International Journal Dental and Medical Sciences Research
Volume 3, Issue 4, July-Aug 2021 pp 781-785 www.ijdmsrjournal.com ISSN: 2582-6018

Seasonal Variation in Occurence of Rotavirus Infection in Children Less Than 5 Years of Age with Acute Diarrhea.

Dr. Jugal KishorAgarwal[1],Dr. Manoj Kumar[2], Dr. Dipty Agrawal[3],Mrs Zenab Naseem[4], Dr. S. P. Garg[5]

1. *Assistant Professor, Department of Microbiology, Rama Medical College Hospital and Research Center, Hapur, India.*
2. *Assistant Professor, Department of Microbiology, Rama Medical College Hospital and Research Center, Hapur, India.*
3. *Assistant Professor, Department of Anaesthesia, Rama Medical College Hospital and Research Center, Hapur, India.*
4. *Tutor, Department of Microbiology, Rama Medical College Hospital and Research Center, Hapur, India.*
5. *Professor and Head, Department of Microbiology, Saraswathi Institute of Medical Sciences, Hapur, U.P.*

Submitted: 05-08-2021 Revised: 22-08-2021 Accepted: 25-08-2021

ABSTRACT

Introduction- Rotavirus is one of the leading cause of Pediatrics diarrhea. There is a need for data analysis on the seasonal epidemiology of rotavirus diarrhea. This study was carried out to determine the seasonal pattern of rotavirus infection in children up to the age group of 5 year who presented with diarrhea. The study also ascertains factors associated with rotavirus infection in them.

Material and Method: In the study we reviewed over a 1 year period for potential relationship of rotavirus cases with seasonal variation and locality by plotting average monthly preparation of diarrhea cases which were positive for rotavirus diarrhea.

Result: Out of 240 cases of acute diarrhea in children, 32 (150) were males and 20 (90) were females analysed for rotavirus cases in the study. As in relationship to seasonal variation, Rotavirus cases were maximum during colder months (Oct-Feb) in comparison to hotter months (Mar-Sep), which is statistically significant (P value<0.05).

I. INTRODUCTION

Acute diarrheal disease is a major public health problem and a leading cause of high morbidity and significant mortality in both developed and developing countries like India. Rota virus infection is the third most common cause of severe diarrhea in young children Worldwide[1.] Almost all kids have had a Rota virus infection by the time they are 5years old. It is estimated that Rota Virus infection annually causes 111million episodes of gastroenteritis requiring home care, and about 5 million clinic visits, millions of hospitalization and approximately 600,000 deaths in children less than 5 years of age Worldwide[2]. There are seven Rota virus groups (A-G) known to infect the humans, among them the most dominant is group A. World Health Organization (WHO) estimated that diarrhea is responsible for 18% deaths among children younger than 5 years of age[3].

In view of high incidence of morbidity and mortality in developing countries like India there is a need for rapid and sensitive detection method in routine diagnostic laboratory, which perform antigen detection using enzyme immunoassay (EIA), latex agglutination assay[3] or immune-chromatography[4, 5.]Evidence by direct virus detection using electron microscopy is not practical by routine laboratories. Although Rota virus can be isolated from stool sample by culture, but it is a cumbersome process and needs sophisticated laboratory with skilled personnel. Rotavirus exhibit distinct seasonality, and has been known as 'Winter diarrhea' in some part of the world winter gastroenteritis and winter vomiting disease were recognized illness of early childhood before 'rotavirus was identified and found to their cause'[6]

In an effect to increase one understanding of the transmission and epidemiology of Rotavirus disease this paper update the knowledge of seasonality of Rotavirus infection through a systemic review and meta-analysis of the relationship between monthly rotavirus and climatology variable for each month.

II. MATERIALS AND METHODS

International Journal Dental and Medical Sciences Research
Volume 3, Issue 4, July-Aug 2021 pp 781-785 www.ijdmsrjournal.com ISSN: 2582-6018

The present study was undertaken between January 2014 to December 2014 in the Department of Microbiology and Pediatrics Department, at Saraswathi Institute of Medical Sciences, Hapur U.P. After obtaining a written &informed consent by the parents of children below five years with acute diarrhea. Ethical clearance was taken from the ethical committee of the institution. A total of 240 freshly passed stool samples were collected in wide mouth sterilized container from hospitalized children and OPD patients of Saraswathi Institute of Medical Science, Hapur, with complain of acute diarrhea by the help of their parents or care taker and transported to the Microbiology department as soon as possible. Samples were kept at 4°C and tested within 24 hours of collection. Rotavirus antigen is detected by immune-chromatographic test (SD Bioline test kit) and ELISA kit (Premier Rota clones) according to manufacturer's instruction (One step rotavirus antigen test Korea, 2011; Rotavirus antigen ELISA, 2012).

III. RESULT:

Of the 240 children of cases of acute diarrhea, 32 (out of 150) were mere males and 20 (out of 90) were females respectively of total children suffering from rotavirus diarrhea (52/240). Present studies showed male children were affected more than female children in a ratio of 1.6:1, which is also observed with other studies where in a prepordence of infection was observed in male children (Tab3). Banerjee 1et al, 2006 formed that a large proportion of admitted children in hospital due to rotavirus were male (63.8%)[7].

Study by Ghazi HO et al, (2005) found that out of 48 patients infected with rotavirus, 30 (63%) were male and 18 (37%) were female [8], whereas 54.6% of male children were suffering from rotavirus infection by Raboni SM (2002) [9].

In another study Junaid SA et al, (2011) showed rotavirus excreted in diarrhea samples were male cases 14(8.8%) and female were 8 (5%) respectively [10].

While other studies showed no association between male and female children, like a study done by Saravanan P.et al, (2004) reported that as such no association of rotavirus infection could be discerned between male male (23.85%) and female (21.13%) children[11].

In present study, more cases were seen during cooler months (Oct-Feb) that summer months (Mar-Sep), a higher prevalence during cooler months (35 out of 52) (Table 1), which is statistically significant (X^2=7.9, p value <0.05) , (Table 2A and 2B), which is in concordance with majority of study carried out in India and other developing and developed countries . Rotavirus diarrhea shows a seasonal variation with a higher incidence in winter months having low relative humidity i.e the factor may be because of temperature influence on the stability of human and animal rotavirus that might contributes to efficient transmission of human rotaviruses and because of influence of low relative humidity in the home act as a facilitating factor for the survival of rotaviruses on surfaces [11].

Saravanan P. et al (2004), reported that in the hotter months (Mar-Aug) during the three years (1996-1997 and 1998) showed a decreased rate of rotavirus infection (17.6, 17.0 and 14.3% respectively) than the cooler months (Sep-Feb) (21.8, 31.8 and 22.5 respectively). The same pattern could be appreciated when the summation of seasons were analysed as 16.4% in hotter months and 25.9% in cooler months[11].

Raboni SM et al (2002) too observed a similar seasonal pattern in rotavirus diarrhea, which was associated more with cooler months and a drier atmosphere[13].

Kang et al, (2009) observed a marked seasonal peak of rotavirus diarrhea cases in northern temperature location but was less seasonal in Southern location tropical climate[12]. Bahl R et al, (2005) reported that hospitalization for rotavirus associated diarrhea occurs round the year in Delhi, but there was a distinct peak in winter (Nov-Feb)[14].

Similar trends were observed by sharift M etal (2003) in Eastern Nepal. In contrast, Baneerjee I et al, reported no significant seasonal trends in Vellore. However, they found a peak of rotavirus diarrhea in the months of (July-September, 2003), corresponding to rainy season.

Table 1 :Monthly distribution of Rotavirus positive cases

Month	Number of cases	Number of Rotavirus positive cases	% of Rotavirus cases
January	32	8	15.4
February	18	5	9.6
March	18	3	5.7
April	18	4	7.8
May	16	2	3.8

International Journal Dental and Medical Sciences Research
Volume 3, Issue 4, July-Aug 2021 pp 781-785 www.ijdmsrjournal.com ISSN: 2582-6018

June	18	1	1.9
July	20	2	3.8
August	14	2	3.8
September	18	3	5.8
October	26	6	11.5
November	18	6	11.5
December	24	10	19.2
Total	240	52	100%

Table 2A

Observed value		**Cooler Months (Oct-Feb)**	**Hotter Months (Mar-Sep)**	**Total**
Rotavirus cases	**Positive**	35	17	52
	Negative	83	105	188
Total		**118**	**122**	**240**

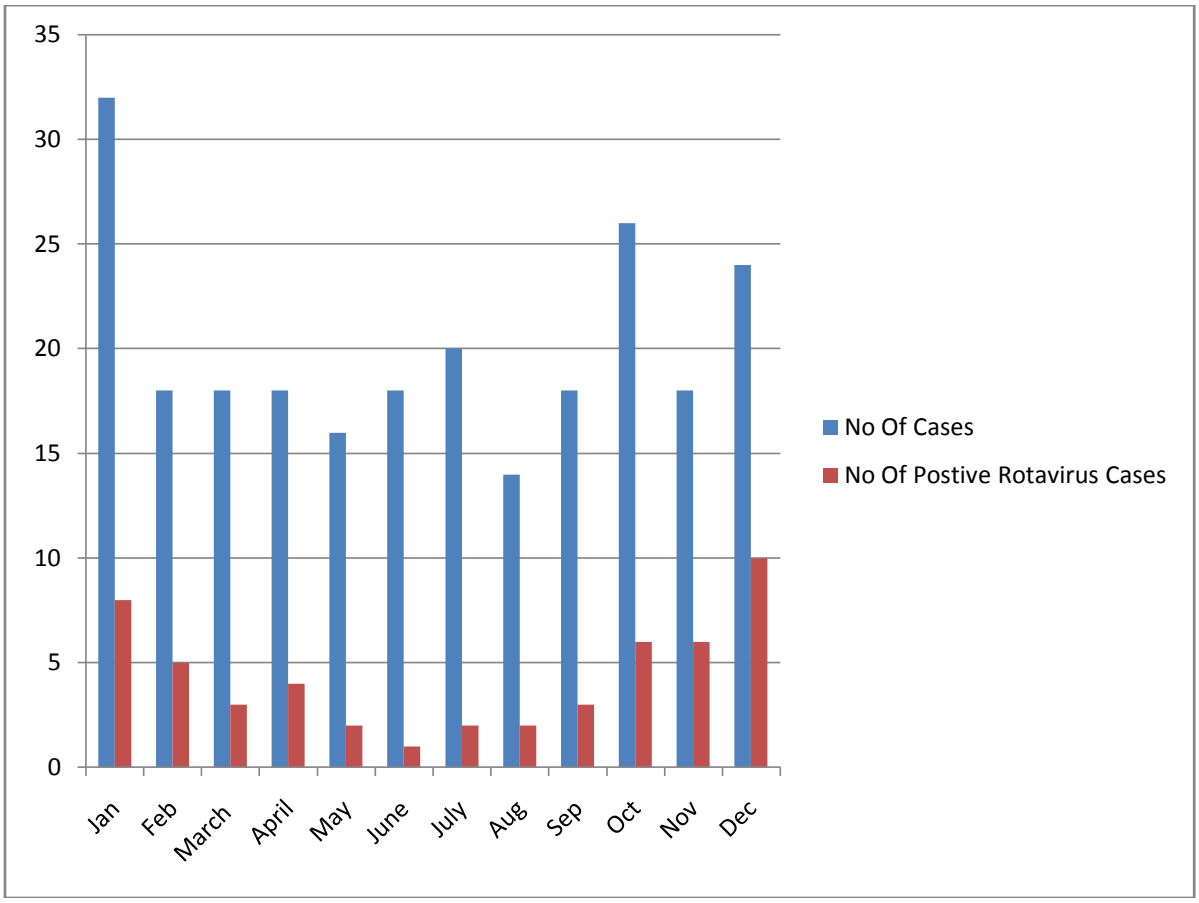
Table 2B

Expected value		**Cooler Months (Oct-Feb)**	**Hotter Months (Mar-Sep)**	**Total**
Rotavirus cases	**Positive**	26	26	52
	Negative	92	96	188
Total		**118**	**122**	**240**

Out of 52 rottavirus positive diarrhea cases, maximum cases were seen during cooler month (Oct-Feb). Chi-square test (X^2) = 7.9, p value <0.05, shows significant association of rotavirus with cooler months than with hotter months.

Table 3: Ratio of Rotavirus positive male and female childrens

Study	**Male:Female (Ratio)**
Present study	1.6:1
Banerjee I et al	1.76:1
Ghaji HO et al	1.2:1
Raboni SM et al	1.2:1
Junaid SA et al	1.75:1



IV. CONCLUSION:

There is urgent need to do the investigation for rotavirus antigen detection in paediatric acute diarrhea cases especially in developing countries like India with their seasonal prevalence, for preventing in MDR cases, improving hygienic measures in both home and hospital environment as well as implementing immunization for rotavirus.

Acknowledgement
JKA collected data and SP guided the study, and MK, DA and ZN critically reviews the article.

Funding- None
Conflict of interest- None

REFERENCES

[1]. Kapikan AZ, Chamock, R.M. 1996. Rotavirus In: Fields BN Knipe DM, Howley PM et al. eds. Fields virology. 3rd edn. Philadelphia:Lippincott- Raven, PP 1657-1708.

[2]. Parashar, U.D., Hummel mane, G. 2003. Breese JS, Miller MA, Glass RI. Global illness and death. Caused by Rotavirus disease in children. Emerg. Infect. Dis., 9: 565-572.

[3]. Bryce, J., Boschi – Pinto, C., Shibuya, K., Black, R.E. 2005. WHO estimate so the causes of death in children Lancet, 365(9465): 1147-52.

[4]. Dennehy, P.H. ,Hartin M., Nelson, S.M. and Rebing S.F. 1999. Evaluation of immune card STAT Rota virus assay for detection of group- A Rota virus in fecal specimen. J. Clin. Microbiol, 37(6);1977-1979.

[5]. Dewar J., De Beer M., Elliott E. ,Monaisa P., Semenya D., Steele A. 005. Rapid detection of Rota viruses- Are labotatories underestimating infection in infants. South African Med. J. 95(7);494-5.

[6]. Cook SM, Glass K1, Lebaron CW, Ho MP. Global seasonality of Rotavirus infection, Bull world Health organization, 1990, Vol 68 (Pg-171-177 Pub med).

[7]. Banerjee I, Ramani S, Prime rose B, Mosis

P, Iturriza GM, Gray J et al.Comparative study of epidemiology of rotavirus in children from community based cohort and a hospital in South India. J Clin Micro 2006 July; 44(7):2468-74.

[8]. Ghazi HO, Khan MA, Telmesani AM, Idress B, Mahomed MF. Rotavirus Infection in Infants and Young Children in Makkah, Saudi Arabia. J Pakis Medical Asso 2005; 55: 231.

[9]. Raboni SM, Nogueira MB, Hakim VM, Torrecilha V TG, Lerner H and Tsuchiya LRV. Comparison of Latex Agglutination with Enzyme Immunoassay for Detection of Rotavirus in Fecal Specimens. Am J Clin Pathol 2002; 117: 392-394.

[10]. Junaid SA, Umeh C, Olabode AO and Banda JM. Incidence of Rotavirus infection in children with gastroenteritis JOS University Teaching Hospital, Nigeria, J of Virology, 2011; 8: 233.

[11]. Saravanan P, Ananthan S, Ananthasubramanian M. Rotavirus Infection among infants and young children in Chennai, South India, Ind. J Medical Microbiology 2004; 22(4): 212-221.

[12]. Kang G, Arora R, Chitambar SD, Deshpande J, Gupte MD, Kulkarni M,et al; Indian Rotavirus Strain Surveillance Network. J Inf Dis 2009 November 1; 200 (Suppl 1): S147-53.

[13]. Raboni SM, Nogueira MB, Hakim VM, Torrecilha V TG, Lerner H and Tsuchiya LRV. Comparison of Latex Agglutination with Enzyme Immunoassay for Detection of Rotavirus in Fecal Specimens. Am J Clin Pathol 2002; 117: 392-394.

[14]. Bahl R, Ray P, Suboth S, Shambharkar P, Saxena M, Parashar U et al. Incidence of severe rotavirus diarrhea in New Delhi, India and G and P types of infecting rotavirus strains. JID 2005; 192 (Supp.1): S114-19.

[15]. Shariff M, Deb M, Singh R. A study of diarrhea among children in eastern Nepal with reference to rotavirus. Indian Journal of Medical Microbiology, 2003; 21 (2): 87-90.