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Original Research Article

# Incidence of Rotavirus Infection in Children with Acute Gastroenteritis at a Tertiary Care Hospital Kanpur, U.P. India

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**Conflict of interest: Nil**

**Abstract**

**Background:** Diarrheal diseases account for majority of deaths globally making it the second leading cause of death in childhood especially in developing countries like India. Area wise investigation of Rotavirus infection may give us a clue to start immunisation program. Thus, this study aimed to detect the Rota virus antigen in children with acute gastroenteritis at Rama medical College, Hospital& Research Centre, Kanpur.

**Materials and Methods:** A total of 50 stool samples from children less than 5 years of age, presenting with acute diarrhoea and hospitalized were processed according to CerTEST Rotavirus based on immune-chromatography for the detection of rotavirus antigen.

**Results:** Rotavirus antigen was detected in 7 (14%) cases. Fever and vomiting were the most common symptoms association with rotavirus diarrhoea. Rotavirus infection was significantly less frequent in breast-fed than among bottle-fed babies (71.42%).

**Conclusion:** Our study concludes that rota virus stool antigen test is a rapid diagnostic test also cost effective. The incidence reported in this study gives indication for immunisation and make the mothers aware about importance of breast feeding.

**Keywords:** Rotavirus, Diarrhoea, Gastroenteritis.



## Introduction

Diarrheal disease is the second largest cause of death of children below five years of age and is responsible for 1.5 million deaths worldwide every year. World Health Organization (WHO) reports that there are two billion cases of diarrheal disease every year worldwide [1].

In India, diarrhoea accounts to 14 percent deaths in children less than 5 years of age [2]. Diarrhoea can be caused by bacteria, viruses, parasites, and rarely fungi. Viral diarrhoea is the commonest among children below five years of age and Rotavirus being the commonest virus. Other viruses like enteric Adenovirus, Calcivirus, and Astroviruses are also known to cause diarrhoea [3]. Rotavirus infection is most common amongst the viral aetiology leading to 20-30 percent hospitalized cases in India [4].

Timely diagnosis of rotavirus infection in patients with acute gastroenteritis helps to determine the appropriate treatment, prevents unnecessary use of antibiotics and minimizes the spread of the disease[5-9]. Hence the present study was

undertaken to know the incidence rate of Rotavirus infection by rapid Ag card test in and around Rama Medical College, Hospital & Research Centre.

**Aim**

To know the incidence of Rotavirus infection by rapid Ag card test.

**Materials and Methods**

The study was conducted in the Department of Microbiology and Department of Paediatrics at Rama Medical College, Hospital & Research Centre. The present observational prospective study was conducted from January 2021 to December 2021. Children under 5 years having vomiting, watery diarrhoea, and low-grade fever that persists for approximately 5 days, living in Mandhana, Kanpur and surrounding area was the study population. Total 50 patients were included for the study, satisfying inclusion and exclusion criteria.

**Inclusion Criteria**

Patients under 5 year of both gender who were suffering from vomiting, watery diarrhoea, and low-grade fever.

**Exclusion Criteria**

The patient who were receiving Zinc compounds (Zinc acetate or Zinc sulphate), H2 antagonists, or proton pump inhibitors within the preceding 5 days.

Stool samples of selected patients were collected and subjected to rapid stool antigen test (CerTest, SD Biosensor) and ELISA test method. The test results were interpreted according to the kit literature using controls.

The rapid stool antigen test (CerTest, SD Biosensor) and ELISA test method were compared to check the efficacy of the rapid Ag test method[6].

The variables of the study were collected in Microsoft excel sheet. Data were analysed by descriptive statistical analysis using suitable statistical tools available in Microsoft.

**Ethical Approval**

The study was approved by the Ethics Committee of Rama Medical College, Hospital & Research Centre, Kanpur.

**Result**

This study includes 50 stool samples from children less than 5 year having acute diarrhoea. The incidence of Rotavirus infection was 14 % (n=7). Diarrhoea was more common in 7-12 months age group of patient's i.e. 20 (40%) (Table No.1 and Graph No.1).

**Table 1: Age wise distribution of suspected cases for Rotavirus infection.**

| Age group | Total number of cases | Percentage (%) | Rotavirus infected cases |
|---|---|---|---|
| <6months | 9 | 18% | 2 |
| 7-12 months | 20 | 40% | 3 |
| 1-2 year | 15 | 30% | 1 |
| >3-5 year | 6 | 12% | 1 |
| Total | 50 | 100% | 7 |

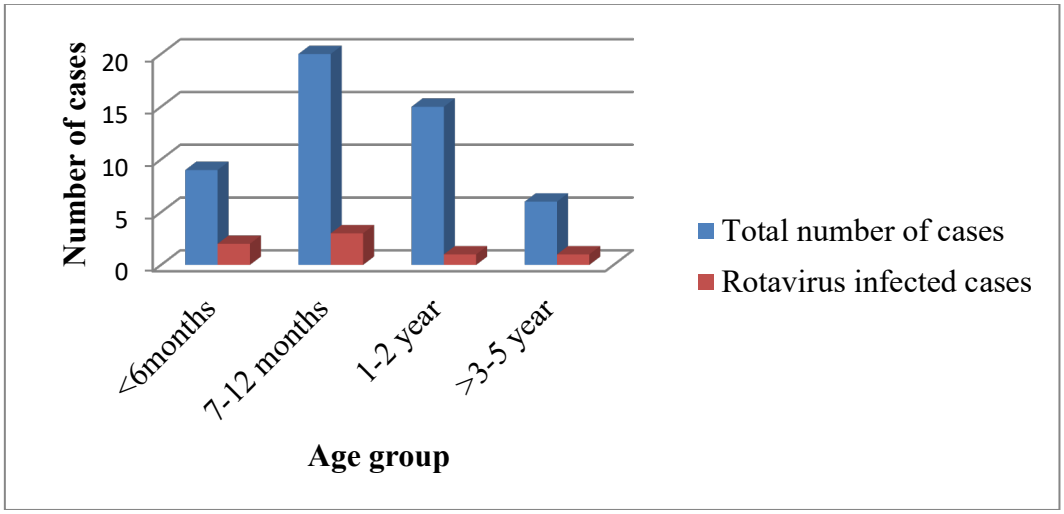


**Figure 1: Age wise distribution of suspected cases for Rotavirus infection**

The most common symptoms were diarrhoea and dehydration 70% and 78% respectively. Symptoms such as watery diarrhoea and abdominal pain were less common (Table No.2 and Graph No.2).

**Table 2: Distribution of signs and symptoms of suspected cases for Rotavirus infection**

| Signs / Symptoms | Total cases (n= 50) | Percentage % |
|---|---|---|
| Fever | 25 | 50% |
| Vomiting | 28 | 56% |
| Dehydration | 35 | 70% |
| Diarrhoea | 39 | 78% |
| Watery diarrhoea | 10 | 20% |
| Abdominal pain | 20 | 40% |

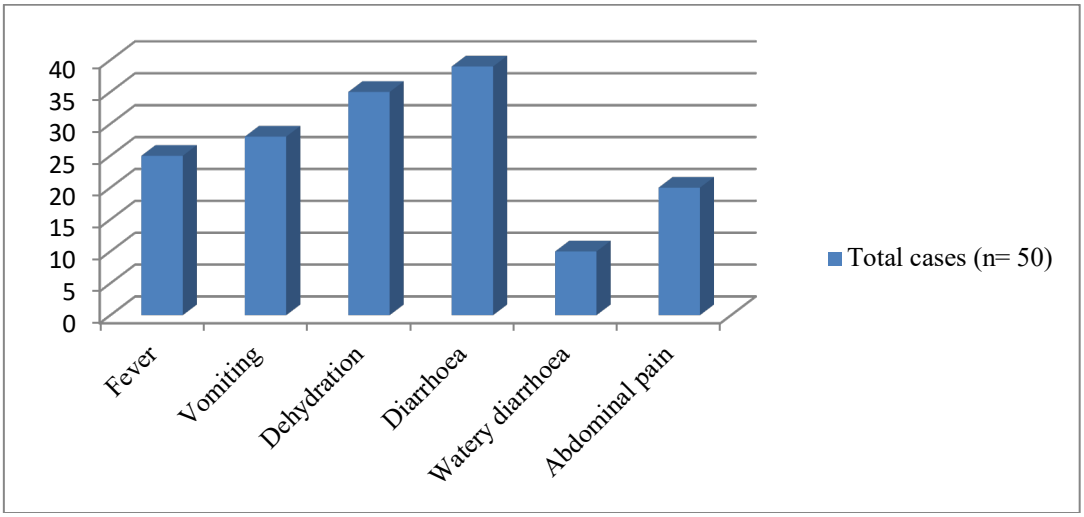


**Figure 2: Signs and symptoms of suspected cases for Rotavirus infection**

Diarrhoea as well as Rotavirus infection was mainly observed among children on bottle feeding (Table No.3 and Graph No.3).

**Table 3: Risk factors associated with diarrhoeaand Rotavirus infection in children.**

| Risk | Number of cases | Rotavirus infection |
|---|---|---|
| Breast feeding | 21 (42%) | 2 (28.6%) |
| Bottle feeding | 29 (58%) | 5 (71.4%) |

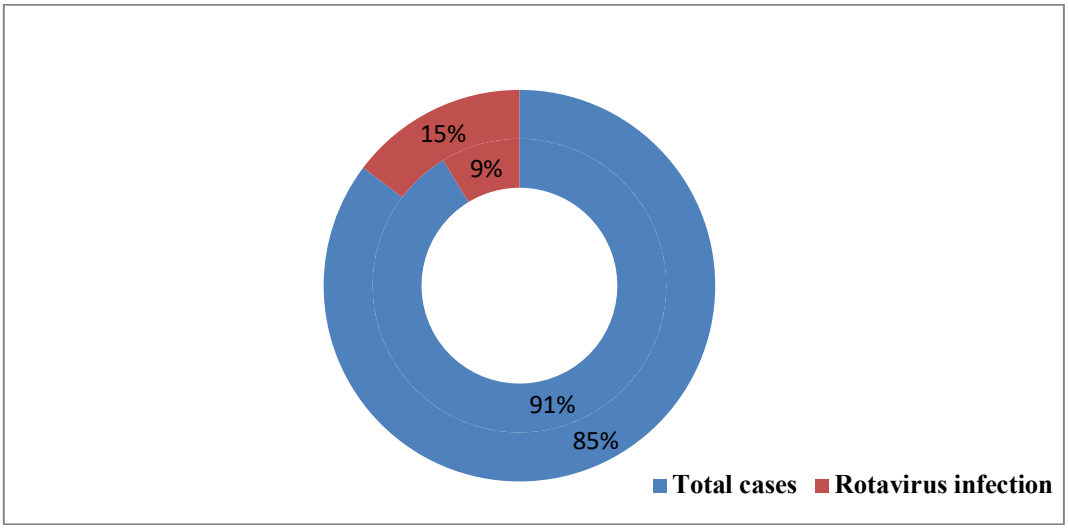


**Figure 3: Risk factors associated with diarrhoea and Rotavirus infection in children**

**Table No. 4: Comparison of ELISA test with Rotavirusrapid stool antigen test.**

| Test | | ELISA | | Total |
|---|---|---|---|---|
| | | Positive | Negative | |
| Rotavirus stool Antigen Test | Positive | 6 | 1 | 7 |
| | Negative | 0 | 43 | 43 |
| Total | | 6 | 44 | 50 |

The sensitivity and specificity were 85.74% and 97.72% respectively when compared with ELISA test. Positive predictive value and negative predictive value were 85.71% and 100%. The accuracy was 98%.


**Figure 4: CerTest Biotech Rotavirus Antigen test kit showing positive (Right) and negative (Left) test results**

## Discussion

The incidence of Rotavirus infection was observed 14 percent after investigation of 50 acute diarrheal cases. In the present study maximum rotavirus positive cases were seen in the age group of 7-12 months (42.85%), followed by 1-2 years (14%) and the least were seen among less than 6 months and 2-5 years age group. Rotavirus infection was more in males than female shows 56% and 43% respectively.

In the present study Rotavirus infection was common in the age group of 7-12 months 3(50%) which is correlated with the study of Gianvencenro Zuccotti et al [10].

Predominant number of cases in the age group of 6-12 months may be due to the commencement of weaning period, which leads to exposure to the water and other contaminants and also during this period infant starts toddling and acquire the habit of mouthing.

In the present study male (57.14%) were more affected than female (42.8%). The finding was in accordance with Gianvencenro Zuccotti et al [10].Comparison of sensitivity and specificity in the present study is accordance with the study of Habib FB, et al[11].

## Conclusion

Our study concludes that prevalence of rota virus cases is 14 percent in and around the hospital. The study shows that maximum rotavirus cases were seen in the age group of 7-12 months with watery diarrhoea. We also concluded that the rotavirus stool antigen test is a rapid diagnostic test also cost effective with a high sensitivity and specificity this test can be used for detecting rota virus infection in children less than five years with acute diarrhoea. As the samples collected were from unvaccinated children, it also relates the importance of vaccination which could prevent dehydration resulting from rotavirus infection. Also, a rapid diagnosis of these infections with stool antigen test may be valuable in the formulation of prognosis for children with acute diarrhoea and may prevent the irrational use of antibiotic therapy and prolonged hospitalization.

## References

1. Centers for Disease Control and Prevention. Prevention of rotavirus gastroenteritis among infants and children. Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR. 2006; 55(RR-12):1– 16.
2. Santos N, Hoshino Y. Global distribution of rotavirus serotypes/genotypes and its implication for the development and implementation of an effective rotavirus vaccine. Rev Med Virol. 2005;15:29–56.
3. Dey RS, Ghosh S, Chawla-Sarkar M, Panchalingam S, Natro JP, Sur D, et al. Circulation of a novel pattern of infections by enteric adenovirus serotype 41 among children

below fi ve years of age in Kolkata, India. J Clin Microbiol2011;49:500-5.
4. Jindal N, Arora S, Arora R. Enterotoxigenic Enteric bacteria causing secretory Diarrhoea. Indian J Pathol Microbiol. 1995;38(2):177–80.
5. Jain V, Parashar UD, Glass RI, Bhan MK. Epidemiology of rotavirus in India. Indian J Paediatr. 2001;68:855-62.
6. Singh V, Broor S, Mehta S. Comparison of reverse passive haemagglutination assay and solid phase agglutination of coated erythrocytes with ELISA for rotavirus antigen detection. Indian J Med Res. 1986;84:327-30.
7. Light JS, Hodes HL"Studies on epidemic diarrhea of the new-born: Isolation of a Filtrable Agent Causing Diarrhea in Calves". J. Public Health Nations Health.(1943);33(12):1451–4.
8. Woode GN, Bridger JC, Jones JM, Flewett TH, Davies HA, Davis A, White GB (1 September. "Morphological and antigenic relationships between viruses (rotaviruses) from acute gastroenteritis in children, calves, piglets, mice, and foals". Infect. Immun.1976;14 (3): 804–10.
9. Rotavirus vaccine for the prevention of rotavirus gastroenteritis among children. Recommendations of the Advisory Committee on Immunization Practices (ACIP)". MMWR Recomm Rep. 1999;48:1–20.
10. Rotavirus vaccine for the prevention of rotavirus gastroenteritis among children. Recommendations of the Advisory Committee on Immunization Practices (ACIP)". MMWR Recomm Rep. 1999;48:1–20.
11. Habib FB et al A Comparative Study of Rotaviral Antigen Detection by ELISA and ICT in Children below Five Years with Acute Diarrhoea in A Tertiary Care Hospital 2020; 49(1):216-30.