

Dengue Haemorrhagic Fever Prevention and Control Activities in South-East Asia Region

by

Chusak Prasittisuk and A.G.Andjaparidze
WHO Regional Office for South-East Asia
New Delhi

ABSTRACT

DEN/DHF is endemic in seven countries of the WHO South-East Asia Region. The estimated number of DHF cases during 1995 were estimated to be around 160 000 cases 4000 deaths. In Indonesia, Myanmar and Thailand, the disease is not only confined to urban towns but has also spread to rural areas wherever *Ae. aegypti*, the vector species, is present. The disease affects mostly children and the case fatality rates range between 6-10 per cent. In these countries, the disease is notifiable. In Bangladesh, India, Maldives and Sri Lanka, the disease has taken a milder course and affects adults and older children, causing high morbidity but no mortality. However, in recent years, sporadic outbreaks of DHF have been recorded with mortality among children. In these countries, although the disease still remains unnotifiable, but

outbreaks are generally documented. Bhutan, and Nepal have remained free of this infection, largely due to the absence of the vector species. WHO/SEARO has taken a number of initiatives for promotion of research, capacity building and control of DEN/DHF in the Region and has published guidelines and monographs for the benefit of the Member States.

Introduction

Ever since the recognition of DEN/DHF as a disease entity in Manila in 1950 the disease has spread to many countries in South-East Asia. Notably among them was Thailand which recorded a severe outbreak in 1958, followed by Indonesia in 1968, and Myanmar in 1970. The disease affected mostly children and the case fatality rate

ranged between 6-10 per cent. The disease has now become endemic and the occurrence of outbreaks is a regular feature. Other countries of the Region viz. Bangladesh, India and Sri Lanka were also affected by dengue fever at the same time. However, the course of the disease was milder with high morbidity but no mortality. Of late, these countries have also been reporting sporadic outbreaks of DHF with severe clinical manifestations and mortality among children. Bhutan, Maldives, and Nepal however, have not so far reported any DEN/DHF outbreak. The estimated number of DHF cases in SEAR countries, during 1995 were 160 000 and while the number of deaths ranged between 4000.

DHF incidence in notifiable countries of South-East Asia

DHF, which is endemic in Indonesia, Myanmar and Thailand, is not only confined to urban areas, but has spread to other small towns and rural areas wherever *Aedes aegypti* the vector species, exists. In these three countries, DEN/DHF is a notifiable disease (see Table).

Table. DHF cases and deaths in Indonesia, Myanmar and Thailand from 1986-1995*

Year	Indonesia		Myanmar		Thailand	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
1986	16 529	608	2 192	111	29 030	206
1987	23 864	1 105	7 424	233	171 630	1 030
1988	47 573	1 527	1 181	65	26 926	179
1989	10 362	464	1 196	52	69 204	280
1990	22 807	821	6 318	182	113 855	422
1991	21 120	578	8 055	305	43 782	119
1992	13 848	382	1 678	37	42 878	113
1993	17 418	418	2 279	67	66 925	216
1994	18 697	470	11 647	444	66 367	204
1995	34 995	895	2 221	48	60 559	166

*Data pertains to III and IV degree hospitalized cases.

Indonesia

DEN/DHF has spread from Surabaya and Jakarta in 1968 to urban areas in Java and to other islands, and also to semi-urban and rural areas since 1975. The number of cases and their geographical distribution has steadily increased. Outbreaks have shown irregular variation in size with peak years occurring in 1987 (23 864), 1988 (47 573), 1990 (22 807) and 1991 (21 120)⁽¹⁾. There were 34 995 reported cases with 895 deaths in 1995 and the incidence remains highest in Java.

During the last 10 years, different activities were initiated in many areas to determine the most appropriate community approaches for source reduction. The school approach for source reduction through school children, teachers and local administrative officials, was carried out in Central Java and later expanded to other part of the country. In 1992, the Ministry of Health issued a special decree to control DEN/DHF, and five technical guidelines were developed for case-finding and treatment; reporting and surveillance; epidemiological investigations; early warning actions; vector control and source reduction of breeding sites. The experience gained over the years, showed that thoroughness and continuous guidance and supervision was the most important factor for achieving success of the control programme.

Myanmar

DHF is still one of the ten most important causes of a pediatric hospitalization in the country. The incidence has been increasing

for over 20 years, and the upward trend is continuing. The number of cases in 1994 was the highest ever recorded in Myanmar with a high case fatality. Entomological surveillance is sporadic and only in some parts of the country.

During the early 1980s, malathion space spray was one of the main control measures to deal with the outbreaks⁽²⁾. However, later, a viable health education programme was developed involving individual and group talks, use of radio, television, newspapers and other programmes directed at schoolchildren. Presently a systematic organization has been developed to apply source reduction measures. Guidelines have also been developed for intersectoral coordination and given to administrative bodies at different levels. This has involved states, divisional councils, townships, wards and village health workers. However, sustainability of the programme on a regular basis has proved to be a difficult proposition.

Thailand

DHF in Thailand gradually increased from 2 000 cases in 1958 to 92 005 cases in 1990, but showed a downward trend in 1991 when 43 782 cases were reported⁽³⁾. The disease has rapidly spread from urban to rural areas. The majority of DEN/DHF cases are confined within the age group of 5-14 years old who are mostly schoolchildren (70-75% of the reported cases). The mean of the case rate from 1986-1990 of these children is extremely high (447.8/100 000 population).

In Thailand, a national DEN/DHF control programme using, schoolchildren for source reduction, was established in 1990 with close cooperation and collaboration between health and education ministries. The evaluation of the programme was conducted by Wangroongsarb (1994) to assess goal achievement, larval control with involvement of schoolchildren and the programme management. The results revealed that 94% of the schools sampled were involved in the programme. The majority of the staff had a positive attitude to the objectives, strategies of the programme and approaches for disease control. The activities connected with the reduction of breeding places near schools and households were guided by 80% of teachers and performed by 94% of schoolchildren. However, low frequency and non-regularity of the teaching and learning process, lack of supervision and poor communication and coordination between staff of different organizations were the main constraints of the programme which needed to be improved for better management. In general, the programme was achieved with some encouragement. A reduction in the average case rate of 149.8 per 100 000 population and average death rate of 0.54 per 100 000 population during the period 1986-1990 to 85.2 and 0.2 per 100 000 population during 1991-1994 respectively was observed. According to the Seventh National Economic and Social Development Plan (1992-1996), the DEN/DHF control programme will further strengthen the schoolchildren approach for source reduction with better systematic

collaboration and coordination between the two ministries.

Incidence in non-notifiable countries of the Region

India

Dengue infection is known to exist in the country, but the first serious outbreak of DEN accompanied by DHF, was reported in Calcutta in 1963. Since then this infection has spread to other major towns along the eastern coast, river valleys of major river systems on the east and west coasts and, finally, into the drought-prone north-western plains and wet Indo-Ggangetic plains and has followed the distribution of *Aedes aegypti* in the country⁽⁵⁾. All the four serotypes, i.e. DEN 1, DEN 2, DEN 3 and DEN 4 have been isolated, except in Calcutta where chickungunya (a nonflavivirus) was also found circulating. The infection, being classical dengue, followed a milder course with high morbidity but no mortality. However, of late, sporadic outbreaks of DHF have been reported in a number of urban towns, including Delhi, which reported a serious outbreak in 1988 when the case fatality rate among the admitted children exceeded 33.3 per cent⁽⁵⁾. DHF has now extended to rural areas with the spread of *Ae. aegypti* because of the introduction of safe drinking water supply schemes in rural areas.

There is no national programme for the control of DHF; only the units of the National Malaria Eradication Programme (NMEP) are called upon to control the epidemics

wherever they occur. MIS is equally poor as DHF is not a notifiable disease.

Bangladesh and Sri Lanka

DHF in both these countries is sporadic but has been rising sharply in recent years. Of late, information on the DHF outbreaks has generally been documented⁽⁶⁾.

Chronological landmarks in the advancement of WHO activities for prevention and control of dengue/dengue haemorrhagic fever

1964: First inter-regional seminar on mosquito-borne haemorrhagic fevers for formulation of control strategies

In 1964, the WHO South-East Asia and Western Pacific regions organized the first inter-regional seminar on mosquito-borne haemorrhagic fevers, which was held in Bangkok, Thailand. Since then WHO has been actively involved in the planning, development and implementation of preventive and control measures in respect of this infection.

1970: Pathology of DHF

In the 1970s, WHO/SEAR supported a collaborative study on the pathology of DHF. The results of this study showed that DEN/DHF is responsible for deaths from hypovolemic shock in patients and not from other viruses or bacterial infections.

1974: Establishment of Technical Advisory Committee (TAC)

In 1974, the SEA and Western Pacific Regions established a Technical Advisory Committee (TAC) on DHF. Following the epidemics that occurred in the countries of these two regions, it was felt that a guide for the diagnosis, treatment and control of dengue infection would be valuable for clinicians and other health officials who were faced with the growing risk of its epidemic. The TAC addressed these problems in depth and the first version of this guide, under the title "Technical Guidelines for Diagnosis, Treatment Surveillance, Prevention and Control of Dengue Haemorrhagic Fever" was published in 1975.

1976: Formulation of advisory committee on medical research on DHF

Considering the high case fatality rate of DHF/DSS, WHO felt the need for research for better comprehension of the host-parasite relationship of this infection. To administer and regulate research in this area, WHO established the South-East Asia Advisory Committee on Medical Research on DHF. Research studies on pathophysiology, clinical/laboratory diagnosis and case management were accorded priority.

On the basis of the results of these studies, the guidelines on DHF drafted earlier were revised by the Technical Advisory Group in 1978 (published in 1980) and in 1983 (published in 1986). In these revisions some changes were made in the

criteria for diagnosis and in the recommended treatment.

In 1994, these guidelines were again revised by the TAC and some corrections and changes have been undertaken in the light of the latest knowledge gained on dengue infection.

1979: Standardization of epidemiological research

In 1979, the Research Study Group on DHF in SEAR, in order to get comparable results in the countries of the Region, designed a standard master protocol which was made available to Member Countries of the Region to serve as the basis for undertaking epidemiological research studies. Initially, Indonesia, Sri Lanka and Thailand were supported by SEARO in conducting five-year research studies on the epidemiology of DHF. Myanmar joined this group in 1984. These multicentre epidemiological studies yielded both broad information on the epidemiology of dengue and also information of practical importance in the development of a tetravalent dengue vaccine. One important accomplishment of this study was the development of laboratory competence to work with dengue viruses in the four participating national laboratories.

1986: Community-oriented DHF vector control/DHF a notifiable disease

Following the 1983 and 1986 WHO/SEAR intercountry meetings on DHF, community-oriented DHF vector control studies have been undertaken in Indonesia, Myanmar and Thailand. As an outcome of

these studies, Indonesia and Thailand developed national DEN/DHF control programmes using community approaches which have been under way since 1990. DEN/DHF is a notifiable disease only in Indonesia, Myanmar and Thailand.

1993: Monograph on dengue/DHF prevention and control

Extensive research on different aspects of vector control and the cumulative knowledge built up in the Region on the feasibility and practicability of community-based control programme culminated in a monograph being brought out on DEN/DHF prevention and control. It contains all available information on the prevention and control of this infection. This publication was well received and has been reprinted twice. It is proposed to bring out a similar publication in the Regional Office in the near future.

1994: Brainstorming on Dengue in India

WHO and the Rockefeller Foundation supported an International Conference on DHF and a national "brainstorming" session on dengue in India in 1994. The conference recommended inclusion of DHF in the list of notifiable diseases and established control activities in India.

1995: Global, regional and national strategy on Prevention and control of DHF

WHO provided technical information and supported a national workshop on dengue/DHF in India in February 1995.

Draft guidelines for the national strategy on prevention and control of dengue/DHF in India have been prepared. A global strategy for dengue vector control was developed as an outcome of the consultative meeting on key issues in dengue vector control towards operationalization of the Global Strategy in June 1995 in Geneva. Following this meeting, the SEA regional consultative meeting was held in October 1995 in New Delhi to review the guidelines for prevention and control and develop a control strategy applicable to the countries of the Region.

1996: Development of dengue vaccine

The most important progress made in the South-East Asia Region is the development of a tetravalent live attenuated dengue vaccine at Mahidol University, Thailand, with technical and financial support from WHO. The activities for this project, which was started in 1980, have been reviewed in Bangkok every year by a Peer Review Group since 1983. The last 12th Peer Review Meeting on Dengue Vaccine Development was held in August 1994. The results of the clinical trials of this new vaccine in adult volunteers have shown that it is safe and its immunological response is encouraging. The Phase I and II trials of the tetravalent dengue vaccine in children are currently under way.

WHO is planning to establish a technical advisory group for providing technical assistance in developing a protocol and also for monitoring of the Phase III trial of dengue vaccine in children in 1996.

Dengue Bulletin

The WHO Regional Office for South-East Asia, New Delhi, and the Western Pacific Regional Office, Manila, have been publishing annually a Dengue Newsletter for dissemination to the Member Countries of knowledge about DEN/DHF incidence and its control. The severity of the disease and the high case fatality rate has triggered off global research interests. These efforts have now culminated in building up sensitive diagnostic techniques for management of cases and vector control strategies. For dissemination of more scientific knowledge the Dengue Newsletter is now being

renamed as Dengue Bulletin to better reflect its content and scope.

References

1. Suroso T, Abas A. Kadir and Saiful Jazar. Dengue haemorrhagic fever situation and DHF control programme in Indonesia. *Dengue Newsletter*, 1993 19 : 4-8.
2. Myint Thein, Dengue haemorrhagic fever in Myanmar. *Dengue Newsletter* 1993 18 : 18-11.
3. Sumalee Nuangplee, Kriangsak Ruechusaatswat, Suntharee Rojanasuphot and Pajit Warachit. *Dengue Newsletter* 1995 19 : 1-4.
4. Kalra NL, BL Wattal and NGS Raghvan. Distribution patterns of *Aedes (Stegomyia) aegypti* in India. Some ecological considerations. *Bull. Ind. Soc. Mal. Com. Dis.* 1968, 5: 307-34.
5. Kabra SK, IC Varma, NK Arora, Jain Y, and Kalra V, Dengue haemorrhagic fever in children in Delhi. *Bull., W.H.O.*, 1992, 45 : 105-108
6. Anonymous: Dengue fever and DHF in Sri Lanka. *Dengue Newsletter* 1993, 18 : 12.