breast feeding / weaning in ALRI and Diarrhoea.

The study has been initiated in 11 villages of Kalikapur Gram Panchayet 1 and 2 area of Sonarpur block of south 24 Pargana District, in a population of 29000 approximate.

A baseline demography of the families have been done and are being entered in computer. A module on ARI for health personnel was prepared in local language. West Bengal Government health staffs and NICED field workers were given one

day orientation training on ARI and Breastfeeding. In turn they trained Voluntary Health Workers under close supervision of investigators. Newborn infants are being enlisted for weekly follow up. Anthropometric measurements of infants have been started at the subcentres.

So far 901 infants have been identified and enlisted, of which 5 children died of ALRI, parents of 10 babies left study area, 6 parents did not co-operate.

Anthropometrical measurements of infants have been continuing at the subcentres. Till March'05 769 Diarrhoea and 854 ALRI cases were recorded. Overall incidence of Diarrhoea and ALRI was 1.0 and 1.1 episodes respectively.

#### 2.2 An operational study on effect of zinc supplementation on reduction of diarrhoeal morbidity amongst rural children (In collaboration with Health Department, Government of West Bengal)

*Investigator:*

D.N. Gupta

Repeated attacks of diarrhoea are commonly associated with malnutrition. Almost all malnourished children suffer from both macronutrient and micronutrient deficiency which leads to reduce immune function and increase morbidity from infectious disease including diarrhoea. Beneficial effect following zinc supplementation has been observed by different workers in their studies. Present study aims to determine the role of weekly zinc supplementation on reduction of diarrhoeal morbidity during supplementation and post supplementation period amongst rural under five children, as well as to find out any constraints (if any) of zinc supplementation at the community level.



The study was undertaken in the new rural field area in south 24 Parganas which is about 35 Km away from the Institute. Approximate population of the area was 28000 spread over 11 villages under 2 Gram Panchayet. Health care of the area was provided by four Sub Centers. A total of 1878 children aged between 6-48 months were initially identified for inclusion into the study. Children were randomly divided into two groups employing group randomization where 30 volunteers were considered as 30 groups. Number of children in the two groups was 943 and 935 respectively. One hundred sixty six children were dropped out and finally 1712 children were followed up during the entire period of study, of them 854 children received zinc and 858 children received placebo respectively. Zinc and placebo syrup supplementation was started from month of May 2003 and continued upto October 2003. Both the syrups were in identical sealed cap containers with identical colour and taste. Weekly Surveillance for detection of diarrhoea was also started from month of May 2003 and was continued up to April 2004. After syrup administration, history of vomiting was noted in 2.9% and 1.6% of the study and control children respectively. Baseline information of the study children of two groups are given in Table 2.2.1.

During May 2003 to April 2004, a total of 1438 diarrhoeal episodes occurred in 846 children of which 648 episodes occurred during supplementation period May 03 to October 03 and the remaining 790 episodes occurred during follow up period November 03 to April 04. During this period 80534 weekly visits was made giving 1548.73-child year of observation. Fig. 2.2.1 shows incidence of diarrhoea during supplemented and follow up period in two groups. During supplementation period incidence of diarrhoea in zinc and placebo group was 0.72 and 0.96 ep./ch./yr. [ $P < 0.001$ ; (RR 0.74, 95% CI 0.64-0.87)]. Significant difference in incidence was also observed during follow up period [0.95 and 1.10 ep./ch./yr ( $P < 0.05$ )] but less protective effect was noted (RR 0.86, 95% CI 0.75-0.99).

Children in the zinc group below 2 years had significantly less incidence of diarrhoea during both supplemented and post supplemented (0.87 and 1.30) as compared to placebo (1.30 and 1.75) respectively [(RR.0.67, 95% CI 0.53-0.85) and (RR.0.74, 95% CI 0.57-0.96)].

Significant reduction in the incidence on invasive diarrhoea was seen compared to watery episodes (Fig. 2.2.2 /3).

*Prof. N.K.Ganguly, Director General, ICMR, signing Grant in Aid documents of JICA*



**Table 2.2.1 Baseline information of study children**

Number of children (6-48 months) initially identified: 1878

Parameter	Study child		
	Gr. A	Gr. B	T
<b>Number</b>	854	858	1712
<b>Sex:</b>			
Female	438(49.9)	440(50.1)	878(51.3)
Male	416(49.9)	418(50.1)	834(48.7)
<b>Religion:</b>			
Hindu	634(49.3)	651(50.7)	1285(75.1)
Muslim	220(51.5)	207(48.5)	427(24.9)
<b>Housing:</b>			
Permanent	197(46.9)	223(53.1)	420(24.5)
Non-permanent	657(50.8)	635(49.1)	1292(75.5)
<b>Latrine:</b>			
Sanitary	565(48.8)	592(51.2)	1157(67.6)
Non-sanitary	289(52.1)	266(47.9)	555(32.4)
<b>Per capita income (Rs.):</b>			
=500	715(50.9)	689(49.1)	1404(82.0)
>500	139(45.1)	169(54.9)	308(18.0)
<b>Parents Education:</b>			
Literate Father	627(48.5)	665(51.5)	1292(75.5)
Illiterate Father	227(54.0)	193(45.9)	420(24.5)
Literate Mother	529(48.3)	567(51.7)	1096(64.0)
Illiterate Mother	325(52.7)	291(47.2)	616(36.0)

Fig. 2.2.4 shows incidence of diarrhoea at two month interval in both the groups. The figure indicates an increase in risk difference during supplemented period but gradual decline of the same was noted during post supplemented period.

Risk of development of multiple episodes (= 2) was significantly less in the children received zinc syrup shown in Fig. 2.2.5.



Evaluation to find out any constraints was started from June 2003. More than 30% of the study children were evaluated every two months interval by NICED team as well as Government health staff. NICED team as well as Government health staff evaluated a total of 1121 and 911 children respectively shown in Table-2.2.2

Zinc supplementation is effective in reduction of diarrhoeal morbidity particularly among children below 2 years of age. Supplemented children had less risk of development of multiple episodes

### 2.3 Epidemiology of typhoid fever in a rural and urban slum community of West Bengal

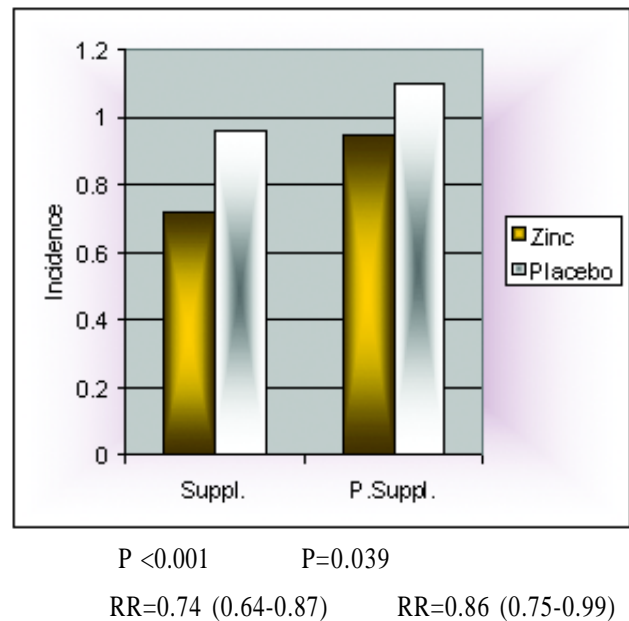
*Investigator:*

S. Ghosh

The study was initiated to know the magnitude of problem due to typhoid fever in rural community of West Bengal. Age specific incidence may indicate appropriate age for initiation of typhoid vaccine if it is included at National Immunization Schedule. Drug sensitivity pattern of circulating strains of *Salmonella enterica serover typhi* in the community may help the doctors for rational use of antibiotic for treatment of typhoid fever.



*Dr. S. K. Bhattacharya, Director in discussion with Foreign delegates*

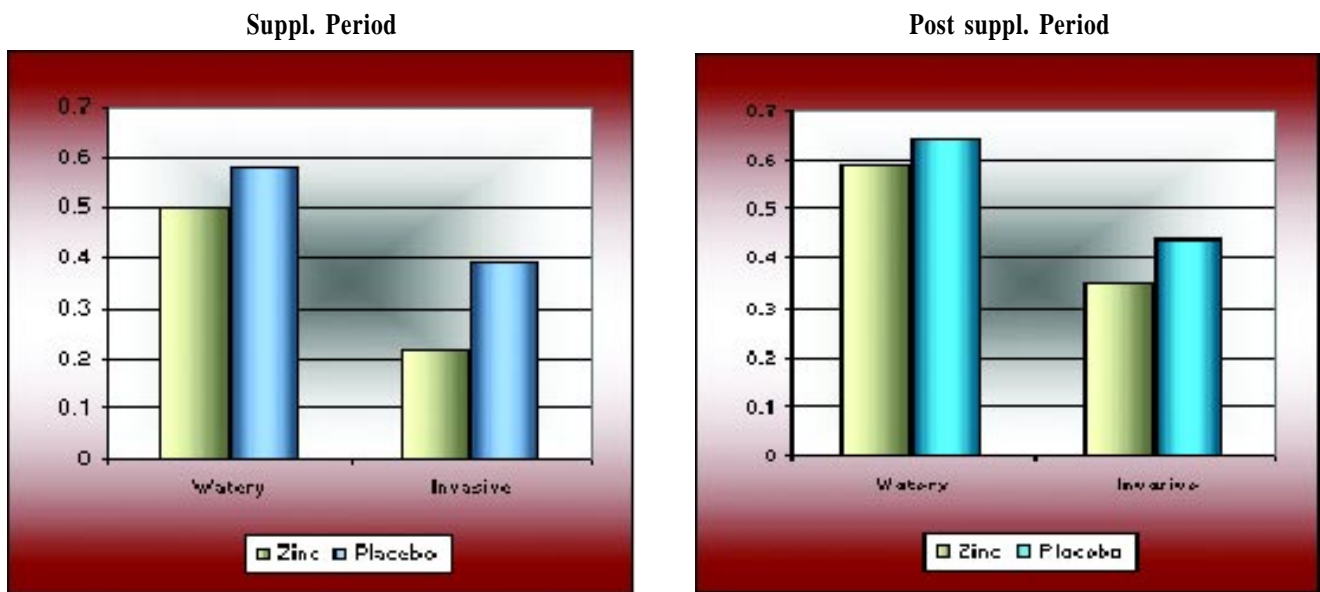


**Fig. 2.2.1** Incidence of diarrhoea in both groups during supplemented and follow up period.

There is a total population about 29,000 living in 5967 families in 11 villages. Only 30.4% families live in permanent (Pucca) houses. Tube well is the main source of drinking water and 30% households use tap water. Open field defecation is common (50%) in that population. Majority of the families fall within the income group of  $\leq$  Rs. 2000/month. However, over all literacy rate is 72.9%.

Since April 2003 up to 2005, a total of 459 blood samples were collected of which 20 (4.4%) were positive for *Salmonella typhi*.

Duration of fever at the time of collection of blood samples from 20 bacteriologically positive fever cases were of < 7 days in 12 cases, 7 to 14 days in 6 cases and > 14 days in 2 cases. Among the 20 culture positive typhoid cases 10 patients received antimicrobials. Anorexia, headache and pain in abdomen were predominant features.



P=0.145, RR 0.87  
95%CI 0.74-1.05

P=0.404, RR 0.93  
95%CI 0.78-1.11

Fig. 2.2.2 / 3. Incidence of types of diarrhoea in supplemented and non-supplemented groups during the period of supplementation and post supplementation

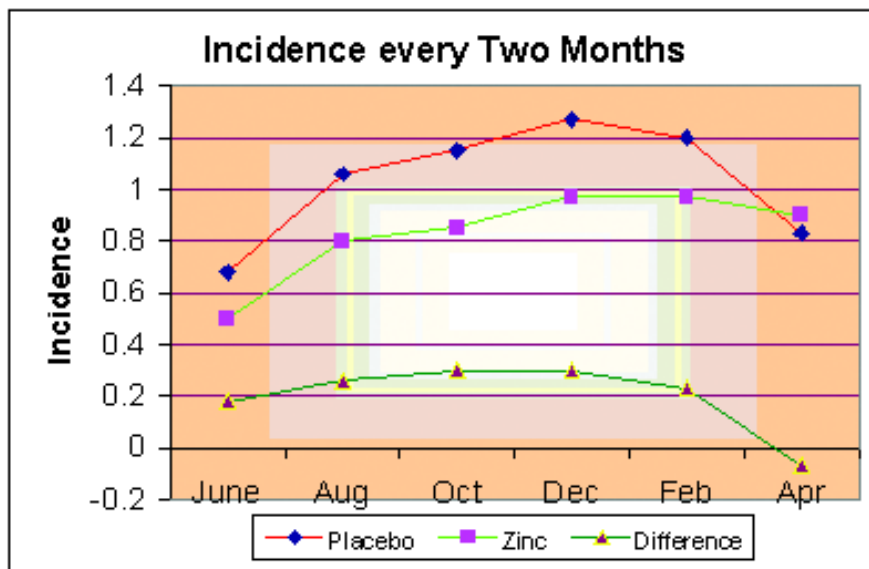
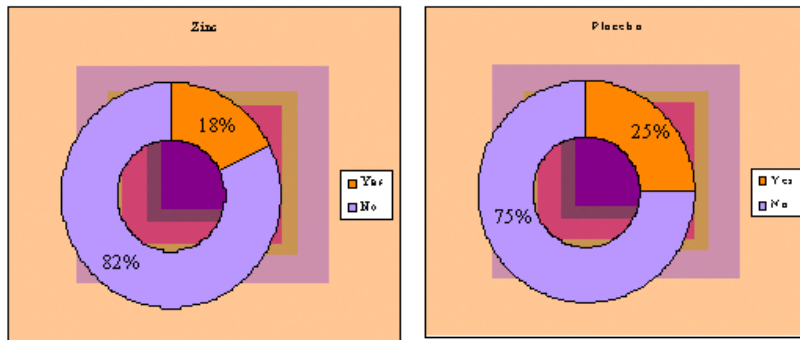


Fig. 2.2.4 Incidence of diarrhoea during study period.





P <0.001

RR 0.72, 95% CI 0.59-0.86

**Fig. 2.2.5** Impact of zinc supplementation on development of multiple episodes of diarrhoea

*Salmonella typhi* strains isolated from blood culture were resistant to chloramphenicol, ampicillin, trimethoprim, cotrimoxazole, furazolidone and amoxicillin. All the strains were sensitive to tetracycline, gentamycin, norfloxacin, pefloxacin, cefotaxime and amikacin.

#### 2.4 Identifying environmental risk factors for endemic diarrhoeal diseases in West Bengal, India: a remote sensing - geographic information system (GIS) approach

Investigator:

A. Palit

The study has been undertaken to generate Geo-environmental database (land use, land cover, water bodies, proximity of settlements to water bodies etc.) of selected foci using remote sensing and GIS technology, macro-stratify the “geo-environmental factors” by retrospective RS-GIS analysis in relation to incidences in those foci and assess the “feasibility” of identifying diarrhoeogenic factors with reference to water bodies, water supply structure, human habitations etc. and develop a

RS-GIS model to visualize the dynamics of transmission defining macro-ecosystem of pathogens in relation to incidences and seasonal variability.

Data of acute diarrhoeal disease incidences in Kolkata and its adjoining areas with special reference to cholera and shigellosis for two years (2001 and 2002) has been taken into account as per objectives. Disease sur-

**Table 2.2.2**

Number of houses evaluated by

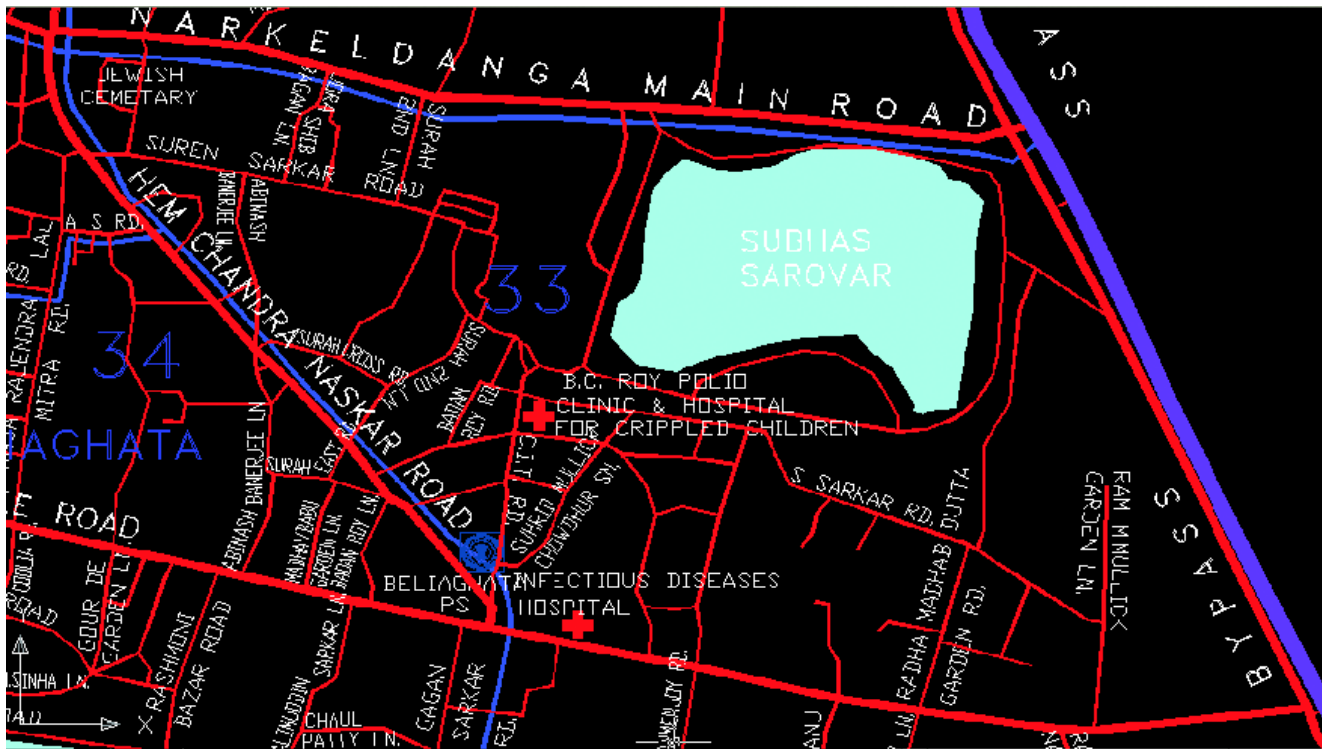
Parameter	NICED	WBHS	Total
	(N=1121)	(N=911)	(N=2032)
<b>House visited by VHW</b>			
Regular	84.5	85.0	84.7
<b>Recognition of VHW by family</b>	97.6	99.2	98.3
<b>Administration of syrup</b>			
Administered	98.5	97.5	98.0
<b>Method of administration</b>			
Method followed	97.8	95.3	96.7
<b>Mother’s Awareness about benefit of syrup</b>			
Aware	83.7	91.1	87.0
<b>Knowledge about specific benefit</b>			
Knowledge present of aware mothers	95.3	95.1	95.2
<b>Syrup administration in diarrhoea week</b>	(n=83)	(n=33)	(n=116)
Administered	74.5	75.7	75.0



veillance data (based on records of Infectious Disease hospital, Kolkata, Institutional surveillance and Directorate of Health Services records) are being analysed to identify particular foci of epidemic outbreaks as well as of endemic ones in and around Kolkata. Baseline ecological data on temperature, humidity, surface water temperature of water bodies, land covers etc. are being collected from meteorological office, Kolkata. The type of human habitations in relation to water resources, water bodies, drinking water supply structures etc. are in the process of identification in some foci for ground truth evaluation.

Formats have been designed to record drinking water epidemiology along with its microbiological characteristics (water quality testing, monitoring etc.) at different sample locations in preselected foci in relation to environmental and land cover variables.

Retrospective satellite data of IRS ID LISS III and LISS IV are in the process of identification and primary classification for mapping out the images of Kolkata as well as some of its worst diarrhea affected foci based on the disease surveillance data.



Classified Areas of Primarily Identified FOCI in Kolkata (East)

