

Social determinants and treatment seeking behaviors of malaria among gold miners in Shwekyin Township, Myanmar

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ABSTRACT

Background: Myanmar is one of the countries with the evidence of artemisinin resistance and the greatest burden of malaria in the Greater Mekong Sub region. At present, migrant/mobile populations are considered to play a major role in the potential spread of artemisinin resistant malaria within countries and across borders. On this regard, we conducted cross-sectional community-based survey in Shwekyin Township, Bago Division of Myanmar from March to April of 2013 to investigate social determinants and treatment seeking behaviors of malaria among gold miners.

Methodology: A total of nine Key Informant Interviews and five Focus Group Discussions were conducted in two gold mines and two villages with different accessibilities to health facilities. Key informants were asked and discussed about local health service, people's perception of malaria, treatment-seeking behaviors. Focus group discussions were focused on knowledge, attitudes, and treatment seeking behaviors of malaria.

Results: Most of villagers and gold miners had high understanding of causes and transmission of malaria though somewhat mixed and confused. Most of the villagers and only a few gold miners expressed some correct knowledge and practices of malaria prevention. Artesunate and artemether were the most familiar anti-malarials among all respondents. Though villagers close to rural health centre used to take treatment within 48 hours, those living with social malaria workers and gold miners were still familiar with self-treatment. The use of rapid diagnostic test was well accepted but test negative result was poorly understood.

Conclusion: Gold miners had limited knowledge and attitude of malaria especially in treatment and prevention. Self-treatments using artemisinin-based monotherapies were still common among them. Migrant-friendly malaria communication campaigns encouraging healthy lifestyles and prevention should be encouraged. Regular assessment and refresher course on quality of service provided by public health care providers are mandatory. Bilingual intervention and employment of Karen ethnic people in malaria prevention and control program should be initiated.

Keywords: Malaria, Myanmar, Migrants, Qualitative, Knowledge, Attitude and Practices

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23 1. INTRODUCTION

24 Malaria is one of the life-threatening infectious-diseases which are widespread in
25 tropical and subtropical regions. In 2012, about 207 million cases of malaria infection and
26 627,000 deaths were reported globally [1]. Although the number of malaria cases has fallen
27 by more than 50% in 43 countries over the past decade, one of the major growing threats to
28 control effort of malaria is the emergence of parasites that are resistant to artemisinins [1].
29 Artemisinins produce early remission of clinical symptoms of malaria and therefore,
30 adherence to the full 7-day treatment regimen is generally poor. Since this incomplete
31 treatment courses induce emergence and spread of artemisinin resistance, WHO called for a
32 ban on artemisinin-based monotherapies (AMTs) and replacement with artemisinin-based
33 combination therapies (ACTs) in 2005.

34 By WHO malaria report (2013), about 60% of the population in Myanmar is living
35 under malaria risk and 37% are in high transmission area. *Plasmodium falciparum* (65%)
36 and *Plasmodium vivax* (35%) are the major malaria parasites in Myanmar. Regarding vector
37 species, *Anopheles minimus* and *Anophele dirus* are the most prevalent ones. In Myanmar,
38 ACTs has been the first line treatment for *Plasmodium falciparum* malaria since 2002.
39 According to WHO guidelines, public health care providers are treating the patients of all
40 ages by using RDTs and ACTs free of charge. Regarding prevention and control
41 intervention, ITNs/LLINs has been distributed free of charge to all age groups since 2003 [1].

42 Along with the emergence of artemisinin-resistant malaria in western Cambodia in
43 2006-2007, there is growing evidence that artemisinin resistant parasites in other parts of the
44 Greater Mekong Sub-region (GMS), including eastern Myanmar [2,3]. Myanmar has the
45 greatest malaria burden in the Greater Mekong Sub region and currently more than 70% of
46 malaria treatments are directly accessed from the private sector and more than 80% of all
47 malaria cases are still treated with AMTs [2,3]. At present, migrant/mobile populations are
48 considered to play a major role in the potential spread of artemisinin resistant malaria within
49 countries and across borders. And these populations live and work in areas with high
50 malaria transmission, high human–vector contact and limited access to health services
51 including effective malaria prevention tools, accurate diagnosis and treatment with ACTs
52 [3,4]. Understanding treatment seeking behaviors about malaria among the migrants is
53 necessary for developing an appropriate strategy to prevent the emergence of artemisinin
54 resistance. For this reason, this qualitative study aimed to investigate social determinants
55 and treatment seeking behaviors of malaria among migrants in Myanmar.

56 57 2. MATERIAL AND METHODS

58 59 2.1 Study setting

60 Myanmar Artemisinin Resistance Containment (MARC) defined areas of Tier 1, 2
61 and 3 according to Global Plan for Artemisinin Resistance Containment (GPARC) guidelines
62 and recognized migrant/ mobile populations as an important target group [3,4]. Our
63 designated area was Shwekyin Township, Bago Division of Myanmar which is one of the
64 Tier 1 areas of Myanmar [3]. The township is composed of plains and hilly, forested areas.
65 This township is about 945.44 square miles in area and with a total population of 879 54
66 (male 42730 and female 45224). There are 82 villages and a number of gold mines in
67 Shwekyin Township. Public health care is provided by one township hospital, one regional
68 hospital, 5 rural health centers, 18 sub rural health centers and one malaria campaign. The
69 control strategy includes provision of long-lasting insecticide-treated nets (LLINs) and early
70 diagnosis/adequate treatment (EDAT) through health staffs and village volunteers. In
71 Shwekyin, thousands of people are migrants, working in gold mines. By the study conducted
72 in 16 townships of Bago Division under the Malaria control project supported by Japan
73 International Cooperation Agency (JICA) in 2009, 97% of 28,332 positive (confirmed) cases
74 were migrants [3].
75

2.2 Study design and sampling

A cross-sectional community-based survey was carried out from March to April of 2013. From the study area, two gold mines and two villages of different population sizes, distances from the city and availabilities of health care services were selected for this qualitative study. A big village V1 with Rural Health Centre and a small village V2 with Social Malaria Worker were chosen to explore their knowledge, attitude and treatment seeking behaviors of malaria. Accordingly, a small gold mine, G1 which was located near V1 and a big gold mine, G2 which was far from the city, were included to reveal the social determinants and treatment seeking behaviors of malaria among gold miners with different accessibilities to health care services. At first, the permission to conduct our study was requested from the authorities of gold mines and villages.

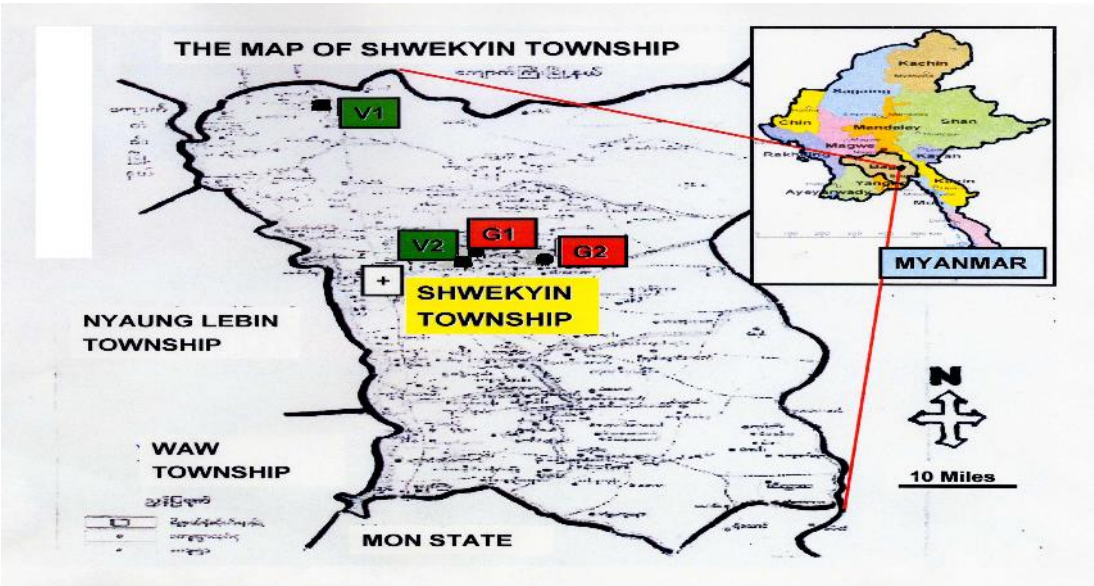


Fig 1: The map of Shwekyin Township showing study sites. [V1 and V2 represent two villages. G1 and G2 represent two gold mines. A rectangle with positive sign indicates township hospital.]

A total of nine Key Informant Interviews (KIIs) were conducted in two gold mines and two villages. According to the recommendation of household heads and workers, people like authorized persons, religious leaders, village heads, village health workers, midwives, local healers or teachers, drug retailers and worker heads from gold mines were selected as key informants for interview. Key informants were asked and discussed about local health service, people's knowledge and perception of malaria, anti-malarial drugs, rapid diagnostic tests (RDTs) and their treatment-seeking behaviors. A total of five Focus Group Discussions (FGDs) were conducted: one each in two gold mines, two in V1 and one in V2. Each FGDs included about 7 people. FGDs participants were mobilized by the local authorities. The adult males and females of 18-60 years with the history of fever within one month were included. Participants were recruited from different parts of villages and gold mines to maximize diversity. FGDs were conducted with the aim to explore barriers to access in more detail, gathering in-depth information on the interaction between different factors and how they influence access to prompt and effective treatment. Questions were focused on knowledge, attitudes, and treatment seeking behaviors regarding malaria. All KIIs and FGDs were conducted in school and monastery to provide privacy and digitally recorded and notes were also taken as necessary.

2.3 Data analysis

Field supervisors checked all data collecting forms for completeness and reliability. Digital recordings of KIs and FGDs were transcribed verbatim in the original Myanmar and then translated into English by a bilingual research member. On completion, another member read and reviewed each translated English transcript, comparing it against the audio recordings and original Myanmar version. Quotations that best mentioned knowledge, attitudes and practices of the respondents regarding malaria were identified.

3. RESULTS

3.1 Socio-demographic characteristics of participants

Among the participants of three FGDs in two villages, 11 males and 10 females were included. Most of them were 20-40 years old, native born and married. Regarding ethnicity, the villagers were mostly Myanmar and the remaining ones were Karen. Most of the males are gold mine related workers and female were mostly dependents. Most of the participants have the middle school education. Average daily incomes of males were 1000 – 2000 Kyats of Myanmar currency (about 1-2 US dollars). In case of two FGDs in two gold mines, seven males were included in G1 and four males and three females in G2. Most of them were 30-50 years old, from other townships and married. The gold miners in G1 were mostly Myanmar but in G2 mainly belonged to Karen ethnicity. Their education levels were mostly primary school. Most of them could earn average 3000-4000 Kyats of Myanmar currency (about 3-4 US dollars) per day.

3.2 Major research themes

3.2.1 Understandings of malaria

Most of villagers and gold miners reported at least two major causes of malaria as mosquito bite and drinking contaminated water. People who are going into forest and working in gold mines, are perceived to get malaria through mosquito bite and drinking contaminated water. Most frequently, they linked the cause and transmission of malaria infection with drinking contaminated water and unclean environment. A few gold miners mentioned malaria was due to contaminated food touched by a mosquito or fly.

“When we go to forest and mountain, we are bitten by the mosquitoes and also we have to drink unclean water for example like water fermented with fallen leaves, you see? We got malaria in this way, I think.” [54 year old, male FGDs participant, V1]

Most of the villagers and gold miners perceived feeling of hot body with shivering and head ache as the major symptoms of malaria by their experiences. But they could not mention the danger symptoms of severe malaria.

“When I got malaria, I started to feel hot outside of my body and then shivering inside. My head and body became ache and I didn’t want to work anymore. I was thirsty so much. You know, I felt sleepy and could not touch water.” [25 year old, female FGDs participant, G2]

Regarding knowledge about anti-malarial drugs, although most of the villagers and gold miners knew and could call the name Artesunate and Artemether correctly, only a few villagers living in V1 knew and could describe the appearance and color of Coartem (governmental recommended drug).

“This brand (showing the registered brand of Artesunate tablets) is the best selling antimalarial drug. Every malaria season, the owners of the gold mines used to come to my shop and buy a large number of boxes of Artesunate tablet for their workers. They can ask and buy by the name Artesunate. Most of them are really familiar with Artesunate and always ready to take it like their snack.” [Key Informant Interview with 45 year old, male, owner of a big drug shop]

1.2.2 Preventive measures based on their perception of malaria

When asked about prevention methods, most of the villagers named using bed nets as the most common one. Using mosquito coils was the second choice of prevention. But in case of gold miners, as their knowledge and perception about the cause and transmission of malaria were somewhat mixed and confused, they mentioned drinking boiled water, eating safe food and cleaning the environment as preventive measures.

"We don't know so much. It depends on sanitation of house and environment. We try to keep our environment clean. We need to eat safe food and water, I think. And also we need to sleep under bed net, I think." [43 year old, male FGDs participant, V2]

3.2.2 Old friend in their treatment seeking behaviors

When the villagers in V1 were asked about their first action to getting malaria, most of them used to get malaria diagnosis and treatment at the public health facility within 48 hours. Though Malaria Social Worker has been serving in V2, most of the villagers in V2 did know his presence and service. They used to buy cocktail of drug containing Artesunate from nearby retailers and took by themselves within 48 hours. Only when their fever was not relieved and still high, they went to township hospital directly. In case of gold miners in both G1 and G2, their first response was self-treatment or treatment provided by their manager or owner. Most of the gold miners with working experience used to buy and keep Artesunate tablet by themselves. A few big gold mines have their own health care providers who are not well trained and not well educated about government recommended antimalarial drugs and not equipped with RDTs.

"Last year, I, myself experienced of being owner of gold mine in the forest on the mountains. When I went to my gold mine, I brought a package of boxes of Artesunate tablets together with me. So, when my workers got malaria, I treated them by using these drugs. Although some people wished to go to health facility, the motorcycle transportation fee was about 20 000 Myanmar Kyat (20 US dollars) for one way and it was time consuming to get hospital, you see?" [Key Informant Interview with 43 year old man, the owner of biggest drug shop in Shwekyin]

"We use to take a cocktail containing Artemether for malaria. I use to buy and store cocktails containing Artemether in my gold mines. Drug retailers in the city said Artemether is a strong medicine. So, I first treat them with soft medicine, you see? Like Paracetamol and Burmeton. I don't always give cocktail containing Artemether to my workers when they get malaria, only when their fever is high." [Key Informant Interview with 30 year old man, the owner of gold mine in Shwekyin]

3.2.3 Beyond the complete adherence to RDTs

AMTs: A consequence of negative RDTs?

The use of RDTs was well accepted among villagers and gold miners. Most of the villagers thought they got malaria whenever they were febrile. So, they were willing to go and take RDTs at the public health facility. But, when RDTs was negative and they did not get any anti-malarials, they were dissatisfied with the service. It led them to self-treatment by taking cocktails of drugs available at the nearby shop. The most commonly used drugs in cocktails were Artesunate or Artemether tablet, a kind of analgesic and antibiotic

"In my last fever, I was quite sure it was malaria because I got so many times of malaria since birth. That is why I went to health care provider who tested my blood by using his test. Then, he said I had no malaria and gave me only paracetamol. But, as I was still suffering from fever, I went to drug shop and took the cocktail they mixed. Then, my malaria was completely cured." [36 year old, male FGDs participant, V1]

"You see, every time the local people get fever, they said it was malaria. Sometimes, they even think they know better than us about malaria. They never use the term Fever, ever say Malaria. If the RDTs is negative, they are not satisfied with the result. If

217 *we don't prescribe any anti-malarials to them, they are not satisfied with our service. Then,*
218 *they go to buy Artesunate outside and take by themselves."* [Key Informant Interview with 36
219 year old male, Health Assistant of V1]
220

221 **4. DISCUSSION**

222 Most of the gold miners and villagers believed that malaria was caused by both
223 mosquito bite and drinking contaminated water in the forest. Similar to findings in Swaziland
224 and India, their perception of mosquitoes in the cause and transmission of malaria was
225 somehow confused [5]. They knew the cause and transmission of malaria by mosquitoes
226 bite via health education through various media like TV, radio and new papers and via the
227 behavioral change campaign of VBDC of Ministry of Health, Myanmar. But through their
228 traditional belief and living experience and malaria attacks, they still perceived malaria was
229 linked to drinking contaminated water and other causes [5, 6, 7].

230 Regarding preventive measures for malaria, using Insecticide Treated Net was the
231 best known and the most commonly used method among the villagers. Coverage of LLINs
232 and health education along with activities of MARC in Shwe Kyin might have contributed to
233 this result. But in case of gold miners, the most common preventive measures among them
234 were to drinking boiled water, eating safe food and cleaning the environment. These findings
235 highlighted the coexistence of traditional and modern beliefs and practices in these societies
236 similar to other studies in developing countries [8, 9]. Most of the gold miners working there
237 were from the other townships near by and around the country and some of them have
238 never experienced malaria before. That is why their knowledge regarding cause,
239 transmission and prevention of malaria were poor.

240 The villagers in V1 close to RHC used to get malaria diagnosis and treatment at the
241 public health facility within 48 hours. But, most of the villagers in V2 living with social malaria
242 worker were still experiencing self-treatment using cocktail of drugs containing AMTs from
243 nearby retailers. Only when their fever was not relieved and still high, they went to township
244 hospital directly. In case of gold miners, their first response was self-treatment or treatment
245 provided by their manager or owner. It was consistent with the study among Wa ethnic
246 population in Myanmar where significantly higher proportion accessing the retail sector
247 (79.6%) was found [10].

248 Though Artesunate and Artemether were the most familiar anti-malarials among
249 villagers and gold miners, only a few villagers living close rural health centre could describe
250 the appearance and color of Coartem (governmental recommended drug). The awareness of
251 Coartem as the first line anti-malarial drug was still low in V2 and both gold mines. The
252 reason which could explain that point is public health staffs in rural health centre were well
253 experienced and could provide not only early diagnosis and prompt treatment but also health
254 education thoroughly to the community [9, 10].

255 Although the public health care providers were treating the patients with ACTs after
256 testing with RDTs according to national malaria treatment guidelines free of charge, the
257 residents are still using AMTs by their self-treatment. The government was preparing to ban
258 AMTs (Brand name Artesunate) officially but not yet. The best selling anti malarial drug in
259 that area was AMTs (Brand name Artesunate). ACTs was largely unknown to the local
260 people at the time of the study. All of them never heard about drug resistance malaria. They
261 could not link the use of AMTs and drug resistance malaria [11, 12].

262 In Cambodia, the program of village malaria worker was established since 2001 and
263 they could play the equivalent role as the health center [13]. In Myanmar, social malaria
264 workers program was established in 2005 and now, 6100 malaria volunteers were already
265 trained in 2012 [14]. The role of malaria volunteer in improving timely diagnosis and
266 treatment using RDTs and ACTs was found to be beneficial in Myanmar [15]. At this stage,
267 they are trying to cover all villages without health center services and remote areas where
268 the migrants are working in gold mines. But providing early diagnosis and prompt treatment
269 to gold miners are still challenging because they are always migrating and their working sites

are always changing [16,17]. Moreover, the workers serving in the remote gold mines are mostly Karen ethnic people. On this regard, they are not fully accessible to currently providing health education and behavioral change communications, all of which are in Myanmar language.

Treatment providing behaviors greatly affect the treatment seeking behaviors of the people with malaria [18, 19]. Ministries of health of WHO member countries are trying to set the policy and guidelines for health care provider to adhere fully to RDTs and ACTs. But at the same time, beyond the full adherence to RDTs and ACTs, thorough understanding of the patients' perception and response to the test results is paramount important [20]. Though experienced basic health staffs could explain the patients about the possibilities and meaning of RDTs results thoroughly, malaria social workers were not confident and trained enough yet to communicate patients especially in the face of negative RDTs results [20, 21, 22]. Provider's knowledge and experience to achieve patient's satisfaction especially in case of negative RDTs result is critical otherwise it may lead to self-treatment with AMTs [20, 21,22]. Moreover, the most concerned issue is the possibility of dissatisfaction and distrust in public health services which will become a major barrier in utilization of public health facilities.

5. STUDY LIMITATIONS

Owing to the non-random sampling procedure and small sample size in this study, the results are specific to the population sampled and may not be applicable to other areas in Myanmar.

6. CONCLUSION AND RECOMMENDATIONS

Gold miners had limited knowledge and attitude of malaria especially in treatment and prevention. Self-treatment using cocktail was still common among them. Migrant-friendly malaria communication campaigns encouraging healthy lifestyles and prevention should be initiated. Regular communication between the owners of gold mines, local administrative and health authorities will lead to a better intervention targeting the gold miners to get good access to LLINs, RDTs and ACTs. As drug retailers play a major role in the first and initial response to malaria, refresher course or education towards them about the link between monotherapy usage and drug resistance should be considered [24]. At the same time, regular assessment and refresher course on quality of service provided by public health care providers are mandatory. To achieve satisfaction with test-based diagnoses and adherence to public health facility, counseling and health education will be critical in dealing with patients especially RDTs negative ones [19, 20, 21]. For the effective health education and behavioral change communication among Karen people, bilingual interventions and employment of Karen people should be considered [25].

ABBREVIATIONS

AMTs: Artemisinin-based monotherapies; ACTs: Artemisinin-based combination therapies; FGDs: Focus group discussions; KIs: Key informant interviews; RDTs: Rapid diagnostic tests for malaria; LLINs: Long-lasting insecticide-treated nets; WHO: World Health Organization

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COMPETING INTERESTS

All the authors declare that they have no competing interest.

AUTHURS` CONTRIBUTIONS

Author Z.Z.Y.W, T.M, K.K and I.K designed the study and drafted the manuscript. Author Z.Z.Y.W and I.K managed the analyses of the study. All authors read and approved the final manuscript.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal.

ETHICAL APPROVAL

This study was approved by Ethical committees of Military Institutes of Nursing and Paramedical Sciences, Myanmar and Juntendo University, Japan. Before enrolment, written informed consent was taken from each of all participants. Confidentiality and anonymity were maintained.

REFERENCES

- [1] World Malaria Report (2013)
- [2] WHO. Malaria in the Greater Mekong Subregion : Regional and Country profile, 2010
- [3] Strategic Framework for Artemisinin Resistance Containment in Myanmar (MARC) 2011 - 2015.
- [4] Global Plan for Artemisinin Resistance Containment (GPARC) (2011)
- [5] Hlongwana KW, Mabaso ML, Kunene S, Govender D, Maharaj R: Community knowledge, attitudes and practices (KAP) on malaria in Swaziland: A country earmarked for malaria elimination. *Malar J* 2009, 8:29.
- [6] Das A, Gupta RD, Friedman J, Pradhan MM, Mohapatra CC, Sandhibigraha D: Community perceptions on malaria and care-seeking practices in endemic Indian settings: policy implications for the malaria control programme. *Malar J* 2013, 12:39.
- [7] Vijayakumar KN, Gunasekaran K, Sahu SS, Jambulingam P. Knowledge, attitude and practice on malaria: a study in a tribal belt of Orissa state, India with reference to use of long lasting treated mosquito nets. *Acta Trop.* 2009;112:137–142.
- [8] Mubyazi G, Bloch P, Kamugisha M, Kitua A, Ijumba J. Intermittent preventive treatment of malaria during pregnancy: a qualitative study of knowledge, attitudes and practices of district health managers, antenatal care staff and pregnant women in Korogwe District, north-eastern Tanzania. *Malar J.* 2005;4:31.
- [9] Enato EF, Okhamafe AO, Okpere EE. A survey of knowledge, attitude and practice of malaria management among pregnant women from two health care facilities in Nigeria. *Acta Obstet Gynecol Scand.* 2007;86:33–36.
- [10] Jian-Wei Xu, Qi-Zhang Xu, Hui Liu, Yi-Rou Zeng: Malaria treatment-seeking behaviour and related factors of Wa ethnic minority in Myanmar: a cross-sectional study. *Malar J* 2012, 11:417.
- [11] Mishra N, Anvikar AR, Shah NK, Kamal VK, Sharma SK, Srivastava HC, Das MK, Pradhan K, Kumar H, Gupta YK, Gupta P, Dash AP, Valecha N: Prescription practices and availability of artemisinin monotherapy in India: where do we stand? *Malar J* 2011, 10:360.
- [12] Sayang C, Gausseres M, Vernazza-Licht N, Malvy D, Bley D, Millet P. Treatment of malaria from monotherapy to artemisinin-based combination therapy by health professionals in rural health facilities in southern Cameroon. *Malar J.* 2009;8:174.
- [13] Lim S, Yasuoka J, Poudel KC, Ly P, Nguon C, Jimba M: Promoting community knowledge and action for malaria control in rural Cambodia: potential contributions of village malaria workers. *BMC Res Notes* 2012, 5:405.
- [14] VBDC, Myanmar, 2012

- 374 [15] Ohnmar , Tun-Min , San-Shwe , Than-Win , Chongsuvivatwong V: Effects of malaria
375 volunteer training on coverage and timeliness of diagnosis: a cluster randomized controlled
376 trial in Myanmar. *Malar J* 2012, 11:309.
- 377 [16] Wangroongsarb P, Sudathip P, Satimai W. Characteristics and malaria prevalence of
378 migrant populations in malaria-endemic areas along the Thai-Cambodian border. *Southeast*
379 *Asian J Trop Med Public Health*. 2012;13:261–269.
- 380 [17] Lee CI, Smith LS, Shwe Oo EK, Scharschmidt BC, Whichard E, Kler T, Lee TJ,
381 Richards AK: Internally displaced human resources for health: villager health worker
382 partnerships to scale up a malaria control programme in active conflict areas of eastern
383 Burma. *Glob Public Health* 2009, 4:229-241.
- 384 [18] Bury M: Researching patient-professional interactions. *J Health Serv Res Policy* 2004,
385 9(Suppl 1):48-54.
- 386 [19] Mangione-Smith R, McGlynn EA, Elliott MN, Krogstad P, Brook RH: The relationship
387 between perceived parental expectations and pediatrician antimicrobial prescribing behavior.
388 *Pediatrics* 1999, 103:711-718.
- 389 [20] Chandler CI, Mwangi R, Mbakilwa H, Olomi R, Whitty CJ, Reyburn H: Malaria
390 overdiagnosis: is patient pressure the problem? *Health Policy Plan* 2008, 23:170-178.
- [21] Chandler C, Whitty CJ, Ansah EK: How can malaria rapid diagnostic tests achieve
their potential? A qualitative study of a trial at health facilities in Ghana. *Malar J* 2010, 9:95.
- [22] Evelyn K Ansah, Joanna Reynolds, Samson Akanpigiabiam, Christopher JM Whitty,
Clare IR Chandler: "Even if the test result is negative, they should be able to tell us what is
wrong with us": a qualitative study of patient expectations of rapid diagnostic tests for malaria.
Malar J 2013, 12:258.
- [23] Bisoffi Z, Sirima SB, Meheus F, Lodesani C, Gobbi F, Angheben A, Tinto H, Neya B,
Van den Ende K, Romeo A, Van den Ende J: Strict adherence to malaria rapid test results
might lead to a neglect of other dangerous diseases: a cost benefit analysis from Burkina
Faso. *Malar J* 2011, 10:226.
- [24] Tavrow P, Shabahang J, Makama S: Vendor-to-vendor education to improve malaria
treatment by private drug outlets in Bungoma District. Kenya. *Malar J* 2003, 2:10.
- [25] Anderson LM, Scrimshaw SC, Fullilove MT, *et al*. Culturally competent healthcare
systems. A systematic review. *Am J Prev Med* 2003;24:68–79.