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Epidemiology of Rotavirus Cases among Children under Age 5 Years in Basra Province from 2008-2011

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Abstract:

Rotaviruses are the leading cause of severe diarrheal disease and dehydration in infants and children under the age of 5 worldwide. The aim of the present study was to assess the prevalence and incidence of Rotavirus cases among children under age 5 years in Basra province from 2008-2011. A 701 stool samples of diarrheal disease in infants and children under the age of 5 years from general Basra hospital were tested for the presence of Rotavirus infection by using of ELISA technique. This study shows the positive cases of RV to total samples of diarrhea were 278 (39.66 %), 165 (59.35 %) of them were males. The incidence rate was more among children less than 11 month. Most of cases (96.4%) admitted with some dehydration, 86.69% treated with both of ORT and IVF. The present study recommends enter the Rotavirus vaccine as part of childhood vaccination programme.

وبائية الفيروس الدوار ما بين الاطفال تحت سن الخامسة في محافظة البصرة من الاعوام 2008-2011

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الخلاصة:

يعد الفيروس الدوار السبب الرئيسي لامراض الاسهال والجفاف في الرضع والاطفال تحت سن الخامسة في العالم.لذلك هدفت الدراسة الحالية الى تقييم معدل انتشار وحدوث الاصابة لحالات الفيروس الدوار ما بين الاطفال تحت سن الخامسة في محافظة البصرة من الاعوام من 2008–2011. شملت الدراسة على 701 طفل مصاب بالاسهال راقد في مستشفى البصرة العام , اذ أخذت منهم عينات براز ونقلت الى قسم الصحة العامة /البصرة التي بدورها أرسلتها الى المختبر المركزي في بغداد لغرض فحصها بواسطة تقنية المعايرة الامتصاصية المرتبطة بالانزيم.أظهرت الدراسة ان عدد الحالات الموجبة لهذا الفيروس كانت 278(39.66%), وان معدل حدوث الاصابة كانت أكثر في الاطفال تحت سن الحادية عشر شهرا. علما ان معظم الحالات (96.4%) كانت تعاني جفافا بسيطا, و86.69% منهم تم معالجتهم بواسطة أعطاء

المحاليل الفموية و السوائل تحت الجلد معا. توصي الدراسة الحالية بأدخال اللقاح المناسب للفيروس الدوار ضمن برنامج لقاحات الاطفال , مع أدخال الفحص التشخيصي لهذا الفيروس ضمن مختبرات العراق.

Introduction:

Diarrheal diseases represent a major health problem in developing countries (Kosek *et al.*, 2003).Rotaviruses (RV) are the leading cause of severe diarrheal disease and dehydration in infants and children under the age of 5 worldwide (Clark *et al.*, 2008) and accounts for up to 50% of hospitalizations for severe diarrhea in infants and children(Rheingans *et al.*, 2006) RV infection can also occur in adults (Anderson & Weber,2004), especially in institutionalized or hospitalized elderly patients (Marshall *et al.*, 2003) .its importance is still not widely known within the public health community, particularly in developing countries (Simpson *et al.*, 2007) . RV are non-enveloped RNA viruses in the family Reoviridae (Kapikian *et al.* ,2001) .The RNA is surrounded by a three-layered icosahedral protein capsid (Pesavento *et al.*, 2006).There are five species of rotavirus, referred to as A, B, C, D and E. Humans are primarily infected by species A, B and C, most commonly by species A (Kirkwood, 2010).Rotavirus A, which accounts for more than 90% of rotavirus gastroenteritis in humans (Leung *et al.*, 2005). Rotaviruses infect and cause diarrhea in the young of many species of animals (Hirsh *et al.*, 2004) such as rats (Pérez-Cano *et al.*, 2007) cats and dogs (Enriquez *et al.*, 2001). There is evidence that animal rotaviruses can infect humans, either by direct transmission of the virus or by contributing one or several RNA segments to reassortants with human strains (Müller & Johne, 2007). The global situation recently changed with the advent of new oral RV vaccines (Parashar *et al.*, 2003).The aim of the present study was to determinate the prevalence and incidence of rotaviruses cases among children under the age of 5 years that consulted the general Basra hospital from 2008-2011 before the introduction of Rotavirus vaccination programme.

Materials and Methods:

Across sectional study was conducted on a 701children, 393(56.06%) of them are males and 308(43.94%) females with age range 1-59 months , attending to children ward of general Basra hospital during the period between 2008 into 2011. From each child, full information was taken, and then samples of stool were taken and sent to Baghdad general public lab for examination. The samples were tested for the presence of Rotavirus infection by using of ELISA technique according to the manufacturer's recommendations.

Statistical Analysis:

Analysis of the data obtained was made by using SSPS software. Data of the present study was analyzed by ANOVA test, P values <0.05 were considered statistically significant. Calculation of mean values and standard deviation (SD) were made for mean age, mean duration of symptoms and mean rate of stay in hospital.

Results and Discussion:

1. Rotavirus incidence

By application of ELISA technique, the results showed a positive of 278 (39.66 %) Rotavirus cases (Table, 1). Worldwide, RV has been estimated to account for almost 40% of all cases of severe infant diarrhea (Bresee et al., 2004), which translates into 527 000 deaths each year in the World (range: 475 000-580 000), mostly in children under age 2 (Parashar et al., 2006). The major role of rotavirus in causing diarrhea is not widely recognized within the public health community, particularly in developing countries (Simpson et al., 2007).

The incidence for the studied years (2008-2011) was 126 (45.33%), 47(16.9%), 27(9.72%) and 78(28.05%), respectively. There was a

decrease in the incidence at 2009 and 2010.The table (Table, 1) shows RV cases in all months of the year and become increased in May, Jun and November in 2008, also there was no marked changes in 2009, while 2010 and 2011 there were no RV cases in Aug. to December and from Jan. to April, respectively. Overall, RV cases become increased from May to Aug. and from November to December. This means that there is a seasonal variation from year to year. In temperate areas, rotavirus infections occur primarily in the winter, but in the tropics they occur throughout the year (Koopmans & Brown, 1999).

Table (1) Rotavirus incidence from 2008 into 2011

Month	Years				
	2008	2009	2010	2011	Total
Jan.	7	2	2	0	11
Feb.	9	4	6	0	19
March	5	3	5	0	13
April	8	4	7	0	19
May	18	4	4	2	28
Jun	20	4	2	13	39
July	14	5	1	12	32
Aug.	15	4	0	9	28
Sep.	3	2	0	6	11
October	2	4	0	11	17
November	18	7	0	12	37
December	7	4	0	13	24
Total	126(45.33%)	47(16.9%)	27(9.72%)	78(28.05%)	278
P < 0.05					

2- Age distribution

The age ranges of the infected children varied between 1 and 59 months. Mean age of all positive cases was 10.59±9.73. The age period between (6 -11) was significantly prone (52.87%) to the infection (P< 0.001). In contrast, the age period (18-23) was significantly decreased (1.08%) to the infection (Table, 2). Almost every child has been infected with rotavirus by age five (Parashar et al., 2006).Because at this age feeding starts and child put things in his mouth.

Table (2) Age distribution of positive cases

Age/ month	positive	%
0-5	68	24.46
6-11	147	52.87
12-17	20	7.2
18-23	3	1.08
24-59	40	14.39
P< 0.001		

3- Sex distribution

The present study showed that 165 (59.35 %) of the males were more susceptible to the infection with significantly elevated value (P<0.05) than females, 113 (40.65 %). Boys are twice as likely as girls to be admitted to hospital (Rheingans et al., 2006).

4- Clinical information

All cases were complained with diarrhea (100%). Vomiting (85.25%) and fever (73.02%) which were typical symptoms of RV cases (Table, 3). Mean duration of symptoms was 6.48 ± 3.76 days. Rotavirus gastroenteritis is a mild to severe disease characterized by vomiting, watery diarrhea, and low-grade fever. Once a child is infected by the virus, there is an incubation period of about two days before the appearance of the symptoms (Hochwald & Kivela ,1999).Both symptomatic and asymptomatic patients shed RV in their stools for 7-10 days, but shedding can happen to last for several weeks. The virus is highly resistant in the environment and can survive for months in stools at room temperature (Fischer et al., 2004). Outbreaks of RV gastroenteritis in day-care centers and hospitals can spread rapidly among non-immune children, presumably through person-to-person contacts, airborne droplets, or contact with contaminated toys (Gleizes et al., 2006). Children from low socioeconomic background and low birth weight infants have an increased risk for hospitalization (Dennehy et al., 2006).

Most of cases (96.4%) admitted with some dehydration and (3.24 %) admitted with sever dehydration. In spite that most of cases with some dehydration but most cases (86.69%) treated with both of Intravenous Fluid (IVF) and Oral Rehydration Solution (ORS), so only 6.84% and 6.47% of cases treated with ORS or IVF, respectively (Table ,3).

Table (3) Clinical information of positive cases

Features	No.	%
Sign and symptom		
Fever	203	73.02
vomiting	237	85.25
Diarrhea	278	100
Degree of dehydration		
Sever	9	3.24
Some	268	96.4
None	1	0.36
Management of RV cases in hospital		
ORT only	19	6.84
IVF only	18	6.47
ORT and IVF	241	86.69
Duration of stay in hospital		
Less than one week	263	94.6
More than one week	15	5.4
Outcome of RV cases		
Improved	266	95.68
Discharge on responsibility	12	4.32
Deaths	0	0
$P < 0.05$		

Also mean rate of stay in hospital was 3.74± 3.26 days. Public health campaigns to combat rotavirus focus on providing oral rehydration therapy for infected children and vaccination to prevent the disease (Diggle, 2007). Untreated, children can die from the resulting severe dehydration (Alam & Ashraf, 2003). Treatment of acute rotavirus infection is nonspecific and involves management of symptoms and, most importantly, maintenance of hydration (Diggle ,2007). Some infections are serious enough to warrant hospitalization where fluids are given by intravenous drip or nasogastric tube, and the child's electrolytes and blood sugar are monitored (Patel et al., 2007)

Rotavirus is usually an easily managed disease of childhood, but worldwide nearly 500,000 children under five years of age still die from rotavirus infection each year (Tate et al., 2011) And almost two million more become severely ill(Simpson et al., 2007).

In conclusion, this study shows the positive cases of RV to total samples of diarrhea were 278 (39.66 %).Annual epidemics occurring between May to Aug. and from November to December, variable from year to year. The present study recommends introducing the diagnostic test for RV cases in Iraqi laboratories.Also enter the Rotavirus vaccine as part of childhood vaccination programmes .Even if vaccination early in life may not prevent all subsequent disease episodes, it should prevent most cases of severe RV disease and their complications such as dehydration, physician visit, hospitalizations and deaths (Parez,2008).

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