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## Treatment seeking behaviour and prevalence of treatment delay among malaria patients along Thailand-Myanmar border in Tak province

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## PEER REVIEW

**Peer reviewer**

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The paper is interesting and the methods used are valid and well presented. It contains useful public health messages and could contribute to reducing the incidence of malaria.

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## ABSTRACT

**Objective:** To investigate treatment seeking behaviour and the prevalence of treatment delay of malaria patients.

**Methods:** A cross-sectional study was conducted with malaria patients along the Thailand-Myanmar border in Tak province, Thailand.

**Results:** Most of patients (70.0%) were treated for fever before receiving treatment at a malaria clinic or public hospital. The sources of initial treatments were self-treatment (64.0%), malaria clinics (20.0%), public hospital (11.0%), sub-district health promotion hospital (3.3%), and malaria posts (1.1%). Prevalence of patients delayed more than one day after onset of symptoms was 79.4%, but doctor delay of more than one day occurred in only 1.3%. The prevalence of treatment delay (total delay) of more than one day was 79.6%. Patient delay and treatment delay were found to be significantly higher among hill tribe than Thai subjects ( $P=0.004$  and  $0.003$ , respectively) but, there was no significant association between ethnicity and doctor delay ( $P=0.669$ ).

**Conclusion:** Patient delay in seeking treatment is a major problem along the Thailand-Myanmar border in Tak province, especially in hill tribe people. Self-treatment accounted for most of initial treatment sought by patients.

## KEYWORDS

Treatment seeking behaviour, Prevalence, Self-treatment, Patient delay, Doctor delay, Treatment delay

### 1. Introduction

Malaria remains a serious illness, 300-500 million cases of illness and more than one million deaths occur each year worldwide[1]. Cases of malaria with the majority (85%) occur in the African region, 10% in South-East Asia and 4% in the

Eastern Mediterranean region[2]. In addition to its impacts on health, malaria has continued to be responsible for weakening the economies of many countries and worsening their cycles of poverty[3].

Malaria is a significant problem in Thailand, where there are more than 10000 cases each year. A particular concern is Tak

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province, which is adjacent to the border with Myanmar, because people migrating across the border are causing an increase in transmission of malaria between the two countries[4]. Between 2008 and 2010, the prevalence of malaria in Tak has been higher than that in any other parts of Thailand[4-6]. The diverse ethnicities of people residing in this area, especially hill tribe people were vulnerable of high risk of infection .

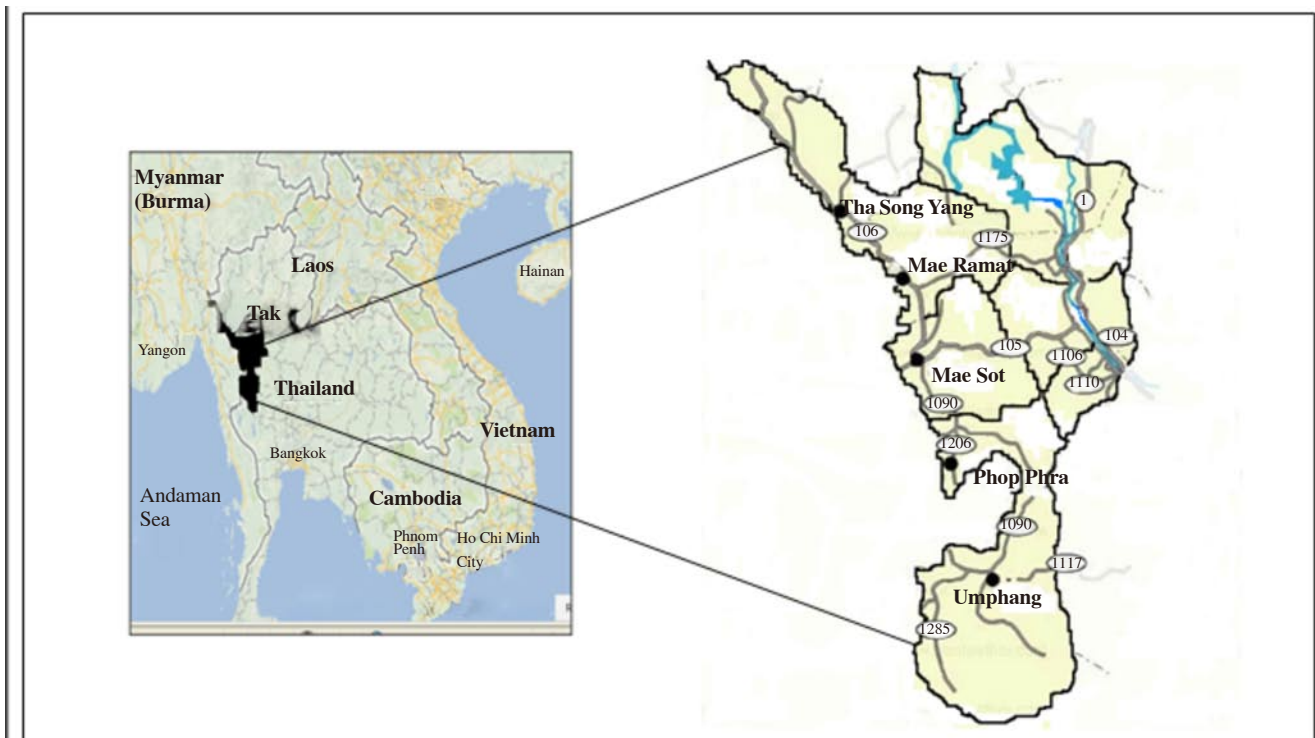
Inappropriate treatment seeking behaviour and self-treatment prior to visiting health facilities were the main causes of progressing of disease and death[7,8]. The treatment seeking behaviour of people, especially following the onset of fever, a common symptom of malaria, is important for the effective case management and control of malaria[8,9]. Early diagnosis and prompt treatment are the control strategies for decreasing transmission and the prevention of complications[10,11] because diagnostic and treatment delays are major causes of complications and death[11,12]. A delay in treating *Plasmodium falciparum* (*P. falciparum*) malaria is especially serious because severe complication may occur within a few hours, and cerebral malaria is the most severe complication of *P. falciparum* infection occurring in patients and cause of death[10]. Early diagnosis and prompt treatment are part of effective disease management[10]. For appropriate case management, diagnosis and prompt treatment should happen within 24 h after the onset of symptoms[10]. Previous studies have provided very little information about the prevalence of treatment delay in the area of Tak province. The purpose of the present study was to investigate treatment seeking behaviour and the prevalence of treatment delay in malaria patients along the Thailand-Myanmar border in Tak province. The findings are expected to assist in the development of potentially more effective strategies to combat malaria in this area.

## 2. Materials and methods

A cross-sectional study was conducted to investigate treatment seeking behaviour and the prevalence of treatment delay in malaria patients along the Thailand-Myanmar border in Tak province. The study site consisted of the five districts with a high prevalence of malaria along the Thailand-Myanmar border in Tak province: Mae Sot, Phop Phra, Umphang, Mae Ramat and Tha Song Yang (Figure 1).

The subjects were patients with malaria who had received laboratory-confirmed diagnosis of malaria as shown by the presence of all species of the *Plasmodium* parasite by thick blood film. They were treated in 11 malaria clinics and 5 public hospitals between January 2011, and December 2011. The inclusion criteria included Thai nationality, residence in one of the five districts and age of more than 15 years. The exclusion criteria included change of permanent residence and psychosis. The subjects were selected by stratified random sampling from the malaria clinics and public hospitals. Data were collected from the patients by the use of a structured interview questionnaire and also from their medical records. The data obtained in these ways consisted of information about demographic characteristics, treatment seeking behaviour, species of infecting parasite, date of onset of symptoms, date of seeking treatment at malaria clinics or public hospitals, and date of diagnosis and initiation of treatment.

Early diagnosis and treatment was defined as when treatment was initiated within 24 h after the onset of symptoms[10]. Patient delay was the time elapsing between the onset of symptoms and seeking treatment at a malaria clinic or public hospital when this was more



**Figure 1.** The study site: five districts along Thailand-Myanmar border in Tak province, Thailand.

than one day (24 h). Doctor delay was the time between seeking treatment at a malaria clinic or public hospital and the initiation of treatment when this was more than one day (24 h). Treatment delay (total delay) was the time between the onset of symptoms and the initiation of treatment when this was more than one day (24 h).

All analyses were performed using the STATA 10.0 software package. Descriptive statistics were used to summarize patient characteristics, treatment seeking behaviour and species of parasites. Percentages and 95% confidence intervals (95% CIs) were used to determine the prevalence of patients delay, doctor delay and treatment delay. Chi-square tests were used to analyze the relationships between ethnicity and patient delay, doctor delay and treatment delay.

This study was approved by the Committee of Human Research Ethics, Khon Kaen University, Thailand (reference No. HE542290). Written consent was obtained from all subjects before the interviews.

### 3. Results

#### 3.1. Demographic characteristics

The median age of the 456 patients, who participated in this study, was 34 years (range 15-80), and most were males (67.5%). In terms of educational background, 30.9% reported receiving no formal education, 38.4% attended primary school, and 30.7% had progressed to secondary school. The majority of subjects were employed in agriculture (50.0%), 23.0% were self-employed, and 12.3% were students. For most of the patients, the monthly incomes were more than 3 000 bath (35.8%) or less than 1 000 baht (27.6%) (median=2 000; range=0-25 000), of hill tribe was Karen (62.5%), or Hmong (3.3%), followed by Thai (34.2%). The species of infecting parasites involved were confirmed as *Plasmodium vivax* (55.9%), *P. falciparum* (41.9%) or mixed species (2.2%).

#### 3.2. Treatment seeking behaviour

Most of the patients (70.0%) were treated for fevers before obtaining treatment at a malaria clinic or public hospital. The initial sources of treatment were self-treatment (64.0%), a malaria clinic (20.0%), a public hospital (11.0%), a sub-district health promotion hospital (3.3%), a malaria post (1.1%) and a private health facility (0.6%) (Table 1).

#### 3.3. Patient delay, doctor delay and treatment delay

Patient delay (more than one day between symptom onset and seeking treatment at a malaria clinic or public hospital) occurred in 79.4% (95% CI=75.7-83.1) of the cases (Table 2), the median time

to seek treatment was three days (range: 1-26 d).

Doctor delay (more than one day before treatment initiation after arriving at a malaria clinic or hospital) occurred in only 1.3% (95% CI=0.3-2.4) of the cases (Table 2), and the median time to treatment was one day (range: 1-3 d).

Treatment delay (more than one day between the onset of symptoms and the initiation of treatment) was experienced by 79.6% (95% CI=75.9-83.3) of the patients (Table 2). As for patient delay, the median total time elapsing between symptom onset and treatment was three days (range: 1-26 d).

**Table 1**

Treatment seeking behaviour prior to treatment (n=456).

Treatment seeking behaviour		n	Percentage (%)
Action taken to treat fever	Had no treatment	137	30.0
	Had treatment	319	70.0
Initial treatment source	Self-treatment (n=292, 64.0%)	173	59.2
	Taken remained drug at home	166	56.8
	Tepid sponge	71	24.3
	Drug from shops	14	4.8
	Herbs	91	20.0
	Malaria clinic	50	11.0
	Public hospital	15	3.3
	Sub-district health promotion hospital	5	1.1
	Malaria post	3	0.6
	Private health facility		

**Table 2**

The characteristics of patient delay, doctor delay and treatment delay (n=456).

Characteristics of delay		n	% (95% CI)
Patient delay	1 d	94	20.6 (16.9-24.3)
	>1 d	362	79.4 (75.7-83.1)
Doctor delay	1 d	450	98.7 (97.6-99.7)
	>1 d	6	1.3 (0.3-2.4)
Treatment delay	1 d	93	20.4 (16.7-24.1)
	>1 d	363	79.6 (75.9-83.3)

The frequencies of both patient delay and treatment delay were found to be significantly higher among hill tribe than Thai subjects ( $P=0.004$  and  $0.003$ , respectively). However, there was no significant association between ethnicity and doctor delay ( $P=0.669$ ) (Table 3).

**Table 3**

The association of ethnicity with patients delay, doctor delay and treatment delay (n=456).

Characteristics		< 24 h	> 24 h	Total	P-value
		n (%)	n (%)		
Patient delay	Thai	44 (28.2)	112 (71.8)	156	0.004*
	Hill tribe	50 (16.7)	250 (83.3)	300	
Doctor delay	Thai	155 (99.4)	1 (0.6)	156	0.669
	Hill tribe	295 (98.3)	5 (1.7)	300	
Treatment delay	Thai	44 (28.2)	112 (71.8)	156	0.003*
	Hill tribe	49 (16.3)	251 (83.7)	300	

\*:  $P<0.05$ , compared with hill tribe.

### 4. Discussion

Early diagnosis and treatment was a problem for patients along

the Thailand-Myanmar border in Tak province. Although some patients sought help at malaria clinics, public hospitals, sub-district health promotion hospitals or malaria posts when their symptoms began, most initial treatment were done by themselves for fever by the use of drugs available at home, a tepid sponge or medications purchased from shops. This occurred even though malaria posts were easily accessible for people residing in the high transmission areas, and the use of rapid diagnostic tests at these facilities reduces diagnostic and treatment delay. Self-treatment has been an important cause of increasing the duration of diagnostic and treatment delay[7,8].

The prevalence of patient delay by malaria patients along Thailand-Myanmar border in Tak province was an issue of serious concern. In the present study, 79.4% of the malaria patients delayed more than a day in seeking medical treatment after symptom onset (median delay: 3 d, range 1-26 d). Such delays result in an increased transmission of the disease and a higher risk of complications. Other studies have also found a median patient delay of the same length and similar percentages of malaria patients, who delayed more than a day ranged between 64.2% and 91.5%[8,13-16]. Two studies reported lower percentages: 42.0% and 58.9%[17,18].

The problem of patient delay might arise from the patients' lack of understanding on the optimum health seeking behaviour and their unawareness of the severity of disease. Especially, as the initial symptoms are similar to other less severe diseases, and often relieved by self-treatment. The use of drugs available at home or purchased from shops was a major self-treatment whereas a few symptoms increasing the duration of patient delay. When self-treatment failed to relieve their symptoms, the patients then sought treatment at malaria clinics, public hospitals, sub-district health promotion hospitals or malaria posts. Ethnicity may also be seen as explanation for the high rate of patient delay. The majority of the patients were hill tribe people, mostly Karen, and patient delay was higher in this group than in Thais. Hill tribe people tend to live in remote and mountainous rural areas making access to health facilities difficult, especially during the rainy season. Their diverse languages and their animistic spiritual beliefs can also be barriers to understanding and accepting modern Western medical ideas and practices.

The low prevalence (1.3%) of doctor delay was identified in this study. The delay was occurred slightly because almost all patients (98.7%) were detected for *Plasmodium* parasite in the first time of visiting a malaria clinic or public hospital and received treatment within one day of arriving. There is usually the active case finding in the high transmission areas in Thailand. The findings showed that patient delay played a major role on treatment delay (total delay) and self-treatment was a major cause of patient delay occurring from an inappropriate treatment seeking behaviour. Early diagnosis and appropriate treatment are crucial in the control of

malaria. The success of this approach depends on effective ways of reducing treatment delay, and patient delay (especially delay due to self-treatment) appears to decline as patient knowledge and awareness of malaria improves. Early diagnosis and appropriate treatment are approaches of effective disease management to reduce patient and doctor delay[8,10]. In addition to updating people's understanding about malaria and the importance of early diagnosis and treatment, attention needs to be paid to the adequate provision of initial treatment facilities in the hilly and remote areas where there is a high risk of infection. In conclusion, patient delay of hill tribe people in seeking treatment at a malaria clinic or public hospital is a major problem along the Thailand-Myanmar border in Tak province. Self-treatment accounted for most of initial treatment sought by patients and appeared to be the main cause in patient delay. Health facilities should design strategies to decrease the patient delay in this area of Thailand.

### Conflict of interest statement

We declare that we have no conflict of interest.

### Acknowledgements

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### Comments

#### Background

The malaria is a significant problem in Thailand, a particular concern is Tak province, where has the highest prevalence of malaria in Thailand. The diverse ethnicities of people residing in this area, especially, hill tribe people were vulnerable of high risk of infection that is different from Thais in terms of culture and language. Early diagnosis and prompt treatment are part of effective disease management that should happen within 24 hours after the onset of symptoms.

#### Research frontiers

Other researchers have investigated this topic, suggesting it is an on-going public health problem. Confirmation or other findings from different studies is useful. This study is relatively large, and uses different tools to collect a variety of useful information. The categorization into "patient delay", "doctor delay" and "treatment delay" was very interesting and useful, as was the finding of the significant difference in delay in hill tribe people than other participants.

### Related reports

A link between delay in diagnosis and treatment has been identified by several reports as being a significant barrier to malaria control. The prevalence of delay in seeking treatment in this study corresponded to results from another study, but was higher than others, as noted in the discussion section of the paper. These variations in findings are useful for future meta analyses, and it is important to disseminate them.

### Innovations & breakthroughs

This study demonstrated that patient delay in seeking treatment is a major problem along the Thailand-Myanmar border in Tak province, especially in hill tribe people, and identified significant reasons for this delay.

### Applications

Recommendations of the research suggested that health facilities should design strategies to ensure people understand about malaria and the importance of early diagnosis and treatment. Importantly, they make the point that attention needs to be paid to the adequate provision of initial treatment facilities in the hilly and remote areas where there is a high risk of infection. Additional work could be carried out to explore why hill tribe people in particular are more vulnerable.

### Peer review

The paper is interesting and the methods used are valid and well presented. It contains useful public health messages and could contribute to reducing the incidence of malaria.

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