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Research Article

Prevalence of rotavirus in a semi urban area

Naveen Kumar Reddy A.*, Nageswara Reddy Yamasani

Department of Paediatrics, Viswabharathi Medical College, Kurnool, Andra Pradesh, India

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***Correspondence:**
Dr. Naveen Kumar Reddy,
E-mail: pranaveen@rediffmail.com

ABSTRACT

Background: Rotavirus is one of the leading causes of mortality among children with acute watery diarrhea. There is an urgent need to estimate the prevalence of this infection in different localities so that proper measures can be taken to curb the infection especially with the advent of the new oral live vaccines.
Methods: 246 children belonging to the age of 5 years admitted to our hospital with acute watery diarrhea were included into the study. General demographic details were taken for all the patients with thorough clinical and physical examination. History regarding the number of stools per day, consistency, types of feeds like exclusive breast feeds, exclusive top feeds or both was noted. Rotavirus was detected on stool samples by ELISA method.
Results: 36.2% of the total patients with diarrhea were positive for rota viral infection, and 74.2% of the rotavirus burdens were seen below the 2 year age group. 12.4% of the children infected with rotavirus were exclusively on breast feed, while 32.6% were exclusively on top feed. 55.1% of them were on both mixed (breast and top) feed. The most common comorbidity observed along with rotavirus infection was dehydration, followed by vomiting, lethargy and fever.
Conclusions: There is a significant prevalence of rotavirus in our geographical area as well. Since the rotavirus infection is a public health problem, proper surveillance is to be done to find out the exact prevalence of the disease in a hospital among the admitted children as well as those in the community, so as to actively take protective measures.

Keywords: Rotavirus, Acute diarrhea, Dehydration

INTRODUCTION

Diarrhea is one of the leading causes of mortality among children especially in the developing countries. It is estimated that in the developing countries, about 1.87 million deaths of children below 3 years occur due to diarrhea, while globally, this is estimated to be about 140 million deaths.[1-3] Upto 85% of these deaths occur in low income countries.[4] In India, out of more than 2.3 million annual deaths among children, about 334 000 are attributable to diarrhoeal diseases.[5,6] Majority of these are due to rotavirus.[1,6]

Rotavirus is a highly communicable disease, with a very small infective dose of about <100 virus particles.[7] These viruses are shed in very high concentrations in the feces of infected children and can be transmitted through feco-oral routes, thorough fomites and close person to person contact.[8] They can also be transmitted by fecally contaminated food and water and respiratory droplets.[9]

Diarrhea due to rotavirus is one of the leading causes of hospitalization.[10] Rotavirus often affects children above 3 months of age and it is said that by the time the children reach 3-4 years, they all would have had the disease. The infection the first time is more severe and subsequent exposures to the illness results in minor symptoms.

Children below 3 months, older children and adults are asymptomatic to the infection.[11,12]

Most of the time, rotavirus infection is associated with dehydration.[13,14]

With the development of improved sanitation, there has been a considerable reduction in other diarrheal diseases while the incidence of rotaviral infections is unaffected.[15] Recently, 2 rotavirus vaccines have been developed for rotavirus and have found to be effective, due to which the incidence of the infection is expected to come down by the reduction of severe dehydration

This study was conducted to estimate the prevalence of rotavirus infection in our geographical area.

METHODS

This study was conducted in the department of Pediatrics at Viswabharathi Medical College during the period of 2 years. 246 children belonging to the age of 5 years admitted to our hospital with acute watery diarrhea were included into the study.

Children with dysentery or diarrhea for more than 14 days, those on antibiotic induced diarrhea were excluded from the study. Diarrhoea developed after hospitalization due to any other cause was also excluded from the study.

General demographic details were taken for all the patients. Thorough clinical and physical examination was done. History regarding the number of stools per day, consistency, types of feeds like exclusive breast feeds, exclusive top feeds or both was noted. Classification of dehydration and management was done based on the WHO guidelines for diarrhea management. All the children in the study were treated with oral rehydration therapy or IV fluids based in the severity of dehydration.

The stool samples were collected either in sterile containers directly or through rectal swabs for the detection of rotavirus and stored at -20^{0}C until enough samples were collected for performing the test. Detection of Rotavirus was done qualitatively by ELISA technique.

RESULTS

Among the 246 children admitted for diarrhea, 133 (54.1%) were males and 113 (45.9%) were females (Figure 1).

89 (36.2%) of the total patients with diarrhea were positive for rotaviral infection. 74.2% of the rotavirus burden were seen below the 2 year age group (Figure 2).

11 (12.4%) of the children infected with rotavirus were exclusively on breast feed, while 29 (32.6%) were exclusively on top feed. 49 (55.1%) of them were on both mixed (breast and top) feed (Figure 3).

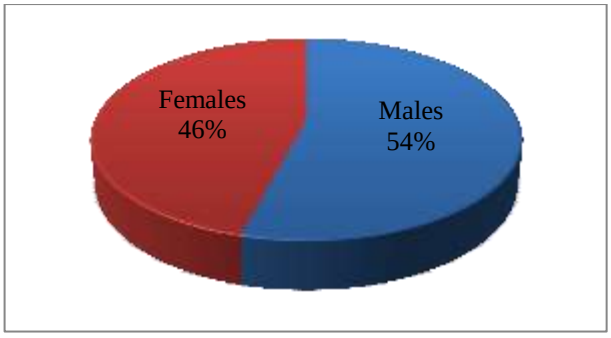

Figure 1: Sex wise distribution.

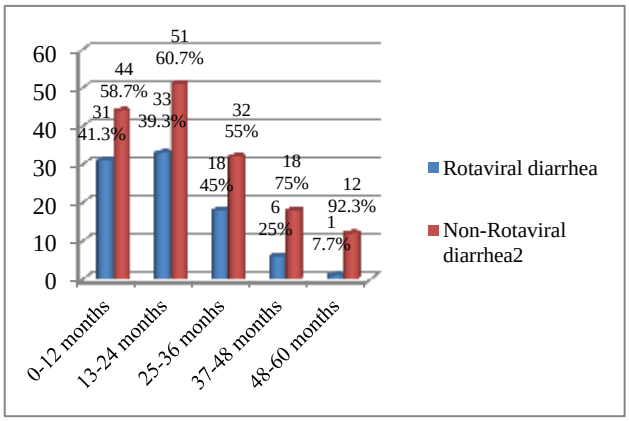

Figure 2: Age wise distribution of rotaviral and non-rotaviral diarrhea.

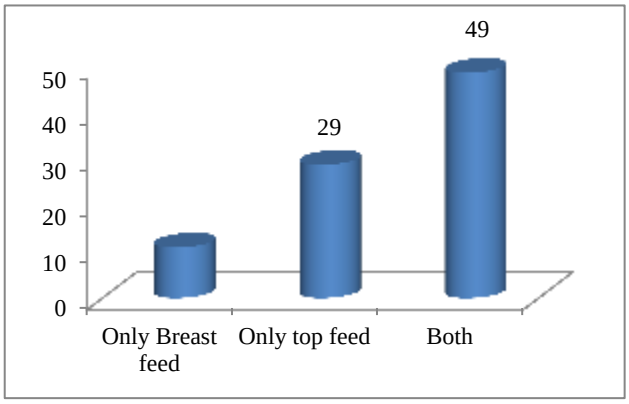

Figure 3: Type of feed among rotavirus infected patients.

215 children had dehydration, out of which 32 were severely dehydrated and were given IV fluids. Vomiting's were seen among 102 children and fever was seen in 83 children (Table 1).

DISCUSSION

Rotavirus is estimated to be the cause of more than 65,000 deaths annually in children admitted to the emergency room. It is estimated that around 40% of the children admitted for diarrhea and 23% of the outpatient are infected with rotavirus.[5]

Table 1: Co-morbidities among rotavirus infected children.

Comorbidities	Rotavirus infected children (n= 89)	Other diarrhea infection (n= 157)
Dehydration		
Mild	34 (38.2%)	85 (54.1%)
Moderate	26 (29.2%)	59 (37.6%)
Severe	14 (15.7%)	23 (14.6%)
Vomitings	46 (51.7%)	103 (65.6%)
Fever	44 (49.4%)	67 (42.7%)
Cough and Coryza	17 (19.1%)	27 (17.2%)
Lethargy	59 (66.3%)	106 (67.5%)
Sunken eyes	21 (23.6%)	46 (29.3%)

Rotavirus was detected in 36.2% of the cases in our study. The detection rate of rotavirus is 40% in the eastern Mediterranean region, while a higher level was found in Asia with 45% and lower in Latin America and Africa with 38% and 24% respectively.[16-18] This was consistent to the studies by Parasher et al.[5] A much higher rate compared to our study was reported by Taqbo et al of 56% rotaviral incidence in children below 5 years of age.[9] In India, an incidence of 34% was reported in various studies.[10,19,20] Almost half of the children admitted to the hospital in Uganda was found to be infected with Rotavirus and it is estimated that nearly 52% of the children below the age of 5 years are affected by the disease in Africa.

Many studies have estimated that 75% of the children experience at 1 episode of rotaviral diarrhea by the time they are 3 years of age.[5,10] We have observed around 40.3% of the children aged below 2 years to be affected by this disease which was corroborated by Sarangi et al, who observed that around 45% of the children below the age of 2 years were affected. Taqbo et al have reported more than 96% of the children <2 years to be affected by this disease while 77% of them were below 1 year of age.

Most of the children with rotaviral infection were on top feed while only around 12% were exclusively breast fed and around 33% were exclusively on top feed. Similar association of type of feed to rotavirus was also reported by John et al, who observed that children on exclusive breast feeds had a reduced prevalence of rotavirus.[22] This was also observed in other studies, where breastfeeding was found to temporarily postpone rather than prevent the outcome.[23-25] In contrast, studies from Bangladesh have eported that breast feeding is only a minor contributor to the protection of viral disease.[24]

The most common comorbidity observed along with rotavirus infection was dehydration, followed by vomiting, lethargy and fever which were corroborated by the study by John et al and Sarangi et al.

Recent advances in the development of 2 vaccines for rotavirus infection have shown to be very effective in protection against this infection in developed countries, although in some cases in India it has not found to be so. The exact reason for the infectivity of this oral vaccine against the rotavirus is not properly iunderstood.[10] It is suggested to be dose dependent.

The main limitation of our study is that it is a hospital based study and the sample size was small. Therefore the exact prevalence in the community is not fully known. More over the number of positive cases were few to establish a positive result of the mother's breast milk on rotavirus.[26]

CONCLUSION

There is a significant prevalence of rotavirus in our geographical area as well. Since the rotavirus infection is a public health problem, proper surveillance is to be done to find out the exact prevalence of the disease in a hospital among the admitted children as well as those in the community, so as to actively take protective measures. More detailed surveillance needs to be done with more cases so as to show the efficacy of breast milk and the effect of vaccines on the children.

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