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Short Communication

Determination of Annual Incidence, Age Specific Incidence Rate and Risk of Rotavirus Gastroenteritis among Children in Iran

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Rotavirus is recognized as a major cause of severe gastroenteritis in infants and has been estimated to be responsible for 20-70% of hospitalization for diarrhea among children world-wide. The greatest burden of disease falls on children in developing countries, where rotavirus accounts for an estimated 600 000 to 870 000 deaths per year. Despite the global recognition of this problem, many countries are unaware of the importance of rotavirus diarrhea in their own setting (Cunliffe et al, 2005, Bresee et al, 2004).

In order to better understand the clinical epidemiology of Rotavirus, we have carried out a survey of acute diarrheal illnesses in three main Children's hospital in capital city of Iran : in the north Aliasghar, in the south Bahrami and in the center Rasool e Akram hospital to assess the rate of rotavirus infection among children less than five years of age with acute gastroenteritis . 260 specimens were collected from children up to 5 years of age From July 2005 to Jun 2006. Fecal specimens were obtained from each patient within 24h of admission, were frozen at -20 ^{c} and were transported frozen for testing to the Virology Laboratory of Tehran. Of these fecal specimens, 193 (74.23%) were inpatients and 67 (25.77%) were outpatients.

These fecal specimens was tested by a monoclonal antibody-based enzyme immunoassay (Rotavirus ELISA kit, DAKO-patts, Denmark) for detection of rotavirus antigen , particularly the internal capsid protein (VP6). A total of 50 fecal specimens collected from healthy children in similar age group were studied as controls. Samples with ELISA cutoff values corresponding to > 0.25 were considered positive. Of these 260 specimens, 91 (35%) were determined to be rotavirus positive by ELISA. Comparison between rotavirus results were elicited from hospitalized (79.12%) and non-hospitalized children (20.88%). And this difference was statistically significant (Exact Fisher Test; p-value= <0.001). Hence there was a significant relationship between rate of hospitalization as a severity of illness indicator and positive rotavirus results. According to the results of previous studies, the association between rotavirus and severe diarrhea is conflicting. In Brazil, the prevalence rates ranged from 13 to 20% in different states (Cardoso et al, 2003) and in a hospital-based study in Bangladesh it was reported that children infected with rotavirus had less severe dehydration than those infected with other enteropathogens (Perez- Schael et al, 1999). Conversely, some studies reported that rotavirus diarrhea was particularly severe compared with infections by other enteropathogens (Linhares et al, 2000, Karadag et al, 2005, Shariff et al, 2003, Huilan et al, 1991 and Mohammed et al, 1994). Therefore rotavirus infections are often more severe as well as more likely to be associated with dehydration and hospitalization.

According to the age of the children it was

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observed that, the highest incidence of diarrhea caused by rotavirus (9.23%) was in children between 6 and 8 months of age, and the lowest incidence (1.15%) was in children between 0 and 2 months. There was a significant difference between the rate of infection in children under 24 month of age with older ones (T-test; p-value=0.001). Age spectrum of positive children was from 36 days to 5 years old with the average age of 12.6 months for boys and 7.8 months for girls. This finding is similar to the incidence in other developing countries where rotavirus is a significant pathogen among infants aged less than 12 months (Huilan et al, 1991), emphasizing that a rotavirus vaccine should be administered in the first months of life to prevent the most severe causes of gastroenteritis.

Rotavirus detection rates between gender showed 60 rotavirus were positive out of 156 samples of male infants (66%) and 31 out of 104 samples of female infants (34%). Nearly twice as many boys as girls were admitted to the hospital for rotavirus diarrhea. This difference is statistically significant (P=value=0.002). These data are similar to reports by some authors (Herish et al, 2006, Chan et al, 1998, Man et al, 2001), even though others did not find a significant difference in rotavirus frequencies between gender (Zarnani et al, 2004, Cardoso et al, 2003).

A possible relationship between the occurrence of rotavirus infection and seasons was investigated. The rates of rotavirus infection were (7.37%) in spring, (1.53%) in summer,(12,70%) in autumn and (13.46%) in winter (Fig 1). Obtained results showed a significant difference between infection rates in the summer and other seasons (x^2; p-value=0.001).In temperate countries, rotavirus exhibits marked seasonal variation with peaks of infections in cooler months (Kheyami et al, 2006, Bresee et al, 2004). This pattern does not coincide with data gathered from countries with tropical and subtropical climates, where the virus is present throughout the year with winter and summer peaks (Kheyami et al, 2006). In this study also rotavirus has a marked seasonal variation in this region and was isolated most frequently from October to March with 81% of rotavirus recovered in these months. These results are in agreement with studies reporting a peak of rotavirus in winter months in temperate regions (Al-Bwardy et al, 1988). The peak incidence, however, is different to a previous study from Tehran (Modarres et al, 1995, Zarnani et al, 2004, Amini et al, 1990), which reported a higher incidence in the spring, But our results are correspond with studies in west of Iran (Khalili et al, 2004). Although the peak incidence occurred in the winter, the incidence of rotavirus was still high in the spring. We would need to continue surveillance for rotavirus to elucidate whether the previous studies have demonstrated a different seasonal pattern in different towns, or variation in the year when our study took place.

The presenting symptoms of children who came to the hospital for diarrhea were analyzed. Vomiting was significantly more common among patients with rotavirus diarrhea than among those with diarrhea due to other causes (91.29% vs.17.15%) (x^2; p-value=0.001). And fever does not have significant difference between positive and negative samples (p-value=0.373). But collapse was more common among patient with diarrhea due to other causes (57.79%) (P-value=0.003).

However, in many parts of the world, human rotavirus is recognized as the main cause of acute gastroenteritis in infants and children (8-10). This report confirms that a significant proportion of acute diarrhea is due to rotavirus in Tehran. These findings are in agreement with report world wide and a previous study from Iran (Modarres et al, 1995, Samarbafzadeh et al, 2005, Kelkar et al, 1999, and Khalili et al, 2004). Moreover, the prevalence we found is similar to those reported from neighboring countries such as Turkey (37%) (Karadag et al, 2005), Iraqi Kurdistan (37%) (Herish et al, 2006), Kuwait (40%) (Marmash et al, 2007) and Jordan (33%) (Youssef et al, 2000).Nevertheless little is known about epidemiology and impact of rotavirus infection in Iran; consequently

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rotavirus infections are not subject to specific surveillance. Therefore a prospective survey of diarrhea illness from various parts of Iran is necessary to provide a more accurate picture of proportion of Iranian children with laboratory – provide rotavirus infection.

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