

SPATIAL EPIDEMIOLOGY AND HOTSPOTS OF ROTAVIRUS IN CHILDREN: AN ANALYSIS AND MAPPING USING GEOGRAPHIC INFORMATION SYSTEM

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INTRODUCTION

Rotavirus is a leading cause of acute gastroenteritis in Sri Lanka. Studies from the western world have assessed the seasonal variations of this infection and its association with environmental factors such as rainfall and temperature. However, little is known of its seasonal variation and geographical distribution in Sri Lanka. A reliable and updated distribution map of rotavirus infection is essential for target control strategies and policy making processes. Geographical Information System (GIS) has previously been used to monitor spatial distribution of diseases and their transmission dynamics. For the first time we describe the spatial epidemiological patterns of rotavirus diarrhoea in Sri Lanka.

OBJECTIVE

To study the spatial epidemiological distribution of rotaviral infection among children with diarrhoeal diseases admitted to the North Colombo Teaching Hospital, Ragama.

DESIGN, SETTING AND METHOD

This study was carried out in two phases. Phase I, a prospective hospital-based study, was conducted in the North Colombo Teaching Hospital from January 2008 to October 2009 to detect the incidence of rotavirus infection in children with diarrhoea. Stool samples were analyzed for Group A rotavirus antigen by enzyme linked immunosorbent assay (ELISA) (Rotaclone).

During Phase II of the study, patients with rotavirus infection were mapped using geographic coordinates obtained from a hand-held GIS receiver (Trimble Juno SB). Rainfall and temperature data for the years 2008 and 2009 in the Gampaha District were obtained from the Department of Meteorology, Sri Lanka and correlated with the spatial distribution data.

RESULTS

In 2008 and 2009, 71 (60.6% males) and 99 (63.6% males) had rotavirus infection respectively. Spatial distribution data showed that most rotavirus infections (78%) presenting to the Teaching Hospital, Ragama were coming from a 10 km radius of catchment area. The hot spots were clustered in and around the marshy land areas of the Gampaha District and 67% use water from their own well or from the well of a neighbour. The peak incidence in both years was between May and July which coincided with the highest rainfall to the area. There was no correlation between environmental temperature and rotavirus infection rates.

CONCLUSION

Incidence of rotavirus infection is highest in children living around marshy lands and using water from private sources such as a well.