Epidemiology and Clinical Features of Dengue Hemorrhagic Fever in Ho Chi Minh City and the Centre for Tropical Diseases; Viet Nam

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Abstract: Dengue haemorrhagic fever (DHF) is one of the major infectious diseases in Viet Nam. In the south of Viet Nam, DHF occurs all the year round. The number of DHF cases has been recorded as the greatest one among many countries in the world (1983: 77,087 cases and 1,301 deaths; 1987: 83,905 cases and 904 deaths). The DHF morbidity rate in children in south of Viet Nam was high (380.73/100,000 population in the 1983 epidemic and 378.37/100,000 population in the 1987 epidemic).

The mortality rate in Ho Chi Minh city (1981−1990) is 1.05 (/100,000 population) and the mean mortality rate (/total of cases) is 0.55%. The majority of confirmed cases were children of 5−9 years old. In the DHF with shock, hepatomegaly relates to the severe grades. In the traetment of DHF without shock, patients were given fluid to drink on the first day to prevent shock.

Key words: Dengue haemorrhagic fever, south of Viet Nam, epidemiology, clinical features, treatment

INTRODUCTION

Dengue hemorrhagic fever (DHF), an epidemic caused by mosquitoes, has spread dramatically all over countries in South-East Asia and the Western Pacific regions. In the South of Vietnam, DHF occurs all the year round in many provinces and cities with a large number of patients. DHF epidemics usually take place from June to November. The peak transmission has been recognized in July, August and September. Major epidemics occurred in a 3−4 year frequency and increased from 1975 to 1990 (Table 1).

Large DHF outbreaks in South Vietnam in 1975, 1979, 1983, 1987 that occurred at the same time with severe outbreaks in the whole country, has shown the 4 year cycle of outbreak.

DHF epidemiology in HCM city (1981−1990):

The morbidity rate per 100,000 population in HCM city (1981−1990): (Table 2 and Fig. 1)

The DHF Morbidity rate/100,000 population in HCM city (1981−1990)

−Years having no epidemics: 96.8−221.5, on mean 159.1

−Years having epidemics : 1983: 799.9

1987: 721.4

Table 1. Number of DHF cases and deaths in 4 outbreaks in the South of Vietnam

Year	Morbidity		Mortality		CFR* (%)
	No. of cases	Rate 10^5 population	No. of cases	Rate 10^5 population	
1975	19,416	112.44	397	2.29	2.04
1979	21,285	115.13	466	2.52	2.18
1983	77,087	380.73	1,301	6.42	1.68
1987	83,905	378.37	904	4.07	1.07

*Case fatality rate.

Table 2. Number of DHF cases in HCMC, 1981−1990

Year	No. of patients	Morbidity rate/10^5 population	Year	No. of patients	Morbidity rate/10^5 population
1981	4,551	187.6	1986	5,001	142.8
1982	6,698	209.3	1987	25,972	721.4
1983	26,398	799.9	1988	8,196	221.5
1984	4,885	143.6	1989	3,775	96.8
1985	6,367	181.9	1990	8,227	205.7

Referred to the statistics of Preventive Medicine Centre, MCM city

−Mortality rate/cases : 0.23−0.8%, on mean 0.55%

−Mortality rate per 10^5 population: 1.05

The spreading of DHF epidemic:

On supervising DHF epidemics from 1981 to 1990, we see that it has developed in 12 urban districts of HCM city and thereafter spread to all 6 suburban ones (Fig. 2).

−In urban districts, epidemics often had developed highly in crowded population

−In the suburbs, the local people had to use various kinds of containers to reserve water, so that they supply good condition for *A. aegypti* to breed and develop.

Although the epidemics could spread to the suburban districts, their distribution was not equal. The lowest index of cases had been seen in districts situated far form the city center.

The development of epidemics by months: (Fig. 3)

DHF cases were recorded all year round. Epidemics have usually occurred from June to November with lowest rate in the dry season (January−April), increasing in May and June. Epidemics have developed dramatically in the rainy season (from July to October) with peak transmission in August and September, and decreasing slowly in November. The seasonal characteristic of DHF is obvious in HCM city.

Epidemic distribution by age and severity: (Table 3−1 and 3−2)

(Based on the investigation of the 1987 outbreak in District I, HCM city)

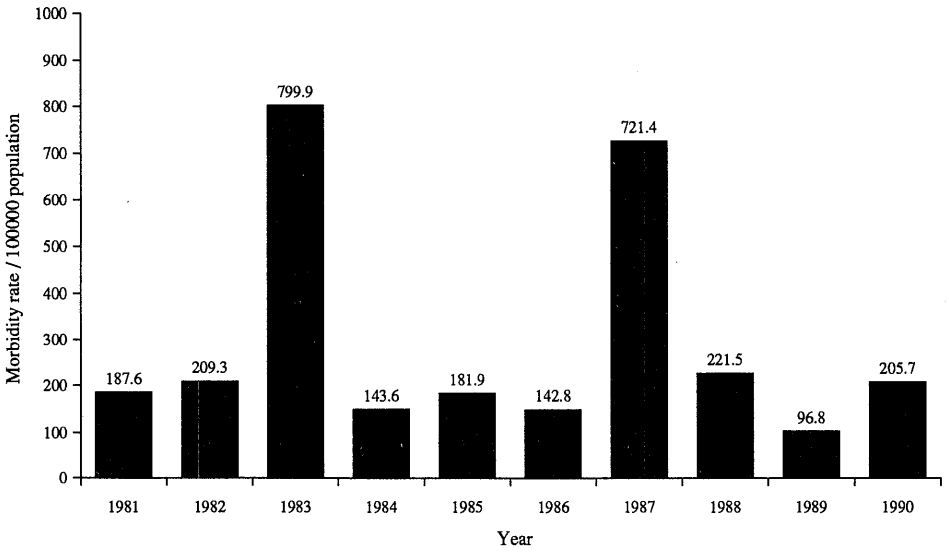

Fig. 1. The DHF morbidity rate/100,000 population in HCMC (1981−1990)

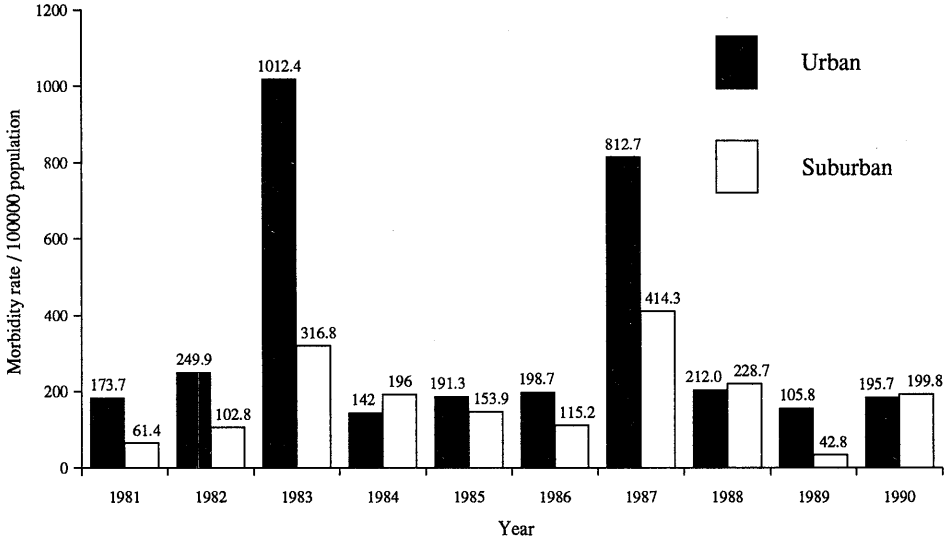

Fig. 2. The mean morbidity rate/100,000 population of urban districts compared with the suburban districts.

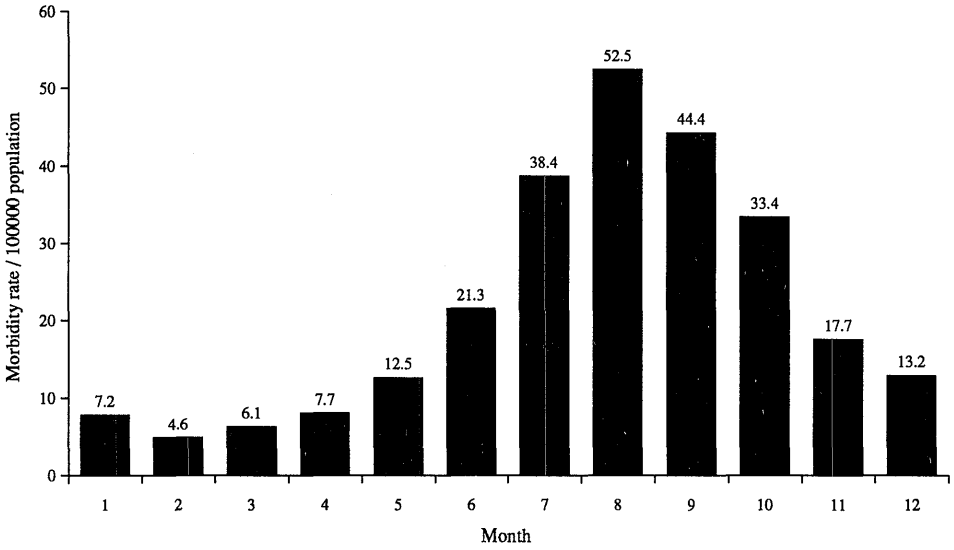

Fig. 3. The development of DHF by month (1981−1990)

Based on above two tables, we note:

−The most affected age groups are 5−9 (39.5%), and 10−14 (29.6%). Total 69.1%.

−The morbidity rate of adults above 15 years is only 10.7%. So, DHF patients in HCM city and Southern provinces are mostly children.

−The patients in grade Ⅲ and Ⅳ are mostly children in 2 age groups: 5−9 years (49.2%), and 10−15 years (27.4%). Total 76.6%.

Table 3−1. Distribution by age groups

Age (groups)	No. of cases	Rate (%)
Under 4 years	406	20.2
5−9 years	796	39.5
10−15 years	595	29.6
Above 15 years	215	10.7
Total	2,012	100.0

Table 3−2. Distribution by severe grades (grades Ⅲ, Ⅳ)

Age (groups)	No. of cases (grades Ⅲ, Ⅳ)	Rate (%)
Under 4 years	85	19.3
5−9 years	217	49.2
10−15 years	121	27.4
Above 15 years	18	4.1
Total	441	100.0

DHF status at the Centre for Tropical Diseases, HCM city:

Data from 1981 to 1990: (Table 4)

−There were 2 outbreaks at interval of 4 years (1983 and 1987)

−The overall death rate of the year 1987 was lower than that of 1983.

−The number of children under 15 years was 92.44%.

−The rate of infant deaths under 10 years was 1.07%, that was higher than the overall death rate (0.99%).

Table 4. Number of hospitalized patients and deaths

Year	Admission		Deaths			
	Total	Children	Total	Overall rate (%)	Children	Rate (%)
1981	1,782	1,757	14	0.78	14	0.79
1982	2,246	1,906	22	0.98	22	1.15
1983	6,550	6,123	89	1.35	89	1.45
1984	1,768	1,703	16	0.90	16	0.93
1985	1,593	1,502	23	1.40	23	1.50
1986	1,163	1,141	18	1.54	18	1.57
1987	7,324	6,731	57	0.37	56	0.83
1988	2,305	2,024	21	0.90	20	0.98
1989	1,154	1.069	9	0.77	9	1.18
1990	2,162	1,971	11	0.50	10	0.50
	28,047	25,927	280	0.99 (Mean)	277	1.07 (Mean)

The clinical signs of DHF virologically confirmed patients treated in Centre for Tropical Diseases during 1987 and 1990:

1/ Dengue virus types: (Table 5)

In the outbreaks of 1983, 1987, 1990, we sent many blood specimens to the Pasteur Institute, HCM city to isolate virus. Positive results were obtained only in 2 years 1987 and 1990.

1987: 30 cases (+)/190 blood specimens

1990: 13 cases (+)/223 blood specimens

Total: 43 cases.

Especially, in 1987, Pasteur Institute (HCMC) isolated 4 Japanese encephalitis viruses in blood specimens of 4 infants (2 in HCM city, 1 in Song Be province, and 1 in Dongthap province). These 4 patients had typical clinical manifestations of DHF as:

−High fever

−Headache

−Nausea

−Petechia

−Painful enlargement of the liver

These patients consisted of 3 boys (4, 6, & 11 years old) and 1 girl (6 years old)

The duration of disease was 6−8 days.

Dengue virus could not be isolated in these 4 patients and they did not have any central nervous system manifestation.

Table 5. Dengue virus types of 43 cases

Dengue virus types	1987 (No. of cases)	1990 (No. of cases)
DEN-1	2	7
DEN-2	27	5
DEN-3	1	0
DEN-4	0	1
Total	30	13

2/ Clinical signs and symptoms of 43 DHF cases (Table 6)

(Based on sero-type)

In the 1987 & 1990 outbreaks, the majority of isolated dengue virus type were DEN-1 and DEN-2. However, the dominant type was DEN-2 in the 1987 outbreak (covering 90%)

**Fatal cases:*

Two cases DEN-2 (1987) and one case DEN-1 (1990) died as consequence of severe gastrointestinal haemorrhages, irreversible shock and late hospitalization.

3/ Hepatomegaly:

The enlargement of the liver is one of four clinical criteria to diagnose DHF (WHO). However, it has some relationship with severity grade.

In the DHF epidemic of 1983, we have monitored the enlarged liver in 4,338 cases divided into 2 groups (with and without shock) and have noted as follows: (Table 7)

−Hepatomegaly could be seen in both groups. However, the liver became enlarged only from the third day of illness.

−In comparison between shock group and non-shock group:

•The incidence of hepatomegaly has been double ($p<0.0001$),

•The size of liver has been greater,

•The soreness has been more marked and durable.

Table 6. Clinical signs and symptoms of 43 DHF cases

Year	1987						1990					
Dengue virus	DEN 1	DEN 2	DEN 3	DEN 4	Total	Rate (%)	DEN 1	DEN 2	DEN 3	DEN 4	Total	Rate (%)
	2	27	1	0	30		7	5	0	1	13	
Signs & Symptoms												
1/ Fever:					30	100					13	100
−High & continuous fever	1	18	1		20	63.6	6	4	1	11		
−Undulant fever		8			8	26.6	1	1			2	
−Light fever	1	1			2	6.6						
2/ Haemorrhagic manifestations:					30	100					13	100
−Positive tourniquet test	2	24	1		27	90	5	4		1	10	
−Petechia	1	18	1		20	66	5	2		1	8	
−Epistaxis		4			4	13		1		1	2	
−GI bleeding		6			6	16.3	1	1			2	
3/ Hepatomegaly		22			22	73	6	5		1	12	
4/ shock		13			13	43	3	2			5	
5/ Other signs												
−Abdominal pain		15	1		16	53	5	3		1	9	
−Vomiting	1	21	1		24	80	4	2		1	7	
−Anorexia	1	16			17	56						
−Lethargy		15	1		17	56	3	4			7	
−Restlessness		11			11	36	1					
−Headache		11			11	36	2	1			3	
−Cough	1	5			6	20	1				1	
−Red throat							2				2	
−Rales in lungs	1	3			4	13						
−Diarrhea							1				1	
6/ Deaths		2			2		1				1	

Table 7. Hepatomegaly in DHF

Clinical signs	Grade I, II (3,200)		Grade III, IV (1,138)		Disparity between 2 groups	
	No. of cases	Rate (%)	No. of cases	Rate (%)	Chi−squares	P−values
−Hepatomegaly	1,440	45	967	85	35.16	<0.0001
−Palpable, below right costal margin:						
*1cm	1,632	51	205	17.68	25.76	<0.0001
*2−4cm	1,568	49	933	82.30	24.10	<0.0001
−The day of the hepatomegaly's appearance						
1st & 2nd	0		0			
3rd	424	44.47	216	18.67	14.48	0.00014
4th	1,248	38.80	401	35.23	0.34	0.5579
5th	528	16.63	425	37.62	11.06	0.0008
6th	0	0	96	8.48	8.33	0.0038
−Painless hepatomegaly	2,656	83.50	432	37.50	44.47	<0.0001
−Painful hepatomegaly	480	14.48	706	62.30	48.90	<0.0001

Treatment:

Most of DHF has mild and moderate course. The shock cases are rare and could be saved if treated from the pre-shock state by rapid volume replacement of fluid and electrolytes to compensate the leakage of plasma as consequence of an acute increase of vascular permeability.

In 1987, in a double-blind randomized study on the use of oral rehydration solution in the treatment of DHF from the first day of illness, Dr. Nguyen Thi Thu Thao has concluded as follows:

1/ No case of shock has been unregistered if the patient was given fluid in the first day (whatever the kind of oral solution might be used).

2/ Fluid administered on the first day is easier because the patient rarely vomits and the amount of vomited material is a little (vomiting incidence is low, about 11%).

3/ The incidence of DHF patient became shock after the use of fluid was 15.6% (fluid given from the second day) and 11.5% (fluid given from the third day), respectively.

Note:

Patients were randomized into 3 groups (A, B, C) based on the kind of fluid used:

A: ORS−supplied by UNICEF.

B: Solution compound of saccharose−salt and bicarbonate. The amount of fluid is calculated based on body weight and the degree of fever.

C: Fruit juice plus plain water, used as tolerated by the body.

Conclusion:

In the past 20 years the number of DHF patients in HCM city and Southern provinces of Vietnam has continued to increase and recorded as the greatest one among other countries in the would. Severe epidemics have occurred in a 3−4 year fiequency as in 1983, 1987, and 1990.

The rainy season is "DHF season" in South Vietnam (from June to November every year). In the 1987 outbreak the predominant type was DEN-2, but in the 1990, the DEN-1 was continuing to grow-up.

In DHF with shock, hepatomegaly relates to the severe grades.

In the treatment of DHF without shock: it was easier for us to give patients fluid to drink on the first day because these patients do not like drinking, but they feel thirsty and can drink if forced. Therefore, in DHF without shock, early oral rehydration therapy can contribute to prevent shock.

Table 8. Relationship between the day of admission and the incidence of shock based on the fluid used

Kind of solution	Group			Total
	A	B	C	
Admission day				
1st: No. of patients	7	3	1	11
No. of shock cases	0	0	0	0
2nd: No. of patients	35	30	12	77
No. of shock cases	3 (8.75%)	6 (20%)	3 (25%)	12 (15.6%)
3rd: No. of patients	38	48	27	113
No. of shock cases	5 (13.6%)	6 (12.5%)	2 (7.4%)	13 (11.5%)

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