

# Frequency of Rotavirus Diarrhea in Hospitalized Children

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## ABSTRACT

**Background:** Rotavirus is one of the major causes of acute diarrhea requiring hospitalization worldwide among infants and young children. In Pakistan, the incidence of rotavirus diarrhea has been identified to differ in the range 20 to 40 percent. The infectivity is related to high morbidity rate all over the world and an elevated mortality rate among developing countries.

**Aim:** To assess the frequency of rotavirus diarrhea in hospitalized children.

**Method:** It was an observational cross-section study conducted at Shahida Islam Teaching, Hospital, Lodhran during 08.02.2017 to 14.11.2017 in which 150 hospitalized children were included. Identification of rotavirus in patients stool was carried out through enzyme linked immunoassay. Data was analyzed using SPSS version 20.0.

**Results:** Among 150 children, 60% were found positive for rotavirus. Among 37-48 months old 14 children, 85.7% were positive for rotavirus. 64.7% children had duration of diarrhea 1-3 days and 60.0% had 8-10 stools per day. Among 57 children who had vomiting, 42.1% had rotavirus and among 91 children who had fever, 57.1% had rotavirus.

**Conclusion:** Study concluded that rotavirus prevalence among children was 60.0% while children aged 24 months and above had more frequency of rotavirus.

**Keywords:** Rotavirus, Diarrhea, Intestinal Infection

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## INTRODUCTION

Rotavirus is the major cause of stomach and intestines infection in infants and children. Rotavirus gastroenteritis is common world-wide<sup>1</sup>. Infectivity of the rotavirus is linked with increasing hospitalization, deaths and bigger cost<sup>2</sup>. According to the estimate of WHO during 2013, 0.215 million child mortalities take place globally due to rotavirus infectivity. This infectivity of rotavirus is comparable to 0.528 million mortalities during 2000. National estimation of rotavirus pertaining to mortalities in children less than five years ranged from 47100 in India to below 5 deaths (seventy nine countries). In all mortalities in India due to rotavirus, 22% happened in less than five years old children. During 2013, Pakistan, Congo, India and Nigeria judge effectively half 49% of all rotavirus deaths under five years of age<sup>3</sup>. In Pakistan, 20% to 40% prevalence of rotavirus is estimated<sup>4</sup>. Globally this infection is still a significant reason of mortality in infants and children. Rotavirus is most leading recognize pathogen in children of less than two years among developing countries with severe gastroenteritis. 35% to 50% infants as well as hospitalized young has been identified rotavirus with acute diarrhea<sup>5</sup>. Rotavirus is a double stranded Ribonucleic Acid (RNA) virus in family of Reoviridae<sup>6</sup>. They have five categories A-B-C-D & E. Among humans rotavirus-A are the most common causes above 90% of infections<sup>7</sup>.

The main transference approach is through oral fecal route with signs usually growing after one to two days phase of incubation. During the first three years of life mostly children got infected with rotavirus, with rotavirus diarrhea maximum prevalence between 6 months to 24 months. Earlier infectivity gives protection from later sickness. Although the re-infectivity is normal but later

sickness tend to less severe<sup>6</sup>. Diarrhea consequently to rotavirus might be reasoned by less absorption of sodium and glucose, as injured cells on villi are reinstated by non absorbing unripe crypt cells<sup>8</sup>.

Rotavirus diarrhea can decreased significantly through better sanitation and hygiene. The most effective preventive measure is vaccination and is very efficient in preventing acute rotavirus disease in infants and young. It is presumed that the diarrhea rate of morbidity and mortality can be reduced through vaccination. Reduction in the rate of severe rotavirus infections has been observed in that countries who have conducted programmes on rotavirus vaccination, however mild rotavirus infection remain there.<sup>[9]</sup> The objective of present study is to evaluate the rotavirus diarrhea frequency in hospitalized children.

## MATERIAL AND METHODS

It was observational cross section study conducted at Shahida Islam Teaching, Hospital, Lodhran during 08.02.2017 to 14.11.2017. Total 150 patients both males and females aged 1 month to 5 years with symptoms of acute gastroenteritis were included in the study. Children with the bloody diarrhea and nosocomial gastroenteritis acquired in hospitalization for other disease were excluded. Samples of stool were taken immediately within 24-48 hours to prevent nosocomial infection. Containers of stool were labeled with unique patient identifier. Identification of rotavirus in patients stool was carried out through enzyme linked immunoassay. Data was analyzed using SPSS version 20. Frequencies and percentages were calculated for all categorical variables like gender, age groups, duration of diarrhea and rotavirus positive or negative. Mean and standard deviation were calculated for age. Chi-square test was used to see the association of age groups and clinical features with rotavirus. Confidentiality of data was ensured and proper consent was obtained before data collection.

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**RESULTS**

Table-1 asserts that among 150 children, 62(41.3%) were 1-12 months old, 37(24.7%) were 13-24 months old, 30 (20%) children were 25-36 months old and 14(9.3%) were 37-48 months while 7(4.7%) children were 49-60 months old. The mean age of the children was 21.55±15.13 months.

Table-2 depicts that among 150 children, 88(58.7%) were males and 62(41.3%) were females. Table-3 exhibits that among 150 children, 97(64.7%) had duration of diarrhea 1-3 days while this duration for 53(35.3%) children was 4-6 days.

Table 4 demonstrates that among 150 children, 26(17.3%) had upto 7 stools per day, 90(60%) had 8-10 stools and 34(22.7%) children had 11-15 stools per day.

Table-5 reveals that among 150 children, 90(60%) were found positive for rotavirus while 60(40%) patients were found negative.

**Table-1:** Age of hospitalized children

	Frequency	%age
1-12 months	62	41.3
13-24 months	37	24.7
25-36 months	30	20.0
37-48 months	14	9.3
49-60 months	7	4.7
Total	150	100.0
Mean±SD	21.55±15.13	

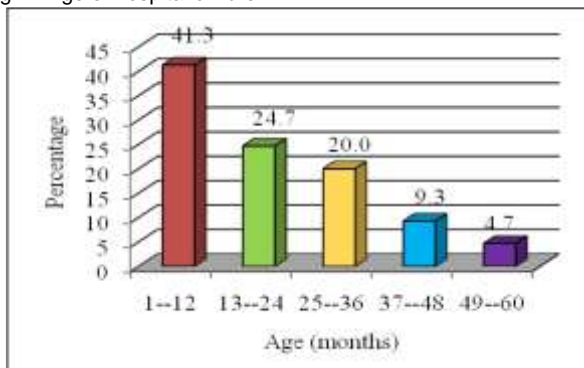
**Table-2:** Sex of hospitalized children

	Frequency	%age
Male	88	58.7
Female	62	41.3

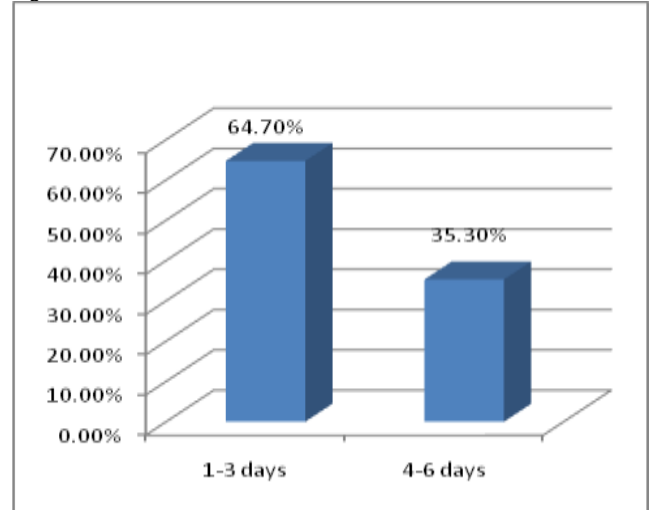
Table-6 indicates that among 62 children who were positive for rotavirus, 32(51.6%) were 1-12 months old, among 13-24 months old 37 children, 19(51.4%) were positive, among 25-36 months old 30 children, 20(66.7%) were positive and among 37-48 months old 14 children, 12 (85.7%) were positive while 49-60 months old all 7 (100%) children were positive for rotavirus.

Table 7 elucidates that among 57 children who had vomiting, 24(42.1%) had rotavirus and among 93 children who had no diarrhea, 66 (70.9%) had rotavirus. Among 91 children who had fever, 52(57.1%) had rotavirus and among 59 children who had no fever, 38(64.4%) had rotavirus.

**Fig. 1:** Age of hospital children



**Figure-2:** Duration of diarrhea



**Table-3:** Duration of diarrhea

	Frequency	%age
1-3 days	97	64.7
4-6 days	53	35.3
Total	150	100.0

**Table-4:** Number of stools per day

	Frequency	%age
≤7	26	17.3
8-10	90	60.0
11-15	34	22.7
Total	150	100.0

**Table-5:** Frequency of rotavirus

	Frequency	%age
Positive	90	60.0
Negative	60	40.0
Total	150	100.0

**Table-6:** Association of rotavirus with age (n=150)

Age (months)	N	Rotavirus		P-value
		Positive	Negative	
1-12	62	32 (51.6%)	30 (48.4%)	0.01
13-24	37	19 (51.4%)	18 (48.6%)	
25-36	30	20 (66.7%)	10 (33.3%)	
37-48	14	12 (85.7%)	2 (14.3%)	
49-60	7	7 (100.0%)	0 (0.0%)	

**Table-7:** Association of clinical features of diarrhea with rotavirus (n=150)

Clinical features	N	Rotavirus		P-value
		Positive	Negative	
<b>Vomiting</b>				
Present	57	24 (42.1%)	33 (57.9%)	0.00
Absent	93	66 (70.9%)	27 (29.1%)	
<b>Fever</b>				
Present	91	52 (57.1%)	39 (42.9%)	0.03
Absent	59	38 (64.4%)	21 (36.6%)	

**DISCUSSION**

Rotavirus is considered like a leading cause of non-bacterial gastroenteritis especially among infants and young children. Present study assessed the frequency of rotavirus among hospitalized children. To acquire better

results, 150 children aged one to sixty months were enrolled. Study revealed that majority of the children (41.3%) were 1-12 months old, followed by 13-24 months old (24.7%), 25-36 months old (20%), 37-48 months old (9.3%) and 49-60 months old (4.7%). Virtually same results were also offered by a study carried out by Badur and coworkers (2015) who reported that most of the children (60.4%) were 1-12 months old, followed by 13-24 months old (28.9%), 25-36 months old (6.4%), 37-48 months old (3.8%) and 49-60 months old (0.5%)<sup>8</sup>.

As far as gender of the children is considered, study divulged that majority (58.75) of the children was male and remaining proportion (41.3%) was of female children. The findings of our study are comparable with the study carried out by Badur and coworkers (2015) who also stated that 57.2% children were male and 42.8% were females<sup>8</sup>.

Diarrhea is considered a leading cause of morbidity and mortality among children. Study disclosed that 64.7% children had duration of diarrhea 1-3 months and 35.3% had 4-6 days. Same results were also obtained from the study conducted by Habib et al. (2014) who also confirmed that 65% children had duration of diarrhea 1-3 months and 35% had 4-6 days<sup>2</sup>.

Study also assessed the numbers of stools per day among children and found that 17.3% children had upto 7 stools and majority (60%) had 8-10 stools while 22.7% children had 11-15 stools per day. The findings of the study performed by Habib et al. (2014) exhibited similar scenario who reported that 17.0% children had upto 7 stools and mainstream (60.3%) had 8-10 stools while 22.7% children had 11-15 stools per day<sup>2</sup>.

When the frequency of rotavirus was identified, it is appalling to note that more than half (60%) of the children were positive for rotavirus. The results of the study carried out by Salim and colleagues (2014) are better than our study results who reported that 49.8% children were infected with rotavirus<sup>1</sup>. But the study done by Habib et al. (2014) showed almost similar results that 63% children were positive for rotavirus<sup>2</sup>.

Study further disclosed that rotavirus was more prevalent among children who were 24 months old and above but the study conducted by Salim and colleagues (2014) showed that rotavirus was almost equally prevalent among children except those who were 49-60 months old<sup>1</sup>.

Study pointed out that most of the children who had no vomiting were found positive for rotavirus. A recent study undertaken by Ehsanipour and collaborators (2017) also confirmed that more than half of children who had no vomiting were positive for rotavirus<sup>10</sup>.

Study further demonstrated that rotavirus was positive among majority of children who had fever. The findings of our study are comparable with the study done by Ehsanipour and collaborators (2017) who reported that rotavirus was positive among majority who had fever<sup>10</sup>.

## CONCLUSION

Study concluded that rotavirus prevalence among children was 60%. Children 24 months old and above had more frequency of rotavirus. Hygiene practice, timely treatment and health education programs among mothers at community level can prevent children from ill effects of rotavirus.

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