

# Barriers to prompt and effective malaria treatment among malaria infected patients in Palaw township, Tanintharyi region, Myanmar

S104

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## Abstract

**Purpose** - The aim of this study was to assess barriers (socio-demographic characteristics, knowledge of malaria, behaviors related to malaria treatment and health system factors) regarding prompt and effective malaria treatment among malaria infected patients in Palaw Township, Tanintharyi Region, Myanmar.

**Design/methodology/approach** - A cross-sectional study was conducted from January 2018 – March 2018 in 17 high risk malaria villages of Palaw Township. The study populations were 18 to 65 years old malaria infected patients. The total sample size of 204 malaria infected patients were selected randomly from each village proportionately. Face-to-face interview method was employed by using structured questionnaires.

**Findings** - Majority of respondents (85.8%) did not get prompt and effective malaria treatment within 24 hours due to barriers. There were statistically significant with socio-demographic characteristics ( $p$ -value  $< 0.05$ ), good knowledge of malaria ( $p$ -value  $< 0.001$ , AOR= 65.3, 95% CI), good behaviors related to treatment seeking ( $p$ -value = 0.021, AOR = 3.889, 95% CI), health system factors ( $p$ -value  $< 0.05$ ) and prompt and effective malaria treatment at 95% confidence interval.

**Originality/value** - The prompt and effective malaria treatment was influenced by socio-demographic characteristics, knowledge of malaria, behaviors related to treatment seeking and health system factors. Enhancing the knowledge and promoting good behaviors about malaria should be implemented through health education sessions. Health system factors regarding health providers should be managed by the Local Health Authority.

**Keywords** Malaria, Effective malaria treatment, Myanmar

**Paper type** Research paper

## Introduction

Malaria, life-threatening disease caused by *Plasmodium* parasites carried by infected female *Anopheles* mosquitoes. If it is not treated, leading to complicated malaria and can be fatal [1]. The keystone of malaria case management and reduction of severe morbidity and mortality is the provision of prompt and effective malaria treatment [2].

The WHO African region explained for the most malaria cases globally (90%), accompanied by (7%) of malaria cases in South East Asia Region and (2%) of malaria cases in the Eastern Mediterranean Region [3]. With the occurrence of an estimation of 429,000 malaria deaths, African region (92%), accompanied by South East Asia Region (6%) and Eastern Mediterranean Region (2%) [4]. In the GMS, Myanmar is the highest malaria burden and 77, 842 cases and 37 malaria deaths are reported in 2015. Some 8.5 millions of people (16% of the population) are at high risk of malaria which occurs mainly in or near forests, particularly among remote populations, migrants and ethnic minorities [5]. As prompt and effective malaria treatment is the corner stone to reduce malaria morbidity and mortality, National Malaria Treatment policy was updated in line with WHO malaria treatment guidelines that place RDTs and ACTs as the main pillars of diagnosis and treatment. Standby treatment is recommended among migrants in areas where diagnostic facilities are not available [6].

Tanintharyi Region is situated in the southernmost part of Myanmar. There are total 1453 villages where 1216 villages are high risk malaria villages [7]. In 2017,

morbidity rate is 3.5 per 1,000 population [8]. In Palaw Township, the population is 80,068 and there are 147 villages where 25 are high risk malaria villages, 28 are moderate risk and 8 are low risk villages and the rest of 86 villages are potential to risk of malaria [7]. In 2015, morbidity rate was 14.23 and mortality rate was 1.3, morbidity rate was 3.9 and mortality rate was 0.13 in 2016 and morbidity rate was 3.5 and there was no malaria deaths in 2017 [8-10]. Due to located in the border area of Myanmar, Tanintharyi region including Palaw township is still facing difficult to assess prompt and effective treatment because of many migrant workers across the border and some studies shown that drug resistance in Tanintharyi region due to self-treatment and usage of oral artemisinin monotherapy [2].

In Myanmar, Prompt and effective treatment of malaria is given through Rural Health Centers, Integrated Community Malaria Volunteers and Non-Governmental Organizations in rural areas [11]. Although National Malaria Control Program leads to fill the gaps for prompt and effective treatment of malaria, gaps are still present related to sociodemographic characteristics and knowledge of malaria, treatment seeking behaviors, health system factors such as accessibility, availability, affordability and accountability [6]. Therefore, this study aims to assess sociodemographic characteristics, knowledge of malaria, behaviors related to treatment seeking and health system factors (accessibility, affordability, availability and accountability) regarding prompt and effective malaria treatment among malaria infected patients in Palaw Township, Tanintharyi Region, Myanmar.

## **Methods**

### *Research design*

This study was descriptive cross-sectional study and was conducted among 204 malaria infected patients who suffered malaria within January 2018 to March 2018 in Palaw Township, Tanintharyi Region. The sample size for this research was calculated by using Taro Yamane formula at 95% confidence level [12]. The inclusion criteria are both male and female of 18 to 65 years old malaria infected patients who tested malaria with RDTs or microscopy during January 2018 to March 2018. They were the residents in the study area more than 3 months. Exclusion criteria are unconscious, severe ill and mental disorder patients.

### *Sampling technique and data collection*

Firstly, 17 high risk malaria villages were chosen from total 147 villages in Palaw Township by purposive sampling method. The sample malaria infected patients were calculated by proportionately based on the total malaria infected patients in each village. And then, malaria infected patients were selected randomly from each village. Ten Integrated Community Malaria Volunteers (local dialects persons) were recruited as research assistants from these 17 samples villages and so, they could easily follow the addresses of malaria infected patients and could easily communicate with various ethnic respondents and bias was avoided. For the respondents who had more than once infection during 3 months, only one-time infection was included in this survey. To reduce the recall bias, the research team asked all of the respondents for their last infection if they had more than once infection during 3 months. Face to face interview method and Myanmar Language questionnaires were used in conduction of survey.

### *Research instruments*

Structured Questionnaire was measurement tool and it was comprised with 5 parts; sociodemographic characteristics, knowledge of malaria, behaviors related to malaria treatment, health system factors and prompt and effective treatment of malaria. For the validity of the questionnaires, reviewed the literature and consulted

with 3 experts. The average IOC (Item-Objective Congruence) result was 0.98. Translation and back translation of questionnaires were done. For testing of reliability, pilot study was conducted in 30 malaria infected patients in Myeik Township. The questionnaires related to knowledge were tested with KR20 and the result was 0.73 and questionnaires related to treatment seeking behaviors were calculated with reliability coefficient (Cronbach's Alpha) and the result was 0.71. SPSS version 22 licensed by Chulalongkorn University was used to analyze the data. Descriptive Statistics such as frequency, percentage, mean, median, standard deviation, range were used for analyzing the data in this study. Bivariate Analysis (Chi-square test and Fisher's exact test) was used to determine the association. Multivariate analysis (binary logistic regression) was used to access strength of association between the independent and dependent variables at 0.05 significant level and to determine the model of determinants.

#### *Operational definitions*

Barriers refer to obstacles for getting of prompt and effective treatment of malaria in malaria infected patients which are socio demographic characteristics that are favorable to give obstacles, poor knowledge about malaria, presence of inappropriate treatment seeking behaviors and health system services requirements [13]. Malaria Infected patient refers to a person who suffered malaria related symptoms caused by malaria parasites that are transmitted to people through the bites of infected female *Anopheles* mosquitoes. The first symptom of malaria is fever with chills and rigors and headache. Malaria was detected by Rapid Diagnostics Test (RDT) or Microscopy [6]. Prompt and Effective Treatment of malaria refers to ability to precisely use of appropriate anti-malarial drugs for the treatment of suspected or confirmed malaria patients within 24 hours' onset of malaria symptoms according to National Malaria Treatment Guidelines under National Malaria Treatment Policy [5]. Behaviors related to malaria treatment refers to testing of malaria within 24 hours or 24 hours onset of malaria symptoms and seeking of antimalaria treatment at health facilities or volunteers and taking of anti-malaria drugs completely or not. Good behavior refers to more than 80% of 20 scores of survey questionnaires, moderate behavior refers to 60-80% of 20 scores of survey questionnaires and poor behavior refers to less than 60% of survey questionnaires [5].

#### *Ethical consideration*

The study was approved by Research Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University (Approval No: 039-1/61, dated on 16 March 2018).

#### **Results**

Total 204 malaria infected respondents were face to face interviewed in this study giving a response rate of 100%. The mean average age of respondents is 37 years old (18 to 65 years old). Most of the respondents were male (89.7%) and more than half were Kayen ethnicity (58.3%). Majority of them were secondary educated (32.4%) and worked in Animal Husbandry (17.2%). Most of them stayed in Palaw Township from 1 to 5 years (67.2%) and mean family income per month was 131.6 USD (57.5 USD – 251.6 USD). Respondents of 60.8% had moderate knowledge about malaria but 70.6% of respondents had poor behaviors related to malaria treatment. Most of the respondents had barriers due to accessibility, affordability, availability of malaria services and accountability of service providers (Table 1 and 2).

**Table 1.** Sociodemographic characteristics, knowledge of malaria and behaviors related to malaria treatment of the respondents

General characteristics	n=204	%	General characteristics	n=204	%
<b>Age (years)</b>			<b>Length of stay</b>		
18 - 35	98	48.00	1 to 5 years	137	67.20
36 - 50	66	32.40	6 to 10 years	52	25.50
51 - 65	40	19.60	11 to 15 years	11	5.40
<b>Gender</b>			16 to 20 years	3	1.50
Male	183	89.70	21 to 25 years	1	0.40
Female	21	10.30	<b>Monthly family income (USD)</b>		
<b>Marital status</b>			36 USD-72 USD	29	14.20
Single	47	23.00	73 USD-108 USD	71	34.80
Married	89	43.60	109 USD-144 USD	48	23.50
Divorced	27	13.20	145 USD-180 USD	27	13.20
Separated	23	11.30	181 USD-216 USD	23	11.40
Widowed	18	8.90	>216 USD	6	2.90
<b>Ethnicity</b>			<b>Family members</b>		
Bamar	49	24.00	1-3 members	50	24.50
Mon	32	15.70	4-6 members	138	67.60
Kayen	119	58.30	7-9 members	16	7.90
Others (Salon)	4	2.00	<b>Knowledge of malaria</b>		
<b>Education status</b>			Poor knowledge	14	6.80
Never attend	44	21.60	Moderate Knowledge	124	60.80
Primary School	48	23.50	Good knowledge	66	32.40
Secondary school	66	32.40	<b>Behaviors related to malaria treatment</b>		
High school	42	20.50	Poor behavior	144	70.60
College/University	4	2.00	Moderate behavior	35	17.20
<b>Occupation</b>			Good behavior	25	12.20
Housewife	18	8.60			
Teacher	5	2.50			
Health personnel	21	10.30			
Small shop owner	25	12.30			
Vendor	10	4.90			
Animal husbandry	35	17.20			
Plantation	27	13.20			
Garbage Keeper	23	11.30			
Water Supplier	25	12.30			
Fisherman	15	7.40			

**Table 2.** Association (Multivariate Model) between the characteristics of respondents and prompt and effective malaria treatment (n=204)

Characteristics	Got P&E Treatment	Did not get P&E Treatment	Adjusted OR	95% CI		p-value
				Lower	Upper	
<b>Marital status</b>						<0.001*
Single, divorced, separated and widowed (ref:)	0	47	1			
Married	29	128	5.964	0.813	8.321	
<b>Ethnicity</b>						0.003*
Bamar (ref:)	3	46	1			
Mon	0	32	1.01	0.112	1.761	
Kayen	26	93	4.287	2.233	11.41	
Others (Salon)	0	4	1.31	0.321	1.931	

(continued)

Table 2. (continued)

Characteristics	Got P&E Treatment	Did not get P&E Treatment	Adjusted OR	95% CI		p-value
				Lower	Upper	
<b>Education status</b>						
Never attend school (ref:)	0	44	1			0.001*
Primary school	11	37	2.802	0.732	5.931	
Secondary school	10	56	3.884	0.231	6.432	
High school	8	34	4.801	0.632	8.873	
College/University	0	4	1.021	0.221	1.921	
<b>Monthly family income (USD)</b>						
36 USD – 72 USD (ref:)	8	21	1			0.016*
73 USD – 108 USD	12	59	2.831	0.432	4.643	
>108 USD	9	95	1.631	0.211	3.882	
<b>Knowledge of malaria</b>						
Poor knowledge (ref:)	0	14	1			<0.001*
Moderate knowledge	10	114	14.17	2.783	16.31	
Good knowledge	19	47	65.3	4.629	71.23	
<b>Behaviors</b>						
Poor behavior (ref:)	0	144	1			0.021*
Moderate behavior	5	30	2.693	0.023	6.321	
Good behavior	24	1	3.889	0	8.037	
<b>Accessibility</b>						
<b>Duration to nearest RHC</b>						
1 Hour	13	51	3.231	0.326	5.231	0.031*
≥ 2 Hours (ref:)	16	124	1			
<b>Duration to nearest ICMV</b>						
1 Hour	17	79	1.384	0.491	3.335	0.001*
≥ 2 Hours (ref:)	12	96	1			
<b>Mode of transportation to service providers</b>						
Boat (ref:)	1	55	1			0.001*
Motorcar	4	35	1.821	0.281	2.13	
Motorcycle	13	75	2.355	0.235	5.322	
Walk	11	10	9.625	2.513	36.867	
<b>Receiving of diagnosis easily</b>						
Yes	16	49	2.316	0.142	3.705	0.004*
No (ref:)	13	126	1			
<b>Receiving of treatment easily</b>						
Yes	4	49	2.431	0.804	7.345	0.015*
No (ref:)	25	126	1			
<b>Affordability</b>						
<b>Borrow money for services</b>						
Yes (ref:)	15	37	1			
No	14	138	1.25	0.321	2.565	<0.001*
<b>Spend much time for getting services</b>						
Yes (ref:)	5	87	1			
No	24	88	4.745	2.43	13.004	0.001*
<b>Availability</b>						
<b>Opening hours of nearest RHC per day</b>						
<8 Hours (ref:)	25	91	1			
8 Hours	4	84	1.722	0.286	4.234	0.021*
<b>Always getting of services from ICMV</b>						
Yes	4	119	13.281	4.411	39.98	<0.001*
No (ref:)	25	56	1			

(continued)

Table 2. (continued)

Characteristics	Got P&E Treatment	Did not get P&E Treatment	Adjusted OR	95% CI		p-value
				Lower	Upper	
<b>Absence of equipment to test malaria</b>						
Yes (ref:)	9	9	1			
No	20	116	3.12	0.043	4.339	<0.001*
<b>Absence of drugs to treat malaria</b>						
Yes (ref:)	0	32	1			
No	29	143	3.276	0.342	5.432	0.012*
<b>Absence of health providers</b>						
Yes (ref:)	3	70	1			
No	26	105	5.778	0.684	19.882	0.002*
<b>Good communication with providers</b>						
Yes	8	115	5.031	2.103	12.034	<0.001*
No (ref:)	21	60	1			
<b>Health education and advocacy</b>						
Yes	11	142	7.041	3.039	16.315	<0.001*
No (ref:)	18	33	1			
<b>Accountability</b>						
<b>Distribution of LLINs by service providers</b>						
Yes	4	120	13.636	4.527	41.075	<0.001*
No (ref:)	25	55	1			
<b>Service providers according to work ethics</b>						
Yes	9	150	13.333	5.457	32.579	<0.001*
No (ref:)	20	25	1			

Note: \*p-value <0.05

According to the results, we found that marital status ( $p$ -value <0.001, AOR=5.964), ethnicity ( $p$ -value 0.003, AOR=4.287), poor education status ( $p$ -value =0.001, AOR= 4.801) and poor monthly family income ( $p$ -value =0.016, AOR=2.831) were socio demographic barriers to get prompt and effective treatment. Poor knowledge about malaria ( $p$ -value <0.001, AOR =65.3) and poor behaviors related to malaria treatment ( $p$ -value =0.021, AOR=3.889) were also barriers to get prompt and effective treatment. We also found that the barriers related to the accessibility, affordability, availability for malaria services and accountability of service providers.

## Discussion

The findings agreed with other studies in which married persons got prompt and effective malaria treatment than other people [14], ethnicity could influence the norms and attitude towards health and education and could delay getting of prompt and effective treatment [15], education attainment was very significant associated with getting of prompt and effective malaria treatment [16] and low monthly family income could delay treatment seeking time and so respondents did not get prompt and effective malaria treatment [17].

The findings agreed with another studies in which malaria prevention and treatment and got poor knowledge about it and increase prevalence of malaria and decrease in getting of prompt and effective malaria treatment [18] and one of the studies highlighted that delayed treatment seeking behavior is one of the barrier of

getting prompt and effective treatment [19]. These findings were agreed with one of the study in South East Nigeria reported that the closeness of the health facilities to the homes and receiving of easy diagnosis and treatment could influence getting of prompt and effective malaria treatment [20]. These findings were agreed in malaria experience of adults in Shan State, Myanmar that perceived costs for malaria treatment (transportation cost and cost for services) were significantly associated with getting of prompt and effective malaria treatment [21].

### Conclusion

In this research, barriers could be found relating to the sociodemographic characteristics, knowledge of malaria, behaviors related to treatment seeking and health system factors (accessibility, affordability, availability and accountability). Barriers to prompt and effective malaria treatment should be broken down by increasing health education sessions to improve knowledge of malaria and behaviors related to treatment seeking, recruitment of ICMVs more to reduce the duration to get services and effective supervision of staff for their accountability matters.

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