

Abstract

Background: Diarrhoeal disease is an important global health problem in children in both developed and developing countries. Rotavirus is the most common viral pathogen worldwide and ETEC is an important but and unrecognized bacterial pathogen in developing countries.

Objectives:

1. To determine the incidence of rotavirus and adenovirus infections in children below 5 years with diarrhoea attending the Lady Ridgeway Children's Hospital (LRH), Colombo from January to March 2009.
2. To determine the incidence and age-specific isolation rates (IR) of common bacterial pathogens and to identify antibiotic sensitivity testing (ABST) patterns.
3. To describe socio-demographic factors and clinical characteristics of children with diarrhoeal diseases.

Methods: 320 stool samples were analyzed for the presence of common enteric bacterial pathogens using standard bacteriological methods and for rotavirus and adenovirus antigens using ELISA technique. Bacterial isolates were also subjected to ABST using the disc diffusion method.

Results: Rotavirus showed the highest incidence of 26.9% and adenovirus was the second frequent enteric pathogen with incidence of 7.5%. Of diarrhoeagenic bacterial pathogens, Enterotoxigenic *Escherichia coli* (ETEC) was the commonest (IR = 4.7%) and *Shigella* species and Enteropathogenic *E. coli* (EPEC) were the second commonest with similar IR of 4.1%. Out of all *Shigella* isolates, 70% (9/13) were *Shigella sonnei* phase-1. The IR of *Campylobacter* species was 3.8% and 92% (11/12) were *Campylobacter jejuni*. The *Salmonella* species were the least common (IR=2.2%) and 57.2% were infected with *Salmonella* serogroups A and B. The IR of enteric bacterial and viral pathogens were higher in children below 2 years of age, compared to children older than 2 years. Of infants below 6 months, 13% (8/61) had diarrhoea due to ETEC, EPEC and *salmonellosis* and none of them were on exclusive breast feeding. The incidence of acute viral gastroenteritis was 18% (12/61) common in infants below 6 months and

almost all had mixed feeding pattern ($p < 0.05$). There were 0.9% of mixed bacterial infection with ETEC, *Campylobacter jejuni* and *Shigella sonnei*-1 and 1.3% of co-viral infections with rotaviruses and adenoviruses. Mixed viral and bacterial infections were 3.2% and (60%, 6/10) of them were significantly severely dehydrated on admission ($p < 0.001$). Majority of (13/15) ETEC and (11/13) EPEC diarrhoea patients presented with watery and mucoid stools and one patient had mixed bacterial infections with ETEC and *Campylobacter jejuni* produced blood and mucus diarrhoea. Watery diarrhoea was the commonest manifestation of rotavirus (48/86) and adenovirus (10/24) diarrhoea and 4 patients with viral gastroenteritis yielded *Shigella* species from their stool samples had blood and mucus diarrhoea. Most bacterial isolates were sensitive to ciprofloxacin, furazolidone, mecillinam and ceftriaxone and resistant or intermediately sensitive to nalidixic acid and ampicillin. All *Campylobacter* species were sensitive to chloramphenicol and erythromycin and resistant to ciprofloxacin. All *Salmonella* isolates were sensitive to ceftriaxone and mecillinam and both *Salmonella* group A isolates were resistant to nalidixic acid. None of the children received rotavirus vaccines. Only 170(53%) children had always consumed cool boiled water for drinking, 116 (36.2%) had a history of intake of meals from outside and on average 50% of children and their parents had a good practice of hand hygiene.

Conclusions: Higher incidence of gastroenteritis due to either viruses (34.4%) or bacteria (18.8%) can be traced primarily due to faulty weaning practices, poor personal and hand hygiene and/ or intake of unsafe food and water. Exclusive breast feeding should be promoted for at least 6 months in infancy. The higher incidence of rotavirus infections in both developed and developing countries suggest that it will not be controlled merely by controlling above factors and implementation of important preventive strategies with improvement of the public health care facilities would be the most suitable intervention.