

## Some of the clinico-epidemiological features of human rotavirus in children with gastroenteritis below five years of age, A hospital-based study

By

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### Abstract

**Background:** A prospective study done for 7 months in the period between the 1st of January 2009 to the 1st of August 2009 on 200 patients with gastroenteritis attending Child' Central Teaching Hospital in Baghdad, Iraq. **The aim of the study:** to determine the frequency of rotavirus infection among children with gastroenteritis and to identify the important clinical features of the illness. **Patients and method:** A sample of 200 children below 5 years of age with gastroenteritis were tested for the presence of human rotavirus using latex agglutination test to examine the stool sample in addition to general stool examination, stool PH, PCV ,WBC count, blood urea and serum electrolytes. **Results:** The results reveal that the frequency of rotavirus infection among children less than five years of age with gastroenteritis was 28% and that most infected children were below 2 years of age , and have watery diarrhea and the infection is significantly increasing during winter time and more common among artificially fed infants. **Conclusion:** Rotavirus is an important cause of morbidity among young children with gastroenteritis and breast feeding is an important protective factor.

**Keywords:** Rotavirus; children; gastroenteritis; breast feeding

## Introduction

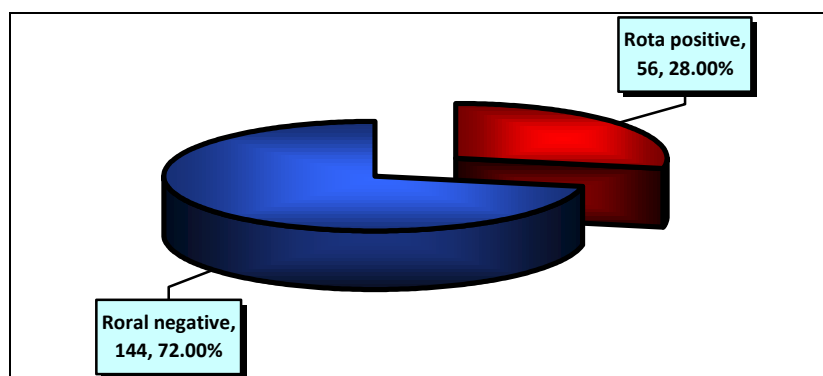
Acute diarrhea is one of the most important causes of morbidity and mortality in young children <sup>(1)</sup>. Gastroenteritis means inflammation of the stomach, the small and large intestines. Viral gastroenteritis is an infection caused by a variety of viruses resulting in vomiting, diarrhea or both. It is often called the "stomach flu" although influenza viruses do not induce it <sup>(2)</sup>. During the seventies and eighties, viral causes of gastroenteritis have joined bacteria and parasites as recognized pathogens involved in medically important diarrhoeal disease <sup>(3)</sup>. Since the discovery of Norwalk virus in 1972, five major categories of human gastroenteritis viruses have been identified: human rotavirus, enteric adenovirus, norwalk virus, calicivirus, and astrovirus <sup>(4)</sup>. Clinical manifestation of human rotavirus infection are related primarily to the effects of intestinal infection. Diarrhea is usually watery (no blood or leukocytes) which has extremely foul odor, lasting 5-8 days but longer in malnourished and immune deficient individuals due to cellular and humeral cell deficiency <sup>(5)</sup>. In children admitted to the hospital with HRV infection, fever and vomiting persists for 2-3 days, diarrhea for 4-5 days and dehydration is commonly isotonic. Although coryza and cough may precede GI. Symptoms, replication of HRV in the upper respiratory tract is not important in the spread of the virus <sup>(6)</sup>. For human rotavirus induced diarrhea treatment involves replacement of fluids and electrolytes lost during infection. Breast feeding confers some protection against rotavirus infection in young infants that likely is mediated through rotavirus antibodies in the milk and other nonimmunologic factors <sup>(7,8)</sup>. The aim of the study was to determine the percentage of rotavirus infection among patient with diarrhea below five years of age in relation to some risk factors of its infection.

### Patients and methods:

A cross section study of two hundred patients attending the Central Teaching Hospital of pediatric in Baghdad from the period between 1<sup>st</sup>. of January 2009 till the end of July 2009 their age range from birth to five years with history of diarrhea. Two hundred patients were collected in this study all of them were inpatients, 116 male and 84 female, all patients were investigated for detection of rotavirus antigen in their stool by the use of LATEX agglutination method, rotavirus was detected in 56 patients (28%). The cases were collected each month separately to identify if a specific pattern of seasonality in infection is present. All the patients were subjected to Age, sex, and residence, Type of diarrhea, duration, and frequency of bowel motion, type of feeding type of water supply (tap water, river, and other sources) and whether it was boiled or not. Laboratory investigation includes for identification of human rotavirus was done by LATEX agglutination test by Rota Kits, produced by (Bio-Kit, Barcelona-Spain).

### Results:

From the 200 diarrheal specimens collected during the period of study, only 56 case (28%) were positive for human rotavirus, while the remaining 144 (72%) were negative for human rotavirus as shown in figure 1.



**Figure 1: The rota+ cases in total 200 cases included in the study.**

This study has revealed that infection is common at the age of (6-11) months as it constitute (28 patients =50%) of the total 56 patients who where positive for human rotavirus as shown in Table 1. The study show there is no significant difference between males with acute diarrhea (116 patients =58%), and females (84 patients=42%).

**Table (1): The age and sex of patients in the study.**

	Total (n=200)		HRV (n=56)	
	No	%	No	%
Age groups (months) <6	28	14	4	7.41
6—11	84	42	28	50
12—17	64	32	16	28.57
18—23	12	6	4	7.41
=>24	12	6	4	7.41
Mean±SD (Range)	11.88±6.05 (2 - 27)		12.69±6.08 (2 - 24)	
P value	0.560			
Sex      Boys	116	58	36	64.28
Girls	84	42	20	35.71
P value	0.261			

As shown in table 2 above that breast feeding reduce the risk of HRV, HRV was detected in (4 patients=7.14%) who were breast fed, while detected in (36 patients =64.28) who were bottle fed, and in (12 patients=21.42) used mixed feeding, and in the remaining (4 patients=7.14%) who eat weaned food, so there is significant relationship between HRV infection and type of feeding P. value 0.037.

**Table (2): The type of feeding of patients.**

	Total (n=200)		HRV (n=56)	
	No	%	No	%
Breast feeding	24	12	4	7.14
Bottle feeding	142	71	36	64.28
Mixed feeding	24	12	12	21.42

Weaned food	10	5	4	7.14
P value	0.037*			

\*Significant difference

The study show that (24 patients=42.85%) were using antibiotics before taking stool samples for HRV and (32 patients=57.14%) were not taken antibiotics so there is no relationship between the usage of antibiotics and absence of growth of organism of HRV P. value 0.364.

**Table (3): The antibiotics used by the patients.**

	Total (n=200)		HRV (n=56)	
	No	%	No	%
Using antibiotics	96	48	24	42.85
Not	104	52	32	57.14
P value	0.364			

As shown in table 4 above those who used boiled tap water was (14 patients=25%), unboiled tap water (24 patients=42.85%), while those who used un boiled other sources of water (River, irrigation canals, wells) HRV was found in (2 patients=3.57%), and boiled other sources was found in (16 patients=28.57) , so there is a significant relationship between HRV infection and type of water supply as HRV infection is more common in patients using un boiled tap water P.value 0.012.

**Table (4): The type of water supply used by patients.**

	Total (n=200)		HRV (n=56)	
	No	%	No	%
Boiled tap water	32	16	14	25
Not boiled tap water	72	36	24	42.85
Not boiled other	4	2	2	3.57

sources				
Boiled other sources	92	46	16	28.57
P value	0.012*			

\*Significant difference

## DISCUSSION:

The result of this study can be discussed more easily and the interpretation of the result will be clearer if the epidemiological and clinical feature of Rotavirus infection. The frequency of HRV in our study in children aged 2 weeks to 5 years (200 cases) who were admitted with acute diarrheal disease was 28 % as shown in figure 1. Mahmoud D A et al study in Basrah, Iraq in 1987 <sup>(28)</sup>. Carline JB et al a study done in Australia 1993-1996 <sup>(9)</sup>. El-Ahmed RK et al study in Baghdad, Iraq in 1989 (HRV=30.1% of the total cases <sup>(10)</sup>. AL-Alosi BD et al study in Baghdad, Iraq in 2000 (HRV=29.3% of the total cases) <sup>(11)</sup>. Flewett TH et al study done about tropical disease (15%) <sup>(12)</sup>. This difference between these study and our study may be related to the period of the study our study was for 7 months and some of these studies was more than that period and also may be related to the procedure used to detect the virus, in our study we used the latex agglutination technique while most of these study used ELIZA technique. Most of infected children in our study were under 2 years of age, with highest number between 6 and 11 months . Susceptibility of this age group may be explained by many factors like declining level of transferred maternal immunity to her infant, introduction of weaning food which may be contaminated by enteropathogens together with the introduction of foreign materials to the mouth of these children of such age as they have learned to crawl and pick up objects in there hands, which increase the risk of exposure to fecal

pathogens, feco-oral transmission <sup>(4)</sup>. In our study the male had higher rate of infection with HRV than female but this difference was not significant (P. value 0.261) because acute diarrhea in general in our study the male had higher infection rate than female. These results are similar to AL- Alosi BD study done in Baghdad, Iraq in 2000<sup>(11)</sup>. Hummady HS study done in Hilla, Iraq in 2007<sup>(12)</sup>. AL-Madainy MA study done in Mosul, Iraq in 2008<sup>(13)</sup>. In our study the incidence of HRV in breast feeding was 7.14%, while its incidence in bottle feeding was 64.28%, so there is significant relationship between HRV and type of feeding, this data confirms the role of breast feeding in protection against rotavirus gastroenteritis due its well known immunological properties. These results are similar to AL- jumaily I. study done in Mosul, Iraq in 1996<sup>(14)</sup>. Hummady HS study done in Iraq in 2007<sup>(15)</sup>. Raheem RA study done in Iraq in 2007 <sup>(16)</sup>. These results are different from Hussein AM study done in Iraq in 1999 <sup>(17)</sup> show that breast feeding had no protective effect against HRV infection. The study has shown that patients with HRV have normal serum creatinine in 100% and normal blood urea, PCV, and WBC count as shown in figure 5, and these results are constant with the finding of other authors as AL-Alosi B D <sup>(11)</sup>. The abnormal blood urea with normal serum creatinine in some cases can be explained by the dehydration.

### **Conclusion:**

We have shown in this study that: Rotavirus is a common cause of diarrhea under 5 years of age, its frequency among cases with gastroenteritis requiring hospital admission was (28%) during cold months, especially January and February. Breast feeding seems to be protective against HRV infection.

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