

A Large Dengue Epidemic Affects Sri Lanka In 2017

Umesh Jayarajah^{1,3}, Shuaib Faizer^{2,3}, Ishan M De Zoysa^{3,5}, Suranjith L Seneviratne^{3,4,5}

¹Dengue Unit, National Hospital of Colombo, Sri Lanka

²Department of Forensic Medicine, Faculty of Medicine, University of Colombo, Sri Lanka

³Dengue Research Group, Colombo, Sri Lanka

⁴Institute of Immunity and Transplantation, Royal Free Hospital and University College London, UK

⁵Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka



Abstract — Sri Lanka experienced its largest dengue epidemic in 2017 with 110,372 reported cases and 301 deaths during the first seven months. Several factors including a change in the dengue virus serotype, unusually heavy monsoon rains and failure to control mosquito breeding sites may have contributed to the magnitude of this epidemic. We describe aspects relating to this large dengue epidemic and the control measures taken to combat it.

Keywords — *Dengue Fever; Sri Lanka; Dengue Epidemic; Mosquito Control; Viral Serotype; Monsoon Rains; World Health Organization.*

I. INTRODUCTION

Dengue viral infections are endemic or epidemic in virtually all tropical countries including Sri Lanka [1]. Most dengue infections are asymptomatic whilst others present with undifferentiated fever, dengue fever (DF), dengue hemorrhagic fever (DHF), or dengue shock syndrome (DSS) [2]. Dengue is a notifiable disease in Sri Lanka [3]. The first serologically confirmed case of dengue in Sri Lanka was in 1962 [4]. Since then epidemics of dengue have occurred regularly in Sri Lanka, causing a significant burden to the countries healthcare system [5]. Sri Lanka experienced its largest dengue epidemic in 2017. We describe aspects relating to this large dengue epidemic and the control measures taken to combat it.

II. METHODS

Information on dengue in Sri Lanka (especially during the 2017 epidemic) were obtained from published reports, the findings were pooled and then analyzed.

III. RESULTS AND DISCUSSION

The trend of reported dengue cases in Sri Lanka over the last 5 years is shown in Figure 1. From 1 January to 28 July 2017, the Epidemiology Unit of the Ministry of Health,

Nutrition and Indigenous Medicine, Sri Lanka reported 110,372 cases of dengue [6]. This is 4.3 times higher than the average number of cases for the same period during the years 2010 to 2016. In addition, 301 dengue related deaths were reported during the same period [6] and this is considerably higher than in previous years (Figure 2).

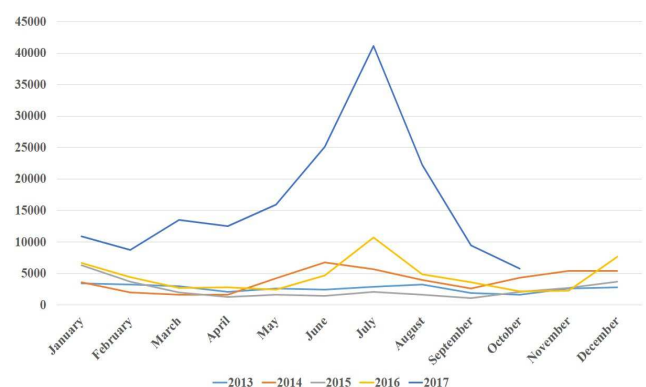


FIGURE 1. THE TREND OF REPORTED DENGUE CASES IN SRI LANKA OVER THE LAST 5 YEARS

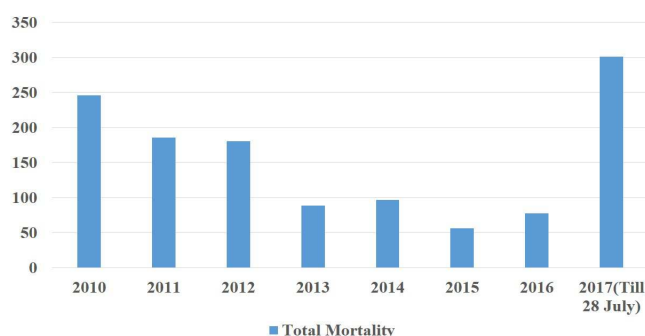


FIGURE 2. THE TREND IN THE REPORTED DENGUE RELATED MORTALITY IN SRI LANKA FROM 2010 TO 2017

The vast majority of cases (59,805 by July 2017) were reported from the Western province of the country which also happens to be the most densely populated region in Sri Lanka. Around 45% and 53% of overall dengue cases and deaths were from this region [6]. Within the Western province, the Colombo and Gampaha districts had 28,007 and 23,934 dengue cases respectively. During the same period, the North Central Province of the country had the lowest number of cases at 3217 [6]. The peak number of dengue cases was between June 30 and July 7, 2017. Whilst persons of all ages were affected, the highest incidence was in the age group 20 to 24 years, 30% were of school going age and 1% was infants [6].

Sentinel site surveillance done during the past seven years, has found the months May to July to be the peak period for dengue transmission [7]. This period coincides with the South-Western monsoon that usually commences in April. The 2017 Sri Lankan dengue epidemic occurred in the context of massive heavy rains and flooding that affected 15 of the 25 districts in Sri Lanka [6].

Preliminary laboratory testing identified Dengue virus serotype 2 (DENV-2) as the predominant circulating strain during the 2017 epidemic [8]. This dengue virus strain is known to be associated with increased virulence and atypical clinical presentations [9]. Although all four DENV have been co-circulating in Sri Lanka for more than 30 years, DENV-2 has been infrequently detected since 2009 [6], [10].

During the 2017 dengue epidemic, several measures were taken by the Ministry of Health, Sri Lanka in collaboration with the World Health Organization (WHO) with a view to ensuring an efficient and comprehensive health response. Support from military forces were sought to manage the overwhelming demands placed on available

healthcare resources and facilities. Medical personnel from the armed forces were mobilized to assist their civilian counterparts [6]. The availability of well-trained medical staff and adequate facilities for intensive patient monitoring are often major issues during large dengue epidemics. With a view to reducing the high morbidity and mortality in the present dengue epidemic, temporary specialized dengue treatment units were established at government hospitals and doctors, nurses and other healthcare staff were mobilized from other wards for this purpose.

The WHO presented an intensified strategic and operational plan to rapidly reduce dengue morbidity and mortality in Sri Lanka and this was accepted by the Minister of Health, Sri Lanka [11]. The response was coordinated at a national level and the President of Sri Lanka declared a continuous three-month dengue control program starting from the 1st of June 2017. The Regional Office for South-East Asia (SEARO) constituted a Task Force to guide the response. WHO/ SEARO deployed an epidemiologist, an entomologist and two dengue management experts from the WHO Collaborating Centre for case management of Dengue/Dengue Hemorrhagic Fever (Queen Sirikit National Institute of Child Health, Thailand) and Ministry of Public health of Thailand. The updated triage protocol proposed by the expert team was used to assist with better management of patients in health care facilities. The entomologists deployed by WHO/SEARO conducted training programs for entomologists and public health inspectors on vector control measures. Control measures to minimize mosquito breeding sites and to minimize human-vector contact were implemented simultaneously [10]. Recent entomological reports from the National Dengue Control Unit, suggests around 40% of *Aedes* mosquitoes (the vector for dengue), breeds in discarded containers and utensils. Furthermore, construction sites, schools, religious places and other institutions are found to contain high numbers of mosquito breeding sites [12]. The army, police and civil defense forces were mobilized to conduct house-to-house visits with the trained health staff, in the high-risk areas. Efforts were also taken to mobilize the community in proper garbage disposal, cleaning of vector breeding sites, and in health education and promotion. The WHO in collaboration with the Ministry of Health, guided the media in spreading awareness on the importance of vector control and personal protection [11].

Several factors may have contributed to this massive epidemic including a change in dengue virus serotype, unusually heavy monsoon rains and the high population density in the affected areas. A study from Sri Lanka has

shown that specific meteorological conditions often preceded dengue epidemics across various spatial units. Preceding medium and high rainfall levels and high temperatures were found to be associated with increase in incidence [7]. The failure to properly dispose of rain-soaked garbage, standing water pools or other potential breeding sites for mosquito larvae may have contributed to the large number of cases reported from the urban and suburban areas. To minimize future dengue epidemics, continuous monitoring and control of dengue breeding sites and long term solutions for proper waste disposal are needed. During this epidemic, several specialized dengue units were established within government hospitals. The immediate allocation of infrastructure and human resources for such units could be difficult without pre-planned protocols. Thus having well thought out plans for setting up such units in different large hospitals and for the mobilization and allocation of human resources and health infrastructure could help combat future epidemics more effectively and thus reduce morbidity and mortality.

IV. CONCLUSION

Sri Lanka experienced its largest dengue epidemic in 2017 with a major impact on the health system. Several factors including a change in the dengue virus serotype, unusually heavy monsoon rains and failure to control mosquito breeding sites may have contributed to the magnitude of this epidemic. This warrants extensive preventive measures and planning to reduce or combat future epidemics.

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