Original Article

Frequency of Rotavirus as a Cause of Acute Diarrhea

Zia Muhammad, Abdul Khaliq, Tabinda Shadab, Syed Mohsin Ali Shah, Sabir Khan and Zulqarnain Haider

ABSTRACT

Objective: To find out how frequently infants between the ages of one month and twenty-four months who have severe diarrhea are affected by the Rota virus.

Study Design: A Descriptive Cross-Sectional Study.

Place and Duration of Study: This study was conducted at the Department of Pediatrics Units, Khyber Teaching Hospital in Peshawar between January 2021 and January 2022.

Methods: The investigation was conducted at the pediatric departments of the Khyber Teaching Hospital in Peshawar. The study employed a descriptive cross-sectional study design and ran for six months. The sample size was calculated using WHO software to be 140 with an 8% margin of error, 63% Rota virus diarrhea, and a 95% confidence level.

Results: We found that the mean age was 7 months, with a standard deviation of 2.77. 38% of the children were female and 62% of the youngsters were male. Three quarters of children had severe dehydration, compared to sixty-five percent who had mild dehydration. More than 63% of kids had pus cells that were less than 10, while 37% of kids had pus cells that were greater than 10. Children had RBCs in 35% of them, bacteria in their stools in 8% of them, and cysts in 15% of them. Rotavirus antigen frequency was 63%.

Conclusion: The study has demonstrated that diarrhea in children under the age of five is frequently caused by the rota virus.

Key Words: Frequency, Rota Virus, Acute diarrhea.

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INTRODUCTION

Worldwide, diarrhea is responsible for 1 in 9 child deaths and accounts for mortality of 801,000 in children under 5 years of age every year[1]. In developing countries, children of less than 3 years of ageexperience around 3 episodes of diarrhea each year[2].In terms of juvenile mortality from diarrheal sickness, Pakistan is rated 23rd by the (W.H.O) (WHO) with over 6.4 million instances of pediatric diarrheal illness annually[3]. Pakistan's predicted 2019 diarrheal mortality rate was 67 fatalities per 1,000 live births, according to reports4. Hospitalization rates for children under five years old are 40%, with rotavirus infection being the most prevalent cause[1]. The (W.H.O) advises adding the rotavirus vaccine to national vaccination regimens, particularly in high-risk areas like Asia and Africa[4,5].

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The rotavirus vaccination offers lifelong defense against diarrhea that causes hospitalization in children under the age of two. While the mortality rate linked with diarrhea has been decreasing[6,7], the total incidence of diarrhea has been shown to be constant over time at around 3.2 bouts per kid year. In the summer and rainy season, 40–50% of hospital admissions are still related to diarrhea.[8]

The most frequent pathogens linked to the majority of diarrhea cases include non-typhoidal salmonella, rotavirus, ETEC, shigella, campylobacter, and Vibrio cholerae[9]. There are differences in the prevalence of certain infections in industrialized and underdeveloped countries. About 70% of diarrhea cases in affluent nations are caused by viruses (rotavirus accounts for 40%), followed by bacteria (10–20%), and protozoa (<10%)[10–13]. 50–60% of cases in underdeveloped nations are caused by bacterial Enteropathogenic E. Coli (25–60%), Campylobacter jejuni (10–18%), Shigella spp. and Salmonella spp. (5% each), and 35% are of viral (15–25% rotavirus) origin. Many cases have unclear or mixed causes. A few factors that increase a person's risk of diarrhea include not nursing, unclean habits, consuming contaminated food or water, malnutrition, and a lack of parental education and awareness, especially in developing countries. Young age, immunodeficiency, measles, and micronutrient deficiencies, particularly those of zinc and vitamin A, are additional risk factors[14]. In both industrialized and

developing nations, rotavirus is the main cause of severe diarrhea in children. It has been demonstrated that two rotavirus vaccinations are effective against rotavirus. By lowering the frequency of diarrheal disease-related deaths and the prevalence of severe diarrhea, the introduction of these vaccinations is anticipated to lower child mortality. In Khyber Pakhtunkhwa, there are no regional data on diarrhea caused by the Rota virus available. The results of this study will be helpful in defining policy on the rotation of rotavirus vaccinations as the most important intervention in public health initiatives that lower childhood mortality and morbidity.

METHODS

This descriptive and cross-sectional study was conducted at the Khyber Teaching Hospital in Peshawar. The research was done between January 2021 and January 2022. Using non-probability sequential sampling, a sample of 140 kids who met the study's inclusion requirements were taken into account. "The abrupt onset of three or more loose (taking shape of the container) or watery stools per day and lasts no longer than 14 days and presents with early, moderate, or severe dehydration" is the definition of acute diarrhea. In contrast, rotavirus diarrhea was described as follows: "Diarrhea in an unvaccinated patient whose rotavirus antigen detected by a commercial enzyme immunoassay (EIA) in a fecal specimen will be defined as a confirmed case of rotavirus diarrhea."

Inclusion Criteria: Enrollment was open to children of either gender between the ages of 1 month and 24 months who had severe diarrhea lasting less than 14 days as their main ailment.

Exclusion Criteria:

1. Children with bloody diarrhea.
2. Children with persistent diarrhea
3. Children admitted to hospital for some other illness and develop diarrhea during their hospitalstay.

All children who satisfied our inclusion requirements and presented themselves at the pediatric unit and emergency services of Khyber Teaching Hospital in Peshawar were enrolled in the trial. A complete medical history and physical examination were performed to look for signs of diarrhea caused by the rotavirus. Stool samples were collected and kept in containers labeled with the patient's information. One spoonful of freshly voided diarrheal feces was placed into the designated container using the spoon that came with the container. The National Institute of Health in Islamabad employed enzyme linked immunoassay, or EIA, to determine the rota virus antigen.

The data was collected using Proforma, and the analysis was done using SPSS version 25.0. Mean ± SD was calculated for numerical parameters including age, duration of diarrhea, arrival temperature, pus cells, and RBC in stool R/E. Frequency and percentages were calculated for categorical factors such gender, dehydration status, bacteria and cyst in stool R/E, and rotavirus antigen. All of the results were shown using tables and graphs.

The project was approved by the Khyber Medical College Ethical Review Committee. The guidelines for preserving data confidentiality set forth in the Helsinki Declaration were adhered to.

RESULTS

The analysis of the age distribution of 140 children revealed that 46 (33%) were between the ages of 1-6 months, 38 (27%) between 7-12 months, 32 (23%) between 13-18 months, and 24 (17%) between 19-24 months (Table 1). With an SD ± 2.77, the mean age was 7 months.

Table No.1: Age Distribution

Age	Frequency	Percentage
1-6 months	46	33%
7-12 months	38	27%
13-18 month	32	23%
19-24 months	24	17%
Total	140	100%

140 children's gender distribution was examined; 87 (62%) of the youngsters were male and 53 (38%) were female (Figure 1).

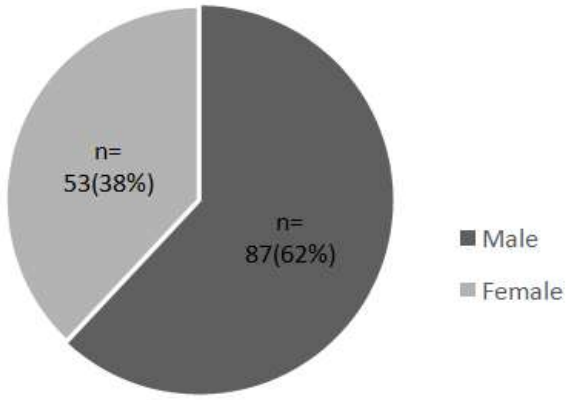

Table No.1: Gender Distribution

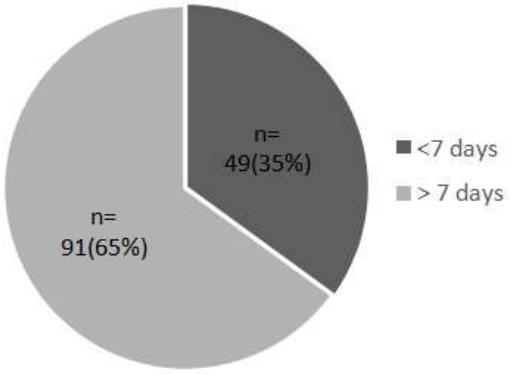

Figure No.2: Duration of Diarrhea

The length of diarrhea experienced by 140 children was examined; 49 (35%) had diarrhea for fewer than seven days, and 91 (65%) had diarrhea for more than seven days (Figure 2).

140 children's arrival temperatures were examined; 98 (or 70%) had fevers < 100°F, whereas 42 (30%) had fevers > 100°F. (Table 2).

The dehydration status of 140 youngsters was examined; 91 (65%) had some dehydration and 49 (35%), severe dehydration. (Table 3)

Table No.2: Temperature at Arrival

Duration	Frequency	Percentage
≤ 100°F	98	70%
> 100°F	42	30%
Total	140	100%

Table No.3: Dehydration Status at Arrival

Dehydration	Frequency	Percentage
Some	91	65%
Severe	49	35%
Total	140	100%

Stool R/E examination among 140 children was analyzed as 88(63%) children had pus cell less than 10 while 52(37%) children had pus cell more than 10. RBCs were present in 49(35%) children while 91(65%) children didn't had RBCs. Bacteria in stool was found in 11(8%) children and cyst was found in 21(15%) children (Table 2).

Frequency of Rotavirus antigen among 140 children was analyzed as 88(63%) children had rotavirus antigen while 52(37%) children didn't had rotavirus antigen (Figure 3).

Table No.4: Stool R/E Findings

Stool R/E		Frequency	Percentage
Pus Cells	≤ 10	88	63%
	> 10	52	37%
RBC	Present	49	35%
	Absent	91	65%
Bacteria	Yes	11	8%
	No	129	92%
Ova/Cyst	Yes	21	15%
	No	119	85%

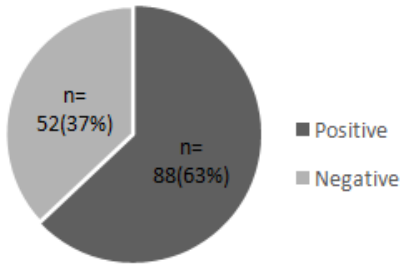

Figure No.3: Rota Virus Antigen

DISCUSSION

The primary pathogens causing diarrheal illness globally, particularly in impoverished nations, are rota viruses. Within the first three to five years of life, almost all children have the Rota virus; however, the most prevalent age group for severe diarrhea and dehydration is between three and five months of age. By the time they are five, nearly all children worldwide have had gastroenteritis from the Rota virus.[15] A Karachi-based study indicated that the incidence of the rota virus was 12.3% in 1990 and 24.4% in 1991. The majority of children who contracted the Rota virus were between the ages of 6 and 24 months. According to a Washington, DC study, most children acquire antibodies against the Rota virus by the time they are two years old, which helps to explain why incidence has been found to decrease in later childhood. The incubation period of the rota virus is two to three days. Usually, vomiting and diarrhea occur suddenly at the beginning of an illness. Dehydration can occur when vomiting and diarrhea cause such a large loss of fluids. Most of the patients are feverish. Patients with and without diarrhea caused by the Rota virus do not have substantially different clinical symptoms. 15% of newborns in a South African study had dual or mixed infections with the human Rota virus and other enteropathogens, including Giardia lamblia, Entamoeba histolytica, and E. Coli. In cases of such combined infections, diarrhea typically lasts longer. As no bacteriological studies were done, it is difficult to comment on the bacterial cause of diarrheal episodes.

While no experiment was carried out to determine specific Rota virus serotypes, group-A In young children globally, rota viruses are the main cause of severe acute diarrhea. For children under the age of five, it is a leading cause of disease and mortality in India. Of the approximately 600,000 Rota virus-related deaths that happen annually, almost 1.5 million happen in India.

Since Rota viruses account for 20–30% of diarrhea cases, a strong Rota virus vaccine has to be developed and tested. The WHO recommends nations that every country should include the Rota virus vaccine in its immunization schedule. Results from developed countries where this has been used show a significant drop in the incidence of severe diarrhea in children. Clinical research in these areas are necessary to investigate the benefits of Rota virus vaccination in developing countries where vaccines are most likely to have the greatest impact.[16]

One important limitation is that the study was done on children with diarrhea who were inpatients. To get current estimates on the Rota virus, research in community and clinical settings is required. Therefore, it is essential to support EPI awareness campaigns on diarrhea prevention and management as well as to build

a national level registry for the Rota virus in order to educate the public.

CONCLUSION

The study has shown that the rota virus is often the cause of diarrhea in children under five years old. The rota virus was responsible for 63% of cases of diarrhea. Overall, there were more male children present, and many of them were dehydrated and suffering from severe diarrhea. An examination of the feces revealed common bacterial and cystic infections in addition to a significant incidence of Rotavirus. These findings demonstrate the range of pediatric diarrheal infections and the need of the rotavirus vaccination.

Author's Contribution:

Concept & Design of Study:	Zia Muhammad
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Revisiting Critically:	Zia Muhammad, Abdul Khaliq
Final Approval of version:	Zia Muhammad

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