

ORIGINAL RESEARCH

## Analysis Of Prevalence Of Rotavirus Diarrhoea In Known Population

<sup>1</sup>Dr. Ramkesh Meena, <sup>2</sup>Dr. Ghanshyam Bansal<sup>2</sup>, <sup>3</sup>Dr. Mahendra Meena<sup>3</sup>

<sup>1,2,3</sup>Senior Specialist (Pediatrics), District Hospital, Karauli, Rajasthan, India

**Corresponding author**

**Dr. Mahendra Meena**

Senior Specialist (Pediatrics), District Hospital, Karauli, Rajasthan, India

**Email:** [drmahendrameena@gmail.com](mailto:drmahendrameena@gmail.com)

Received: 14 September, 2022

Accepted: 02 November, 2022

### ABSTRACT

**Background:** Rotavirus is the leading cause of severe diarrhea among children worldwide. The present study was conducted to assess prevalence of rotavirus diarrhea in know population.

**Materials & Methods:** The study was conducted among children age group 3–36 months who were admitted with acute diarrhea over a period of 1 year. Demographic details were recorded. Rotavirus testing was performed by a laboratory technician with expertise in rotavirus identification. All statistical analyses were carried out using SPSS 17.0 Inc (SPSS, Inc., USA). Statistical significance was set as a p-value < 0.05.

**Results:** In the present study, 400 children aged 3–36 months with an episode of acute diarrhea enrolled in the hospital were evaluated. Out of 400 children, 70% were male and 30% were female child. Maximum children belong to age group 13-24 months. Stool samples of 84 children (21%) were confirmed to have rotaviruses from a total of 400 children.

**Conclusion:** The present study concluded that prevalence of rotavirus diarrhea in know population was 21%.

**Keywords:** Stool, Rotaviruses, Diarrhoea.

### INTRODUCTION

Diarrhea is a leading cause of death in children under five years of age globally, with an estimated 1.5 million child deaths per year.<sup>1</sup> Rotavirus infection remains the commonest cause of severe dehydrating diarrhea among children worldwide.<sup>2</sup> Rotavirus (RV) was first discovered in 1970, and since its discovery, it has been associated with most diarrheal infections among pediatric age group.<sup>3</sup> Rotaviruses are members of the *Reoviridae* family containing a double stranded RNA and are classified into 7 groups (A–G) on the basis of distinct antigenic and genetic properties.<sup>4</sup> The outer capsid consists of the two major neutralizing antigens; a glycoprotein, termed the G-type (VP7) and a protease-sensitive protein, P-type (VP4).<sup>5</sup> The clinical symptoms of rotavirus infection range from mild watery stools to severe diarrhea and fever, which cause dehydration and electrolyte imbalance. Acute diarrhea due to rotavirus infection is associated with loose and watery stools coupled with abdominal pain, vomiting, weight loss, and fever.<sup>6</sup> WHO recommends that rotavirus vaccine for infants be included in all national immunization programmes.<sup>7</sup> Two vaccines, Rotarix™ from GlaxoSmithKline (Rotarix™) and RotaTeq® from Merck & Co have been prequalified

by WHO.<sup>8</sup> Data on rotavirus disease burden are needed across India to support credible, evidence-based decisions regarding any intervention. There is a lack of nationally representative data on the incidence of severe rotavirus disease in India.<sup>9</sup> Previous studies in the Indian Rotavirus Strain Surveillance Network have confirmed that rotavirus accounts for 39% of acute diarrheal hospitalizations.<sup>10</sup> The present study was conducted to assess prevalence of rotavirus diarrhea in know population.

## MATERIALS & METHODS

The study was conducted among children age group 3–36 months who were admitted with acute diarrhea over a period of 1 year. The study included only children who were vaccinated against rotavirus and had an episode of acute diarrhea and who had acute diarrhea with passage of loose stools more than three times a day, lasting for at least 7 to 10 days.<sup>11</sup> Demographic details were recorded using a standard questionnaire Rotavirus testing was performed by a laboratory technician with expertise in rotavirus identification. Rotavirus infection was tested by collecting stool samples processed within 24 h and confirmed using a rotavirus enzyme immunoassay kit (Human Rotavirus antigen, RV Ag ELISA Kit). Guardians were also asked about the frequency of stools, feeding information, and onset of diarrhea before hospital admission. All statistical analyses were carried out using SPSS 17.0 Inc (SPSS, Inc., USA). Statistical significance was set as a p-value < 0.05.

## RESULTS

In the present study, 400 children aged 3–36 months with an episode of acute diarrhea enrolled in the hospital were evaluated.

Out of 400 children, 70% were male and 30% were female child. Maximum children belongs to age group 13-24 months.

Stool samples of 84 children (21%) were confirmed to have rotaviruses from a total of 400 children.

**Table 1: Demographic Characteristics**

Demographic Characteristics	N(%)
<b>Gender</b>	
Male	280(70%)
Female	120(30%)
<b>Age group (months)</b>	
3-12	140(35%)
13-24	170(42.5%)
25-36	90(22.5%)

**Table 2: Prevalence of Rotavirus Infection**

Prevalence of Rotavirus Infection	N(%)
<b>Present</b>	84(21%)
<b>Absent</b>	316(79%)
<b>Total</b>	400(100%)

## DISCUSSION

Severe acute diarrhea, also termed gastroenteritis is most notably caused by rotaviruses. In the majority of cases of acute gastroenteritis or severe diarrhea in infants, children require special emergency care and hospital admission for better management.<sup>12</sup> There are also certain cases in which an infant may be infected with the virus two or three times via the fecal-oral route. However, the severity of infection decreases with re-infection with

rotavirus.<sup>13</sup> The main reason for re-infection is the unhygienic nature of children from contaminated food and drinks.<sup>13</sup>

In the present study, 400 children aged 3–36 months with an episode of acute diarrhea enrolled in the hospital were evaluated. Out of 400 children, 70% were male and 30% were female child. Maximum children belong to age group 13-24 months. Stool samples of 84 children (21%) were confirmed to have rotaviruses from a total of 400 children.

John BM et al included a total of 250 children with diarrhea. The Male: Female ratio was 0.97:1. We found 24% children presenting with diarrhea to be positive for rotavirus antigen. 78.3% of children with rotaviral diarrhea were in the age group of 6e15 months. There was a significant association between type of feeding and rotavirus diarrhea with reduced prevalence while on exclusive breast-feeding. Though only 10.4% of children with rotavirus diarrhea had severe dehydration, 61.5% of children with severe dehydration were positive for rotavirus.<sup>14</sup>

Nakawesi JS et al found that the prevalence of rotavirus infection was 45.4%. On multivariate analysis rotavirus was significantly associated with a higher education (above secondary) level of the mother [OR 1.8; 95% CI 1.1-2.7]; dehydration [OR 1.8; 95% CI 1.1-3.0] and breastfeeding [OR 2.6; 95% CI 1.4-4.0]. Although age was significantly associated with rotavirus on bivariate analysis; this association disappeared on multivariate analysis. No significant association was found between rotavirus infection and nutritional status, HIV status and attendance of day care or school.<sup>15</sup>

Mathew MA, et al found that among the 1827 children, 648 (35.9%) were positive for rotavirus by the Rotaclone ELISA test. The prevalence of rotavirus diarrhea in infants less than 6 months of age was 24.7%; 6- 11 months 31.9%; 12- 23 months 41.9%; 24- 35 months 46.9%; and 33.3% in 36- 59 months. Rotavirus infections were most common during the dry months from January through May. G1P[8] (49.7%) was the most common strain identified followed by G9P[8] (26.4%), G2P[4] (5.5%), G9P[4] (2.6%) and G12P[6] (1.3%).<sup>16</sup>

## CONCLUSION

The present study concluded that prevalence of rotavirus diarrhea in know population was 21%.

## REFERENCES

1. WHO: Global networks for surveillance of rotavirus gastroenteritis, 2001- 2008. Weekly epidemiological report 2008, 83(47):421-425.
2. Parashar UD, Gibson CJ, Bresse JS, Glass RI: Rotavirus and severe childhood diarrhea. *Emerg Infect Dis* 2006, 12(2):304-306.
3. Glass RI, Tate JE, Jiang B, Parashar U. The rotavirus vaccine story: from discovery to the eventual control of rotavirus disease. *J Infect Dis.* 2021;224(12 Suppl 2):S331–S342. doi:10.1093/infdis/jiaa598
4. Bonkougou I, Sanou I, Bon F, Benon B, Coulibaly SO, Haukka K, et al. Epidemiology of rotavirus infection among young children with acute diarrhoea in Burkina Faso. *BMC Pediatr.* 2010;10:94. doi: 10.1186/1471-2431-10-94.
5. Adah MI, Rohwedder A, Olaleye OD, Durojaiye OA, Werchau H. Serotype of Nigerian rotavirus strains. *Trop Med Internat Health.* 1997;2:363–370. doi: 10.1111/j.1365-3156.1997.tb00152.x.
6. Gastañaduy AS, Bégué RE. Acute gastroenteritis viruses. *Infect Dis.* 2017;2017:1390–1398.e3
7. WHO: Rotavirus Vaccines; an update. *Weekly epidemiological record.* 2009, 84 (51-52): 537.

8. WHO: WHO vaccine -preventable diseases: monitoring system 2009 global summary. Geneva: Immunisation, Vaccines and Biologicals. 2009, 29.
9. Khan G, Fitzwater S, Tate JE, Kang G, Ganguly N, Nair G, et al. Epidemiology and prospects for prevention of rotavirus disease in India. *Indian Pediatr.* 2012;49:467-74.
10. Kang G, Arora R, Chitambar SD, Deshpande J, Gupte MD, Kulkarni M, et al. Multicenter, hospital-based surveillance of rotavirus disease and strains among Indian children aged <5 years. *J Infect Dis.* 2009;200:S147-53.
11. Riddle MS, DuPont HL, Connor BA. ACG clinical guideline: diagnosis, treatment, and prevention of acute diarrheal infections in adults. *Am J Gastroenterol.* 2016;111(5):602–622. doi:10.1038/ajg.2016.126.
12. Skansberg A, Sauer M, Tan M, Santosham M, Jennings MC. Product review of the rotavirus vaccines ROTASIIL, ROTAVAC, and Rotavin-M1. *Hum Vaccin Immunother.* 2021;17(4):1223–1234. doi:10.1080/21645515.2020.1804245
13. Burke RM, Tate JE, Barin N, et al. Three rotavirus outbreaks in the postvaccine era - California, 2017. *MMWR Morb Mortal Wkly Rep.* 2018;67(16):470–472. doi:10.15585/mmwr.mm6716a3
14. John BM, Devgan A, Mitra B. Prevalence of rotavirus infection in children below two years presenting with diarrhea. *Medical journal armed forces India.* 2014 Apr 1;70(2):116-9.
15. Nakawesi JS, Wobudeya E, Ndeezi G, Mworozzi EA, Tumwine JK. Prevalence and factors associated with rotavirus infection among children admitted with acute diarrhea in Uganda. *BMC pediatrics.* 2010 Dec; 10:1-5.
16. Mathew MA, Paulose A, Chitralkha S, Nair MK, Kang G, Kilgore P. Prevalence of rotavirus diarrhea among hospitalized under-five children. *Indian pediatrics.* 2014 Jan;51:27-31.