

13 Epidemic Investigations

13.1 Investigation of acute diarrhoeal diseases at Tripura

Investigators :

D.N. Gupta, S.K. Mondal, B.L. Sarkar

At the request of the Director Health services, Government of Tripura a team consisting of Dr.D.N.Gupta Deputy Director, Dr.S.K.Mondal Deputy Director and Dr.B.L.Sarkar Assistant Director of the National Institute of cholera and Enteric Diseases, Kolkata investigated the reported outbreak of acute diarrhoeal diseases at Dhalai and North Tripura district of Tripura state during 28th June to 2nd July 2004. The objectives of the investigation were i) to determine the extent of the outbreak, ii) to find out its causative agent and other epidemiological factors including mode of spread and iii) to suggest the control measures.

The population of Dhalai district is 3,34,175 and that of North Tripura district is 6,90,655. The affected area is situated approximately 160 - 170 km away from the state capital Agartala. The area is remote hilly region and difficult to approach easily.

Information for this investigation was collected from 3 PHCs namely Manu, Chamanu and Anandabazar Sub. Divisional Hospitals of North Tripura district namely Chailangta and Kanchanpur. However admission data of the Kanchanpur S.D.H. showed that the catchment area of this hospital was not affected. The distance of the affected pockets are 6-30 km apart from the Health facility and mainly approachable by foot.

During the period from April 15 to June 30, 2004, a total of 6261 diarrhoea cases were reported from Manu, Chamanu,

Chailangta and Anandabazar area amongst 33355 population at risk. (Table-1). Of total 43 deaths, 35 (81.3%) were domiciliary and 8 (18.6%) were hospitalized. Hospital death rate was 4.6 /1000, whereas Domiciliary death rate was 7.7 /1000.

The fig. 13.1.1 Shows week-wise admission of cases in Manu

Table 13.1.1 Distribution of diarrhoea cases in different places

Area	Population	Case	Attack Rate (%)	Death	C.F.R./ 1000
AB PHC	7395	1888	25.5	1	0.53
Manu PHC	1449	1156	79.8	13	11.2
Chamanu PHC	21724	2709	12.5	22	8.1
Chailangta	2787	508	18.2	2	3.9
Total	33355	6261	18.8	43	6.9



Water collection.



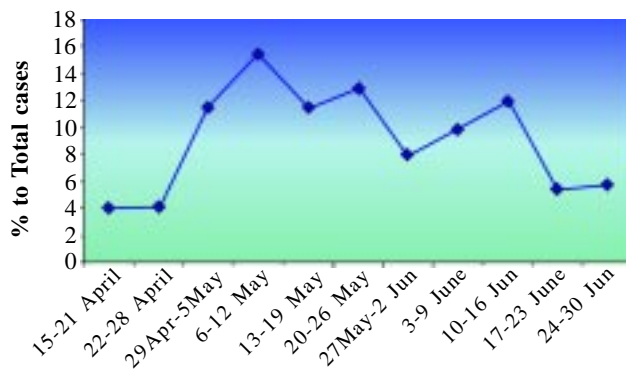


Fig. 13.1.1. Week wise hospitalized diarrhoea cases in Dholai and North Tripura Districts (n=1267)

PHC, Chamanu PHC, Chailangta SDH and Anandabazaar PHC. Case admission was maximum between April 29 to May 19, 2004. Cases occurred amongst all ages and sexes. Majority of the admitted cases (61.4%) were in adults aged 15 yrs and above. All sexes are equally affected.

Ten rectal swabs were collected from acute phase of hospitalized diarrhoea cases in Cary and Blair's transport media of which 4 were from Manu PHC, 3 from Chamanu PHC, 1 from Chailangta SDH and 2 from Anandabazaar PHC. The samples were processed bacteriologically for detection of enteropathogens using standard laboratory technique at the reference center in Indira Gandhi Memorial Hospital at Agartala. Five water samples were also collected from the affected areas of which 2 were from cherra and 2 were from shallow well and 1 from pond.

Vibrio cholerae O1 biotype ElTor, serotype Ogawa was obtained as a sole pathogen from 4 (40%) of 10 stool samples cultured. The same pathogen could be recovered from 1 of 5 water samples. The positive water sample was taken from open well, which was used as drinking water source in Manikpur Jagannath temple campus under Chamanu PHC. All the isolated strains were sensitive to Tetracycline, Doxycycline, Norfloxacin, Ciprofloxacin, Chloramphenicol, and

Azithromycin but uniformly resistant to Erythromycin, Furazolidone and Trimethoprim-sulphamethoxazole.

Clinically all the cases had watery diarrhoea with some to severe dehydration, 80% had history of vomiting. Abdominal pain was present in 70% of the cases and 50% had history of fever. Cases were managed with either ORS or IV fluid according to the degree of dehydration. However several antibiotics were used either singly or in combination and this included Amikacin, Gentamycin, Tetracycline and Chloramphenicol.

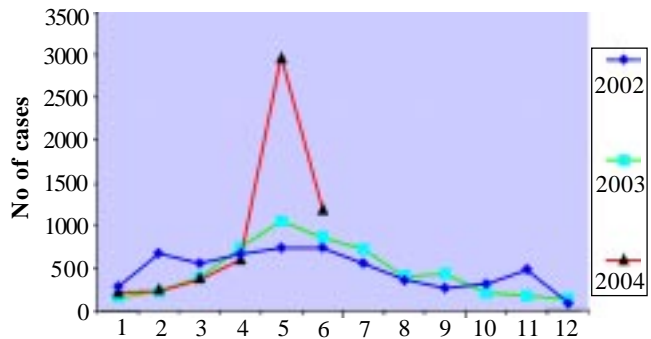


Fig. 13.1.2 Month-wise distribution of case (2002-2004 July)

Available month wise data for previous two years and also for current years shown in Fig. 13.1.2 indicating that an outbreak of diarrhoea occurred in the month of May 2004.

Epidemiological, clinical and microbiological data suggest that the outbreak was caused by *Vibrio cholerae* O1 biotype ElTor, serotype Ogawa. Although it is difficult to postulate the exact mode of transmission of this outbreak, the most probable hypothesis appears to be through water. Stream water and shallow well which was found to be used for drinking purpose were also used for other purposes and were found liable to be contaminated anytime. Use of open fields for defaecation might also helped to disseminate the infection. These coupled with low literacy, poverty, lack of personal hygiene, frequent movement from one hilly terrains to other for practice "Jhum





Epidemic investigation in a difficult Area at Tripura

cultivation" and poor nutritional status might have helped to spread the disease within and outside the affected area.

13.2 Investigation of Diarrhoeal diseases outbreak in Delhi Tripura

Investigators :

S.K. Mondal, T. Ramamurthy

Dr. S.K. Mondal along with Dr T. Ramamurthy, Asstt. Director NICED conducted investigation of an epidemic of diarrhoeal disease in Delhi from 19.05. 2004 to 21.05.2004.

There was increase in number of diarrhoea cases from March 2004, till 19 May 2004, 540 cholera cases have been admitted to Maharshi Balmiki Infectious Disease Hospital with no death, Central Zone of the Delhi Municipal Corporation Area was mostly affected, All the wards of the zone were affected. The most affected wards were ward No's 3, 63, 64, and 65, comprising 66% of total admitted cholera cases in the area. Highest attack rate was in ward number 3 (0.3/ 1000 popn.) and lowest in ward number 9 (0.006/1000 popn.). First and second case was from Gari area under ward number 8, in the month of January and February respectively, then there was increase in number of cases (12) in march 5 wards were af-

ected, 89 in April, ward affected 11 and 21 till 19 May, wards affected 8. All age groups were affected. Children <5 years constitute 30% of cases There was no history of secondary cases in the family. Most of the cases occurred in the areas where sanitary condition was unhygienic and water supply scanty or no supply at all.

Water supply needs a special mention. The investigators noticed that in Sangam Bihar area of ward number 64 there no water supply system at all. Water is supplied by private house owners who have dug a deep tube well for their consumption supply to a cluster of about 30-50 houses through metal pipes laid on the road. Obviously the pipes are liable to leakage and contaminated. In areas where water is supplied by Delhi Jal Board (DJB), the pipe lines are ill maintained and pipes were seen to cross a pool of stagnant dirty water. Although the DJB claims to supply chlorinated water, but we could not observe any residual chlorine at the consumer point. Furthermore, out six water samples we could collect and process in our laboratory at NICED three were positive for V. cholerae, suggesting gross contamination.

All the admitted cases were treated with single dose Doxycycline on admission and then combination of norfloxacin and metrogyl for subsequent three days, along with rehydration with ORS and /or Ringer lactate.

13.3 Investigation of an outbreak of acute diarrhoea at Beldanga, Murshidabad District of West Bengal, Nov 2004

Investigators :

K.K. Dutta and S. Dutta

In pursuance of the order no E-43/ 2004 -Misc. dated Nov. 22, 2004 a team comprising of Dr. K. K. Dutta Emeritus Scientist, NICED ICMR, Dr. (Ms) Shanta Dutta, Assistant Director, Microbiology Dept., Mr. S. P. Guin, Sr. Technical Assistant, Epidemiology Dept and Dr. R Mukherjee, SRF (Med) had visited Murshidabad (Baharampur) district in con-



nection with investigation of outbreak of diarrhoeal diseases on 23 Nov 2004. The primary affected area is major part of Beldanga block 1 of Murshidabad district and adjoining Gram Panchayat. There are 13 GPs in Beldanga block 1 with a population of 2,62,416 in 154 villages served by Block Health Centres, One rural hospital and 40 sub-centres. According to the information given by Health Centre Medical Officer that increased number of acute diarrhoea cases were admitted in the hospital from 31 October 2004. Within a span of 3 weeks 554 cases of acute diarrhoea have been admitted, but no death has been reported. The attack rate varies from 8.42 to 0.72 per 10,000 populations, Mirjapur Block 1 being the worst affected area. All age groups were involved with more preponderance in children below 15 years of age. 55% of the cases were secondary to a primary case. Seven (50%) strains of *V. cholerae* O1 eltor Ogawa could be isolated from 14 rectal swab samples collected during the visit. Susceptibility test indicated that the strains were susceptible to doxycycline, ciprofloxacin and norfloxacin. Out of 8 collected drinking water samples 6 were unfit for drinking as they had coliform count of more than the maximum permissible limit.



Anthropometric measurement at village level.



13.4. Testing of stool and drinking water samples received from other parts of West Bengal

On Request from Government of West Bengal, stool and water samples collected from several diarrhoea patients in various districts of West Bengal were investigated.

A number of stool and water samples sent from following District Hospitals were processed following standard procedure for diarrhoeal pathogen and drinking water quality testing.

- i) Sardarpara and Mollapara, village Parganti, Block Canning II, South 24 Parganas during 7 July 2004.
- ii) Dakatepara, Sanatanipara, Milanpally and Piadapara, Bonhoogly II, Sonarpur Block during 29-30 Nov 2004.

13.5 Epidemic investigation of diarrhoeal outbreak in Garulia, North 24 Parganas

Investigators :

D. Sur, M.K. Bhattacharya

In response to the request of the Ministry of Health & Family Welfare, Govt. of West Bengal, an investigation of diarrhoeal outbreak in different wards of Garulia, North 24 Parganas was conducted by epidemiological team of National Institute Of Cholera & Enteric Diseases, Kolkata on 25th April 2005. The team visited different wards of Garulia from where increased number of acute diarrhoea cases were reported from 22nd April 2005 and submitted its valuable observations and recommendations.

Geographical location and epidemiological situation:

Garulia town, under Garulia Municipality, consists of 21 wards and is situated by the side of river Hooghly in North 24 Parganas. The total population of the area is around 80,000, living mostly in a congested environment and comprising of both poor and rich communities.

Investigation report :

Out of 21 wards, 7 (1,2,3,4,5,7,8) adjacent wards were affected. The population at risk was approximately 7000. The first case was reported from ward no.4 when a two year old boy suffered from several bouts of rice watery stool on 22nd April, 2005. Cases then spread to different wards of the area with the total number of acute diarrhoea cases mounting to 1590 till 18.05.2005, giving an attack rate of 22.7%. They were mostly treated in Garulia emergency clinic with anti-diarrhoeals, anti-emetics and ORS. Those with severe dehydration requiring i.v. fluids and antibiotics were admitted to nearby hospitals. Total no. of hospital admissions were 634, out of which 616 were discharged and 15 were referred to tertiary health care centers. Four diarrhoeal deaths were reported throughout the outbreak. Both sexes and all age groups were affected, although disease prevalence was noted more towards the extremes.



Water sample collection from hilly river at Tripura

Water supply :

Garulia municipality supplies treated drinking water from its Treatment Plant twice a day to major portion of the region and the rest was tube well supply. As observed by the team

most of the pipelines are ill maintained and chances of contamination hence are high. Most houses have sanitary privies, though few katcha privies remain till date. Drainage system is mostly open and is inadequate and malfunctioning in most parts of the area.

Study subjects :

Altogether, 28 cases were examined, 14 from Garulia emergency clinic and 14 from Infectious Disease Hospital, Kolkata, who were referred from Garulia with uncorrected severe dehydration. All 28 cases (100%) complained of watery diarrhoea with an average of 15-20 motions/day. In the clinic, 2 cases (14.2%) complained of vomiting, while 9 cases (64.28%) complained of vomiting who were admitted in I.D. Hospital. 12 cases (85.7%) had some dehydration during examination in Garulia emergency clinic, while 14 cases (100%) cases suffered from severe dehydration who were admitted in I.D. Hospital. None of them complained of fever or tenesmus. None gave history of any movement outside during the last seven days, neither they had any history of taking food outside their house during the period.

Material collection :

A total of 8 rectal swab samples were taken from fresh cases visiting Garulia emergency clinic, in Cary Blair Transport Media and 14 stool samples were collected from hospitalized patients. The stool samples were transported in icebox for running PAGE to exclude any viral etiology. Eight water samples were collected (5 from taps supplying potable water for domestic use and from a leakage point in ward no. 2 and 3 from pumping stations) for quality testing to exclude any faecal contamination.

Processing of stool sample in NICED laboratory :

Thiosulfate-citrate-bile salts-sucrose agar was used as the selective medium for the isolation of *V.cholerae*. Mac A and Hocktoen Enteric Agar were also included to exclude *Shigella*





species and entero virulent E.coli.

After primary inoculation in TCBS Agar, the samples were enriched in alkaline peptone water for 18-24 hours for secondary subculture.

Processing of water sample in NICED laboratory :

Water samples were filtered using Whatman no 1 filter paper and subsequently filtered through an ultra-thin membrane using vacuum pressure. The membrane was cut into 8 pieces and vortexed in phosphate-buffered saline for 3 mins. One ml. of the suspension was added to 10ml. of alkaline peptone water containing peptone and NaCl for enrichment and incubated for 16-18 hours.

Identification of organism :

The characteristic colony on TCBS agar was identified as *Vibrio cholerae* by its appearance (round, yellow), character (sucrose-fermenting) and biochemical testing (oxidase reaction). Final identification was done by slide agglutination with poly and monovalent antisera. The organism was identified as *V.Cholerae* 01 Inaba.

Microbiological and epidemiological results :

All the stool samples taken from Garulia emergency clinic were positive for *V.cholerae* 01, Inaba. Out of 14 samples collected from I.D. Hospital, 12 samples were positive for *V.cholerae* 01, Inaba. Stool samples of 2 cases did not confirm presence of any *Vibrio cholerae* may be due to administration of appropriate antimicrobial agents before sample collection.

Out of 8 water samples, 5 were positive for *V.cholerae* 01 Inaba and fecal *E.Coli*. Epidemiological survey of the outbreak revealed that the affected area used to receive its water supply from three pumping stations. It was observed that connecting pipelines supplying potable water were either broken or ill maintained and they were lying dangerously close to sewage pipelines, thus weakening the sanitation barrier. The tube wells were mainly broken and were without any plat-

forms and surrounded by stagnant polluted water.

Epidemiological significance of the microbiological result is that the water samples from pumping stations were sterile in all cases while those from taps supplying potable water for domestic use and from leakage point of connecting pipelines were grossly contaminated. Our epidemiological team recommended urgent chlorination of piped water supply and establishment of effective sanitation barrier through repair and maintenance of pipelines.



Vaccine given to a child.

Drug sensitivity :

Drug sensitivity tests were carried out by Kirby Bauer Disc Diffusion Method. It was observed that the organism was sensitive to gentamycin and tetracycline (which is the drug of choice for treating cholera). The organism was intermediately sensitive to fluroquinolones and completely resistant to ampicillin, cotrimazole, nalidixic acid and furazolidone.

Conclusion :

Cases admitted in I.D. Hospital with severe dehydration were treated with i.v. fluids and Tetracycline and discharged after



complete remission. Source of infection was detected as gross sewage contamination of drinking water. Outbreak was controlled eventually with effective chlorination of piped water supply, distribution of ORS and antidiarrhoeals in sufficient quantities in households, supply of drinking water temporarily through mobile tankers till effective chlorination occurred and sinking of 5 deep tube wells in the affected area.



Children after vaccination.

13.6 Diarrhoeal diseases outbreak in different Wards of Behala, Kolkata, West Bengal

Investigators :

M.K. Bhattacharya, M.K. Saha

In response to the request of the Superintendent Vidyasagar S.G. Hospital, different Wards of 13 and 14 Boroughs under Calcutta Municipal Corporation, West Bengal, an investigation of diarrhoeal outbreak was conducted by this Institute at different Wards of 13 & 14 Boroughs under Calcutta Municipal Corporation, West Bengal on 17th September 2004. The team consisted of Dr. Mihir Kr. Bhattacharya (Clinician), Dr. M.K. Saha (Virologist), Dr Gaurab Roy (MAE scholar, NIE,

Chennai) and Mr. S. Turi (staff of NICED). The total population of the said two boroughs are 6 lakhs (approx).

No. of wards - 18

Method of investigation :

The team met the members of the health authority, who briefed them about the latest outbreak situation (index case, onset of outbreak, worst affected blocks, outcome of cases, presenting features). They also accompanied the investigating team to the wards and the hospital mentioned above. Up to 24th Sept, the picture of outbreak is as follows:

Total number of affected wards	-	5
Date of first attack	-	07.09.2004
Total number of Hospital admission	-	327
Total number of death	-	4

A total of 6 hospitalized patients were enlisted in the survey. Stool samples were collected from the hospitalized cases and 8 water sample were also collected from different source of drinking water of different wards of Behala, Kolkata.

Information was also collected from the health authority about age and sex wise distribution of affected population who admitted at Vidyasagar S.G. Hospital.

The rapid epidemiological survey was conducted at the affected wards to understand the clinical presentation and transmission dynamics of this outbreak.

Geographic information of affected area:

Behala is situated in the extreme South-West portion of the mega city Kolkata. Formerly Behala was part of South 24-Paraganas district and it has a separate municipality. Later Behala Municipality was annexed in KMC.



Fig. 13.1.1. Week wise hospitalized diarrhoea cases in Dholai and North Tripura Districts (n=1267)

Water Sample No.	Location from where water has been collected	Total colony count of coliform bacteria (MPN)	Fecal Esch. Coli	Remarks
W-1	Tubewell no. 1, Hospital area	12 / litre	+	Vibrio Phage Present
W-2	Tubewell no. 2, Hospital area	8 / litre	+	Vibrio Phage Present
W-3	Stored household water (chlorinated water) - Begunbari	+++Plenty / litre	-	-
W-4	Household Tube well -Begunbari	-	-	-
W-5	Tube well with Arsenic treatment plant- Dadpur Gobindo pur	20 / litre (++)	-	Vibrio Phage Present
W-6	Same source of W5- stored household water Dadpur area	+++Plenty / litre	+	-
W-7	Tubewell of Lalchand Seikh - Dad Pur Gobindopur area	-	-	-
W-8	Tube well without arsenic treatment plant - Common supply	++	+	V.choleraNon - 01Non - 0139 present

Remark: All tube wells require urgent disinfections for safe drinking water supply. Samples 4 and 7 are suitable for drinking, other water samples are not potable.



Table 13.5.2 Characteristics of V.cholerae eltor O1 Ogawa strains isolated from Murshidabad outbreak

Sl. no.	Sample no.	Age /sex	Organism	Basu & Mukherjee phage type	New type	PFGE type	Resistant profile
1.	RS2	7yrs/ M	V. cholerae O1	4	27		NaFzCo*
2.	RS3	6yrs/ M		4	27		NaFzCo*
3.	RS4	28yrs/ F		4	27	contaminated	NaFzCo*
4.	RS5	60yrs/ F		4	27		NaFzCo*
5.	RS6	7yrs / F		4	27		NaFzCo
6.	RS10	8yrs/ F		4	27		NaFzCo*
7.	RS11	42yrs/ F		4	27		NaFzCo
8.	S31	60yrs/ F		4	27		NaFzCo*
9.	S32	42yrs/ F		4	27	contaminated	NaFzCo*
10.	S36	6yrs/ M		4	27		NaFzCo*

A large number of population affected by partition of Bengal, settled here in different colony type of residency. Besides there are several slums with unhealthy environment inhabited by a large section of poor and labouring population. Newly built highrises and housing complexes have also increased the population.

Now KMC is supplying treated drinking and potable water from its Gardenreach Treatment Plant, twice in a day, in the morning and afternoon, in a major portion of the region. Till a large number of people are dependent and habituated with tube wells and ponds for other domestic use. Most houses have sanitary privies, though few katcha privies remain till date.



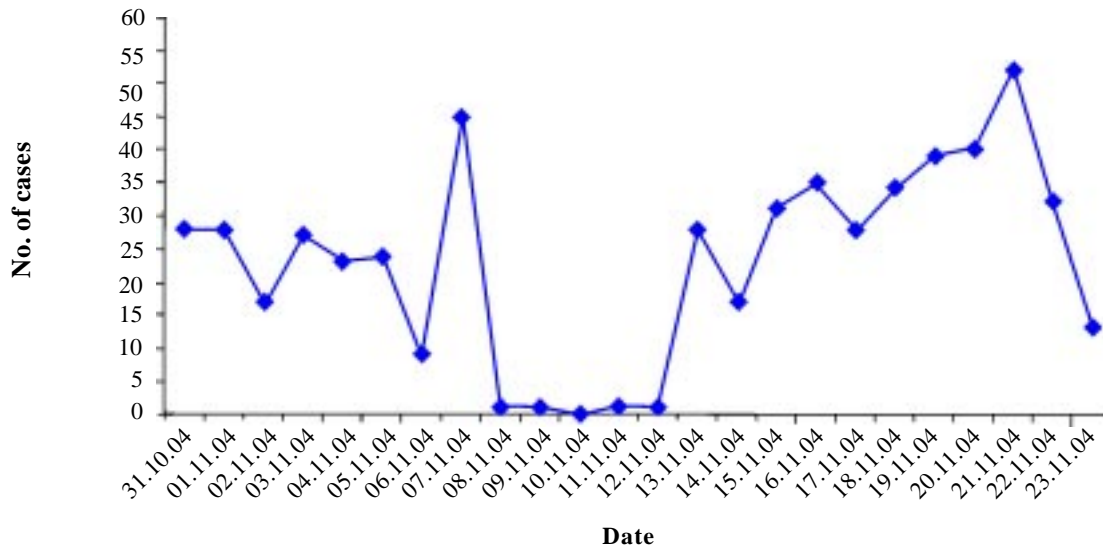


Fig. 13.5.1 Daily incidence of admitted cases of acute Diarrhoea at Health Center, Beldanga-1, Murshidabad

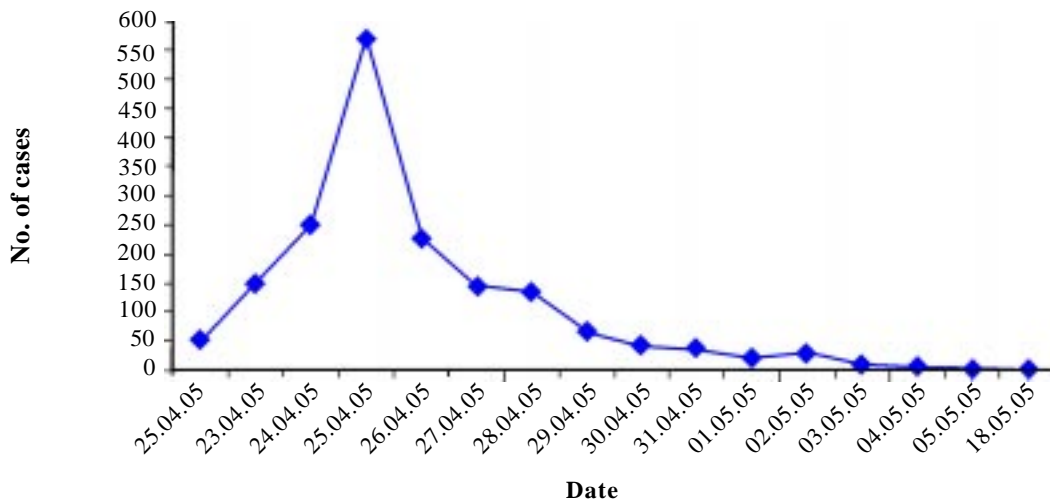


Fig. 13.5.2 Daily cases of diarrhoea during the outbreak at Garulia





Drainage system is not adequate and is not properly functioning in most of the areas. Water-logging in rainy season is a problem in some areas.

Borough XIII consists of 9 Wards (115 to 123)

Borough XIV also consists of 9 Wards (124 to 132)

Age groups 19-45 years have to devote most of their time for earning and household job and eventually they have to encounter more exposures. Naturally they were mostly affected. Again the two extreme of life, i.e., groups 1,2 and 6 are more vulnerable and naturally they were more affected.

The authority already stated that they had no paediatric ward and paediatrician, so they could not admit children. The local people knew this. They took their affected children to other hospitals situated in different places according to their convenience. Therefore, all the data of this investigation have this limitation and constraint.

The table 13.6.5 shows peak of incidence was 11.9.04 following outbreak, then it gradually decreased, again increased on 14.9.04 but it declined from 15.9.04. Incidence among male is slightly higher than female. This finding corroborates with VSGH tables.

Results :

Out of 6 stool samples collected from hospitalized patients, 4 were positive of *Vibrio cholerae* (67%). Among them, 3 were *Vibrio cholerae* O1 Ogawa and 1 was non O1 non O139. These positive cases came from 3 endemic wards (2 from ward 127 and 1 each from ward 126 and 131).

Water samples collected from 8 different sources of the affected area. Among them water sample collected from 2 ponds confirm the presence of *Vibrio cholerae* non O1 non O139 and water sample collected from other sources did not confirm the presence of *Vibrio cholerae* may be due to chlorination. However, *V.cholerae* strains were susceptible to tetracycline, tetracycline was used as the drug of choice for treating cholera.

Conclusion :

It is observed that the character of stool was watery. Maximum number of cases (here 5 out of 6 - 83%) were associated with vomiting but was not associated with fever or tenesmus. Similar cases in family were found in 83% cases (5 out of 6). All the hospitalized cases had severe (6 out of 6), which were being treated with I.V. fluid. Patients were being treated with tetracycline.

Table 13.6.1 Daily distribution of hospital admission cases at the Vidyasagar S.G. Hospital (VSGH), Behala, Kolkata.

Date	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
No.	35	27	16	29	17	26	10	18	26	13	13	19	15	24	12	7	11	9

Table 13.6.2 Sex wise distribution of hospital admission in VSGH (n=327):

Male	Female
169	158



Table 13.6.3 Clinical presentation of 6 hospitalized diarrhoea cases:

Feature	Present (%)	Absent (%)
Stool character (watery)	6 (100%)	Nil
Vomiting	5(83%)	1 (17%)
Fever	Nil	15(100%)
Tenesmus	Nil	6 (100%)
Similar case in family	5(83%)	1 (17%)
Degree of dehydration	Treatment received	Total No. (%)
Moderate	ORS	0(100%)
Severe	I.V. fluid	6(100%)

No. of Male = 3 (50%); No. of Female = 3 (50%)

Table 13.6.4 Age wise distribution of hospital admission in VSGH

No. of groups	Age Group (years)	Number
1	0 to 5	1
2	6 to 10	29
3	11 to 18	48
4	19 to 25	67
5	26 to 45	107
6	> 45	75
Total		327

Recommendation :

Primary:

- The district health authority must be alert so that all the

steps would be taken to control this outbreak and to arrange for the proper management of cases.

- Adequate supply of drugs, posting of personnel should be done.
- An effective surveillance system is to be established to monitor the disease with such symptom complex and for the early prediction of such outbreak.
- Construction of deep tube wells for safe portable water.
- Local Health authority (Dy. CMOH II/ CMOH) should

Table 13.6.5 Date and sex wise distribution of patients attended in KMC Health Camp:

Date	Male	Female	Total Number
10.09.04	10	11	21
11.09.04	22	22	44
12.09.04	11	7	18
13.09.04	10	5	15
14.09.04	15	17	32
15.09.04	2	5	7
16.09.04	5	3	8
Total	75	70	145

be equipped with additional funds to tackle the epidemic situation.

Secondary :

- Regular check-up and maintenance of pipe lines.
- Daily collection of house wastes.
- Daily removal of market wastes, hospital wastes, industrial wastes etc.
- Ensuring 100% establishment and utilization sanitary la-





Table 13.6.6 Age wise distribution of patients attended in KMC Health Camp (n=145):

Age group (years)	Number
0 - 5	23
6 - 10	21
11 - 18	23
19 - 25	15
26 - 45	48
> 45	15

trines.

- Establishment of appropriate and adequate drainage system and their proper maintenance.
- Opening of Paediatric Unit in VSGH
- Setting up of Isolation / Diarrhoea Ward having Paediatric facility.

Table 13.6.7 Particulars of the death:

No.	Name	Age	Sex	Ward	Date of admission	Date of death
1	Mamata Das Burman	32	F	129	6.09.04	7.09.04
2	Bikramjit Gupta	74	M	127	10.09.04	14.09.04
3	Jagannath Sarkar	72	M	126	14.09.04	15.09.04
4	Golapi Mandal	70	F	127	16.09.04	17.09.04

- Proper record keeping with surveillance.
- Setting up of back up Microbiological Laboratory.
- Dissemination of data with KMC Health Department and other hospitals.
- Improvement of personal hygiene particularly use of sanitary latrine, hand washing after ablution and before feeding of child.
- Use of safe chlorinated water.
- Covering of storage water.
- Proper disposal of garbage.

13.7 Investigation report of an outbreak of acute diarrhoeal disease in Mograhat Block-I of South 24parganas of West Bengal

Investigators :

M.K. Bhattacharya, S. Ghosh

In response to the request of the Jt. Director of Health Services, Govt. of West Bengal, an investigation of diarrhoeal out-



break was conducted by NICED (ICMR), Kolkata at South 24 Paraganas, West Bengal, 25th June 2004. The team consisted of Dr Mihir Kr. Bhattacharya, Assistant Director (Clinician) and Dr Subrata Ghosh, Assistant Director (Epidemiologist). The South 24 paragona district Geographically located in the south part of Bengal

Method of investigation :

The team met the members of the district health authority, who briefed them about the latest outbreak situation (index case, onset of outbreak, worst affected blocks, outcome of cases, presenting features). They also accompanied the investigating team to the blocks and the rural hospital mentioned above. On 25th June 2004, the picture of outbreak is as follows :

- Population of affected village - 3700
(Kochua Village)
- Ist case occurred on date - 14.06.2004
- Total number of diarrhoeal cases - 55



Children waiting for vaccination.



(till 24th June 04)

Total number of death - 02

Total 15 patients were enlisted in the survey. Biological samples of stool were collected from them (4 from hospitalized cases and 11 samples were taken from community active cases) and a total no. of 5 water sample were collected from different source in affected village of Mograhat Block of South 24 parganas.

Information was also collected from the block authority about age and sex wise distribution of the population. Sex distribution of the population was unavailable. Age wise distribution was found in table 13.7.1.

The rapid epidemiological survey was conducted at the affected block to understand the clinical presentation and transmission dynamics of this outbreak.

Table 13.7.2 Clinical presentation of 15 Diarrhoea cases:

No. of Male = 6 (40%)	No. of Female = 9 (60%)
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Data were collected from Dy. CMOH II office, Baneswarpur BPHC and field visit. The team visited Molla Para of Kachua village of Sangrampur GP. Kachua village has the total population of 3,700. Diarrhoea cases were clustered in Molla para having a population of 1500.

1st case occurred on 14th June 04, and total cases became 55 up to 25th June 04. Attack rate was 1.5% in Molla para village and during this period two patient died with case fatality rate of 3.6%. This is due to severe cases not utilizing the proper case management at health care facility. Qualified physician did not treat these cases, but they were treated by quacks. Thirty (54.5) diarrhoea cases were among children below 10 yrs of age which may be due to endemicity of disease in this area.

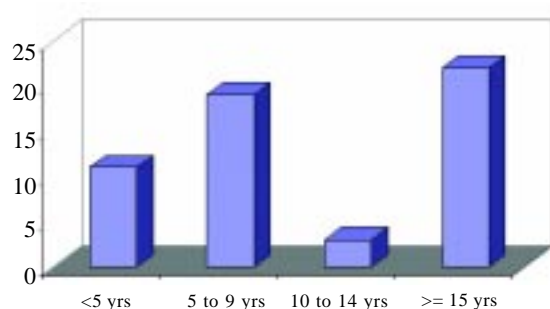
1st case found to be Monohar Hossain Molla, 2yrs Male, son

of a quack doctor Nur Alom Molla. The child was unimmunised, malnourished suffered from acute watery diarrhoea. Date of onset was 14.6.2004(8 PM) He received oral rehydration therapy but not any IV therapy, not taken to health facility and died at home on 15.6.2004(3AM). 2nd case was Badruddoza Laskar 33 yrs Male, son of Late Akkas Ali Laskar suffered from 11PM on 22nd June 04 and died on 23rd June at 8AM after receiving one and half bottle of IV fluid. He received ORT (Electral). Oral rehydration fluid though used in

Name of block- Mograhat-I

The population of the said blocks are: 2.28 lakhs

Fig. 13.7.1 Age group wise distribution of cases



villages but they are not empowered with proper knowledge regarding the preparation of ORS solution, proper management of diarrhoea and when to refer the cases to health care facility where IV fluid can be started.

Conclusion :

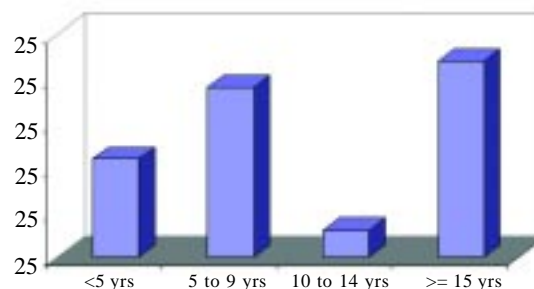
It is observed that the character of stool was watery. Maximum no. of cases (here 12 out of 15 - 80%) were associated with vomiting. It was not associated with fever or tenesmus. Similar cases in family were found in 53.3% cases (8 out of 15). Degree of dehydration was severe in 66.7% cases (5 out of 15), which were being treated with I.V. fluid. Rest of the cases (10 out of 15) received ORS solution. Patients were

being treated with injection tetracycline &/or metrogyl or fluoroquinolones &/or metrogyl.

Recommendation :

1. The district health authority must be alert so that all the steps would be taken to control this outbreak and to arrange for the proper management of cases.
2. Adequate supply of drugs, posting of personnel should be done.
3. An effective surveillance system is to be establish to monitor the disease with such symptom complex and for the early prediction of such outbreak
4. Construction of deep tube wells for safe portable water.
5. Local Health authority (Dy. CMOH II/ CMOH) should be equipped with additional funds to tackle the epidemic situation.

Table 13.7.1 Following figure show daily occurrence of diarrhoeal cases and deaths



13.8 Report of an epidemic investigation of an unknown fever at Siliguri town, district Darjeeling

Investigators :

M.K. Bhattacharya, S. Chatterjee

In response to the request of the Director of Medical Educa-



tion and Director of Health Services, Govt. of West Bengal,

Feature	Present (%)	Absent (%)
Stool character (watery)	15 (100%)	Nil
Vomiting	12 (80%)	3 (20%)
Fever	Nil	15(100%)
Tenesmus	Nil	15 (100%)
Similar case in family	8 (53.3%)	7 (46.7%)
Degree of dehydration	Treatment received	Total No. (%)
Moderate	ORS	10(66.7%)
Severe	I.V. fluid	5(33.3%)

an outbreak of unknown fever was investigated by NICED (ICMR), Kolkata at Siliguri town, District Darjeeling close to the border of Nepal, Sikkim, Bhutan and Bangladesh during 18th Nov to 22nd Nov, 2004. Team started investigation on 18.11.2004 from the office at Siliguri town.

Geographical location and population characteristic:

The affected areas of that town consists of ward number 2,3,4,8,9,13,21,25 & 28 are within the Siliguri Municipality. The populations of the said wards are shown in table.

Method of investigation :

The team met the members of the district health authority, who briefed about the latest outbreak situation (index case, onset of outbreak, worst affected wards, outcome of cases, presenting features, occurrence of similar cases in previous years etc.). They also accompanied the investigating team to the affected wards, Sub Divisional Hospital and the nursing homes of the Siliguri Town. Up to 22nd Nov, the picture of the outbreak is as follows:

The information about similar episodes in the corresponding months of previous 3 years suggests that the present occurrence of the disease is an outbreak.

A questionnaire for rapid survey was prepared. A working case definition was formulated: "Any person suffering from fever since 15th October, 2004 at Siliguri, Darjeeling District." Both the questionnaire and the case definition were discussed among the health workers of that block and the team with their help conducted survey.

The rapid epidemiological survey was conducted at affected wards to understand the attack rate of the disease, clinical presentation and transmission dynamics of this epidemic. Twenty three cases were included in our investigation both from the Siliguri SD Hospital (OPD) and from affected areas. Irrespective of age and sex distribution of fever cases, except infants, all age groups ranging from 7yrs to 56 yrs were more or less affected, as evident from Siliguri SD Hospital OPD register, where 634cases attended during 2nd Nov 19th Nov 2004.

During this investigation the local nursing homes were also visited to evaluate the fever cases attending in the OPD of those nursing homes from 2nd Nov to 20th Nov. 2004. Data collected are presented in the following Table.

To understand the place characteristics the map of the different wards of Siliguri

Mean duration of illness was 3-5 days. Most of the patients presented high fever with headache, joint pain, body ache, malaise and vomiting occasionally with nausea. It is evident that there is no significant sex difference among the cases. Both male and female are more or less equally affected.

Sample Collection :

A total of 23 blood samples and 7 throat swabs in Minimum. Essential Media were collected and brought to the laboratory,





Kolkata for analysis. Mosquitoes from different affected areas could be collected for the identification of the definite vector (if any).

Conclusion :

It is observed that patients mainly suffered from headache, joint pain, malaise, back ache along with high fever. Some cases presented with cough. Interesting observations were made in some cases which had GI disorders with high SGPT and SGOT levels. Out of 28 cases, 23 blood samples and 7 throat swabs were collected.

At present the outbreak is in its declining state. There was no evident sex differentiation among cases. Cases were mostly found in the study area in a scattered manner with clustering in some houses. The mode of transmission is possibly due to mosquito. Vector (mosquito) population at this time is very high in the affected area. A large number of mosquitoes could be collected from the different affected areas. These were identified as follows:

Clinical-epidemiological observations of the investigation suggest a) the possibility of a communicable disease of viral origin, which has potentiality to cause respiratory problems and high fever to the patients.

Laboratory confirmation :

23 blood samples collected from acute cases were subjected to Mac Elisa test to detect IgM antibody against Dengue and Japanese encephalitis virus. Amongst them 14 were positive to IgM antibody against Dengue virus. No IgM antibody to JE virus was detected among the collected samples. Based on the clinical symptoms, presence of IgM antibody to Dengue virus and identification of aedes mosquito, it amply proves the recent illness of those cases with Dengue virus. Attempts were made to isolate the virus, but no virus could be isolated from the mosquito and the serum samples. The collected throat swab samples are still under passage for isolation of influenza virus (if any).

Table 13.8.1 Ward wise total population

Number of wards	Total population
2	11436
3	11753
4	20028
8	7843
9	7306
13	5070
21	5875
25	8525
28	9578
Total 9	87414

Age and sex distribution of population of the said wards were not available.

Diagnosis :

Based on clinical, epidemiological & laboratory investigations, the cause of the outbreak is due to dengue virus. The dengue negative samples are still under investigation to find out the causative organism of the illness.

Recommendations for control & prevention :

Dengue is a mosquito-borne (*Aedes aegypti*) viral disease and usually a self-limiting disease and most people recover within a span of 5-7 days. However, mortality is very high in those who develop shock and or hemorrhage. There is no specific drug available and vaccine is under trial. Therefore preventive and control measures are primarily necessary. For this purpose all round anti-vector measures, good clinical management and appropriate surveillance is recommended to control the disease.



Table 13.8.2 Data on outbreak

	9
Total number of affected wards	87414
Population of affected wards	10.10.2004
Date of first attack	18.10.2004
Date of first information	
Total number of fever cases at SD Hospital	634
OPD, Siliguri (2.11.2004-19.11.2004)	1
*Total number of death	
*Mr. Promod Upadhyay 30yrs/male suffered from high fever, joint pain, head ache, body ache and malaise and died within 3 days of onset of disease	

1. Anti-vector measures

- Aedes is domestic and peri-domestic in nature and prefers to breed in clean water and therefore all water containers, where water for household use are stored should be evacuated at least once in a week and refilled afresh.
- The broken cans, cups, unused tyres, tubes and other containers in the peri-domestic environment should be disposed properly, to prevent unwanted stagnation of water.
- Spraying of insecticide, particularly with pyrethrum to kill all existing adult mosquitoes, will immediately bring down number of cases. But as trans-ovarian transmission of Dengue is known to be the subsequent crops of mosquito also may contain the virus, hence insecticide application should be repeated for a period. The people should be advised to use home sprayer. Space spray with fogging machines will not be suitable in rural setting.

Table 13.8.3 Following table shows daily distribution of unknown fever cases attending the Siliguri SD Hospital, OPD.

Date	No of case
2-Nov	34
3-Nov	36
4-Nov	50
5-Nov	58
6-Nov	39
8-Nov	55
9-Nov	45
10-Nov	64
11-Nov	38
12-Nov	18
13-Nov	54
16-Nov	48
17-Nov	28
18-Nov	38
19-Nov	29
Total	634

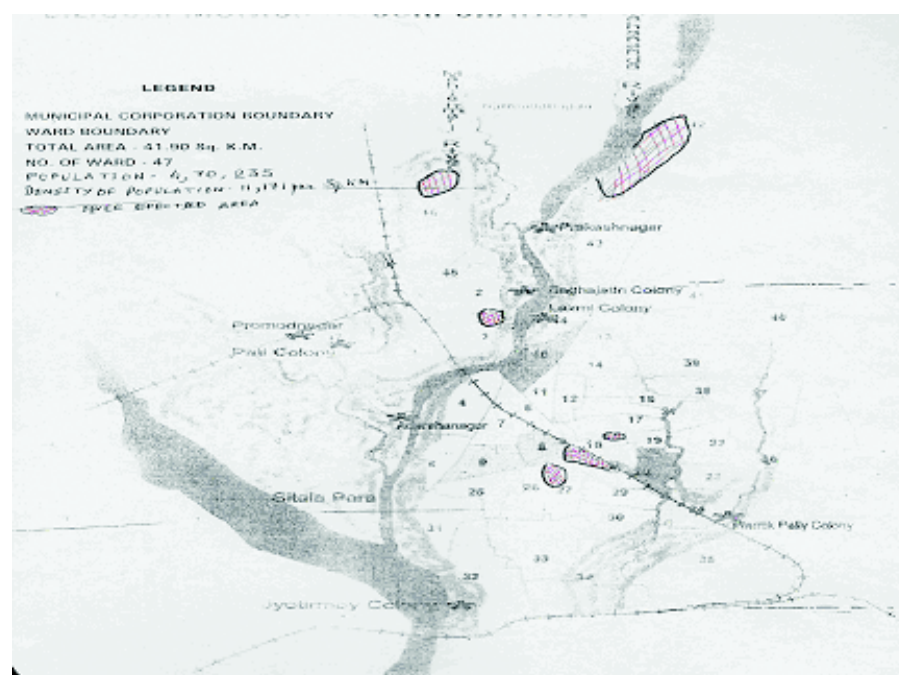
3. Good clinical management

- The district hospital specialists should meet and discuss among themselves the various clinical manifestations and agree for a good management and referral protocol and brief PHC medical officers, general private practitioners through a half day update on the subject and this will raise awareness among the medical practitioners and it will bring down morbidity.



Table 13.8.4 Number of patients attended/admitted to different Nursing Homes

Name of the nursing home	No. of patients in OPD	No. of patients admitted
Arogyo Niketan	268	25
North Bengal Clinic	—	01
Sunrise nursing home	—	14
Paramount nursing home		42 (32 in Oct +10 in Nov)
Total	268	82

GEOGRAPHICAL AREA AFFECTED**Clinical presentation :**

- The clinical episode is often biphasic and the patient often reports sick after 2-3 days of apparent recovery with cessation of fever. As incidence of malaise and weak-

ness is almost universal the patient should be advised rest and it should be enforced during the apparent recovery phase. Dengue is usually a self limiting disease



Table 13.8.5 Clinical manifestations of fever cases (n =28)

Symptoms	No	%
Fever	28	100
Backache	25	89
Headache	20	71
Joint pain	17	61
Malaise	23	82
Rash	3	11
Nausea and vomiting	28	100

MALE=17 FEMALE=11 M: F=1.5:1

and hence there is no need of panic. Death usually occurs among those who develop shock or bleeding. It is difficult to predict who will develop those. However monitoring of platelet count helps as a good indicator

- Platelet transfusion or blood transfusion would be nec-



Vaccination site.

essary for cases developing shock and or haemorrhage and the same should be available.

4. Surveillance

Surveillance should be augmented and the alert should be maintained till the episode low down.

Table 13.8.6 Identification of the mosquitoes collected from different locality of the Siliguri town

Area	Culex		Armigeres		Aedes		Total (NO)
	Male	Female	Male	Female	Male	Female	
Goyal patty	08	06	02	01	0	0	17
Gurung basti	09	07	15	11	01	01	44
Suryasen colony	03	0	12	02	0	0	17
Khalpara	07	02	05	02	01	01	18
-	-	-	-	-	-	-	96

