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Original Article

Acute Gastroenteritis Outbreak in Meghalaya, India

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Abstract

Background: Between January and February 2018, an outbreak of acute gastroenteritis (AGE) was reported in Nongpoh Civil Hospital, Ri-Bhoi District in Meghalaya among the under five children. The mothers reported that the children developed diarrheal diseases after receiving polio drops administered during Intensified Pulse Police Immunization (IPPI) first round (January 29–31, 2018). **Objective of the study:** To describe the outbreak and to prevent and control the outbreak. **Methods:** This survey was conducted among the under-five children on February 2, 2018 reported with increased AGE cases. Rapid Response Team from District Surveillance Unit, Ri-Bhoi generated an early warning signal and conducted an epidemiological investigation. Parents alleged that polio drops administered during IPPI first round caused illness. All the under-five children admitted and registered in in-patient were investigated. A total of 85 cases fit the case definition of AGE. **Results:** The median age of these cases was 1 year 2 months (1 month, 5 years) with 44 (51.7%) male and 41 (48.2%) female. All three stool samples (100%) tested positive for Rotavirus Ag. Similarly, all two water samples (100%) showed coliforms beyond permissible values. The present outbreak highlights that a high proportion of infants who were affected from Nongpoh, Umtasor, and Umkaduh. **Conclusion:** The identified causative agent is Rotavirus Ag. Polio vaccine was not associated with illness.

Key words: Acute Gastroenteritis, Outbreak Investigation, Polio Drops Immunization

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Introduction

Diarrheal disease is a leading cause of child mortality and morbidity in the world and mostly results from contaminated food and water sources. Diarrhea can last for several days and can leave the body without the water and salts that are necessary for survival; severe dehydration and fluid loss were the main causes of diarrhea deaths. Diarrheal disease is the second leading cause of death in children under 5 years old.[1] Diarrheal diseases are a major cause of hospitalizations and child deaths globally. Together they account for approximately one in six deaths among children younger than 5 years.[2] In India, diarrhea remains the second leading cause of death in children under 5 years, killing an estimated 321 children every day in 2015.[3] *Rotavirus* is the leading cause of severe diarrhea in children in developed and developing countries.[4]

On February 2, 2018, The Medical Superintendent, Nongpoh Civil Hospital reported that there is increased acute gastroenteritis acute gastroenteritis (AGE) cases (diarrhea, vomiting, fever, and abdominal pain) among under-five children. Parents alleged that polio drops administered during Intensified Pulse Police Immunization (IPPI) first round (January 29–31, 2018) caused illness.

Materials and Methods

This survey was conducted in Nongpoh Civil Hospital between January 28 and February 26, 2018. All the

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under-five children who were admitted and registered in in-patient register of Nongpoh Civil Hospital had a complaints of vomiting, loose watery stool, fever, and abdominal cramps were investigated. They were given IV fluids and other supportive treatment.

Data were collected from January 28 to February 26. The survey used a self-designed epidemiological case sheet. The case sheet was intentionally designed to collect information on demographics, date and time of onset of illness, presenting symptoms, and treatment history. All the 85 participants were from among the children who were admitted at Nongpoh Civil Hospital.

A case was defined as anyone having more than three loose stools in the past 24 h in 0–5-year-old children admitted at Nongpoh Civil Hospital between January 28 and February 26, 2018.

A total number of 85 children were interviewed. Three stool samples were collected on February 10, 2018, and were sent to the laboratory of Indian Council of Medical Research, Dibrugarh, Assam on the same date. The real-time polymerase chain reaction (RT-PCR) and ELISA test were conducted. Two water samples were collected from two different villages on March 10, 2018, and were tested in the Pasteur Institute, Shillong laboratory for bacteriological examination. Data were analyzed using Statistical Package for the Social Sciences v.16. The categorical variables were expressed in frequency and percentage.

Results

Around 85 children participated in the study, where a total of 85 cases fit the case definition of AGE. These 85 cases were affected during the IPPI 2018 and were admitted to Nongpoh Civil Hospital. The villages affected were Nongpoh, Umtasor, and Umkaduh. A thorough investigation was done where three stool samples were collected, RT-PCR and ELISA test were conducted, and two water samples were collected from two different villages.

The median age of these cases was 1 year 2 months (1 month, 5 years) with 44 (51.7%) male and 41 (48.2%) female being affected. Figure 1 shows the distribution of cases according to the date and time of onset. Most of the cases exhibited symptoms [Figure 2] of vomiting (84%), loose watery stool (81%), fever (56%), and abdominal cramps (40.4%). Place wise distribution of cases [Figure 3] depicts that majority of the cases were from Umling Block 43(50.59%) from Nongpoh area 21 (48.84%) [Figure 4].

As depicted in epidemic cure [Figure 1], the index case was reported on January 28, 2018, followed by a slow increase in the following days. A sharp increase was seen on February 5, 2018 where then the cases decline and slowly increases in the subsequent days. The epidemic curve also suggests the outbreak to be a propagated outbreak.

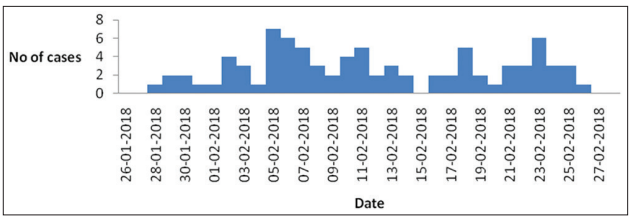

Figure 1: Distribution of acute gastroenteritis cases at nongpoh civil hospital by date of onset of symptoms, January 01, 2018–February 26, 2018

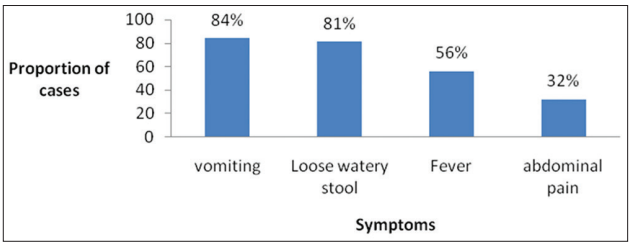

Figure 2: Distribution of acute gastroenteritis cases by symptoms from January 27, 18 to February 26, 18

All three stool samples (100%) tested positive for *Rotavirus* Ag. The bacteriological examination of the water samples detected the presence of coliforms beyond permissible values.

Containment measures:

1. Continued surveillance (hospital and other health units) required.
2. Surveillance in all age groups required.
3. Safe drinking water practices in high burden areas need to be assessed.
4. Informed parents about the safety of polio vaccine.
5. Informed about prevention from *Rotavirus* infection.
6. Including *Rotavirus* vaccine in National Immunization Schedule of district.

Discussion

This survey was conducted between January and February 2018 wherein other study it was found out that most of the children had diarrhea and it was mostly occurred in winter months.[5] Three stool samples were collected, RT-PCR and ELISA test were conducted. It was found that all three stool samples (100%) tested positive for *Rotavirus* Ag. A similar study found out of 200 stool samples, 100 (50%) had *Rotavirus* antigen detected by ELISA and 73 (36.5%) were found positive by RT-PCR.[6]

As pointed out earlier; stool samples detected the presence of *Rotavirus*. The most common symptoms of *Rotavirus* diseases are vomiting and watery diarrhea for 3–8 days, fever accompanied by abdominal pain.[7] Similar to the findings in our investigation in which most of our cases presented symptoms of vomiting (84%), loose watery stool (81%), fever (56 %), and abdominal cramps (40.4%). It is imperative to note that the disease has a winter and spring seasonal pattern, with annual epidemics occurring

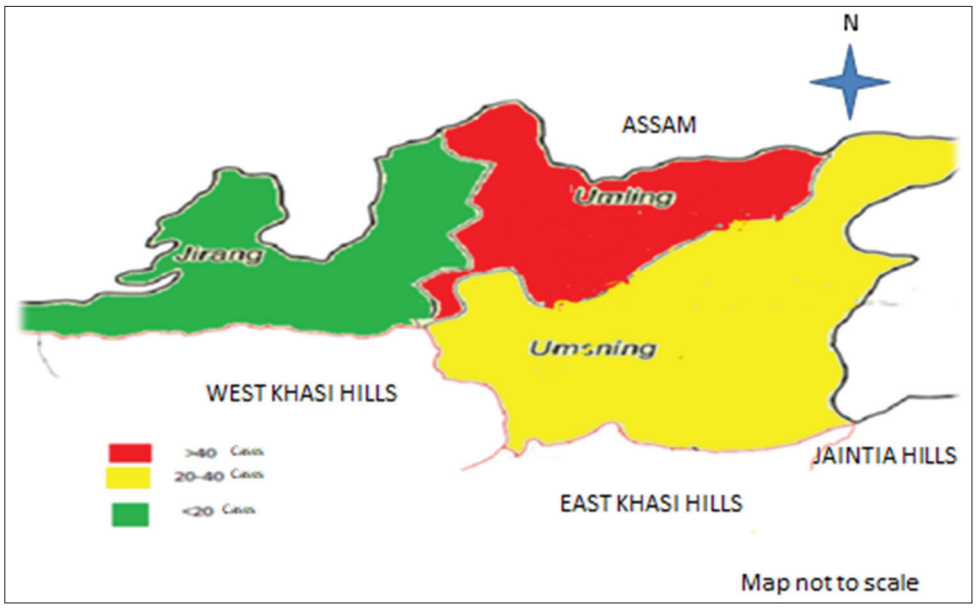

Figure 3: Area map showing acute gastroenteritis cases, Ri-Bhoi district, January-February 2018 (*n*=85)

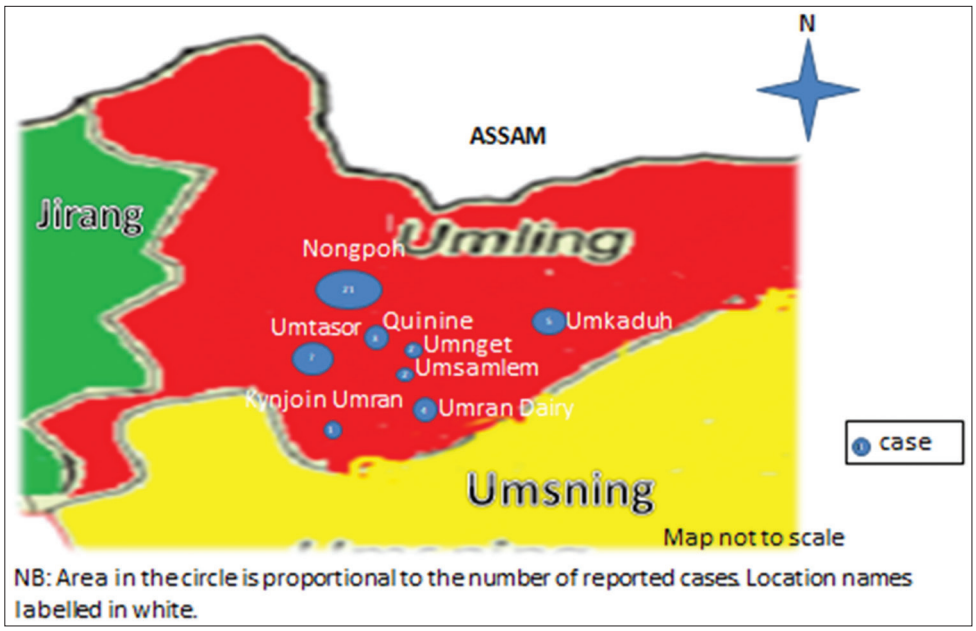

Figure 4: Spot map showing acute gastroenteritis cases in umling block, January-February 2018 (*n*=43)

from December to June.[6] Similar to our findings where the sudden increases were noted in the month of January–February 2018. The illness is common among infants and young children, and most children are infected by age 5.[8] In our study, the median age of these cases was 1 year 2 months (1 month, 5 years).

Conclusion

The present outbreak highlights that a high proportion of infants who were affected from Nongpoh, Umtasor, and Umkaduh. The identified causative agent is *Rotavirus* Ag. Polio vaccine was not associated with illness. Safe drinking water practices in high burden areas need to be assessed. Parents need to be aware of prevention from *Rotavirus* infection. It is high time for the state to include *Rotavirus* vaccine in National Immunization Schedule of the district. As *Rotavirus* vaccines are implemented in routine childhood immunization programs, assessment of the impact of vaccination on severe morbidity and mortality associated with childhood diarrhea will be a priority.[4] Despite improvements in sanitation and case management, *Rotavirus* still caused by children.[6]

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