A SURVEY OF KNOWLEDGE, ATTITUDE AND PRACTICE OF THE PREVENTION OF DENGUE HEMORRHAGIC FEVER IN AN URBAN COMMUNITY OF THAILAND

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Abstract. To evaluate the effect of a health education program on the prevention and control of dengue hemorrhagic fever (DHF) in the municipality of Mae Sot, Tak Province, a survey of adult residents, mainly housewives, was conducted in late April 1990 to assess their knowledge of DHF and practice of preventive methods. A total of 417 respondents from 417 households selected by a systematic-cluster sampling method were interviewed. More than 90% of them knew that the disease is transmitted by *Aedes* mosquitos and indicated water jars and water retention in the houses as the common breeding places. However, the other two common breeding places, ant-traps and cement baths, were less frequently mentioned. This finding was consistent with the greater proportion of respondents who reported no larval control methods for these two kinds of containers than for the others. Covering water containers was the most common practice to prevent mosquito breeding in drinking-water containers whereas addition of abate (temephos sand granules) or changing stored water frequently was commonly used for non-drinking water storage. Larval control for ant-traps was mainly accomplished by the addition of chemicals, including abate, salt, oil or detergent. Health education efforts in this area could induce the majority of respondents to accept themselves as responsible for the *Aedes* control program. Health education by health personnel played an important role in disseminating DHF information and prevention methods. Radio and television were the main effective mass media for public health education on DHF in this area.

INTRODUCTION

Dengue hemorrhagic fever (DHF) has been one of the major public health problems in Thailand since it was first recognized in 1958 (Thongcharoen, 1977; Nimmannitya, 1987; Ungchusak and Kunasol, 1988). Periodic outbreaks of DHF have been reported throughout the country, with a large outbreak involving 174,285 cases and 1,008 deaths reported in 1987 (Division of Epidemiology, 1989). The *Aedes aegypti* mosquito is the most important vector of dengue transmission in Thailand (Thongcharoen, 1977; Halstead, 1966; Scanlon, 1966; Pant *et al,* 1973; WHO, 1984). Although considerable efforts have been made in the development of a live tetravalent dengue vaccine, no vaccine currently exists to protect susceptible persons from infection. At present long-term antimosquito control is the only intervention means of prevention and control of this disease. Health education aimed at increasing the community's knowledge about DHF and participation in the vector control is essential. This report presents a community-based survey of adult residents, mainly housewives, in one urban area in northern Thailand to assess their knowledge about DHF and practice of preventive measures in their houses.

MATERIALS AND METHODS

A study was conducted in the municipality of Mae Sot District, Tak Province, about 500 km north of Bangkok. This area contained 5,341 houses with 20,283 residents in 1990. DHF is endemic in the area, with periodic outbreaks observed every 2 or 3 years. A severe epidemic of DHF (892 cases per 100,000 population) was reported in 1987. An intensive health education program has been implemented since 1988. Health information on DHF, its transmission and methods of preventing the disease was extensively provided to the public through mass media,

lectures and discussions. In 1989 and 1990, trained health workers conducted house-to-house visits twice a year (in March and June) to educate people in the community. Details of the education program are reported elsewhere (Swaddiwudhipong *et al,* 1992).

An interview survey was carried out in every other household in one electoral area randomly selected from the 6 electoral areas in the municipality of Mae Sot. This survey was done in late April 1990, one and a half months after the first health education home visit in March 1990. Only one person per household was interviewed. In each household the housewife, or another adult resident if she was absent, was identified and interviewed by trained health workers.

The questionnaire contained 2 parts; the first part covering questions on sociodemographic characteristics, knowledge about DHF, its transmission, prevention and control, and the ways they had received health information related to DHF; the second part covering questions on their practice of measures to reduce *Aedes* larvae in the 4 major breeding habitats in their houses, including water-storage containers for drinking, washing, bathing and ant-traps.

RESULTS

Out of the 423 eligible persons contacted, 417 (98.6%) agreed to be interviewed. Three hundred and eighty-two (91.6%) respondents were housewives. About 60% of these 417 respondents were 40 years of age or younger. Fifty-eight per cent of them had education levels of primary school grade 6 or less, and nearly all of the remainder received secondary schooling.

The proportions of respondents who possessed knowledge about DHF, its transmission, prevention and control of the disease are shown in Table 1. Out of the 417 respondents, 369 (88.5%) were able to give one or more symptoms or signs of DHF. Fever was the symptom most commonly mentioned (74.8%), with bleeding phenomena (including rashes) the next most common (48.0%). only 48 (11.5%) had no knowlege of the disease features.

Three hundred and ninety-two of the respondents (94.0%) knew that DHF is a disease transmitted by mosquito bites and 376 of these (95.9%) could mention *Aedes* mosquitos (Yoong-lai) as the disease vector. The majority of them (80.1%) could also indicate correctly that this mosquito vector bites people during day-time. The most common breeding place of *Aedes* mosquitos men-

Table 1

Proportion of the 417 repondents responding to selected DHF knowledge.

DHF knowledge	No.	(%)	
Symptoms/signs*			
Fever	312	(74.8)	
Bleeding phenomena/rash	200	(48.0)	
Nausea/vomiting	35	(8.4)	
Shock	5	(1.2)	
Don't know	48	(11.5)	
Transmission			
Mosquito bites	392	(94.0)	
Others	18	(4.3)	
Don't know	7	(1.7)	
Mosquito vectors			
Aedes	376	(95.9)	**
Others	13	(3.3)	
Don't know	3	(0.8)	
Biting time			
Day-time	314	(80.1)	**
Others	74	(18.9)	
Don't know	4	(1.0)	
Breeding places*			
Water jars	280	(67.1)	
House drains/water retention in and around houses	206	(49.4)	
Ant-traps	75	(18.0)	
Cement baths	71	(17.0)	
Flower vases/pots	46	(11.0)	
Others+	93	(22.3)	
Know of abate (temephos sand granules)			
Yes, used it regularly	239	(57.3)	
Yes, used it occasionally	63	(15.1)	
Yes, but never used it	72	(17.3)	
Don't know	43	(10.3)	

* Some reported more than one item.
** Percentage was calculated among those reporting mosquito bites as disease transmission.
\+ Including tin cans, bottles, coconut shells and tyres.

tioned by the persons interviewed was water jars (67.1%), followed by household drains/water retention in and around houses (49.4%). Other recognizable breeding places included ant-traps, cement baths, flower vases and pots, tin cans, bottles, coconut shells and tyres. However, 68 respondents (16.3)% had mistaken beliefs that *Aedes* mosquitos lay eggs in municipal drain pipes (which are usually filthy and dirty).

The majority of the respondents (374, 89.7%) knew of abate (temephos sand granules). Of these, 239 (63.9%) had applied it regularly to control mosquito larvae in their water-storage containers, whereas 63 (16.8%) had used it occasionally and the remainder 72 (19.3%) who knew of it had never used it. Most of the non-users, some of whom had a dislike of abate odor, gave reasons that they employed other preventive methods such as covering water containers or changing the stored water frequently.

One question included in the survey to determine attitude towards control of DHF vector was the question, "who should be the first person responsible for the control of *Aedes* mosquito?". Of those respondents, 377 (90.4%) considered themselves as the first ones; the others cited hospital personnel (4.8%), municipal officers (2.6%) and others (2.2%).

The proportions of respondents who mentioned various control measures to prevent the disease are presented in Table 2. The 2 commonly recognized methods were addition of abate to stored water (61.6%) and covering water containers (45.8%). Other mentioned control measures were the use of mosquito net, disposal of discarded containers, changing stored water frequently, and addition of salt.

Table 3 presents anti-larval measures used by the respondents for larval reduction of the 4 major breeding places in their houses. Our study reveals that the respondents applied different control methods to different kinds of water containers. Covering water containers, the simple and inexpensive method, was the most common practice to prevent mosquito breeding in dringking-water containers as compared to other control methods. However, it was less commonly practised for vector control in the containers holding water for non-drinking purposes, for which the method of changing stored water frequently or

Table 2

Proportion of the respondents who mentioned methods of prevention of DHF.

Preventive methods*	No.	(%)
Addition of abate	257	(61.6)
Covering water containers	191	(45.8)
Using mosquito nets	95	(22.8)
Disposal of discarded containers	88	(21.1)
Changing stored water frequently	38	(9.1)
Addition of salt	9	(2.2)

*Some reported more than one method.

abate application to stored water was frequently employed, particularly for bathing-water containers. There were some respondents who reported using 2 or 3 methods in combination for each kind of water container. Most ant-traps were protected from larval breeding by the application of chemicals, including abate, salt, oil or detergent. It should be noted that some persons did not attempt to prevent the breeding of *Aedes* mosquitos in their houses. The proportions of ant-traps and bathing-water containers without anti-larval measrues were greater than those of the other two kinds. Our study found that those respondents who reported applying larval control methods for drinking-water containers were significantly ($p < 0.05$) more likely to know of abate and indicate covering water containers as one control measure than those who did not apply anti-larval measures. The respondents who employed anti-larval measures for the other three kinds of containers were significantly ($p < 0.05$) more likely to mention addition of abate as one of the control measures than those who did not.

The dominant sources from which they received health information on DHF were health personnel (52.5%), radio (47.7%) and television (46.0%) (Table 4). Thirty respondents (7.2%) stated that they had never heard of DHF.

DISCUSSION

The aim of health education is to inform people of scientific knowledge so that they can use such knowledge for changes in favor of health. In the prevention and control of DHF, people in the

Table 3

Vector control methods used by the respondents for larval reduction of the 4 major breeding sources in Mae Sot, Tak.

Anti-larval methods	Drinking-water containers		Washing-water containers		Bathing-water containers		Ant-traps*	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Covering water containers (A)	283	(67.9)	94	(22.5)	20	(4.8)	–	
Addition of abate (B)	7	(1.7)	59	(14.1)	114	(27.3)	108	(39.1)
Both A and B	82	(19.7)	68	(16.3)	22	(5.3)	–	
Changing stored water frequently (C)	–		66	(15.8)	116	(27.8)	–	
Both A and C	–		32	(7.7)	4	(1.0)	–	
Both B and C	–		15	(3.6)	46	(11.0)	–	
A and B and C	–		43	(10.3)	15	(3.6)	–	
Addition of salt	–		–		–		36	(13.0)
Addition of oil	–		–		–		8	(2.9)
Addition of other chemicals	–		–		–		38	(13.8)
Doing nothing	39	(9.4)	35	(8.4)	76	(18.2)	72	(26.1)
Not answered	6	(1.4)	5	(1.2)	4	(1.0)	14	(5.1)

*141 respondents were excluded because of no ant-traps in their houses.

Table 4

Sources of information on DHF in the respondents.

Sources*	No.	(%)
Health personnel	219	(52.5)
Radio	199	(47.7)
Television	192	(46.0)
Newspaper	69	(16.5)
Health education van	65	(15.6)
Relatives/friends	35	(8.4)
Others	50	(12.0)
Don't know	30	(7.2)

*Some reported more than one source.

community need DHF education to increase understanding of the problem and participation in prevention and control of the disease. Our study reveals that the majority of respondents knew that the disease is transmitted by *Aedes* mosquitos and could name the breeding places commonly found in households. Their increased knowledge and practice of DHF vector control indicate that they consider themselves responsible for the *Aedes* control program. The results of the study indicate the success of our education efforts which could make a number of people accept the vector control program as their own program.

Although water jars and water retention in and around houses were commonly cited as vector breeding sites, two other common sites in this area, ant-traps and cement baths (in bathrooms), were less frequently mentioned. This finding was compatible with the greater proportion of respondents who reported doing nothing for larval control in these two kinds of containers. Their ignorance should be replaced by knowledge through continuous health education. More educational efforts should also be designed to overcome the misconceptions that *Aedes* mosquitos lay eggs in filth and dirt such as in municipal drain pipes.

Most of the respondents knew of abate and therefore indicated addition of abate to be one of the preventive methods. Practices for larval

control of the 4 major breeding places in this area were found to vary with the kinds of water containers. When compared to the results of *Aedes* larval surveys in the area (Swaddiwudhipong *et al,* 1992), covering water containers, which was well accepted for preventing *Aedes* breeding in drinking-water containers was shown to result in more remarkable reduction of *Aedes* larvae than other methods applied to non-drinking stored water. Thus, this simple and inexpensive method should be strongly encouraged to prevent egg laying by mosquitos for all water containers. An alternative method may be the stock of larvivorous fish in these containers.

This study indicates that home visits by health personnel played an important role in disseminating DHF information and prevention methods to people in the community. Talks between health personnel and people can increase more cooperation in the implementation of the prevention programs. It was also found that radio and television were the main effective mass media for public health education on DHF. Radio and television should be the main public channels for distribution of health education and information in urban areas.

DHF knowledge and practices of preventive measures among housewives are of concern since it is usually the housewife who is expected to be the key person in the management of the house. It is recommended that the housewife be progressively informed and encouraged to operate proper preventive methods of *Aedes* control in order to protect her family from infection. Surveys of knowledge about DHF and practices for preventing the disease among the housewives should be carried out over time to evaluate the effectiveness of the DHF prevention and control programs and help guide to future health education campaigns.

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