

**Author Affiliation:**  
Professor, Department of Pediatrics,  
Vinayaka Mission's  
Medical College & Hospital,  
Karaikal, Puducherry-609609, India.

Reprint Request:  
**N. Ganga**, 39, John Selvaraj Nagar,  
Kumbakonam - 612001,  
Tamil Nadu, India.  
E-mail: [gangs.mythila@gmail.com](mailto:gangs.mythila@gmail.com)

## Rotavirus Diarrhea in a Coastal Medical College: A Pilot Study

**N. Ganga**

### Abstract

*Background:* Acute diarrheal disease due to Rotavirus is prevalent in the community. Severe dehydration results in mortality, if not intervened in time. *Aim:* This study was undertaken to identify Rotavirus antigen in stools, to study the influence of age, sex and feeding pattern and to analyse the outcome. *Settings and design:* Prospective, non-randomized, non-controlled, analytical, hospital based study done during 2013-2015. *Materials and methods:* Children less than 5 years with acute watery diarrhea were the study subjects. A commercial kit with Latex Agglutination method was used to identify Rotavirus antigen in freshly passed stool. Children were treated in the standard way, either as out-patient or hospitalised depending on clinical situation. *Results:* Of the 211 motion specimens tested, 37 (17.5%) were positive for Rotavirus antigen. Twenty-two (59.5%) were infants. Children of both sex, either breastfed or bottle fed were equally affected. 75.7% were hospitalised. Mean duration of hospital stay was 7 days. No mortality. *Conclusion:* Children of both sex, irrespective of feeding pattern were prone for Rotavirus diarrhea. Infants were at high risk of infection. Early hospitalisation could have prevented mortality.

**Keywords:** Infants; Latex Agglutination; Rotavirus.

### Introduction

Acute diarrheal disease is still a cause of mortality and morbidity among under five children in India. 13% of death are due to diarrhea and about 3,00,000 children die annually[1]. Rotavirus is the leading cause of severe diarrhea in Indian children which is about 40% [2]. Gladstone B.P et al have estimated the

burden of Rotavirus infection in 2011. It was shown that 48% children experienced at least one episode of rotavirus diarrhea by the age of 3 years [3].

Though viral culture is beyond scope of many health facilities, simpler screening methods can be utilized to confirm the etiology for better case management.

### Materials and Methods

#### *Aims and Objectives*

- ♦ To identify rotavirus in stool specimens
- ♦ To correlate age and sex with rotavirus prevalence
- ♦ To study the influence of feeding pattern
- ♦ To analyze the outcome.

#### *Study Design*

Prospective, non randomized, non controlled hospital based, analytical study.

#### *Study Period*

June 2013 to June 2015.

### Methodology

Less than 5 years old children presenting with acute onset of loose stools were included in the study. Complete clinical examination was done. Based on general condition, fever, vomiting, urination status and degree of dehydration, children were hospitalized or treated as outpatient. The protocol as per Acute Diarrheal Disease Control Programme and

Integrated Management of Neonatal and Childhood Illnesses (IMNCI) were used to treat the children.

Freshly passed stools were collected and Latex Agglutination (LA) test was done utilizing the kit. The commercial kit was obtained from Plasmatic Laboratory Products, United Kingdom.

0.2 gram of feces was added to 1.6ml of distilled water and 0.4ml of buffer. The mixture was centrifuged for 10 minutes at 3000rpm. One drop of the supernatant fluid was added to the Latex reagent and viewed under microscope. Visible agglutination was taken as Rotavirus antigen positive.

The services of Swasti Diagnostics, Kumbakonam were utilized initially to standardise the kit.

#### Inclusion Criteria

1. Children less than 5 years of age.
2. Children with acute watery diarrhea of less than 10 days duration.
3. Children whose parents gave consent for the study.

#### Exclusion Criteria

1. Children with Blood and/or mucus in stools.
2. Children with comorbid conditions.

#### Limitation of Study

1. Small Sample Size.
2. Not randomized and not controlled.
3. Enzyme-Linked Immunosorbent Assay (ELISA), Polyacrylamide Gel Electrophoresis (PAGE) and viral culture could not be done for want of facilities.

## Results

#### Total

n: 211

#### Sex

Male : 120 (56.9%)

Female : 91 (43.1%)

#### Age in months

< 6 : 56 (26.5%)

7/12 to 12 : 79 (37.4%)

13 to 36 : 65 (30.8%)

36 to 60 : 11 (5.2%)

#### Rotavirus Antigen Status

Rota virus Positive : 37 (17.5%)

Rota virus Negative : 174 (82.5%)

#### Sex vs Rota Virus Positivity

Male : 19 (51.4%)

Female : 18 (48.6%)

#### Age vs Rotavirus Positivity

##### Age in months

Less than 6 : 4 (10.8%)

6 to 12 : 18 (48.6%)

13 to 36 : 12 (32.4%)

37 to 60 s : 3 (8.1%)

Infants = 22 (59.5%)

#### Feeding vs Rota Virus positivity

Breastfeeding = 14 (37.8%)

Artificial Feeds/ Bottle : 11(29.7%)

**Table 1:** Few selected similar studies

S. No.	Year	Place	Rota Positivity	Season	More Affected Sex	More Affected Age	Method
1	1993	Tirupati, India	24%	Winter	Males	Up to 18 months	ELISA
2	2000	Brazil	17.9%	Rainy	Males	Up to 2yrs	LA
3	2004	Mumbai, India	10.9%	Winter	--	Infants	ELISA
4	2010	Brazil	25%	Rainy	Males	Infants	Virus Culture
5	2011	Thailand	37.5%	--	Males	Infants	Immuno Chromatography
6	2011	Saudi, Arabia	81%	No Seasonal Variation	Males	Infants	ELISA
7	2012	Karnataka, India	32.3%	Spring	Males	Up to 24 months	PAGE / ELISA
8	2013	Iraq	45.76%	Winter	Females	Up to 2yrs	ELISA, LA
9	2013	Pune, India	38%	Winter	Males	Infants	ELISA
10	2013	Iran	35%	Summer	No difference	Infants	ELISA
11	2014	Kerala, India	35.9%	Spring		Slightly more in Infants	ELISA

Combinations : 12 (32.4 %)

#### *Treatment of Rota Virus Positive Children*

n = 37

In Patient : 28 (75.7%)

Out Patient : 9 (24.3%)

*Mortality: NIL*

### **Discussion**

In this pilot study, utilizing Latex Agglutination (LA) test as a screening tool, 37 (17.5%) motion specimens were positive for Rotavirus Antigen. This is lesser than Venkatesh V.N. et al (Karnataka 2012) who has observed 32.3%; [4] Sanjay Chavan et al (Pune 2013) who has reported 38% [5] and Mathew M.A. et al (Kerala 2014) who found 35.9% [6]. ELISA testing was used in the above studies. A study by Younis Abdul Redha et al (Iraq 2013) has proved that the specificity and sensitivity of both LA and ELISA were comparable [7]. Hence the lesser incidence cannot be attributed to the method of screening.

The results are comparable to a data in Brazil in 2000 by Jose Fernandes et al with LA who has observed 17.9% positivity [8].

The quoted studies were done during winter when the rate of infection will be high. The present study did not concentrate on season since it was year wise hospital data.

Analysis of results reveal that children less than one year were more infected with rotavirus. Four (10.8%) babies were less than 6 months of age and 18 (48.6%) were between 6 months to 12 months of age, who were mostly affected. Out of 37, infants were 22 (59.5%), contributing to 2/3 of victims. This is on par with earlier quoted studies.

There is no obvious sex difference in Rotavirus positivity in this study. (i.e.) males 19(51.4%) and females 18 (48.6). Majority studies referred in Table I show males prevalence. This is comparable to study from Iran in 2013 by Tahereh Ziaei Kajbaf et al, who also observed equal involvement of both males and females [9]. A study from Iraq by Younis Abdul Redha et al in 2013 reports female preponderance [7].

Though breast feeding is advised to prevent gastrointestinal infection, this study revealed that 14 (37.8%) babies were on breast feeds only, while 11 (29.7%) were on bottle feeds and 12(32.4%) were on both. The Rotavirus positivity is not much influenced

by feeding. Multicentric studies with more sample size are needed to support this observation.

Twenty-eight (75.7%) children reported with moderate or severe dehydration, higher purge rate, fever and/or vomiting which warranted hospitalization.

Since supportive therapy, mainly rehydration either with oral rehydration solution and/or intravenous fluids was initiated in time, there was no mortality.

### **Conclusion**

Rotavirus infection is prevalent in this community. Since infants were affected more, prevention by vaccination is the need of the hour. Health education and social marketing of information about the danger signs in diarrhea is essential since prompt hospitalization can prevent death.

### **References**

1. Bassani DG, Kumar R, Awasthi S, Morris SK, Paul VK, Shet A, et al. Causes of neonatal and child mortality in India: a nationally representative mortality survey. *Lancet*. 2010; 376: 18 53-60.
2. Kahn G, Fitzwater S, Tate J, Kang G, Ganguly N, Nair G, et al. Epidemiology and Prospects for Prevention of Rotavirus Disease in India. *Indian Pediatrics*. 2012; 49: 467-74.
3. Gladstone BP, Ramani S, Mukhopadhyaya I, Muliylil J, Sarkar R, Rehman AM, et al. Protective effect of natural rotavirus infection in an Indian birth cohort. *N Engl J Med*. 2011; 365: 337-46.
4. Venkatesh V.N., Prashanth H.V., Bhat K.G., Subha D.S., Sudhindra K.S., Farheen Fathima. Rotaviral Diarrhoea in Children: A Comparison of PAGE with ELISA. *Journal of Clinical and Diagnostic Research*. 2012 April; 6(2): 188-191.
5. Sanjay C. Chavan, Sharad Agarkhedkar, Dipali S. Chavan, Nagdawane RP, Smita Singhania. Prevalence of rotavirus diarrhoea among children hospitalized in a tertiary care hospital in Western India. *Int J Pharm Biomed Sci*. 2013; 4(1) :4-7.
6. Mathew MA, Abraham Paulose, Chitralkha S, Nair MKC, Gagandeep Kang, Paul Kilgore. Prevalence of Rotavirus Diarrhea among Hospitalized Under-five Children. *Indian Pediatrics*. 2014 January; 51: 27-31.
7. Younis Abdul-Redha AL-Khafaji, Hawraa J. AL-Jiboury. Detection of Rotavirus in diarrhea stool samples of children with acute gastroenteritis in Babylon governorate, Iraq. *International Research Journal of Microbiology*. 2013 March; 4(3): 84-88.

8. Jose V. Fernandes, Sylvia M.D. Fonseca, Jenner C.V. de Azevedo, et al. Rotavirus detection in feces of children with acute diarrhea. *Journal de Pediatria (Rio J)*. 2000; 76(4): 300-4.
9. Tahereh Ziaei Kajbaf, Ahmad Shamsizadeh, Gholamreza Kalvandi, Manoochehr Macvandi. Relative Frequency of Rotavirus and Adenovirus among Children aged 1-60 months Hospitalised with acute diarrhoea in South-Western, Iran. *Jundishapur Journal of Microbiology*. 2013; 6(1): 47-50.
- 

### Subscription Form

I want to renew/subscribe international class journal "**Indian Journal of Communicable Diseases**" of Red Flower Publication Pvt. Ltd.

#### Subscription Rates:

- India: Institutional: INR9000/USD900
- Individual: Contact us

Name and complete address (in capitals):

#### *Payment detail:*

Demand Draft No.

Date of DD

Amount paid Rs./USD

1. Advance payment required by Demand Draft payable to Red Flower Publication Pvt. Ltd. payable at Delhi.
2. Cancellation not allowed except for duplicate payment.
3. Agents allowed 10% discount.
4. Claim must be made within six months from issue date.

*Mail all orders to*

#### **Red Flower Publication Pvt. Ltd.**

48/41-42, DSIDC, Pocket-II, Mayur Vihar Phase-I, Delhi - 110 091 (India)

Tel: 91-11-22754205, 45796900, Fax: 91-11-22754205

E-mail: [customer.rfp@rfppl.co.in](mailto:customer.rfp@rfppl.co.in), [customer.rfp@gmail.com](mailto:customer.rfp@gmail.com)

Website: [www.rfppl.co.in](http://www.rfppl.co.in)