PROBLEMS IN DENGUE CONTROL: A CASE STUDY

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Abstract. The control of dengue outbreak requires a multi-pronged effort by the various government agencies. It reguires co-operation of the community in the control activities, strict adherence to existing control procedures and guidelines by health personnel, increased manpower where necessary and strengthening co-operation between various health agencies to prevent delay in instituting control measures.

INTRODUCTION

Dengue fever (DF) and dengue hemorrhagic fever (DHF) present a serious public health problem in many countries in Southeast Asia, including Malaysia. In 1990, there were 4,880 notified cases of DF/DHF in Malaysia of which 4,231 were DF and 649 were DHF, with 21 deaths. The incidence rate of DF/DHF in 1990 was 27.97 per 100,000 and the ratio of DF to DHF was 6.7 : 1. Seventy-four percent of cases were in urban areas.

TTDI, which is situated only a few kilometers outside of Kuala Lumpur, was one of the localities affected by a rather prolonged outbreak despite early intervention measures by the health authorities. We present here a case study highlighting some problems associated with dengue control in Malaysia.

MATERIALS AND METHODS

Profile of TTDI

TTDI is a residential area of 18 km^2 with a population of 16,000, living in 4,300 houses. The population is from the upper middle class. The area is made up of bungalows as well as single and double storey linked houses. It has several rows of shophouses, a supermarket, medical clinics, police station and a market. The residents are mostly civil servants, professionals and business people.

Profile of outbreak

The first case was reported towards the end of December 1990 followed by eleven more in the same locality within the next two weeks (Fig 1). The cases slowly spread to nearby areas and from December 1990 to March 1991, 41 cases were reported, of which 36 were DF and 5 were DHF. No death was recorded. The main age group affected was between 10-34 years with about equal numbers in both sexes. Fifty-nine percent of cases were in Chinese and 42% in Malays. School children made up 31.7% of cases. Seventy percent of cases were admitted to hospitals within 5 days of disease and only 56% were notified to the health authority within 2 days of the disease being diagnosed clinically.

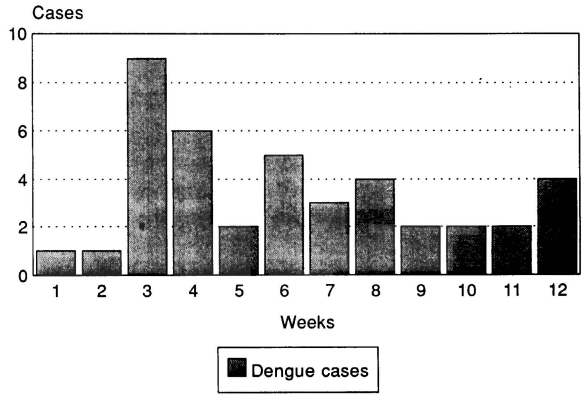

Fig 1—Number of cases in TTDI from 21.12.90 - 14.03.91.

Laboratory investigations

During this period, 29 serum samples were tested serologically using the hemagglutination inhibition (HI) test (Clarke and Casals, 1958) as well as the dengue IgM ELISA (Lam *et al,* 1987). In addition, acute serum samples were inoculated into *Toxorhynchites splendens* mosquito larvae for virus isolation (Lam *et al,* 1986).

***Aedes* survey**

Workers from the Health Department went around the affected areas to carry out inspection for *Aedes* breeding in houses where cases were reported and in surrounding areas. The inspectors worked in teams and conducted house inspection for *Aedes* breeding.

Source reduction

Teams from the Health Department carried out mass source reduction for the whole area of TTDI about 19 times over this period. They worked in 3 teams, each team comprising of 3 workers. On some occasions, teams from other zones were recruited to do 'search and destroy' operations.

Fifty-four percent of houses were fogged by ULV using Responsar (cyfluthrin) within 2 days of disease notification. Second fogging which was supposed to be carried out within 10 days was not possible in 66% of cases. Limited perifocal fogging with resposar was initiated.

Health education

Health education was given to house occupants during the search and destroy campaigns and pamphlets were placed in strategic places. Two exhibitions depicting dengue and its control was held in a supermarket in TTDI for 3 days. A lot of publicity regarding the worsening dengue situation in the city was generated during this period.

Community participation

The Residents' Association discussed the dengue situation in their committee meeting and formulated a plan to motivate the residents to participate in community activities to prevent dengue in TTDI.

RESULTS

The dengue outbreak in TTDI was not particularly severe as compared to the rest of the country. Of the 41 cases reported during this period, only 5 were classified as DHF based on WHO (1986) classification, giving a DF : DHF ratio of 7.2 : 1 as compared to 6.6 : 1 for the rest of the country (WHO, 1991). Although 70% of cases were admitted to hospitals, this was probably not due to the severity of the disease but to be fear among the upper income group of residents in this area. Many of these cases were admitted to private hospitals. It was noted that the disease was very characteristic of dengue infection as 92% were clinically diagnosed as DF or DHF within the first day of admission. However, only 56% of cases were notified to health authorities within 2 days of being clinically diagnosed.

All 29 samples were serologically confirmed to be due to dengue infection. The IgM ELISA was able to provide earlier confirmation over the HI. Twelve strains of dengue virus were isolated of which eleven were dengue 2 and one was dengue 3.

Prior to the outbreak, *Aedes* surveillance was not done in this area. During the outbreak, surveys carried out showed the *Aedes* index to be above 2.5 in 46.4% of case houses but Breteau index was below 10 in all houses. The high *Aedes* index showed that this was a high risk area.

Control measures were initiated soon after the first case was reported but they did not seem to be as effective as expected. A detailed analysis was carried out to identify problems of control in the hope that better remedial measures can be taken to prevent future outbreaks.

One of the problems encountered was a lack of co-operation from residents by their refusal to allow workers from the Health Department to check their homes. Community participation was also lacking among the residents. Many of the houses were left unoccupied during the day because both husband and wife were at work. Generally, only half the houses visited in a day were inspected. Many of the occupants stayed in rented premises and tenants did not bother to keep the compounds clean.

It was noted that there was delay in disease

notification by government and private hospitals as well as private clinics. Such delay will result in late implementation of vector control.

Fogging activity was usually carried out between 0800 and 1200 hours. This could result in reduced adulticiding due to the biting habit of the vector. In addition, many residents tended to keep their doors and windows closed during ULV fogging. Second fogging was delayed in most instances due to poor manpower and resource coordination. Although perifocal fogging was carried out initially, this was done on a limited scale.

The effectiveness of vector control was not monitored after fogging by carrying out repeated *Aedes* surveys. Inadequate supervision by senior health personnel during fogging could be a major contributory factor as control activities may not be effectively done.

From the analysis of this case study, certain weakness in the control strategies have been identified. In a dengue outbreak, it is important to have good coordination of manpower and resources so that these can be utilized maximally. Disease notification must be strictly implemented by clinicians within hours of clinical suspicion in order to avoid delay in vector control measures. Adequate vector control should take into consideration the biting habits of the vector and should include not only ULV fogging but also perifocal fogging. Second fogging must be carried out within 10 days. *Aedes* surveillance should be conducted after fogging to determine the effectiveness of control measures. Manpower shortage should be overcome in the face of an outbreak and there should be adequate supervision of field staff to ensure proper control measures.

Community participation is essential in any control program and steps must be taken to seek such cooperation. Advice from social and behavioral scientists may be helpful in this regard. If all else fails, then legal measures must be taken to prevent the spread of disease.

From the lessons learnt in this case study, it is hoped that dengue outbreaks of this nature can be more effectively controlled in the future.

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