

Epidemiological investigations of an outbreak of acute diarrheal disease in a Tribal Village of Jashpur district of Chhattisgarh.

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ABSTRACT

An outbreak of acute diarrheal disease in a village in Chhattisgarh India was investigated through personal interviews of all households. Spot maps were drawn of the water supply system, sewage, hamlets and area with observed fecal contamination of soil within and around the village. Five clusters of household were selected purposively. One from each hamlets of the village. House to house rapid survey was carried out using pre-structured schedule. Diarrheal disease occurred uniformly throughout the village without clustering in any area. All ages and both sexes were affected, age group 15-44 year and above 60 year persons were more affected. Water samples collected for microbiological examination after instituting control measures showed high coliform counts. Chlorine level in the water examined was found to be inadequate to decontaminated common pathogens. Local cultural practices were followed by people such as indiscriminate defecation in public places, washing clothes and cleaning utensils from water sources where the community collected its drinking water. Storage of cow dung adjoining to the water resources and maintenance of water supply system was the risk factors that could have contributed to this outbreak.

Key words: *Outbreak, diarrhea, tribal, Jashpur, Chhattisgarh.*

INTRODUCTION:

Contaminated drinking water continues to be the source for most diarrheal outbreak recorded in India.(Bhattacharya et al. 2000,Chakravarty et al. 1980, Ramakrishna et al. 1999 and Singh et al. 1995)·Conventional epidemiological method in an outbreak investigation is the prime methodology used all over the world..(Singh et al. 1998).Primary data and observations,

disseminations of information for health solution, provides an insight into epidemiological linkage with potential causes or risk factors.

An outbreak of diarrheal disease in a village of Chhattisgarh in India was investigated under Integrated Disease Surveillance Programme by the Epidemiologist of Jashpur District. The implications of the results for water safety and outbreak management in tribal and rural areas are described.

Review of Literature:

Investigation of outbreaks of communicable diseases is a common practice of community medicine to understand the disease as mass phenomena for its preventive measures. Few of significant work done by medical officers and scientists in the field of diarrheal outbreak is mentioned as: Bhattacharya et al.(2000) were working in West Bengal on Outbreak of cholera caused by *Vibrio cholerae*O1 intermediately resistant. Chakraborty, et al. (1981) studied an outbreak of cholera in Indore City, Madhya Pradesh. Ramakrishna et al.(1996) isolated *Vibrio cholerae*O139 from the drinking water supply during an epidemic of cholera. Singh et al. (1995) investigated an outbreak of viral hepatitis E. Sur et al. (2002) investigated a localized outbreak of *Vibrio cholerae*O139 in Kolkata. Taneja et al.(2003) studied an outbreak of cholera due to *Vibrio cholerae*O1 Ogawa in and around Chandigarh.

MATERIAL AND METHODS:

Study Area

The Bagbahar village in Pathalgaon Block, District Jashpur is situated 32 kilometers from Pathalgaon Development Block and only 16 km from Ludeg in National Highway 78 in the east of the Block towards Odisha. Primary Health Centre and its team provides Primary Health Care and Civil Hospital of Pathalgaon provides secondary health care to the surrounding villages.

Data Collection:

On 16 August 2009, six patients from the Parhatoli hamlet approached the Bagbahar Primary Health Centre, with acute gastroenteritis with mild dehydration. They reported that many others in their hamlet were similarly ill.

A rapid survey of the hamlet, conducted by epidemiologist from IDSP, Unit Jashpur, identified 23 individuals with diarrheal episodes in the previous two weeks. For the investigation, a case was defined as any person in the village passing three or more watery stools, with or without vomiting on or after 5 August 2009. Those individuals who were not permanent residents were

excluded. To identify further cases, an intensive survey among all the households in the entire villages was conducted using a pre-structured schedule. Verbal consent was obtained from the respondents.

The schedule contained information regarding diarrhea, date of onset, frequency of loose stools, abdominal pain, fever, vomiting and nature of treatment undertaken if any. Residents were also questioned about food eaten outside the home in the week before, outside of the village and similar illness in other family members in the preceding week. The questionnaire also contained information on the source of drinking water for each household. The investigation was carried out with the approval of the District Health Society Jashpur. Special ethical clearance for this outbreak investigation was not sought, since the investigations were part of the rapid response team that provides primary and secondary care to the residents of the area.

Sewage disposal of the village was visited and places with evidence of faecal contamination were mapped by direct observation and walking around the perimeter of the contaminated area.

The amount of bleaching powder added to disinfect the water, chlorinated water in households and drinking water sources existing in surroundings. Two special clinics were established in community for prompt treatment and a PHC was opened for 24 hours over the duration of the outbreak. The health authorities transferred patients requiring rehydration to local hospitals and provided doxycycline as prophylaxis to the household contacts of cases. The community was advised to boil its drinking water whereas four wells and three hand pumps were prohibited for water usage.

Data were analyzed using Microsoft Excel 2002, and Epi Info 6.04 software (CDC Atlanta, GA, USA) Age wise attack rates, relative risk were calculated to assess and understand the Epidemiological phenomena of the outbreak. A spot map was drawn during first visit to the field area.

Study Population:

In 2009, the total population of the village was 4648. Out of which 2121 were male and 2527 were female. Total population of PHC area was 23120. Numbers of hamlets were 10. Age wise distribution of the village was as follows: less than one year were 123, between 1-4 years as 428, between 5-15 as 1036 and greater than 15 years as 3061. (Survey- Community Health Centres Jashpur). People are from Lower Income Group, as most of the families belonged to below poverty

line when followed by the criteria of Government of India. Population comprises of Kawars and Bhuinya Scheduled Tribes and Ganda, Chikwa, Scheduled Castes, and others like Rawat, Kalar, Kumhar, etc., which makes it a heterogeneous population.

FINDINGS:

Availability of potable drinking water for a large proportion of the Indian population is a major public health concern (Sur et al. 2002 and Taneja et al. 2003). In the present investigation, a total of 64 persons in the village have been identified with diarrhea. The overall attack rate was 1.37%.

Table – 1: Age and sex distribution of the population in the Bagbahar village of cases with diarrheal disease, with age – specific attack rates for each age group.

Sn.	Age (Years)	Population	Cases		Attack Rate
			Male N (%)	Female N (%)	
1.	0 – 4	511	3(0.59)	2(0.39)	0.97
2.	5 – 14	1002	5 (0.49)	4 (0.39)	0.89
3.	15 – 44	1552	17 (1.09)	17 (1.09)	2.19
4.	45 – 59	1525	6 (0.39)	6 (0.39)	0.78
5.	≥ 60	58	3 (5.17)	1 (1.72)	6.89
Total		4648	34 (0.73)	30 (0.64)	1.37

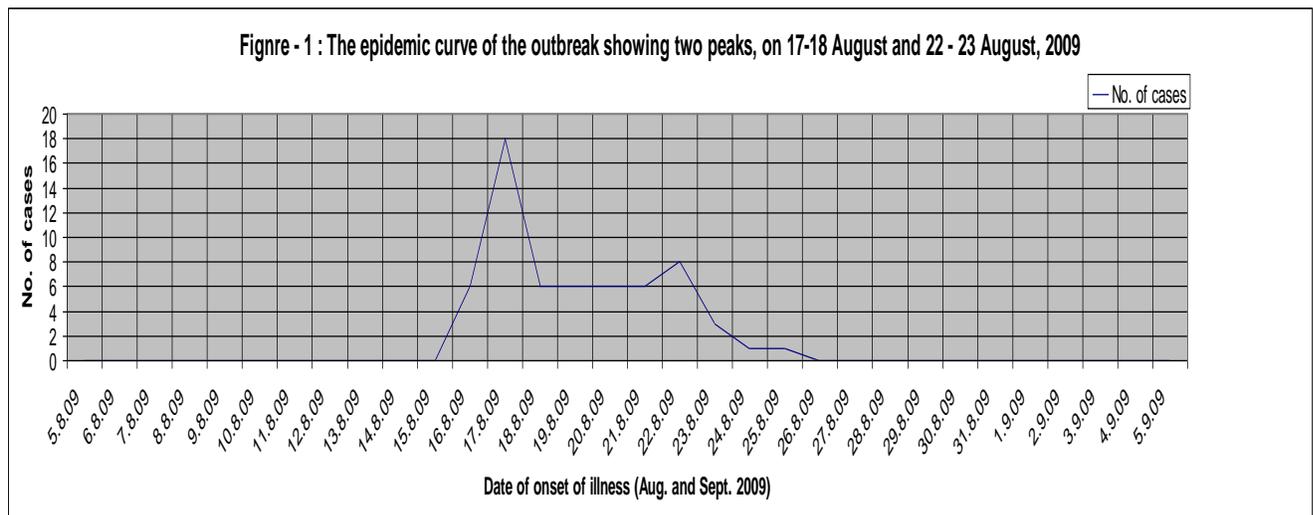


Figure 1 shows the epidemic curve of the cholera outbreak. Two peaks were seen on 17 – 18 August and 22 – 23 August 2009. The age and sex distribution of cases is shown in table 1. All ages were affected. Overall, the age specific attack rate was higher among 15 – 44 year age group and both the

sexes were equally affected however this difference was not statistically significant (Table – 1). There was one death of a 40 – year old male as on early stage of the outbreak. Attack rate was also higher among ≥ 60 year population (6.89) 95% CI was (0.60 – 2.90). Relative risk was almost equally distributed among age group from 1 – 44 years and above 45 years age group it shows variation among 45 – 59 year age group (RR = 7.00) and ≥ 60 year (16.00). There was no history of an outbreak of diarrhea in the village area.

Conclusion:

Information on the source of drinking water was available for 880 households. Western area of the village hamlet known as Parahatoli was badly affected and that area was the source of onset of illness and also as an index case. During the survey, fecal matter of human origin has been seen in many places in the village. In our study all sources of water supply were contaminated included central market area of the village.

Chlorination of drinking water has been recommended as a standard intervention procedure in the control of diarrheal diseases. For effective control of cholera outbreak the WHO has recommended a residual chlorine content of 0.5 ppm (WHO, 1993). Limited access to sanitary latrines, indiscriminate defecation in unregulated areas through which the water mainly ran, inadequate chlorination of drinking water, poor maintenance of bore wells, unhygienic practices such as washing clothes and cleaning utensils in places used for collecting drinking water, communication between water recourses and gutters and rainfall during the time of outbreak may all have contributed to this outbreak.

Conflict of interest: There in no conflict.

Source of funding: It was part of investigation under CM&HO, Jashpur, Chhatisgarh.

Ethical Clearance: Ethically there was approval from the District Health Society Jashpur.

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