

# Dengue in Malaysia - A Commentary

## How serious is the problem?

The incidence of dengue in Malaysia has increased from 15.2 per 100,000 in 1973 to 361.0 per 100,000 population by the year 2014. The same trend was seen in case fatality rates that went up from 0.16% to 0.62% between 2000 to 2013.<sup>1,2</sup> More than 60% of the cases were from the Klang Valley region. In Pahang the dengue incidence rates from 2004 to 2014 showed a similar increase from 40.9 to 193.8 per 100,000 population and an increase in case fatality rates from 0.07% to 0.3% too was observed between 2000-2014. Fortunately these figures were below the national average.<sup>3</sup>

Dengue epidemiology is rapidly evolving, with increase in frequency of outbreaks and involvement of new area that were previously unaffected are being observed lately. These areas are small towns, villages and land schemes. Outbreak in cities and big towns tend to be out of control and has become hotspots, a term used to identify outbreak occurring for more than 30 days. For example, during the epidemiological week 12/2015 (22 to 28 March 2015) there were 183 hotspots reported in Malaysia.<sup>2</sup> In Pahang, for the year 2014, there were 100 outbreaks compared to 22 similar episodes in the previous year with 1 hotspot, showing a marked increase of more than 350%.<sup>3</sup>

Dengue affects all age groups, more prevalent in developed and populated area. Rapid development and population growth, improper management of construction sites, industrial areas and poor solid waste management make these places suitable for *Aedes* mosquitoes to breed.

## What are the challenges?

Combating dengue is always a challenging task. A lot of factors need to be considered in the prevention and control of dengue including dengue virus itself, the vector i.e. *Aedes* mosquitoes, the environment and of course the human factor. Dengue virus had 4 serotypes and all four serotypes were distributed in the population.<sup>4</sup> Any changes in the dominant serotypes in the population will enhance the transmission of the disease in the community. In Malaysia, changes in dominant serotypes occur every 3 years and the same serotypes were observed to be dominant up-to 10 years.<sup>4,5</sup>

*Aedes* mosquitoes have not change physically for the past decade. However, the rate of reproduction of *Aedes* mosquitoes increases with the increase in environmental temperature. It had significantly contributed to the epidemic. The density of *Aedes* mosquitoes in the environment is seen to increase drastically two weeks after rainy seasons due to the available places for breeding. The eggs of *Aedes* mosquitoes can survive in dry seasons for up to 6

months and the dengue virus can be transmitted trans-ovarian to the eggs and thus producing a new generation of *Aedes* mosquitoes with the virus.<sup>5</sup>

Source reduction, larvaciding and space spraying of insecticides are effective ways in prevention and control of the larva and adult *Aedes* mosquitoes.<sup>6</sup> However for source reduction to be effective it needs participation and commitment from the public which at present is very poor. While space spraying is effective in controlling the adult mosquito, only 40% of the cases were done within 5 days of onset.<sup>1</sup> This is due to the delay in patient seeking treatment and insufficient number of control teams during outbreaks. The failure will result in the spread of the disease leading to an uncontrolled outbreak. Humans had ignored the importance of environmental cleanliness as a method to control *Aedes* mosquitoes breeding. Based on Ministry of Health (MOH) annual report 2012, *Aedes* Index was persistently high in public areas such as construction sites (8.7%), factories (8.6%), empty lands (8.0%), recreational areas (7.3%) and schools (6.4%).<sup>2</sup> Many studies show that despite the high level of knowledge about dengue among the public, the practice was very poor.<sup>7</sup> Community as a whole need to see the dengue issue as a serious problem that affect their lives. They should not leave the responsibility to manage this problem solely to the authorities as the source of the problem is around their houses and offices.

## What have been done?

The Ministry of Health (MOH) and local authorities has made a lot of effort and taken action to prevent and control dengue transmission in the community. These include space spraying of insecticide to kill adult mosquitoes, larvaciding, mass premises inspection for breeding places, enforcement of Destruction of Disease-Bearing Insects Act, 1975, producing guidelines, health educations campaigns, conducting activities to facilitate community participation such as COMBI (Communication for Behaviour Impact) and development of special task force at ministerial, states and district level.

Dengue has been made a permanent agenda in Cabinet Committee on Cleanliness and Health meeting chaired by Deputy Prime Minister since 2006. RM 50 million had been allocated for dengue control and prevention programme. In 2009, the National Strategic Plan on Dengue Prevention and Control was initiated.<sup>1</sup> The thrust of the plan includes priority on dengue prevention and control in the Klang Valley, optimising the Integrated vector management strategy, social mobilisation through involvement of all parties including public and non-governmental organisations (NGO), full government commit-

ment, availability of standard dengue management protocol, adequate resources including financial, manpower and capacity building, fast and effective outbreak management, utilisation of research findings and using new methods and technique in dengue control activities. Dengue Task Force Committee for combating dengue was formed in 2013 to monitor and provide guidance in implementation of the plan. However, the impact of the strategic plan has yet to be fully observed. There was indeed a decline in dengue incidence from year 2009 till 2012, however an increase has been noted in 2013 and 2014. In March 2015 MOH has introduced a pilot project in Klang Valley using Indoor Residual Spray, a technique used in malaria control programme to control adult *Aedes* mosquitoes. The result of this effort is yet to be seen.

### Research and hope

We need more research to measure the magnitude of the problem and the effectiveness of the control methods used. We also need research to understand why people do not want to clean their surroundings and how we can change that attitude. Clinical research on dengue management should also be intensified since the case fatality and complication among dengue cases is higher than other neighbouring countries.

Sterile Insect Technique (SIT) a new method is now being tested in Malaysia. This technique produces genetically modified mosquitoes and the mosquitoes are later released into the environment and will mate with the local *Aedes aegypti* mosquitoes. The offspring produced will not survive into adulthood; hence, leading to the overall reduction of *Aedes aegypti* population. Relevant authorities had approved the trial and phase 2 has already been completed (release in uninhabited jungle). Phase-3 trials, that is an open field release of these genetically modified mosquitoes is awaiting approval as the results are still being analysed (Institute of Medical Research Malaysia, 2015).<sup>4</sup>

Research on dengue vaccine is also an on-going project globally. The vaccine has the potential to reduce dengue mortality and morbidity. However, due to the complicated nature of dengue virus with 4 serotypes, its development had been slow. At present, Sanofi-Pasteur, a French company is conducting Phase III clinical trials to test its efficacy. This new vaccine is hoped to reduce dengue mortality and morbidity by 50% and 25% respectively before 2020.<sup>8</sup>

**Dr. Abu Hassan Shaari b. Abd. Kadir, MD, MPH, CIME, CMIA.**

Consultant Public Health Physician, Vector Borne Disease Unit,  
Pahang State Health Department, Jalan Gambut,  
25000 Kuantan.  
Email: drabuhassan@moh.gov.my

**Dr. Mohamed Sopian b. Mohamed, MD, MPH**

Senior Principal Assistant Director  
Communicable Disease Unit,  
Pahang State Health Department

**Assoc. Prof. Dr. Jamalludin Ab Rahman**

B. Med.Sc., MD, MPH  
Department of Community Medicine  
Kulliyah of Medicine  
International Islamic University Malaysia

### REFERENCES

1. Ministry of Health Malaysia (2009). National dengue strategic plan 2009-2013.
2. Ministry of Health Malaysia. Annual Report 2012.
3. Jabatan Kesihatan Negeri Pahang. Vector Borne Disease Unit Report on Dengue 2015.
4. Institute of Medical Research Malaysia. (2015, 23rd November 2013). *GM Aedes aegypti* Research. Retrieved 14th May, 2015.
5. Ng FSP, Yong HS. Mosquitoes and mosquito-borne diseases: biology, surveillance, control, personal and public protection measures: Akademi Sains Malaysia 2000.
6. Chung YK, Lam-Phua SG, Chua YT, Yatiman R. Evaluation of biological and chemical insecticide mixture against *Aedes aegypti* larvae and adults by thermal fogging in Singapore. *Medical and Veterinary Entomology* 2001; 15:321-7.
7. Hairi F, Ong C-H, Suhaimi A, Tsung T-W, Anis AMA, Sundaraj C, Soe MM. A knowledge, attitude and practices (KAP) study on dengue among selected rural communities in the Kuala Kangsar district. *Asia-Pacific Journal of Public Health* 2003; 15:37-43.
8. Thisyakorn U, Thisyakorn C. Latest developments and future directions in dengue vaccines. *Therapeutic Advances in Vaccines* 2014; 2:3-9.