Dengue Haemorrhagic Fever in Indonesia: Epidemiological Trend and Development of Control Policy

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ABSTRACT

DHF FIRST APPEARED in Indonesia in 1968, and, since then, the affected areas have enlarged. The trend of the disease between 1968-1985 fluctuated yearly due to the occurrence of epidemics in different areas and the size of the areas affected. The areas affected by the disease by 1994 included 237 districts (78% of the total number of districts in the country), 2,102 sub-districts (55% of the total number of sub-districts) and 8,509 desas (villages) (13% of total number of desas). The prevalence of the disease follows a seasonal trend which corresponds with the seasonal upsurge of Ae. aegypti. Breeding indices exceed 36 per cent in outbreak areas. Control strategies have improved over the years, starting with a fire-fighting strategy, i.e. focal fogging around DHF case. It now emphasizes the elimination of Ae. aegypti larvae through organized community efforts and fogging before the highest transmission season to prevent epidemics.

Introduction

Indonesia is an archipelago located at 95° to 141° east longitude and 6° north to 11° south latitude, consisting of more than 17,000 islands of various sizes, of which 6,000 are inhabited. The total population by the 1990 census was 180 million. Administratively, the country is divided into
27 provinces, 304 districts, 3,839 sub-districts and 67,637 desas. Being located at the Equator, all the areas have a tropical climate with relatively constant high temperature and humidity, which is conducive to Aedes aegypti perpetuation.

An epidemic of dengue fever was first reported from Batavia (presently Jakarta) in 1779 by Bylon. However, dengue haemorrhagic fever (DHF), the severe form of dengue infection with haemorrhagic manifestations accompanied with death, was recognized in Surabaya and Jakarta during 1968. Since then DHF cases have been reported from different parts of the country with frequent occurrence of epidemics.

Briefly described here is the epidemiological situation of DHF, its control strategies and the constraints faced by the DHF control programme in Indonesia.

Epidemiological Trends

DHF Incidence

Following the first appearance of DHF cases in 1968, the areas affected have been enlarged and the incidence of DHF has fluctuated yearly due to the occurrence of epidemics in different areas with varying size of areas affected every year. The secular trends of yearly DHF incidence and the size of areas affected by the disease, from 1968 to mid-1995 is shown in Figure and Table.

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**Figure. DHF incidence and number of districts/municipalities affected in Indonesia 1968 - 1995**

- DHF Incidence per 100,000 population
- No. District affected Up to June

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Table. Number of DHF cases, deaths and number of provinces & regencies/municipalities affected and incidence per year in Indonesia - 1968 - 1995

<table>
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<th>Years</th>
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<th>No. of deaths</th>
<th>Case-fatality rate (CFR) %</th>
<th>No. of provinces affected</th>
<th>No. of regencies/municipalities affected</th>
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Trend analysis of DHF: 1968-1988

During the period 1968-1988, the DHF incidence tended to increase from year to year. In 1968, a total of 53 hospitalized DHF cases with 24 deaths were reported from two districts. By 1988, the total number of DHF cases increased to 47 573 (27.1 per 100 000 population) with 1 527 deaths reported from 201 districts.

Trend analysis of DHF: 1989-1995

Following the epidemic in 1988, the DHF incidence sharply came down to 6.1 per 100 000 population in 1989, but showed an upward trend during 1990. Since 1990 the annual DHF incidence has been on the decline from 12.7 in 1990 to 9.2 per 100 000 population in 1993. In 1994, however, the incidence went up to 9.7 per 100 000 population. The rising trend was maintained during 1995.

The areas affected by the disease have continuously increased from 177 districts in 1990 to 217 in 1994. The cumulative total number of districts affected by DHF during three years (1992-1994) was 237 or 78% of the total in Indonesia, while the number of sub-districts and desas affected were 2 102 and 8 509 or 55% and 13% of the total sub-districts and desas in the country respectively(4).
Seasonal prevalence of DHF cases

The peak of DHF cases corresponds to the rainy season which extends from December to March; however, in urban areas the peak is reached in June/July which is the beginning of the dry season.

Entomological indicators

*Aedes aegypti*, the main vector of DEN/DHF, is widely spread in the country. A larval survey conducted during 1986-87 in seven cities/towns of Java, Sumatera and Kalimantan yielded an average premises index of 36% which is much higher than 5% which has been considered as a safe level for the transmission of dengue fever.

DHF Control Strategies

In the absence of vaccines and drugs to prevent dengue infection, the main activity of the DHF control programme is the control of *Aedes aegypti*. At the beginning, the vector control strategy followed the “fire-fighting tactics”, i.e. focal fogging around a DHF case, combined with health education in a limited area. Subsequently, these measures were further strengthened from time to time in phases with the availability of resources and also in view of the experience gained. These are briefly discussed below:

1980-1985: Mass larviciding

Mass larviciding by trained volunteers, once a year, of known endemic towns/cities with temephos 1% SG at a dosage of 1 ppm, conducted on total-coverage basis before the onset of the transmission season.

Entomological evaluation, as carried out in Yogyakarta, revealed that although mass larviciding did reduce the larval population significantly, within three months it reached 50% mark of the pre-treatment level as measured by the premise index.

1986-1989: Selective larviciding

Due to resource constraints, mass larviciding was modified to selective larviciding in pre-determined endemic desas (desas reporting DHF cases during the last three consecutive years). The frequency was increased to four applications a year at 3-month interval, but temephos was applied to containers with positive *Aedes* larvae only.

1990-1991: Selective larviciding and fogging

Selective larviciding was enforced with two cycles (one-week interval) of insecticide fogging in endemic desas with high prevalence of DHF cases before the highest transmission season. This two-pronged vector control measure reduced DHF incidence in the areas treated, as observed in seven provinces.

1992-1995: Source reduction by community

Organized community efforts

Community participation in the elimination of *Ae. aegypti* larvae was organized by the DHF Working Group (DHF/WG) at the desa level under the guidance of health centre personnel. One of the members of the DHF/WG is from family welfare foster, an
The activities of DHF/WG at the Desa level consist of: (i) to organize cadres, including PKK (women cadres), in carrying out regular home visits for education of families on DHF prevention and to examine all water containers for the presence of Ae. aegypti larvae; (2) to conduct group education activities; (3) to organize simultaneous activities ("kerja bakti") for emptying and refilling water containers and cleaning up the environs from all articles possible for Ae. aegypti breeding regularly, and (4) to monitor results of these activities in each sub-desa, using premise indices obtained from cadre's report for necessary action[6].

Health centres provide training and guidance to cadres and conduct larval surveys every three months in 100 houses selected at random in each desa. Larvae free index (percentage of houses free of Ae. aegypti larvae) of each desa is to be reported quarterly to DHF/WG and desa's chief, for necessary follow-up actions by the desas.

Health education
Apart from educational activities at the desa level, instructions to elementary school-children were given. Guidelines on DHF prevention for education at schools, including the teaching materials, were distributed. In addition, education to community was also conducted through different channels of communication, such as TV and radio, posters, etc.

Intersectoral coordination
The DHF/WG teams at sub-districts, districts, provinces and up-to the Central level provide intersectoral support for the DHF control programme in which different institutions, including education, information, religious bodies, family welfare foster, regional planning boards, bureaux of social welfare and bureaux of village development are involved.

Problems and Constraints
1. Source reduction activities of Ae. aegypti are not being conducted on a regular and continuous basis in all desas. At present DHF/WGs at desa level have been established in 11 756 (17%) of the total 67 367 Desas in Indonesia. Lack of educational material on DHF prevention as well as scarcity of trained cadres at the community level have affected the health education programmes.

2. The limited coverage of areas under insecticide application due to shortage of supplies and equipment and operational costs of fogging and larviciding are the reasons why dengue transmission and its spread to other areas has not be completely arrested.

3. Insufficient training guidance and supervision by health personnel involved in the control programme has resulted in poor implementation of vector control activities in the field.

4. Lack of strategic information on local DHF situation and DHF control policy to the members of DHF/WGs from sectors
other than health as well as to the district, sub-district and desa chiefs has led to a weakened political and financial support from local authorities.

References

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