



EPIDEMIOLOGICAL INVESTIGATION OF AN OUTBREAK OF ACUTE DIARRHOEAL DISEASE IN KHERAJKHAT AREA OF LAKHIMPUR DISTRICT OF ASSAM

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ABSTRACT

Diarrhoea is a symptom of infections caused by a host of bacterial, viral and parasitic organisms and most of which are spread by faeces-contaminated water. In developing countries, children under three years old experience on average three episodes of diarrhoea every year. A descriptive epidemiological investigation was carried out in kherajkhat area of Lakhimpur district of Assam during the occurrence of Acute Diarrhoeal disease (ADD) cases to find out their source of infection as well as to come across the factor responsible for ADD outbreak. 3 (three) nos of rectal swab specimen were collected in the Carry Blair media for culture and sensitivity test to determine the causative agent from patients those having the complain of passage of 3 or more loose or watery stools in the past 24 hours. 5 (five) nos of water sample using aseptic measures were collected from drinking water source of patients house for H₂S test and bacteriological test like Most probable number (MPN). Culture shows growth of normal Flore of gut (E.coli). H₂S test for water also showed no colour change after observation. But it was suspected that other bacteria may also be present in the water sample which cannot be determined by H₂S test. In MPN test result also not showed the presence of bacilli. The overall attack rate of ADD cases was 1.47%. The overall case fatality rate was 3.2%. Both the sex groups were equally affected. Median affected age is 40.5 years (ranging from 6-60 years) and high risk age group was 11-20 years. The cause of the outbreak was confirmed as due to the consumption of adulterant Proshad in an occasion of Swaraswati Puja as well as the unprotected wells used by the people in that area.

KEY WORD: Acute diarrhoeal disease, H₂S test, morbidity, mortality, MPN test, etc.



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INTRODUCTION

Diarrhoeal disease is the second leading cause of death in children under five years old, and is responsible for killing around 760 000 children every year. Globally, there are nearly 1.7 billion cases of diarrhoeal disease every year.^[1] It is usually a symptom of an infection in the intestinal tract, which can be caused by a variety of bacterial, viral and parasitic organisms.^[2] Infection is spread through contaminated food or drinking-water, or from person-to-person as a result of poor hygiene. Norovirus is the most common cause of viral diarrhoea in adults,^[3] but rotavirus is the most common cause in children under five years old.^[4] Rotavirus and *Escherichia coli* are the two most common etiological agents of diarrhoea in developing countries. Major figure of infections were caused by Adenovirus types 40 and 41,^[5] and astroviruses.^[6] Yet, the bacterium *Campylobacter* is a common cause of bacterial diarrhoea, but infections by *Salmonellae*, *Shigellae* and some strains of *Escherichia coli* (*E.coli*) are also found common.^[7] In Assam acute diarrhoeal disease cases were reported from nearly all the districts which are mainly spread by faeces-contaminated water. Infection is more common when there is a shortage of adequate sanitation and hygiene and safe water for drinking, cooking and cleaning. Rotavirus and *Escherichia coli* are the two most common etiological agents of diarrhoea in this part of India. Our study was aimed to conduct a descriptive epidemiological investigation during the incidence of Acute Diarrhoeal disease (ADD) cases to find out their source of infection as well as to come across the factor responsible for ADD outbreak in Kherajkhat area of Lakhimpur district of Assam. Lakhimpur district having a total population of 1,040,644 which is situated in the northern part of Brahmaputra and most of the part of this district is badly affected with flood in every year which might lead to different water borne diseases.

MATERIALS AND METHODS

Study population

A descriptive study was conducted in four villages mostly affected with ADD cases in Kherajkhat area of Lakhimpur district of Assam, which had a population of 2112. Institutional review board (IRB/IEC) was informed about the investigation and permission for publication was obtained afterwards. All the age groups and both the sexes were included in the study. Informed consent was taken from the participants in the study before collecting stool sample.

Case definition developed for acute diarrhoeal disease

The cases of diarrhoeal diseases fulfilling the WHO Standard case definition of acute diarrhoeal disease were taken into attention for this study. A case of ADD should be suspected by a medical officer when: In an area where more than 5 cases of acute watery diarrhoea (passage of 3 or more loose or watery stools in the past 24 hours) with or without dehydration were came into noticed .

Details of investigation

District Rapid Response Team visited the affected area. Socio-demographic and clinical investigations of all cases were conducted along with sample collection for laboratory investigation. Qualitative epidemiological data was collected by observation of drinking water source and food source used by the affected people and unaffected neighbours, visiting eating places, hospitals, examining the prescription pattern of health care providers and compare cases with unaffected neighbours with respect to suspected exposure. Investigation result: There was an initial case of diarrhoea in a school girl after taking "prashad" during Swaraswati puja in the school on 15th February, 2013. On the same day at night she has suffered with fever, vomiting and loose watery stool and expired on 18th February, 2013. Rest of her 4 (four) family members were also affected on the next

day. Initial case followed by 4 cases suggesting secondary spread. An important observation was that 89% of the ADD patients were suffering with the complaints of loose or watery stools after taking proshad and rest of 11% were not taking prashad from any source suggesting secondary spread. Key factor responsible for the cause was the "Proshad" consumed by the patients during Swaraswati puja in the school. Unprotected wells those are numerous in the village and the quality of water is not safe for drinkable as per visual observation

Containment measures undertaken:

- Active surveillance was done with the help of Paramedical staff in all the affected area.
- All the wells in the affected area (Joypur Pichala gaon) are chlorinated by PHE department.
- ORS, antibiotics and other medicine are given to the people based on sign and symptom
- Medical camp organized in all affected villages
- Educate the population about the risk associated with unhygienic use of wells
- Use safe and Boil drinking water
- Educate for personal hygiene
- Forbid washing of cloths in wells

Sample collection

In the first week of the outbreak, 3 (three) nos of rectal swab specimen were collected in the Carry Blair media and sent to GMCH for culture and sensitivity test to determine the causative agent. 5 (five) nos of water sample using aseptic measures were collected from drinking water source for H₂S test and bacteriological test like Most probable number (MPN).

RESULTS

Rate of acute diarrhoea were in clear excess of the background in the village. We identified 31 cases with one death (1.47% attack rate) in the same area having the population of 2112. A total of 24 nos acute diarrhoeal cases were reported from Joypur Pichala gaon under Kerekjuli S/C. Another 3 person from similar house in Motia no 1 village under Borbali S/C, 1 person from Motia chamua village and 2 person (in similar house) from Motia Jab jug village under Pathalipahar S/C and 1 person from Bhogpur Tipling gaon under kherajkhat SD were affected with ADD (Table 1). There was an initial cluster on 15th February, 2013 followed by a peak around 17th February, 2013 and possible secondary spread (Figure 1).

Table 1
Incidence rate of ADD cases in different villages under Kherajkhat SD

Serial no	Sub Centre	Village	ADD cases	IR/100
1	Kerekjuli S/C	Joypur Pichala gaon	24	2.40
2	Barbali S/C	Motia No 1	3	0.71
3	Pathalipahar S/C	Motia Chamua and Motia Jub jag	3	0.43
4	Kherajkhat SD	Bhogpur Tipling gaon	1	0.18

Figure 1
Time analysis of ADD cases in affected villages under Kherajkhat SD

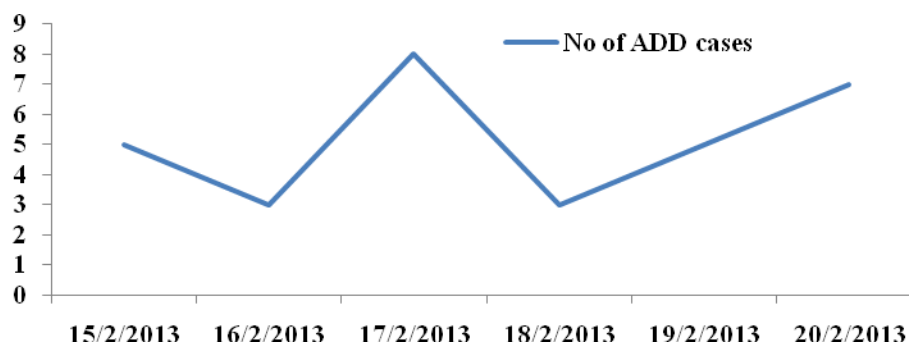


Table 2
Age wise nos of ADD cases in affected villages under Kherajkhat SD

Age group (in years)	Nos of ADD cases
1 to 10	6
11 to 20	13
21 to 30	0
31 to 40	4
41 to 50	7
51 to 60	1

Attack rates were highest among 1-20 years of age groups (Table2). Culture shows no growth of Salmonella, Shigella or Vibrio like organisms. Culture shows growth of normal Flore of gut (E.coli).H2S test for water also showed no colour change after observation. But it was suspected that other bacteria might also be present in the water sample which cannot be determined by H2S test.MPN result also not showed presence of bacilli.After proper investigation it was found that not only proshad but also unprotected wells used by the people might also the cause of the outbreak.

DISCUSSION

Diarrhea is a common illness which is not only caused solely by waterborne pathogens but also through poor hygiene with fecal-oral

transmission, is also a contributing factor.^[10] in our study the cause of the outbreak was confirmed as due to the consumption of adulterant Proshad in an occasion of Swaraswati Puja as well as the unprotected wells used by the people in that area.Both the sex groups were equally affected. Median affected age is 40.5 years (ranging from 6-60 years) and high risk age group was 1-20 years which was found analogous with World Gastroenterology Organization practice guideline. ^[8] The overall attack rate was 1.47%. The overall case fatality rate was 3.2%. Rectal swabs specimen showed normal growth of E coli resembles with earlier finding. ^[8, 9] Water sample does not showed any bacterial infection. But it was observed that there is inadequate sanitation (74.6% practicing open field defecation) and insufficient access to clean potable drinking water as everybody used well without brim or platform in the surrounding.

Rather ponds having dirty water were used for all household uses including washing of utensils and taking bath. The hygienic condition and knowledge about healthy lifestyle of these people were found to be very poor (74.6% used open field defecation). Bacteriological examination of stool and water sample revealed normal growth of E coli as the causative organism. Although we are unable to collect the food samples but investigation finding suggested that the proshad used by the patients might also the cause of infection as 89% of the affected patients developed symptoms after taking prashad, so it can be accounted as food poisoning also. This type of food poisoning can also be prevented, by being careful when preparing and storing food. Wash hands and working surfaces while preparing food, cook foods to safe temperatures, and refrigerate foods promptly. Be especially careful when cooking or heating perishable foods, such as eggs, meats, poultry, fish, shellfish, milk, and milk products. Although, ADD will continue to be a problem not only in this area but also all the way among the population in different areas in the entire district which were unable to meet health education,

safe water and sanitation needs for population. WHO suggested that a system of surveillance of cases coupled with continuing health education measures will help in monitoring and early identification of cases for prompt control measures. There is an urgency to promote national policies and investments that support case management of diarrhoea and its complications as well as increasing access to safe drinking-water and sanitation in developing countries like India and to develop new health interventions, such as the rotavirus immunization.

CONCLUSION

Outbreak of Acute diarrhoeal diseases with an overall attack rate of 1.47% and case fatality rate of 3.2% in kherajkhat area of Lakhimpur district due to consumption of proshad which was thought to be infected. All the possible control measures were taken immediately and overall the outbreak was controlled within 6 days from date of onset of initial case.

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