



A Study to Identify the Viral and Bacterial Causes of Childhood Diarrhoea among children admitted in Selected Hospitals in Indore

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Introduction

Diarrhoea is described as passing watery stool more than three times in 24 hours, which is mainly caused by consuming contaminated food or beverages containing any of many microorganisms. Diarrhoea is still one of the top causes of illness and death among African children. Pathogens that cause diarrhoea might be viral, bacterial, protozoan, helminth, or fungal. It may also be caused by sensitivity to specific foods or medicines, as well as stress. In underdeveloped nations, more than one billion diarrhoea bouts occur each year, with nearly 2.5 million fatalities. In most of these nations, diarrhoea is the third most frequent reason for young children to attend health care facilities, but little information about the causative agents is available. The most prevalent causes of paediatric diarrhoea are viral and bacterial illnesses, however they cannot be distinguished clinically. As a result, in underdeveloped nations, diarrhoea therapy is mostly dependent on symptomatic findings. Enteric viruses are considered as the primary etiologic agents for childhood diarrhoea among viral causes. Rotaviruses, adenoviruses, noroviruses, astroviruses, and bocaviruses are among the viruses thought to be responsible for gastroenteritis. Bacterial pathogens, which include *Escherichia coli*, *Shigella* spp., *Campylobacter* spp., *Salmonella* spp., and *Vibrio parahaemolyticus*, are the second most prevalent causes of diarrhoea in poor nations. Nevertheless, in occasional occurrences of adult diarrhoea, the most prevalent causal agents in poor nations are *Vibrio cholerae*, *Yersinia*, *Shigella*, and *Salmonella* spp. Inadequate hygiene and sanitation, a lack of access to clean drinking water, and a variety of other problems, such as hunger, all enhance the risk of acquiring diarrhoea in these nations. Since 2011, the Ministry of Health in Khartoum has administered a live human-attenuated G1 (P8) oral Rota vaccine in two doses at roughly 2-6 months of age as a strategy to prevent and manage diarrheal illness, although the prevalence of infection remains high. There have been few published research on the issue of childhood diarrhoea in Sudan, with just two publications indicating that rotaviruses and diarrheagenic *Escherichia coli* were prevalent causes. The current investigation aims to detect the presence of viral and bacterial agents in children with diarrhoea. The research will also look at the relationship between certain risk variables, such as the patient's age and gender, antibiotic usage, and clinical characteristics, and the incidence of the discovered enteropathogens.

Methodology

Index Medical College in Indore conducted this study. In 2019, 500 faecal samples were collected in a clean, dry plastic container from 250 boys and 250 girls, the majority of whom live in rural regions, across two separate seasons. The samples were sent in an ice box to the Index Medical College's central laboratory on the same day they were gathered. The samples were stored at 20°C until testing. Between 1 and 5 days after the samples were obtained, the children were clinically diagnosed with severe diarrhoea. The individuals were aged one to five years. 98% had had rotavirus vaccines, whereas 2% had not. A standardised questionnaire was used to collect information from patients on the season, age, gender, clinical symptoms, Rotavirus vaccination status, and antibiotic use. The Index Medical College Ethics Committee authorised the study, and the children's parents provided informed consent. The method was used in this study was Viral nucleic acids (RNA, DNA), A two-tube multiplex PCR method.

Results

The two-tube multiplex PCR on the QIAxcel equipment detected viral diarrhoea in 20.0% of the cases and bacterial diarrhoea in 15% of the cases. In both groups, mixed infections were found in 6.2% of the patients. In the age range 1-5 years, equal samples were taken from 250 males and 250 girls. Tube 1 assay detected 290 sequences of five types of viruses (single and co-infection) (200 rotaviruses, 50 norovirus G1, 30 norovirus G2, 5 adenoviruses, 5 bocavirus), Tube 2 assay detected 210 sequences of six bacteria (110 *Shigella* or EIEC, 50 *V. parahaemolyticus* and 30 EHEC -EPEC, 20 *S. Enteritidis*).

Rotavirus was found in 40% of the samples, followed by norovirus G1 in 10%, adenovirus in 8%, bocavirus in 1%, and norovirus G2 in 6%. *Shigella*—EIEC was the most often found bacterium in 22% of samples, followed by *V. parahaemolyticus* in 10% and EHEC - EPEC and *S. enteritidis* in 00.6%. The difference between the vaccinated and non-vaccinated patient groups was significant among the 70 patients with rotavirus infection,. Fever was

present in 45% of children with diarrheal illnesses who had viral infections, whereas vomiting was present in 66% of these children. 90% of the youngsters were treated with antibiotics. Fever and vomiting occurred in 55 and 70% of patients with bacterial infections, respectively. In 81.2% of the instances, antibiotics were utilised.

Conclusion

Finally, this is the first thorough analysis to detail the pathogen spectrum related with paediatric diarrhoea in Indore, Madhya Pradesh. The current study's findings emphasise the need of implementing proper intervention steps in Indore.

Reference

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