

CHAPTER 5

CONCLUSIONS AND DISCUSSION

The purpose of this study was to test the hypothesis that water consumption characteristics of people in household affect the distribution of larvae of dengue vector. Characteristics of water consumption and larvae indices were analysed in DHF transmission and non-transmission villages, and in Buddhist and Muslim villages. The data were collected in four villages of Kok Pho and four villages in Panarehk Districts, Pattani Province. There were 1,201 water containers in 160 households under survey. The following findings were observed in the study.

Conclusions

In this study, it was found that there were statistically significant differences between water consumption characteristics in the DHF transmission villages and those in non-DHF transmission villages. These water consumption characteristics included drinking water source (chi-squared=11.39, $p<0.05$), washing water source (chi-squared=8.03, $p<0.05$), container type (chi-squared=15.06, $p<0.05$), containers with lid (chi-squared=3.98, $p<0.05$), and container with larvae (chi-squared=25.32, $p<0.05$). Also the larvae indices of the Dengue vector in transmission villages were found to be higher than that for non-transmission villages.

When compared with Muslim villages, the water consumption characteristics in Buddhist villages had statistically significant differences. These included drinking water source (chi-squared=15.77, $p<0.05$), renewal of drinking water in the container (chi-squared=14.42, $p<0.05$), renewal of washing water in the container (chi-squared=11.02, $p<0.05$), container type (chi-squared=70.91, $p<0.05$), container material (chi-squared=30.82, $p<0.05$), location (chi-squared=160.86, $p<0.05$), and size of container (chi-squared=33.68, $p<0.05$). In addition, larvae indices of the

Dengue vector were not different between Buddhist and Muslim villages, except that the *Stegomyia* Index (SI) which was higher in Buddhist villages.

The container type and location, material and lid, transmitted areas, and districts are significantly associated with the distribution of the Dengue vector larvae in the container. Of the standard indices of larvae of dengue vectors, the House Index (HI) was 80.62%, the Container Index (CI) was 53.70%, the Breteau Index (BI) was 403 infected containers per 100 households, and the *Stegomyia* Index was 403 of infected containers per 1,000 person of population.

Discussion

The association between location and larvae in containers was high under caves and outdoors. This result is consistent with that obtained from Chareonsook, et al (1985), who investigated the prevalence of *Aedes* mosquito larvae in three villages in Khon Khaen and reported that containers placed in the houses had larvae lower than those outside the houses. However, a study by Kittayapong and Strickman (1993) reported that containers placed inside houses had more larvae than those placed outdoors and under eaves or in the bathroom. This difference may be due to difference in way of life and culture in each area.

For each location, the numbers of containers in transmission villages was found to be not different from those in non-transmission villages. Note that, the total numbers of containers at each location in transmission village were higher than the numbers of containers in non-transmission villages. When compared to Muslim villages, the numbers of containers placed indoors and outdoors in Buddhist villages were higher, while those under caves were lower. This manifestation may be due to the increasing number of animal watering pans, which was considered as "others" category in Muslim villages because most of the people here domesticate doves as their business. However in Kok Krabur, Panarhek district, which is a Buddhist village and always lacks of water in summer, the villagers prepared containers for reserving water for washing.

The proportions of containers with larvae of drinking and washing water are lower than of those for other purposes. The Division of General Communicable Control of Thailand (Sangtharathip, 1997) and Chareonsook, et al (1985) had reported higher proportions of the containers with larvae for drinking and washing when compared with containers used for other purposes. It is interesting to note that most of the households in this study had cleaned the containers for drinking and washing regularly at interval of one to three days. Moreover, most of the containers for drinking and washing having a low density of mosquito larvae were made of plastic (with or without lid) and were mostly found inside houses. These may have an important role in the distribution of mosquito larvae.

In general, people residing in all the study areas were at high risk of getting DHF infection because these larvae density indices were higher than the normal level of indices given by the WHO (Pant and Self, 1993) in every category. Furthermore, the larvae indices in the transmission villages were higher than those in non-transmission villages, with the Berteau Index and the *Stegomyia* Index nearly double those for non-transmission. This may be because the data were collected in the rainy season. The possibility of having water in the containers is high, therefore, giving a high probability of having larvae in the containers. This is supported by Dulyapaire and Wongskul (1990) who studied the DHF vector density between the dry and rainy season in Narathiwat province. They found that the index of the Dengue vector in the rainy season was slightly higher than that in the dry season.

In addition, Sangtharathip (1997) has studied the determinants and correlation between larvae and adult indices, and incidence rate of DHF in Songkhla province. The study found that the House Index has the highest correlation (in communities, $r = 0.82$; in schools, $r = 0.003$), following by Container Index (in communities, $r = 0.76$; in schools, $r = 0.38$) and *Stegomyia* Index (in communities, $r = 0.40$; in school, $r = -0.22$). The Breteau Index and all adult indices showed negative correlations with the DHF case rate. From these findings, the water consumption characteristics having relation to the larvae indices should be associated with the DHF incidence rate.

Problems and Limitations, and Future Research

Since the data on the frequency of cleaning the containers were collected as household information, this study could not analyze the frequency of cleaning of each container. In fact, cleaning of the containers was not done at the same time for every container, resulting in an imprecise relation between cleaning of the containers and having larvae in the container. Nevertheless, this could either under or over estimate the association. However, there is still some evidence of human behaviors based on the household level.

The information for this study was only collected in the rainy season, so the results of this study, especially larvae density indices, could be generalized only in the rainy season.

For future research, the comparison between water consumption behaviors of the residents and larvae density indices should be done both in summer and rainy season. Also the association between the life cycle of the larvae and the containers characteristics, such as type of material, texture and water temperature in the container, should be explored.

Finally, the statistical analysis based on the containers did not take into account the clustering within household. Taking this resulting correlation into account (using a more complex statistical method such as the GEE method) would increase the standard errors, but is unlikely to cause substantial bias.