

Hospital based clinical surveillance for dengue haemorrhagic fever in Bandung, Indonesia 1994–1995

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Abstract

In Indonesia, by law dengue haemorrhagic fever (DHF) cases must be reported within 24 h to the district health authority. The objective of this study was to evaluate the adequacy, accuracy and reporting delay of this reporting system. In four major hospitals of the city of Bandung, medical records of hospitalised DHF cases admitted between April 1994 and March 1995 were reviewed. This list of DHF cases was compared with the list of reported cases to the Bandung Municipality Health Office. During the study period, 569 DHF cases and 81 dengue shock syndrome (DSS) cases were diagnosed. Only 199 (31%) of the 650 hospitalised cases with suspected DHF/DSS were reported to the Bandung Municipality Health Office. The percentage of fatal cases was significantly lower among all hospitalised cases 11/650 (1.7%) than among reported cases 5/199 (2.5%). In only 443 of the 583 hospitalised cases (76%) in which a dengue serological test was performed, was this test positive. Of the 199 reported DHF/DSS cases 151 (76%) had a positive haemagglutination inhibition test. This study shows that the surveillance system for DHF/DSS in Bandung should be strengthened. DHF/DSS cases should be reported on the basis of a diagnosis made during hospitalisation preferably after a serological confirmation is obtained. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

Dengue fever (DF), especially the more severe form of dengue haemorrhagic fever (DHF), is considered to be the arthropodborne disease with the most important public health significance

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(World Health Organisation, 1997). Hundreds of thousands of cases of DF and DHF cases are reported each year in the tropical regions of America, Africa, Asia and Oceania (Hayes and Gubler, 1992; Ludovice, 1983).

Prevention and control of DF and DHF relies on effective surveillance programs. The objective of these programs is the early detection of outbreaks and the prompt implementation of control measures (World Health Organisation, 1997; Gubler, 1989). There are five types of dengue surveillance: virologic, epidemiological, clinical, serologic and entomological surveillance. Virologic surveillance is a very important type of surveillance, however, this form of active surveillance is based on rapid and sensitive diagnostic tests, often not available in many dengue countries (Gubler, 1989). To date, most developing countries rely on a clinical, passive surveillance system. Such a system is relatively insensitive (Gubler, 1989; Goh, 1983) and is dependant upon the awareness and interest of the medical community (Gubler, 1989). However, this type of surveillance is logistically and organisationally easy to implement (Gubler, 1989; Ludovice, 1983).

Morbidity data should be adequate, accurate and reported timely in order to be useful for surveillance (Evans, 1983). In Indonesia, DHF reporting is regulated by the Epidemic Act (UU wabah no. 4/1984) and the Ministry of Health (regulation no. 560/1989), which states that every case of an infectious disease which could potentially cause an outbreak should be reported to the district health authority within 24 h. Diagnosing DHF, however, usually takes more time, certainly if laboratory confirmation of the diagnosis is required.

The objective of this study is to evaluate case reporting of DHF cases admitted to hospitals in Bandung in terms of adequacy, accuracy and reporting delay.

2. Methods

The study was conducted between August 1995 and March 1996 in four major hospitals in the city of Bandung, namely, the Dr Hasan Sadikin

Hospital (HSH), the St. Boromeous Hospital (SBH), the Immanuel Hospital (IH) and the St. Yusuf Hospital (SYH).

In order to evaluate the adequacy and accuracy of the reporting system, we reviewed whether hospitalised DHF cases from April 1994 to March 1995 were reported to the Bandung Municipality Health Office and whether diagnoses were confirmed by a serological test.

For the evaluation of reporting delay and other problems in case reporting, hospital officials responsible for reporting (medical record officials) and officials of the Bandung Municipality Health Office, responsible for acceptance of reported cases, were interviewed.

2.1. Definitions

The same definitions of 'suspected DHF', 'DHF patient' and 'DHF cases', were used as proposed by the Technical Directory of DHF Monitoring (Petunjuk Teknis Pengamatan Penyakit Demam Berdarah Dengue), issued by the Ministry of Health, Directorate General of CDC and Environmental Health, 1992:

1. a suspected DHF case is a patient with acute fever without any obvious cause, evidence of an haemorrhagic manifestation with at least a positive Tourniquet test and/or a platelet count of less than 150.000/mm³;
2. a DHF patient is:
 - 2.1. a patient with signs and symptoms fulfilling the criteria of the clinical diagnosis of DHF, as proposed by the World Health Organisation (1986); and/or
 - 2.2. a suspected DHF case with a positive serological test for dengue (haemagglutination inhibition (HI) test or dengue blot test).
3. DHF cases include all the DHF patients and the suspected DHF patients.
4. DHF cases included patients with DSS as proposed by the World Health Organisation (1986).

In hospitals a standardised report form is used; this form should be sent to the health office within 24 h after admission.

Table 1
Number of dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS) by age group

Age (year)	DHF (%)	DSS (%)	DHF + DSS	Deaths (%)
<2	13 (2.3)	6 (7.4)	19	1 (5.2)
2–4	50 (8.8)	22 (27.2)	72	3 (4.2)
5–8	104 (18.3)	21 (25.9)	125	4 (3.2)
9–14	120 (21.1)	27 (33.3)	147	2 (1.4)
>14	282 (49.6)	58.2)	287	1 (0.3)
	569	81	650	11(1.7)

The surveillance system was considered to be adequate if the number of hospitalised DHF cases was similar to the number of reported cases and accurate if the clinical diagnosis on admission had been confirmed by a serological test for dengue infection during or after hospitalisation.

It was considered timely reporting, if the cases were reported within 24 h to the Bandung Municipality Health Office.

Laboratory tests to confirm dengue infection included the HI test, using the Clark and Casals microtechnique modification method (Clark and Casals, 1958), the IgG dengue blot (GeneLab, Kalbe) and the IgM dengue blot test (GeneLab, Kalbe) (Chan et al., 1990). For the interpretation of the dengue antibody response in the HI test the WHO guidelines were used (World Health Organisation, 1986)

3. Results

Six hundred and fifty DHF/DSS cases were hospitalised during 1994–1995, DSS was diagnosed in 81 patients (12%) and DHF in 569 patients (88%). Fifty-six percent of the cases were under 14 years of age (Table 1). Most DSS cases belonged to this age group, namely, 76 (94%) of the 81 DSS cases (Table 1). DSS cases were significantly younger than DHF cases ($P = 0.0001$).

Forty-four percent of the cases were admitted in an early phase of their illness, presenting with fever of less than 4 days duration (Table 2). The mean number of fever days before hospitalisation was 3.7 days for DHF cases and 4.2 days for DSS cases ($P = 0.005$). Significantly more DSS cases

had more than 4 days of fever before admission compared to DHF cases ($P = 0.02$).

3.1. Adequacy

Only 199 (31%) of the 650 hospitalised DHF/DSS cases were reported to the Bandung Municipality Health Office. The percentage of fatal cases was significantly lower among non-reported cases 6/451 (1.3%) and among reported cases 5/199 (2.5%). This discrepancy may be due to the difficulties in establishing the diagnosis of DHF/DSS especially in patients admitted early in their illness. Interviews with medical record officials revealed that many doctors wished to postpone reporting until the diagnosis of DHF/DSS had been confirmed. Moreover, health municipality officials were often asked only to report patients with obvious signs and symptoms of DHF/DSS.

Table 2
Duration of fever prior to admission of the dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS) cases

Days	DHF		DSS	
	N	%	N	%
1	13	2	–	–
2	84	15	7	9
3	156	27	18	22
4	140	25	22	27
5	129	23	24	30
6	46	8	8	10
7	1	0	2	2
	569	100	81	100

Table 3
Dengue serological tests in hospitalised cases

Dengue serological test	No. of tests	Positive result	
		N	%
HI test	244	151	62
IgG dengue blot ^a	307	278	91
IgM dengue blot ^a	24	12	50
HI test + IgM dengue blot	3	1	33
IgG + IgM dengue blot	5	1	20
	583	443	76

^a Genelab, Kalbe.

3.2. Accuracy

Of the 583 DHF/DSS cases, diagnosed in the hospital, on which a serological test was performed, the test was positive in 443 (76%) of them (Table 3). One hundred and fifty-one (76%) of the 199 dengue cases reported to the Bandung Municipality Health Office, had a positive HI result. In 67 of the cases (10%), a serological test was not performed.

3.3. Timely report

It was the intention to compare the date of reporting on the hospital report forms and the date of registration of the DHF/DSS diagnosis in the Municipal Health Office reporting log book. Unfortunately both dates were not recorded. However, according to interviews with the Municipality Health Officials, the reporting form was often sent by mail, which often took more than 24 h to arrive, or by courier, who often did not notify the Municipality Health Officials.

4. Discussion

In the initial phase of the infection, DHF presents with non-specific symptoms and signs. In an early stage of DHF, the differential diagnosis includes many viral and bacterial diseases. Only after the third or fourth day of the illness the presence of thrombocytopenia and haemoconcen-

tration makes the diagnosis of DHF easier (World Health Organisation, 1994). DHF phobia may result in overdiagnosis. As parents and physicians are so worried about DHF, unnecessary hospitalisation of children will take place. This phenomenon especially occurs in regions with a high incidence of DHF cases.

In Bandung, less than a third of cases considered by hospital physicians to be DHF cases were reported to the Municipality Health Office. Considering the limited human resources and the low budget for dengue control, the request of the Municipal Health Officials to report only those patients with obvious DHF manifestations is understandable, but this could lead to underreporting.

The percentage of dengue cases confirmed by serology was high (76%), however, this does not mean the diagnosis of DHF was always accurate. The diagnosis of dengue infection by the recovery of virus or the detection of viral antigen is preferable to serological diagnosis (World Health Organisation, 1997), but such tests are not widely available in Indonesia.

Although a presumptive diagnosis of a recent dengue infection can often be made on a single serum sample, a conclusive diagnosis can only be made when rising levels of anti-dengue immunoglobulin are detected in paired sera. The diagnosis of an acute dengue infection is made when antibody levels rise during the 2–4 weeks following infection. The subsequent decline to baseline levels requires another 6–24 weeks, during which time single serum assays may still reveal elevated anti-dengue IgM or IgG antibodies. The most commonly used serological techniques for the diagnosis of dengue infection are the MAC Elisa and the H.I. test (World Health Organisation, 1997). The MAC Elisa is not widely available in Indonesia, while the H.I. test is available in most provincial laboratories. The H.I. test is simple, sensitive and reproducible and uses locally prepared reagents (World Health Organisation, 1997). In this study the H.I. test was only performed on 244 of the tested 583 patients (42%). The IgG dengue blot test was performed more often, but only on a single serum sample. A positive IgG dengue blot result on a single sample

does not indicate an acute dengue infection (Chan et al., 1990). Therefore such a single IgG dengue blot test is not a useful test in a surveillance program.

In conclusion the hospital based clinical surveillance system for DHF in Bandung does not fulfil the criteria of adequacy, accuracy and timely reporting. DHF cases should be reported on the basis of a diagnosis made during hospitalisation, preferably after serological confirmation is obtained. In Bandung the most cost effective and reliable way to do so is the use of the HI test on paired sera. Given the importance of DHF on public health, the surveillance system for DHF in Bandung should be strengthened. The problems Bandung is facing with regard to surveillance of DHF are probably similar to problems encountered in many other places in developing countries, where the DHF burden is increasing. In order to improve the surveillance system the first thing to do is to evaluate it (Centers for Disease Control, 1988). This can be done with relatively simple methods, as has been done in Bandung.

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