

Epidemiology Bulletin

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Epidemiology of Dengue Fever in Taiwan Area

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Taiwan Area being in the sub-tropical zone, has had several island-wide, including even Taipei City, epidemics of dengue fever since the 18th century. These outbreaks occurred at the same time of similar outbreaks in other Asian countries, and often started in the southern part of the island to spread to the north. For the last 40 years since 1942, however, no case had been reported. The disappearance of dengue fever during this period is considered to be related to the mass use of DDT for malaria eradication. Both *Aedes aegypti* and *Anopheles* may have been wiped out at the same time (Note 1, Table 1).

In Fall 1987, an epidemic of dengue fever occurred, first time in 40 years, in the southern part of Taiwan with 1,387 cases reported by local physicians by the end of the year (Note 2). When the weather became cooler, the number of cases had also declined. In May 1988, a small outbreak occurred in Kaohsiung County. Three months later, the entire southern part of Taiwan was infected with dengue fever, with sporadic cases in the middle and the northern parts as well. Cases in May concentrated more in Lin-yuan Township of Kaohsiung County. As the vectors were brought under control, the outbreaks subsided. Yet a flood in August provided vectors with breeding places, the number of cases increased to a total of 10,994 reported cases by the end of December. These cases occurred more in Kaohsiung City, Kaohsiung County, and Ping-tung County (Figures 1 and 2). When Taiwan Area is divided into four geographical zones for comparison, the attack rate is still the highest in the southern zone. As cases are reported by their places of registration, the eastern zone appears to have a higher attack rate. In fact, most cases in the eastern zone were infected in the southern zone (Table 2). Laboratory findings show that the major pathogens are dengue fever serotype 1, with a few cases of types 2, 3, and 4 (Note 3).

Analysis of reported cases shows that the male to female ratio is 1:1; with higher attack rate in male than in female in the age group 10 to 19 years; and higher attack rate in female than in

male in the age group 45 to 54 years. The sexual differences can be explained by their different lengths of exposure to the vectors. Young male and middle-age female seem to have more exposure to the vectors. Generally speaking, middle-age women often stay at home during daytime, and *Aedes aegypti* are more active indoors during daytime, hence these women have higher risks. When the average temperature and rainfalls in Taiwan Area are used to predict the incidence of dengue fever a month later, an initial relationship is found to exist (Table 3)

Note 1: Y.C. Ko, J. of Kaohsiung Med College.

Note 2: Epidemiology Bulletin, 15 October 1988/Vol 4/No.10

Note 3. Unpublished data, National Institute of Preventive Medicine, Department of Health.

Table 1. Dengue Fever Epidemics in Taiwan Area

Year	Area	Attack Rate
1870		pandemic
1889		pandemic
1902	south	pandemic
1915	island-wide	25-50%
1922	off-shore islands	20-30%
1927	south	pandemic
1931	island-wide	pandemic
1942	island-wide	80%
1981	off-shore islands	80%
1987	south	3%
1988	south	5%

Table 2. Incidence Rates of Dengue Fever by Geographic Zones, Taiwan Area, 1988

Geographic Zone	No of Cases	Population	Incidence (per 100,000)
Northern	250	4,921,653	5.1
Eastern	105	1,070,213	9.8
Middle	266	4,983,201	5.3
Southern	9,856	3,642,065	270.6

Table 3. Average Temperature and Humidity Against Incidence of Dengue Fever, Taiwan Area, 1988

Month	Incidence (per 100,000)	Temperature (°C)	Humidity
January	1.42	19.0	675
February	1.57	18.7	420
March	5.68	19.7	905
April	3.90	22.3	1970
May	15.16	27.4	1271
June	16.88	28.7	2752
July	15.21	29.9	1871
August	78.53	28.4	4051
September	138.56	27.7	4097
October	171.15	25.8	1683
November	81.57	20.9	360
December	5.48	18.3	358
df		11	11
r ²		118	48
p*		0.01	0.01

(*Spearman coefficient test)

(Temperature and humidity against incidence of dengue fever a month later)

Fig. 1. NUMBER OF CASES OF DENGUE FEVER REPORTED BY MONTH, 1987-1988

