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EPIDEMIOLOGICAL REVIEW
OF DENGUE INFECTION AMONG CHILDREN IN URBAN SRI LANKA

Sheron J., Silva D. K.

**Scientific Guide: senior lecturer
of the department of pediatrics *L. S. Sergeichik***

**Educational Establishment
«Gomel State Medical University»
Gomel, Republic of Belarus**

Introduction

Dengue is caused by four related mosquito-borne dengue viruses (DENV1–4), which are endemic to many tropical and subtropical regions of the world. Most persons infected with DENV are asymptomatic or show development of a febrile illness known as dengue fever, but disease can be more severe and progress to dengue haemorrhagic fever and dengue shock syndrome (DHF/DSS) [1]. Infection with one DENV serotype confers protective immunity to future infections with that serotype only and these persons are susceptible to secondary infections with heterologous serotypes. Persons with secondary DENV infections are at a greater risk of DHF/DSS than persons having their first infection [2]. Globally, an estimated four billion persons are at risk for DENV infection, and there are an estimated 390 million annual DENV infections and 96 million dengue cases. Dengue viral infections have been endemic in Sri Lanka since the mid-1960s which was when the first cases of DF/DHF were reported. An island-wide seroepidemiological survey, which was carried out in 1966–1967 using the haemagglutination inhibition (HI) test, revealed that DENV activity was endemic throughout the country [3, 4].

Goal

The purpose of this article was to describe the epidemiological characteristics of dengue virus among children below 12 years of age within the urban areas of the country which includes Colombo the capital city which is densely populated and has seen a steady rise in patients infected with dengue fever and its several forms. We will later on see the difference we found with our statistics compared with of the government issued analytics.

Material and methods of research

We searched articles published in NSCID, PubMed, ASTMH using the keywords «Dengue», «dengue in children», «epidemiology of dengue in urban Sri Lanka». The incidence, aetiology, prevalence, patient demographics, level and severity of infection, complications and mortality were reviewed from the articles. This review only included papers on human beings and that were published in English. Studies had to describe an original study involving Burden of Dengue Infection and Disease in a Pediatric Cohort in Urban Sri Lanka.

Results and discussion

Dengue was first reported in Sri Lanka in the 1960s. Studies conducted during 1980–1984 showed a DENV seroprevalence of 50 % among school children and an annual seroconversion rate of 10–15 % among 5–7-year-old school children in Colombo, the capital of Sri Lanka. More recently, analysis of age-stratified seroprevalence data indicated that the annual seroconversion rate among children <12 years of age in Colombo is approximately 14 %. In the past, most dengue cases have been reported from the Colombo district and other neighboring districts in the heavily urbanized southwestern region of the country. However, over the past 10–15 years, dengue has been reported from nearly all districts of the island, and over the past

two decades, the number of reported DF and DHF cases has increased by more than 10-fold.17 This increase in cases has been attributed to introduction of new genotypes of DENV, as well the expansion of the range of the virus on the island.

The study was conducted in the city of Colombo, the commercial capital of Sri Lanka, which has a population of 647,100 and is the most densely populated area in the country; there are 17,353 persons/km2.22 The city is divided into 47 municipal wards. Ward 33 was selected for the study because of its stable population, which reflects the socioeconomic status and demographics of the entire municipal area (Figure 1).
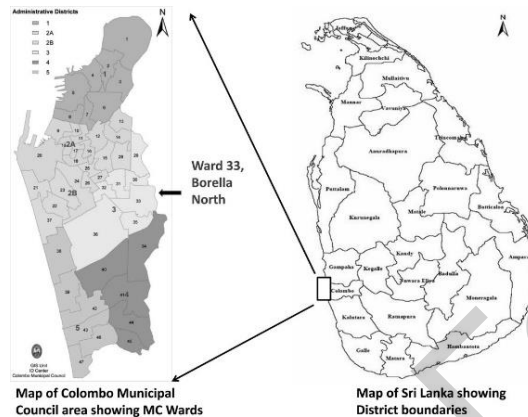
Figure 1 — Location of study site

The following study was done as a sample of 800 children ≤ 12 years of age was recruited for the study. Blood samples were obtained from all children at enrollment (during November 2008–January 2009) and one year after enrollment (during November 2009–January 2010) by finger prick and stored as blood spots on protein saver cards. Some of the whole blood was used to prepare dried blood spots for serologic testing. The remaining blood was centrifuged and the plasma used for molecular diagnostic testing. Ten or more days after recovery from fever, convalescent-phase samples were collected by finger prick and stored as blood spots on protein saver cards. With the blood collected the following tests were done to figure out the following indices; Detection of IgM and IgG against DENV in dried blood spots, DENV neutralizing antibodies. The dengue seroprevalence at enrollment was determined by testing all children by ELISA for IgG against DENV (Table 1).

Table 1 — Age-specific dengue seroprevalence in children, Sri Lanka

Age group (years)	No. children	No. seropositive by IgG ELISA	No. seropositive confirmed by dengue neutralization test	Seroprevalence (%)
<1	51	12	11	21.57
1–3	196	71	67	34.18
4–6	191	105	100	52.36
7–9	225	150	145	64.44
10–12	136	103	101	74.26
Total	799	441	424	53.07

A total of 681 fever episodes were detected among the 799 children, indicating that on average each child reported 0.9 fever episodes over one person-year of follow-up (Table 2). Dengue was laboratory confirmed for 3.9 % (27 of 681) of the fever episodes (Table 2); no child had more than one episode of dengue fever over the course of the study. Therefore, the incidence of clinically apparent dengue in the cohort was 3.38 cases/100 children/year (Table 2). When combined with the clinically inapparent infections, the total incidence of DENV infection was 8.39 cases/100 children (Table 2).

Table 2 — Age-specific fever episodes and incidence of dengue infection and illness in children, Sri Lanka

Age (years)	No. children	Fever episodes		New dengue infections			Incidence of infection per 100 children	Incidence of disease per 100 children
		Total	Mean/child	Total	Inapparent	Apparent		
<1	51	31	0.6	1	0	1	1.96	1.96
1–3	196	252	1.3	27	15	12	13.78	6.12
4–6	191	174	0.9	13	11	2	6.81	1.05
7–9	225	137	0.6	15	6	9	6.67	4.00
10–12	136	87	0.6	11	8	3	8.09	2.21
Total	799	681	0.9	67	40	27	8.39	3.38

Conclusion

Most estimates of dengue incidence in the region are based on hospital-based studies and nationally reported cases, which grossly underestimate the true burden of disease and infection. As the hospitals take into account the number of patients admitted with lab diagnostics being positive to DenV antigen positivity, many patients are counted out of the national analytics. In the children observed through the given time the 800children in Colombo, Sri Lanka, and estimated the incidence of infection and disease to be 8.39 and 3.38 cases/100 children, respectively. The ratio of clinically inapparent to apparent infections was 1.48, which indicated that for every apparent infection there were approximately 1.5 inapparent infections in children.This data can now be used fully understand the extend of this infection that has now become a epidemic spreading at rapid a pace. The true burden of dengue fever towards the quality of life of the children their parents and the government in the matter of funding hospital care and maintaining health care plays a big role in todays healthcare especially in urban Sri Lanka. As our study shows the number of infected cases are higher than the previously announced we need to take a step in the right direction towards better prevention from the disease which is water borne. In way of better supervision of places that stagnate water in and around the city which accumulate mosquito breeding whether it be garbage, unused tires, roofs that collect water. Hopefully this study; the results of the study will be useful for designing vaccine trials in southern Asia and for making decisions about how best to introduce vaccines and be used and good epidemilogical value towards a better cause.

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FOOD ALLERGIES IN CHILDREN AND THEIR GROWTH DEVELOPMENT

Ukwattage Dona Senuri Devanmini Ukwatta

**Scientific Guide: senior lecturer
of the department of pediatrics *L. S. Sergeichik***

**Educational establishment
«Gomel State Medical University»
Gomel, Republic of Belarus**

Introduction

From all types of autoimmune system diseases, the most common is allergic diseases. Even from allergic diseases food allergies take a huge place in the world. Chil-