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Editorial Open Access

Rotavirus Disease in Developing World

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Editorial

Rotavirus is recognized as a major cause of non-bacterial gastroenteritis especially in infants and young children worldwide. It is the leading cause of severe diarrhea in Indian children under 5, and has been projected to cause 457,000 to 884,000 hospitalizations, 2,000,000 outpatient visits, and 122,000-153,000 deaths annually [1].

It has been found that Rotavirus infection, mostly caused by Group A viruses, is prevalent in human populations worldwide. Although the virus infects older individuals, the disease can be severe in immunologically naïve infants and young children. The burden of severe rotavirus illness and deaths falls heavily upon children in low and middle-income countries as more than 80% of rotavirus-related deaths are estimated to occur in lower income countries of Asia and sub-Saharan Africa [2].

It is seen that annually more than 334,000 deaths occurring in Indian children are attributed to diarrheal disease, of which about 98,000 deaths are due to rotavirus alone [3]. The incidence and distribution of G and P genotypes that cause disease in humans varies by geographical location and by year. Rotavirus isolates from India are genetically heterogeneous. Such genetic diversity is characteristic of Asia as a whole and phylogenetic analyses of the VP7 (G) and VP4 (P) genes from India show >95% homology with Asian reference strains for most isolates, suggesting that rotavirus strains circulating in India are part of a larger Asian transmission pool. The distribution of serotypes is similar in northern and southern areas of the country [4,5].

The Million Death Study (MDS) conducted by the Registrar General of India and collaborators from 1998 to 2014, to determine causes of death in India, derived its data from a nationally representative sample of 14 million people in 2.4 million households [6]. The 2011 UNICEF under- five mortality rate for India is 61 per 1000 live births. The MDS estimated the proportionate mortality due to diarrhea in <5 year children to be 13.2%. Thus the under-5 diarrheal mortality rate in India is 8.04 per 1000 live births or an annual mortality of 160.80 per 100,000 children. So Rotavirus persists as a major cause of severe acute diarrhea in Indian children. By 5 years of age, an estimated 1 out of every 256 Indian children will die from rotavirus diarrhea, 1 in every 31-59 children will be hospitalized for rotavirus diarrhea, and 1 in every 13 children will have an outpatient visit due to rotavirus diarrhea. This translates into 99,000 deaths, 456,000-884,000 hospitalizations, over 2 million outpatient visits and 11.37 million diarrhea episodes due to rotavirus in children <5 years of age each year in India [7].

Rotavirus diarrhea continues to be the most important cause of diarrheal deaths, hospitalizations, and outpatient visits annually for children less than 5 years of age in India, and is a major economic burden. Studies between 2001 and 2009 in India have showed an increasing trend of rotavirus isolation from 23.5 to 39.2% among hospitalized children with diarrhea [8-12]. The Indian Rotavirus Surveillance Network, found the proportion of diarrheal hospitalizations among children <5 years of age associated with rotavirus ranging from 35% in Pune, 38-40% in Delhi, 50% Trichy, and 53% in Kolkata [8-11].

Our institutional data also suggests high prevalence of rotavirus gastroenteritis (34.64%) with circulation of a diverse range of rotavirus strains. Majority of rotavirus infection occurs in the younger age group with nearly 90% cases seen in children below 2 years of age. Isolation of rotavirus was significantly more in winter months as compared to summer months. Rotavirus infection causes more severe diarrhea associated with vomiting as predominant feature compared to non-rotavirus infections as assessed by Vesikari scoring.

Since rotavirus causes increased economic burden disease prevention becomes very important. General preventive measures include use of good sanitation and hygiene practices like hand washing, promoting exclusive breast feeding up to the age of 6 month and achieving good nutritional status. However despite the most hygienic conditions virtually all children become infected as a result of the efficiency of infection of the gastroenteritis viruses. Other measures include rotavirus vaccine, a specific, easy and important preventive approach; along with other therapeutic interventions such as oral rehydration solution and zinc supplementation. Rotavirus vaccines are highly efficacious and effective in preventing severe rotavirus episodes and rotavirus deaths in children aged <5 years thus helps in reducing diarrhoea morbidity and mortality. Munos et al. in a meta-analysis found that rotavirus vaccines could prevent 74% (95% CI: 35–90%) of rotavirus deaths and 47–57% of rotavirus hospitalizations [12]. Hence good hygiene along with a vaccine with broad and consistent serotype coverage will help to decrease the burden of rotavirus gastroenteritis.

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