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"Time to re-evaluate our response to diarrhea"

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Diarrheal diseases are one of the major killers of children globally, accounting for nearly 600,000 child deaths worldwide each year. Morbidity due to diarrhea is also very high, especially in the developing world. In the context of public health concerns across the globe, diarrheal diseases constitute one of the foremost causes of infectious morbidity second only to Acute Respiratory Infections (ARI). Unfortunately, India is one of the major contributors to this global burden of diarrheal diseases. Although there is a decline in mortality from this disease due to better antibiotic availability and advent and utilization of oral rehydration therapy, the burden still remains high and is one of the principal causes of morbidity and mortality especially in children.

Enteric bacterial infection is a major cause of diarrhea throughout the world especially in low and middle income countries. The World Health Organization (WHO) estimates that about 1.1 billion people globally drink unsafe water and the vast majority of diarrheal disease in the world (88 percent) is attributable to unsafe water, sanitation and hygiene. In developing countries, enteric bacteria and parasites are more prevalent than viruses and typically peak during the summer months. Recent studies show that bacterial pathogens like Vibrio cholerae (causes cholera), Escherichia coli, Shigella spp. and Campylobacter jejuni are major pathogens accounting for moderate to severe diarrhea in India especially in the under five age group. Among the viral organisms, rotavirus and norovirus are the main pathogens responsible for acute diarrhea.

Among the causative organisms of diarrheal diseases, rotavirus infection and cholera need special mention in terms of morbidity and mortality and require immediate attention. As far as rotavirus infection is concerned, it accounts for approximately one-third of global child deaths attributable to diarrhea. Most of the deaths are from the sub Saharan Africa

and resource poor Asian regions and affects mostly children around one year of age.

Rotaviral diarrhea cannot be controlled by antibiotics nor are there any specific drugs for this disease. It is seen that almost all the children across the globe will suffer at least one rotavirus infection, if not more in their lifetime. It is even seen in developed world, where hygiene, water and sanitation are impeccable. In this scenario it may be said that immunizing children with a vaccine is clearly the means of choice for effectively reducing rotavirus related morbidity, mortality, and associated medical costs. Several rotavirus vaccines formulated for oral administration to infants have shown to be highly effective in reducing the incidence of rotavirus gastroenteritis. The rotaviral vaccines presently available are RotaTeq® (manufactured by Merck) and Rotarix™ (manufactured by GSK). An indigenous vaccine developed in India (ROTAVAC® manufactured by Bharat Biotech International Ltd) has been shown to be efficacious and is currently awaiting licensure.

An important cause of concern is the emergence of cholera across the globe. Recent outbreaks in Cuba, Haiti, and Zimbabwe show that it can cause enormous loss of human lives, can spread like wild fire to new areas and has tremendous potential for causing outbreaks. Thus, it can destroy the existing public health infrastructure and cause huge economic and loss of other resources for a nation. Cholera is endemic in India, stays in the environment especially in coastal areas, and as such, the lower Gangetic plain is called 'homeland of cholera'. It is a pity that despite an estimated annual burden of two to four million cases, we react only, when there is a large outbreak.

Control of cholera depends on the long-term strategy of improving water quality and sanitation systems as done in western world. This improvement will definitely reduce the burden, but it is difficult to achieve in resource poor settings (as seen in most parts of India). Thus, vaccination for cholera can be an important short term preventative approach along with the other intervention efforts.

A low-cost bivalent killed whole cell oral cholera vaccine (Shanchol manufactured by Shantha Biotech) is presently manufactured in India and has also received licensure from Drug Controller General of India (DCGI). It is a two dose vaccine, which has proven efficacy and safety and confers 65 percent protection at the end of five years following vaccination. It can be administered to all persons except children less than a year old and pregnant women.

Recently, the Strategic Advisory Group of Experts on Immunization (SAGE) from the World Health Organization's (WHO's) recommended the use of this vaccine in endemic areas and maintenance of stock piles in case of epidemic situations.

On the occasion of World Health Day, it is important to look back at the progress that India has been making and the importance of live saving vaccines. Given the morbidity that diarrheal diseases bring on, it is pertinent to understand need for research and progress in this critical area.