EDITORIAL

Dengue Fever in Malaysia: Time for Review?

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Dengue is the most important arthropod borne viral disease of public health significance. Compared to nine reporting countries in the 1950's, today the geographical distribution includes more than 100 countries world wide. The WHO estimates that more than 2.5 billion people are at risk of dengue infections, with 50 million cases occurring annually with 22,000 deaths[1]. The dengue virus is an enveloped single stranded RNA of the family Flaviridae. There are four serotypes which share genetic and antigenic features but infection with the one serotype does not provide long-term protection against other serotypes. The principal vector is the day biting *Aedes aegypti* which typically breeds in clean stagnant water in a wide variety of sites including man made containers in the domestic and peridomestic urban environment.

Dengue fever was first reported in Malaysia in 1902 and dengue haemorrhagic fever in 1962[2]. Since then, epidemics of dengue cases have been reported regularly. Incidence rates ranged from as low as $27.5/10^5$ population in 1995 to a high level of $132.5/10^5$ in 2004. Up to the end of September 2005, 29,196 cases of dengue cases have been notified with 76 deaths[3]. The increasing trend in the incidence of dengue infections is a cause for concern.

The reasons for the dramatic emergence of DF/DHF are complex and not well understood, but many factors combine to produce epidemiological conditions that favor viral transmission by the main mosquito vector *Aedes aegyptii*. Among them are population growth, rapid urbanization, rural urban migration inadequacies in urban infrastructure, including solid waste disposal, and rise in domestic and international travel[4]. In the Malaysian context, health reforms in the late nineties that integrated the vertical organizational structure of the Vector Borne Disease Control Programme with the general health services resulted in loss of technical expertise as well as constraints in funding, as limited health resources were moved to other competing programmes under the Ministry of Health. In 2000, the control of vector borne diseases in the bigger towns and cities were made the responsibility of their respective local goverments[3]. Unfortunately many of these local authorities neither have the expertise nor the political will to implement sustainable and effective vector control measures. At times of an epidemic, with the media highlighting the issue, the local authorities carry out knee jerk actions to satisfy the public. However, many of these actions are designed for short term political visibility rather than being based on good epidemiology. After years of neglect, cities like Kuala Lumpur, Penang, Seremban and Melaka have become hyper endemic for dengue transmission, where more than one virus serotype are circulating[5].

Dengue control in Malaysia is primarily based on case surveillance by notification of suspected dengue cases by doctors, and vector control by space spraying of insecticides. Vector surveillance is done by regular larval surveys of Aedes mosquitoes and computing of Aedes index (AI) and Breateau index (BI) according to specific localities. However, this reactive mode of surveillance with the health authorities waiting until the medical community recognizes the dengue cases before reacting to implement control measures is very insensitive because doctors have a low threshold to diagnose dengue during interepidemic periods. In most cases, outbreaks are only recognized at the peak of transmission when it is too late to implement effective preventive measures that impact on transmission[4].

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Space spraying of insecticides to eliminate adult Aedes mosquitoes in the outbreak area to achieve rapid control of an epidemic has been a favored approach for more than 20 years, but recently, there is much controversy on the effectiveness of space spraying of insecticides to control dengue epidemics[6]. Many studies have shown that space spraying with insecticides has minimal impact on disease incidence although the peak of the epidemic may be delayed[7]. There was no difference in the population of immature forms of Aedes between the prefogging and postfogging period in a typical urban household, which means that fogging has no effect on gravid Aedes females in the wild[8]. Thus prevailing policies on space spraying of insecticides need to be reviewed in the light of current evidence.

More research input is needed to develop effective dengue prevention and control methods. There is an urgent need for research on the ecology of dengue infections in the urban environment. By looking closely at the interaction of climate, humidity, type of human dwellings, favored breeding sites, population movement, and other variables that have an impact on transmission, comprehensive vector control strategies can be stratified for different environments. Vector prevention and control strategies have to be a combination of measures that should include building designs, environmental sanitation, source reduction, and biological and chemical control of both adult and immature *Aedes* mosquitoes. More information is required on the dynamics of dengue transmission during the epidemic and interepidemic period, dengue serotypes and genotypes distribution temporarily, and in association with DHF, to understand the resurgence of dengue in Malaysia. More sensitive sampling methods of the Aedes population need to be also developed. The relevance of AI/BI is questionable. Attention should be given to defining a more sensitive adult or larval index to accurately reflect the risk of dengue infections in the neighborhood.

Ways and means to enlist community participation for the control of dengue infection should be explored. The most effective way to control the population of *Aedes aegyptii* is larval source reduction, which is eliminating or cleaning water–holding containers that serve as the larval habitats for the mosquito in the domestic environment. Social behavioral research needs to be strengthened to improve communication at the community level for better prevention and control.

Ultimately the prevention of dengue depends on the availability of an effective vaccine. Although a live attenuated quadrivalent vaccine is undergoing trials and recombinant vaccine is in the early stages of development, their actual deployment in the community will take many more years[9].

Presently prevention of dengue infections is primarily dependent on keeping the population of *Aedes* below a threshold level that does not allow transmission to take place. It is suggested the local authorities develop appropriate strategies to monitor and control the vector population throughout the year. Sufficient funding need to be channeled to vector control measures. Licensing of business activities, approval of buildings and its use must cater for anti Aedes measures activities. However, the final responsibility of urban mosquito control still lies with the citizens of the community, who by their behavior in the domestic and work environment unwittingly perpetuate the breeding of the vector mosquitoes and blame the government for the recurring epidemics. Larval source reduction by the community is the only cost-effective and sustainable measure that will reduce vector density to very low levels. However, the major disadvantage is that it is slow and may take many years before human behavior is modified enough to impact on disease transmission[4].

A proactive laboratory based surveillance needs to be developed that will provide an early warning, predictive capability for epidemic dengue. Trend analysis of data based on rapid diagnosis and identification of serotype can provide the necessary information for initiating vector control measures well in advance to prevent outbreaks. Thus, if the surveillance system can predict dengue epidemics, steps can be taken to prevent them or at least decrease the overall incidence of the disease.

There are no easy solutions to the dengue problem in Malaysia. However, with strategies based more on community based source reduction and less on space spraying of insecticides, coupled with a system of proactive surveillance and commitment by the local governments on integrated and sustainable vector control measures, dengue infections in this country can be reduced in the long term.

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