

【Original】

Basic knowledge of dengue fever and malaria in school teachers in a rural area of Lao PDR

Eiko KANEDA^{1,2)} and Tiengkham PONGVONGSA³⁾¹⁾ Nippon Sport Science University, ²⁾ Toyo University, ³⁾ Savannakhet Malaria Centre, Lao PDR

Abstract: Mosquito-borne diseases such as dengue fever and malaria are one of the most serious infectious diseases in Lao PDR. It is necessary to understand the causes, symptoms, and preventive measures to avoid contracting these diseases, and school health education plays an important role in this respect. It is also necessary for teachers to have correct knowledge of dengue fever and malaria. This paper assesses the teachers' knowledge of dengue fever and malaria, especially the causes, symptoms, and preventive methods, in the Lahanam area of Lao PDR and compares the level of knowledge with teachers' age and teaching experience. We found that all teachers understood the symptoms and preventive methods of dengue fever but did not have an equally thorough understanding of malaria. No correlation was found between knowledge and age or teaching experience. With regard to the cause of infection with dengue fever and malaria, most teachers understood these diseases to be transmitted by mosquitoes. These findings suggested that because local teachers are not transferred, efforts to improve knowledge, such as the training of the teachers, may be needed.

(Received: June 25, 2010 Accepted: July 28, 2010)

Key words: dengue fever, malaria, teachers' knowledge, Lao PDR

1. Background

Dengue virus is spread by the mosquito vector *Aedes aegypti* and causes significant morbidity and mortality worldwide. The World Health Organization estimates 50 million annual worldwide cases of dengue fever¹⁾.

Malaria is also increasingly becoming a serious burden in most tropical countries and a major cause of death in children in sub-Saharan Africa. Approximately 300 million people worldwide are affected by malaria, and 1–1.5 million people die every year due to malaria²⁾. The disease burden is increasing in almost all the tropical countries because malaria creates socioeconomic problems and leads to many deaths, particularly among young children³⁾.

In Laos, there were more than 200 cases of dengue fever in Saravane Province and 73 cases in Sekong Province in 2008⁴⁾. Malaria is also a public health problem in Lao PDR, with approximately 300,000 suspected cases reported each year⁵⁾.

Health education in the schools is one of the effective methods to prevent these infectious diseases. Enhancement of health education in the schools would require not only the availability of appropriate educa-

tional teaching materials but also basic knowledge of teachers about infectious diseases, especially symptoms, causes, and prevention methods related to mosquito-borne infections. In rural areas of Lao PDR, almost no teachers are transferred from the village where they live when seeking employment. Moreover, they have few opportunities to absorb new knowledge and may need to take part in programs such as the training of teachers (TOTs) for health education.

The purpose of this study is to assess the teachers' knowledge of mosquito-borne infections in rural areas and investigate the relationship between knowledge level and teachers' age and teaching experience.

2. Methods

1) Study site and subjects

The Lahanam area is located in the countryside of Songkhone district, Savannakhet province. This study area comprises six villages and five primary schools, including two branch schools. The region is made up primarily of rice fields, and the remainder is covered by forest. Three of the six villages are located near the Banghiang River, which is a tributary of the Mekong River. The total population of the region was 4413

people, and the number of households was 713 families⁶). Malaria has not recently been reported in this area, and only a few cases of dengue fever are reported each year.

2) Data collection

All primary-school teachers in this area were interviewed in person in September 2005. The interview was conducted in the Lao language, and the answers were written in the notebook in English by a Laotian parasitologist.

The questions asked were about symptoms, causes, and preventive methods for dengue fever and malaria. Detailed knowledge of the teachers about dengue fever and malaria was recorded. The number of correct answers and mistakes was tallied to yield individual scores for knowledge of symptoms and preventive methods. Teachers were given one point for each correct answer, and a point was subtracted for each mistake. To make clear the relationship between these points, the teachers' knowledge was compared with their age and teaching experience. After the results of interview were determined, the five highly ranked symptoms and preventive methods of dengue fever and malaria were summarised. Finally, all data were consolidated with regard to the cause of dengue fever and malaria.

3) Statistical analysis

To analyse teachers' knowledge of symptoms and disease prevention and the relationship with age and teaching experience, the data were entered into a computer with the Microsoft Excel program. Pearson correlation analyses were performed by SPSS 11.5 software (SPSS Inc., Chicago, IL).

4) Ethical considerations

The Ministry of Health, Savannakhet province, approved the project at the district level; it was also approved by the Health Development Study Project team and the ethical committee of the Institute of Tropical Medicine, Nagasaki University.

Before the survey was started, a meeting was held in each school, and informed consent was obtained from all the teachers. Confidentiality was guaranteed for respondents' information. If the participants did not agree to participate, we did not include them. The data were stored securely, and participants were as-

signed an identification code that was used in place of their names during data analysis.

3. Results

The number of enrolled teachers in this area was 24. The average age was 39 years (range, 25–57 years) and average teaching experience was 18 years (range, 4–34 years). All teachers except one were residents of this area.

Table 1 shows the teachers' knowledge of dengue fever and malaria, especially the symptoms and preventive methods. All teachers knew the symptoms of dengue fever; in contrast, 4 of 24 teachers were not familiar with the symptoms of malaria. With regard to understanding the prevention of dengue fever, 3 teachers gave wrong answers, while for malaria, 4 teachers gave wrong answers. No correlation was found between the points for the answers to these questions and teacher age ($r=0.071$, $n=23$) or teaching experience ($r=-0.105$, $n=23$).

Table 2 gives more detail about responses with regard to symptoms and prevention. Fever, a typical symptom, was the most well-recognized symptom of both dengue fever ($n=24/24$) and malaria ($n=18/24$). Overall, the typical symptoms of each disease, such as rash in dengue fever ($n=17/24$) and chills in malaria ($n=16/24$), were understood. Furthermore, the use of mosquito net was recognised as a preventive method for dengue fever ($n=24/24$) and malaria ($n=18/24$). Methods related to destroying the mosquito's source ranked from second to fourth for the prevention of both dengue fever and malaria. Half or less than half of teachers know that the house must be cleaned to prevent mosquito breeding; three teachers believe that drinking boiled water leads to prevention of malaria.

Table 3 shows the teachers' knowledge of infection routes for dengue fever and malaria. For dengue fever, 23 of 24 teachers answered correctly, that is, mosquito's bite spread the infection in humans. However, only three-quarters of teachers gave the correct answer regarding the spread of malaria ($n=18/24$). One teacher answered that dengue fever and malaria are caused by the bombs that were dropped by the United States during the Vietnam War. Two teachers believed that infection was caused by ingesting mosquito larvae from unboiled drinking water. Four of 24 teachers answered that they did not know the cause of malaria infection.

Table 1. Teacher's knowledge of dengue fever and malaria

no	sex	age	teaching experience year	educational level*	graduate**	Dengue fever		Malaria		do not know well
						symptom	prevention***	symptom***	prevention***	
1	F	30	9	2	2	2	2	6	2	
2	F	43	24	1	1	4	2	3	2	
3	M	32	10	2	3	2	2	1 (1)	3	
4	F	25	4	2	2	2	3	4 (1)	1	
5	M	46	15	2	2	3	3	3	3	
6	F	35	14	2	1	3	4	4	1	1
7	F	30	8	2	2	3	4	5	4	
8	M	57	29	2	1	3	2	3 (1)	2	
9	M	40	16	1	2	1	3	2	2	
10	F	42	23	2	1	1	2	0	0	
11	F	35	18	2	2	2	4	0	2	1
12	F	43	21	2	2	4	4	4 (1)	1 (1)	
13	F	35	16	2	2	4	4	2	1	
14	F	35	14	2	2	4	2	3	2 (1)	
15	F	39	18	2	2	4	3 (1)	2	2	
16	M	55	34	2	2	3	3	5	3	
17	F	45	25	2	2	4	3	4	3	
18	F	34	16	2	1	3	1	2	1	
19	M	57	34	1	1	2	2 (1)	3	2 (1)	
20	M	39	12	2	2	3	3	4	3	
21	M	38	13	2	2	2	2	4	2	
22	F	40	20	1	1	3	5	5	5	
23	M	42	20	1	2	3	4	4	4	
24	M	31	7	2	1	3	5 (1)	3	5 (1)	

*: 1=primary, 2=secondary, **: 1=primary level, 2=middle level, 3=teacher training college, ***: ()=the number of wrong answer

Table 2. The teacher's answer of symptom and preventive of dengue fever and malaria (five high-ranking items)

	Dengue fever		Malaria				
	symptom	prevention	symptom	prevention			
fever, hot body rash	24	sleep under the bed net	20	fever	18	sleep under the bed-net	19
	17	destroy the breeding sites of mosquito (used cans coconut shells, used	14	chiling	16	clean the house	8
petechia	5	clean the jars	13	headachc	13	destroy biting site	6
hemorrhagic syndrom	4	distroying the breeding site of mosquito	9	asthenia	7	land-full	4
abdominal pain	4	clean the house	8	anorexia	5	drink boild water	3

4. Discussion

We investigated school teachers' basic knowledge of dengue fever and malaria in Lahanam. All teachers had a general understanding about the symptoms of dengue fever; however, some were unaware about the cause of malaria. The rate of correct answers for malaria was low because of no occurrence of malaria in this area; thus, the teachers did not have a reason to educate themselves about the cause and symptoms of this disease. In Lao PDR, however, many endemic areas of malaria infection exist, especially in the rural areas of Attapu, Khammouan, and Savannakhet province⁷⁻⁹; thus, health education in the schools is very important.

Table 3. Cause of dengue fever and malaria

Infection route	Dengue fever	Malaria
mosquito biting	23	18
due to the chemical of bomb	1	1
drink unboiled water	0	2
don't know	0	4

(n=24)

With regard to symptoms and prevention of infection, no correlation was found between teachers' knowledge and teachers' age or educational experience. This finding suggests that when the opportunity

to the participant of the TOTs not have to consider the age and the teaching experience in these schools especially. Since the number of teachers is limited in rural areas, classes are often interrupted for the TOTs, which interfere with the children's education. Therefore, it is desirable that the teacher, who is not influence in the class, should attend the TOT and deliver the knowledge gained from training to the school children through appropriate educational programs.

The use of mosquito net and destruction of the mosquito's source were well-recognized prevention methods in this study. Many reports have shown these methods to be most effective¹⁰⁻¹².

The belief that one can acquire infection from drinking water has also been seen in other countries¹³. Some teachers also believed that dengue fever occurred as a result of the bombs dropped during the Vietnam War because dengue fever first appeared in this area after the Vietnam War.

While it is important for children in rural areas to have access to education, the lack of a system of transfer of teachers in this country sometimes leads to the educational method getting into a rut. Improvement of teacher quality is an important step in avoiding this downfall.

Acknowledgements: We gratefully acknowledge Professor Kazuhiko Moji (the Research Institute for Humanity and Nature, Kyoto, Japan) and Professor Bounngong Bupha (National Institute of Public Health, Lao PDR). We are also thankful to Dr. Panom Phongmany (Savannakhet Province, Ministry of Health, Lao PDR) and the teachers in Lahanam. This research was undertaken with joint financial assistance from the Research Institute for Humanity and Nature, Kyoto, Japan (Professor Tomoya AKIMICHI), through the health development study of the Lao PDR project.

5. References

- 1) World Health Organization. Dengue and dengue hemorrhagic fever, accessed March 04, 2006. (Available from: <http://www.who.int/mediacentre/factsheets/fs117/en/>)
- 2) Winstanley, P., Ward, S., Snow, R., Breckenridge, A. Therapy of falciparum malaria in sub-saharan Africa: from molecule to policy. *Clin Microbiol Rev.* 17(3), 612-37, 2004.
- 3) Wongsrichanalai, C., Pickard, A.L., Wernsdorfer, W.H., Meshnick, S.R. Epidemiology of drug-resistant

- malaria. *Lancet Infect Dis.* 2(4), 209-218, 2002.
- 4) International Society for infectious Diseases, ProMED-mail 22 June 2008, Archive Number 20080802.2367, 2008.
- 5) Phetsouvanh, R., Inthakone, S., Naphayving, P., Hongvanthong, B., Phompida, S., Sidavong, B., Vanisaveth, V., Sengsavath, V., Luangphengsouk, K. The current malaria situation in Lao PDR. *Mekong Malaria Forum* 5, 14-22, 2000.
- 6) Kaneda, E. Result of Health examination in primary school at Lahanam zone in Lao P.D.R. *Jpn J School Health (Japanese)* 47, 322-323, 2005.
- 7) Vythilingam, I., Sidavong, B., Chan, S.T., Phonemixay, T., Vanisaveth, V., Sisoulad, P., Phetsouvanh, R., Hakim, S.L., Phompida, S. Epidemiology of malaria in Attapeu Province, Lao PDR in relation to entomological parameters. *Trans R Soc Trop Med Hyg* 99(11), 833-839, 2005.
- 8) Kobayashi, J., Somboon, P., Keomanila, H., Inthavongsa, S., Nambanya S. Inthakone S., Sato, Y., Miyagi, I. Malaria prevalence and a brief entomological survey in a village surrounded by rice fields in Khammouan province, Lao PDR. *Trop Med Int Health* 5(1), 17-21, 2000.
- 9) Anothay, O., Pongvongsa, T., Maharat, N., Sirivichayakul, C., Chantavanich, P., Silachamroon, U., Looreesuwan, S. Clinical presentation of childhood malaria in Savannakhet province, Lao PDR. *Southeast Asian J Trop Med Public Health* 31, Suppl 1, 85-90, 2000.
- 10) Lindsay, S.W., Alonso, P.L., Armstrong Schellenberg, J.R., Hemingway, J., Adiamah, J.H., Shenton, F.C., Jawara, M., Greenwood, B.M. A malaria control trial using insecticide-treated bed nets and targeted chemoprophylaxis in a rural area of The Gambia, west Africa. 7. Impact of permethrin-impregnated bed nets on malaria vectors. *Trans R Soc Trop Med Hyg.* 87, suppl 2, 45-51, 1993.
- 11) Killeen, G.F., Kihonda, J., Lyimo, E., Oketch, F.R., Kotas, M.E., Mathenge, E., Schellenberg, J.A., Lengeler, C., Smith, T.A., Drakeley, C.J. Quantifying behavioural interactions between humans and mosquitoes: evaluating the protective efficacy of insecticidal nets against malaria transmission in rural Tanzania. *BMC Infect Dis.* 10(6), 161, 2006.
- 12) Gu, W., Novak, R.J. Predicting the impact of insecticide-treated bed nets on malaria transmission: the devil is in the detail. *Malar J.* 16(8), 256, 2009.
- 13) Tsuyuoka, R., Wagatsuma, Y., Makunike, B. The knowledge and practice on malaria among community members in Zimbabwe. *Cent Afr J Med.* 47(1), 14-17, 2001.

<連絡先>

著者名：金田英子

住 所：東京都世田谷区深沢 7-1-1

所 属：日本体育大学衛生学・公衆衛生学研究室

E-mail アドレス：e-kaneda@nittai.ac.jp