

# Hospital-based Retrospective Assessment of Dengue Infection among Filipinos

By

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## Abstract

Dengue infection has increasingly become a significant public health problem in the Philippines. Clinical and laboratory data of confirmed dengue infections in children and adults admitted and referred at a research centre for infectious diseases over an eight-year period (1986-1994) were reviewed. This report highlights the epidemiological pattern of dengue infections among Filipinos.

## Introduction

Dengue infections caused by four serologically-related flaviviruses, DEN-1, 2, 3 and 4, are a major cause of morbidity and mortality among children and adults in both industrialized and developing countries, and are significantly occurring in tropical areas of the world. In the Philippines, the disease continues to be a major public health problem since 1954.

## Materials and methods

Clinical and laboratory data of confirmed dengue infection in children and adults admitted and referred at the Research Institute for Tropical Medicine (RITM) over an eight-year period (1986-1994) were reviewed. The RITM virology laboratory is

the national reference centre for dengue infection in the Philippines. Virological studies include virus isolation using sensitive mosquito cell lines, namely, C6/36 cells derived from *Aedes albopictus* and TRA-84 SFG from *Toxorynchites amboinensis* as well as serodiagnosis by haemagglutination-inhibition (HI) test. The infecting viral serotypes were determined by immunofluorescence method, using dengue-type specific monoclonal antibodies obtained from the Center for Disease Control, Fort Collins, U.S.A.

## Results

A total of 283 patients had confirmed dengue infection. Of these, 57 (20%) were confirmed by culture alone, 157 (55%) by

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serology alone, and 69 (24%) were diagnosed both by virus isolation and serology.

Only DEN serotypes 1, 2 and 3 were isolated. The most frequent infecting virus was DEN type 2 (52.41%), followed by type 1 (44.35%) and type 3 (30.24%). Of the 226 patients in whom dengue was diagnosed by HI based on the antibody response using the WHO criteria<sup>(1)</sup>, 112 (50%) had definite secondary infection, 59 (26%) presumptive secondary infection, 43 (19%) primary antibody response and 12 (5%) possibly primary or secondary antibody response (Table). Dengue fever (DF) and dengue haemorrhagic fever (DHF) Gr. II were the most common clinical syndromes<sup>(1)</sup> in the majority of patients with secondary type of antibody response.

**Table.** Clinical diagnosis of serologically-confirmed dengue patients

WHO clinical Classification	Antibody Response				Total No. (%)
	1°	2°	1° or 2°	Presumptive 2°	
Dengue Fever (DF)	16	31	4	17	68 (33%)
DHF Grade I	12	26		15	83 (28%)
II	6	37	5	11	59 (29%)
III	3	8	3	4	18 (8%)
IV	—	4	—	—	4 (2%)
<b>Total</b>	37 (19%)	102 (51%)	12 (6%)	47 (24%)	202

\* 202 patients with clinical data available

The median age of patients was six years (range eight months to 53 years); 156 (55%) were males and 128 (45%) were females. From 1986 to 1991, a majority or 71 (46%) of the dengue cases

occurred among 5-9-year olds; 52 (33%) between 1-4 years; 17 (11%) <1 year and 15 (10%) of the cases occurred among >20-year old people. From 1992 to 1994, 15 (18%) of the cases occurred in 20-years-old people, 25% or 30% between 10-19 years; 19 (23%) in 5-9-year age group; 17(20%) in 1-4 years; and 8 (9%) in <1 year of age.

All patients had symptoms of acute febrile illness. Only 239 patients had clinical data available. Frequent signs and symptoms were: abdominal pain (61%); headache (42%); flushing (40%); hepatomegaly (39%); vomiting and nausea (37%); myalgia (21%) and arthralgia (21%). Common haemorrhagic manifestations were: petechiae (40%); epistaxis (36%); hematemesis or melena (22%); Hermann's rash (17%) and gum bleeding (13%). Twenty-two patients had dengue shock syndrome (DSS), four of whom went into profound shock. Of the 239 patients, eight died, a mortality rate of 3%. Pleural effusion was seen in 8 (3%) of cases. Thrombocytopenia (platelet count 100,000) and hemoconcentration (hematocrit value of >40 volume% or a rise of >20% of the baseline) were noted in only 25% and 67%, respectively.

## Discussion

The data on laboratory-confirmed dengue infections over the last eight years is an underestimate of the epidemiology of the disease in the country and could be due to the absence of an active surveillance system to monitor clinical cases and the inaccessibility to a virology laboratory for diagnostic confirmation.

Prevention and control of dengue infection are dependent on an effective surveillance system. The Center for Disease Control recommends five basic types of useful active dengue surveillance systems<sup>(2)</sup>. During interepidemic periods or lag phase when there are only sporadic dengue cases, the introduction of a new virus serotype serves as a warning of an epidemic transmission. In this review, for example, during the last two years, only DEN types 1 and 2 had been isolated. The reappear-ance of DEN type 3 or the introduction of type 4 will predict a potential dengue epidemic; therefore, health authorities should intensify surveillance activities and start effective control measures to avert such occurrence. The isolation of DEN type 4 has not been reported in the country; however, it is premature to conclude that this serotype is not present in the country since all four dengue serotypes have been documented in south-east Asia<sup>(3)</sup>. The transmission of this serotype may be of low level and may also vary in geographical distribution.

In this report, a high proportion of dengue cases had secondary type of antibody response which clearly demonstrates the endemicity of dengue in the country. In spite of the secondary type of antibody response observed in most patients where dengue shock syndrome (DSS) is expected more often to occur, only 4% of the patients manifested DSS. Unlike in other south-east Asian countries<sup>(4)</sup> where secondary infection is associated with DSS, in the Philippines a majority did not progress into DSS. Halstead proposed that DHF was due to a self-destructive host response and some

persons were sensitized by their first infection and the course of a second infection with a different serotype may be altered adversely by the immune response<sup>(5)</sup>. Some genetic factors may also determine the clinical outcome in dengue.

During the 1980s, the highest incidence of dengue occurred more frequently in young children. Studies from 1990s showed an increasing proportion of dengue cases among older children and young adults. This latter finding was likewise observed in a 10-year review of dengue patients<sup>(6)</sup>. Multiple dengue serotypes may be transmitted at relatively low rates of infection and previously uninfected adults may become susceptible to the disease.

The clinical and laboratory findings in this study are similar to those reported from studies on Filipino patients<sup>(7,8,9,10)</sup>. A majority had mild haemorrhagic manifestations. Thrombocytopenia and haemoconcentration, which are essential laboratory features in DHF, were observed in only 25% and 67% of patients, respectively. Since the first reported case of dengue fever in the Philippines in 1954, paediatricians have recognized dengue infection as an important clinical problem. The low fatality rate could be due to an early recognition of the disease by parents and a timely and appropriate medical care by physicians.

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