

## Why is dengue such an important public health problem in India?

Deaths and diseases due to dengue continue to dominate the headlines of national newspapers, news websites, televisions and radio channels in India. Very few diseases in India cause the degree of consternation, concern and political upheaval as that of dengue. One wonders why that is the case in India, since there are many other causes of infection, mortality and morbidity whose impact on the society are much more than due to dengue. Gastroenteritis continues to kill thousands of children annually, road traffic accidents are an ever-present menace, suicides and homicides snatch the brightest or the bravest in countless numbers and infections caused by other diseases such as tuberculosis, malaria and Gram-negative sepsis continue to raise their ugly heads with gigantic monstrosity. There are also a large number of non-communicable diseases such as cerebrovascular accident, coronary artery disease, chronic kidney or liver disease, diabetes, hypertension and malnutrition, including obesity which cripples significant numbers with unflinching regularity.

Hence, why does dengue – a disease whose mortality is <1% – grab such attention (as opposed to more than 50% mortality in antibiotic-resistant Gram-negative sepsis)? The answer probably lies how the public and the administration view the problem of dengue. The epidemiology of dengue, the unpredictable clinical course in an individual patient, the lack of specific anti-viral therapy and the unavailability of a vaccine are important technical and scientific issues whose importance is not necessarily realised by all those who suffer from its occurrence.

Dengue represents a big public health problem because of the following reasons: (a) it affects healthy as well as diseased; (b) it does not differentiate between the rich and the poor, the ruler and the subjects; (c) the disease affects the cities as well as the sub-urban and the rural communities (sometimes, the onslaught seems to be more in the cities because of its complexity, higher case detection and notification rate); (d) it tests the public health apparatus of the society from the primary to the tertiary care; (e) the disease tests basic infrastructure such as ability to provide simple laboratory tests such as complete blood count, platelet and haematocrit, examination of peripheral smear of blood to rule out other conditions such as malaria or leukaemia; (f) it reflects the level of public health and sanitary awareness

of the citizens and the administration; (g) it tests the health system's ability to detect and manage early signs of complications such as dehydration, haemorrhage and organ dysfunction; (h) it is a reflection of the efficiency of vector control systems to control vectors and unsanitary conditions.<sup>[1,2]</sup>

In most cases, the management of dengue is about getting the basic right – getting the right tests done at the right time (complete blood count, NS1 antigen ELISA, rule out other diseases with similar clinical presentation such as malaria, typhoid, chikungunya, bacterial sepsis), getting the notification done at the right time to public health departments (so that vector control and case detection can occur promptly), manage the patient through hydration, antipyretics and analgesics (such as paracetamol) and provide haemodynamic, haematologic (e.g., platelet transfusion), respiratory (e.g., ventilator) and organ support (e.g., dialysis) and management of complications. In tertiary care settings, where complicated cases of dengue are taken care of, clinical management may involve maintaining fluid and electrolyte balance, haemodynamic monitoring and supporting through the use of intravenous hydration and vasopressors, managing respiratory failure through artificial mechanical ventilation, monitoring respiratory parameters by arterial blood gas analysis, controlling the risk of haemorrhage through random donor or single donor platelet transfusion and managing renal failure through fluid-electrolyte balance maintenance and haemodialysis. Diseases much more complicated than dengue are often managed successfully in tertiary care settings (such as septic shock or cardiogenic shock), and most advanced health-care facilities generally have the equipment, expertise and technological capability to manage complicated dengue. Deaths from dengue therefore in many instances are due to delayed presentation to health-care facilities, presence of comorbidities (and risk factors such as extremes of age) and lack of adequate infrastructure. Dengue incidence and dengue-related deaths may be viewed as a *de facto* surrogate index of socioeconomic development and public health infrastructure. Vector-borne diseases such as dengue, malaria, chikungunya or West Nile fever do occur in the developed and industrialised countries; however, their socio-political impact is never comparable to those seen in developing countries, especially India. Outbreaks of dengue and mortality from dengue in India are actually

a reflection of inefficiency of health administrative setup and inadequacy of public health measures and tertiary health care. As a result, many cases that could have been reported are not reported. It is not uncommon to see the local administration in a state of denial of problems that exist at various stages – from primary to tertiary care, from health education to vector control, from sanitation and hygiene to quality control of laboratory tests and provision of basic infrastructure at health-care facilities. The availability of poor quality rapid test kits and their use for various reasons ranging from logistics to commerce, vested interests at various levels and sectors, irrational fear and inappropriate importance given to certain laboratory results exacerbates the societal problems of dengue.

In view of the growing population, increasing urbanisation, severe pressure on basic infrastructure and evolution of the vector populations and viruses, it is unlikely that the problem of dengue will be eradicated in the foreseeable future. Government machinery cannot be expected to control mosquitoes, less so viruses following complex evolutionary trajectories, especially when individual actions of its citizens are less than sensible when it comes to civic responsibilities. If citizens do not take care of their country, no amount of government legislation and affirmative action would lead to meaningful and sustainable development. The most efficient governments have achieved control over dengue or other vector-borne diseases less by attacking the virus or its vector, more by engaging with the problems of society (poverty, illiteracy, ignorance, lack of hygiene and unsanitary conditions) and by seeking to give their citizens a greater level of quality at various stages of life. In a way, the problems posed by dengue are more social and less scientific. This is despite the fact that there are no effective anti-viral agents till date and the newly developed vaccine is yet to prove its efficacy in all epidemiological frontiers. The questions posed by this RNA virus of nanometric dimension are as much about integrity, transparency, social responsibility, administrative and economic efficiency as it is about genes, vectors, antigens and immunopathogenesis. Dengue would cease to be a public health problem not when the virus or its vector is conquered, but when we as citizens have grown up enough to eradicate our social evils and create a social and health-care infrastructure, which is not just egalitarian but also fit for healthy living in harmony with nature.

In this issue of Journal of the Academy of Clinical Microbiologists, we have tried to get an idea of the laboratory and clinical practices in the diagnosis of dengue from 26 centres in India.<sup>[3]</sup> The survey shows that tests used in the diagnosis of dengue are varied and so are the clinical management strategies. There is a need for guidelines for the diagnosis and treatment of patients with dengue at various levels of health care – primary, secondary and tertiary; in rural and resource-constrained settings as well as for urban centres and apex hospitals. The guidelines need to take care of the resource limitations at various levels so that they are not just evidence based but also prudent and pragmatic.

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