The active role and limitations of malaria microscopists in Palawan, the Philippines

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List of abbreviations

API: annual parasite index
CFI: comparative fit index
CHWs: community health workers
CMIN: chi-squared
RMSEA: root mean square error of approximation
IRS: indoor residual spraying
ITNs: Insecticide-treated nets
KLM: Kilusan Ligtas Malaria (Tagalog), [Movement Against Malaria]
P.f.: Plasmodium falciparum
P.k.: Plasmodium knowlesi
P.m.: Plasmodium malariae
P.o.: Plasmodium ovale
P.v.: Plasmodium vivax
RBCs: red blood cells
SD: standard deviation
List of abbreviations (Cont.)

SEM:    structural equation modeling

WHO:    World Health Organization
Abstract

Introduction

Microscopists have an important role in Palawan, the most malaria-endemic region in the Philippines. I conducted two studies towards forming strategies to reduce malaria re-infection among ex-patients who visited microscopists in Palawan. Study 1 identified the factors associated with the implementation of community awareness-raising activities by 127 microscopists (43.8% of registered microscopists), and study 2 identified the self-implemented preventive measures against malaria among 141 ex-patients of microscopists in the year 2011 (15.1% of ex-patients of 20 highly endemic villages).

Methods

Study 1: Structural equation modeling was conducted to determine associated factors in terms of microscopists’ (1) place of assignment; (2) annual parasite index; (3) capacity (service quality, knowledge on malaria, and ability in malaria microscopy); (4) self-preventive measures against malaria; and (5) job satisfaction.

Study 2: Structural equation modeling was conducted in terms of ex-patients’ (1) place of residence; (2) socio-demographic characteristics; (3) knowledge on malaria; (4) participation in
community awareness-raising activities for malaria prevention; and (5) satisfaction towards microscopists.

Results

Study 1 suggested that enhancement of service quality and ability in malaria microscopy are the key to strengthening community awareness-raising activities by microscopists. Study 2 suggested that these activities could be effective and have to be strengthened. These activities should be especially focused on improving the self-implemented preventive measurements among ex-patients going to the mountains, and to enhance the knowledge on malaria transmission, especially among indigenous ex-patients.

Conclusion

These findings point towards the possibility of implementing some relatively simple, low-cost interventions to boost efforts to reduce the number of malaria re-infections in Palawan.

Keywords: malaria, prevention and control, patients, microscopists, community health workers, ethnicity, Palawan, the Philippines
CHAPTER 1

Introduction

1.1. Malaria

1.1.1. Biology of malaria

Malaria, which is one of the most serious parasitic infections worldwide, is caused by *Plasmodium*, a genus of the phylum Apicomplexa. It is spread by the bites of infected female *Anopheles* mosquitos [1-3]. There are more than 100 species of *Plasmodium*, but only five kinds are known to be infectious parasites in humans:

*Plasmodium falciparum* (*P.f.*), *Plasmodium vivax* (*P.v.*), *Plasmodium oval* (*P.o.*), *Plasmodium malarie* (*P.m.*), and *Plasodium knowlesi* (*P.k.*) [1-7].

1.1.2. Epidemiology of malaria

With the emergence of drug-resistant parasites and vectors, malaria remains one of the world’s most serious health issues [1-3,8,9]. While the burden of malaria is falling globally, the morbidity and mortality still remain high. As of 2010, there were approximately 3.3 billion people living in 99 countries who were at risk of malaria [10].
Estimates of total reported deaths are between 655,000 [10] and 1.24 million [11], with an estimated 82.69 million disability-adjusted life years lost [12]. The World Health Organization (WHO) estimated that approximately 80% of malaria cases occurred in regions of Africa and Southeast Asia, where health care services are limited [1,10]. Moreover, as has occurred repeatedly in the past, repercussions from the recent global economic crisis are also threatening malaria control [13].

1.2. Strategy against malaria in Palawan, the Philippines

1.2.1. Malaria in the Philippines

Malaria remains endemic in remote rural areas of the Philippines [1,14-29]. In 2011, approximately 75,700,000 people (80% of the national population) were living in malaria-endemic areas of the country; of these, 6,800,000 (7.2% of the national population) were living in high transmission areas [1].

The Philippines is divided into (from highest division to lowest): provinces, municipalities and component cities, and villages. Nationwide, 65 of the 78 provinces, 760 of the 1,600 municipalities and component cities, and 9,345 of the 42,979 villages are considered to be malaria-endemic [14-29].
Anopheles flaviostris, which breeds in clear, slow-flowing streams, is the insect vector for the major Plasmodium species, P.f., which accounts for 75% of infections in the country. Anti-malarial drug resistance is widespread but low-grade.

1.2.2. Malaria in Palawan

In the Philippines, malaria is most endemic in Palawan, where it has (up until the time of writing: 3 February, 2014) consistently ranked as one of the top 5 causes of morbidity [15-29] (Figure 1). Although the annual parasite index (API) per 1,000 decreased from 27.6 in 2004 to 13.0 in 2010. The annual number of cases in the province exceeded 1,000 in 2012.

The province of Palawan is the fifth largest island in the Philippines [30,31]. It is largely covered with tropical rainforest, and consists of 367 villages in 23 municipalities [30,31]. Its capital, Puerto Princesa City, is located at the center of the island and divides the island into the northern and southern regions. According to the Census of Population and Housing in 2010, the total registered population was estimated to be 1,025,800 (527,200 male and 498,600 female) [30,31]. The population is comprised of various ethnicities, including Tagalog (the predominant ethnic group in the Philippines),
Cuyunon, Hiligaynon, Palawan, Cebuano, Ilocano, Bisaya, Kagayan, and Tagbanwa.

Of them, some people from indigenous ethnicities do not speak Tagalog (the primary language of the Philippines).

Infections mainly occur in the tropical rainforests or adjacent areas during the rainy season (June to October) [15-29]. Peaks of transmission are usually 2 months after the start of the rainy season and towards the end of the rainy season. Malaria has commonly affected upland subsistence farmers, indigenous cultural groups, forest product gatherers, frontier settlers, migrant agricultural workers, charcoal makers, and miners.

1.2.3. Microscopists in Palawan

In 1999, 344 community health workers (CHWs) in Palawan (one for each endemic village, excluding 76 non-endemic villages) were trained as malaria microscopists [14]. Using CHWs is a potentially inexpensive, effective and sustainable approach for bringing malaria treatment closer to homes [32-54]. It has particular application in rural areas, such as Palawan, where there is a recognized paucity of formal public and private healthcare providers.
Microscopists in Palawan are trained as CHWs specialized in malaria microscopic diagnosis and treatment. Microscopists identify malaria infection and species of parasites, by microscopic examination of Giemsa-stained blood smears. Under the supervision of midwives, microscopists have administered first-line anti-malarial drugs to malaria patients. In most part of the province, midwives are the only health-care professionals. Except some wealthy people who are mainly living in Puerto Princesa City, majority of the vast area of Palawan are visiting microscopists when they are suspected to be infected with malaria.

This community-based malaria control programme, named Kilusan Ligtas Malaria (KLM) (Tagalog: Movement Against Malaria), has been maintained with the aid of the Japan International Cooperation Agency and the ongoing Global Fund Project through Pilipinas Shell Foundation, Inc. Activities run by KLM have included basic malaria microscopy and refresher courses for microscopists, the hosting of an annual malaria conference and the maintaining of logistic measures.

1.2.4. New strategies are required to reduce malaria re-infection

To further reduce the endemicity of malaria in Palawan, in addition to providing
early diagnosis and prompt treatment, microscopists are expected to conduct community awareness-raising activities for malaria prevention. In Palawan, there has been an ongoing yearly decrease in malaria morbidity and mortality since 1999, although the decrease in the rate of morbidity has slowed since 2006 [15-29]. It is now important for community members to take preventive measures on an individual basis and for microscopists to assist this by raising malaria awareness in their respective communities.

For malaria control, the WHO recommends the use of insecticide-treated nets (ITNs) and indoor residual spraying (IRS) [1]. KLM has distributed 30,804 insecticide-ITNs and re-treated 17,916 existing nets with insecticide. The provincial health office regularly conducts IRS. The stabilization of malaria incidence since 2006 suggests that it is time for community members to take additional preventive measures on an individual basis and for microscopists to assist these measures by raising malaria awareness in their communities.

Several studies have been conducted to determine associated factors and risk factors of several preventive measures against malaria and knowledge on malaria. Despite the massive scaling-up of ITN and IRS, malaria prevalence remains high in
several areas, and a number of risk factors have been identified, namely: a history of high transmission, low community and individual wealth, house design, ethnicity, and being a child [55-57].

The improvement of knowledge on malaria is also important for facilitating preventive measures against malaria. Interventions, including community awareness-raising activities carried out by CHWs have succeeded in improving knowledge on malaria in communities [58]. Moreover, gender, poverty, human mobility, conflict, and displacement, also determined vulnerability with regard to malaria knowledge and coping strategies [59,60]. However, no study has ever been conducted among the inhabitants of Palawan to identify factors that strengthen preventive measures against malaria.

1.3. Objectives

I conducted two community-based studies, which aimed at forming strategies for reducing malaria re-infection among ex-patients who visited microscopists in Palawan. Because, people who have past histories of malaria, or ex-patients, are liable to contract malaria again, or to be re-infected, on account of their way of life, occupations, lacking
preventive behaviors, and so on, thus they are very important population to be taken into account for whom I think of a effective malaria control. In Palawan, re-infection seems more common than recrudescence or relapse among ex-patients since those microscopists are well treating their patients with *P.f.* not to have recrudescence and those with *P.v.* not to have relapse (by administering primaquine).

Study 1 aimed to identify the factors associated with the microscopists’ implementation of community awareness-raising activities with regard to both the types of activities and the frequency at which they were implemented (Figure 2). I hypothesized that “socio-demographic status,” “service quality,” “knowledge on malaria,” “ability in malaria microscopy,” “job satisfaction,” and “self-preventive measures against malaria” would be associated with “community awareness-raising activities for malaria prevention”.

Study 2 was designed to identify factors associated with self-implemented preventive measures against malaria among ex-patients in Palawan (Figure 2). I hypothesized that “place of residence,” “socio-economic status,” “health seeking behavior,” “malaria knowledge” (symptoms, transmission, vector species, and vector’s most active time), “participation in community awareness-raising activities,” and
“satisfaction with microscopists” would be associated with “self-implemented preventive measures against malaria.”

Since malaria incidence is very different in the northern and southern regions of the island, the regional differences of all the factors were also statistically clarified.
CHAPTER 2

Study 1: Determining the active role of microscopists in community awareness-raising activities for malaria prevention

2.1. Methods

2.1.1. Study design and site

A cross-sectional study was conducted among microscopists in the Palawan.

2.1.2. Participants

Inclusion criteria were that, at the time of the survey, the participant was living in Palawan and that they were both registered and working as a microscopist. In this present study, the term “microscopist” refers to a CHW who is trained as a microscopist and diagnoses malaria in febrile patients using a microscope, and prescribes first-line anti-malarial drugs when patients have malaria. Microscopists also implement community awareness-raising activities aimed at preventing transmission of malaria among their patients and their patients’ families. Before starting work, they were trained
by trainers from a “Training of Trainers” programme conducted with malaria specialists from Japan and the Philippines [14]. In 2011, there were 290 registered microscopists, all of whom understood Tagalog. The total number of the microscopists decreased because those microscopists who served in the areas where malaria were no more endemic retired.

2.1.3. Data collection

I originally planned to recruit all 290 active microscopists in Palawan by contacting them at a malaria congress in the southern municipality (Brooke’s Point) in November 2010, and at the refresher courses held in the northern municipalities (Taytay and San Vicente) in February 2011 (Figure 3). However, 127 out of 290 active microscopists attended these seminars. The first and second data collection sessions recruited 81 participants and 46 participants, respectively. All attendees agreed to participate in the present study and provided written consent. The remaining microscopists could not attend the congress or the refresher course seminars due to transportation problems mainly because they were living in the remote islands or in the mountains such as Balabac, Busuanga, Coron, Culion, Linapacan, Quezon, and Rizal municipalities.
Self-administered questionnaires were handed out to all of the 127 attending microscopists. The literacy level among microscopists’ was considered sufficient to properly understand and answer all of the questions in the questionnaire because most of the microscopists (96.1%) graduated from high school (48%), college (45.7%), or higher (4.1%). Of those who did not graduate from high school or college, three participants had not completed any grade of education (2.4%) and one (0.8%) had completed elementary school. I closely supervised all processes of data collection. However, all of the participants were able to read and answer the questionnaires by themselves and there were no inconsistencies in their responses.

2.1.4. Measurements

A structured questionnaire was developed (Figure 2). It included 134 questions regarding: (1) socio-demographic status; (2) community awareness-raising activities for malaria prevention; (3) service quality; (4) knowledge on malaria; (5) self-preventive measures against malaria; (6) ability in malaria microscopy; and (7) job satisfaction. Questions (2–5) were derived from the indices developed by Yasuoka et al. [61,62]. These indices were already used to measure the multi-dimensional quality of
community malaria health workers in Cambodia. To measure ability in malaria microscopy, a series of questions was developed based on the official training content for microscopists [2,63]. For job satisfaction, the short form of the Minnesota Satisfaction Questionnaire was used. This questionnaire has been applied globally to measure the level of job satisfaction among health care professionals [64]. Additionally, regional data on demographic and malaria endemicity were also collected in the Provincial Health Office of Palawan. To enhance the validity and reliability of these questionnaires, they were pre-tested after having been reviewed by two local malaria experts who were fully knowledgeable on the situation of microscopists in Palawan.

2.1.4.1. Socio-demographic status

The socio-demographic variables that were analysed included age, gender, marital status, educational status, ethnicity, religion, occupation, household wealth, duration of work as a microscopist, distance from their house to the nearest health centre, and reason for becoming a microscopist.

2.1.4.2. Community awareness-raising activities for malaria prevention

Community awareness-raising activities are defined as activities to enhance a community’s knowledge on malaria and its prevention of community people. The
microscopists in Palawan perform community awareness-raising activities mainly among their patients and their patients’ families. They explain the process of malaria transmission and how to protect themselves from malaria. At such occasions, if necessary, the patients and their families are provided with WHO printed materials prepared by KLM staff [63].

To investigate the microscopists’ involvement in malaria prevention, the types and frequencies of community awareness-raising activities that they had implemented were measured. Microscopists were asked about the frequency of awareness-raising activities for eight preventive behaviors. Among the eight questions that were asked, six were about preventive behaviors for malaria infection, namely: “sleep inside bed nets,” “bring mosquito nets to the forest,” “wear long-sleeve shorts/pants,” “fill out water pools,” “cover water jars/tanks,” and “spray house.” These questions included three response levels: “always (3),” “sometimes (2),” and “never (1).” The other two questions were about stigmatized attitudes: “should not come close to malaria patients” and “should not share utensils with malaria patients.” These questions also included three response levels, “always (1),” “sometimes (2),” and “never (3).” The total score of eight questions was treated as a continuous variable, and a higher score was interpreted
as being indicative of greater activity in community awareness-raising activities.

2.1.4.3. Service quality

Service quality was measured by asking questions on four assessment indicators:

“active detection,” “diagnosis and treatment,” “prescription of anti-malarials,” and

“follow-up.” In the case of “active detection,” the microscopists were asked about the
regularity of home visits to detect malaria. Response levels ranged from “never (0)” to
“regularly (3).” “Diagnosis and treatment” included five questions with three response
levels ranging from: “never (0)” to “always (2).” For “prescription of anti-malarials,”
four questions were asked, with response levels ranging from “never (0)” to “always
(2).” “Follow-up” was measured by asking about the frequency of follow-up
consultations with recovered patients and ranged from “never (0)” to “always (2).” Each
of the four assessment indicators was divided by its maximum number of points, to give
a maximum score of 1. The total score (range: 0–4) was treated as a continuous variable,
and a higher total score was interpreted as being indicative of a higher quality of service
from microscopists.

2.1.4.4. Knowledge on malaria

To measure knowledge on malaria, four questions about malaria symptoms, six
questions about malaria transmission, six questions about vector species, and four questions about most active time of vector were asked. The answer for each question was “correct (1),” or “incorrect (0).” As for the service quality index, each of the four assessment indicators was divided by its maximum number of points - giving a maximum of score of 1. The total score of these four assessment indicators (range: 0–1) was treated as a continuous variable.

2.1.4.5. Self-implemented preventive measures against malaria

Self-implemented preventive measures against malaria are defined as preventive activities against malaria taken by microscopists for themselves. Attitudes towards the performance of self-implemented preventive measures against malaria were measured using five questions with three response levels ranging from “never (0)” to “always (2).” Responses indicated various preventive behaviors that the respondents had implemented, including: “come back home before dawn,” “wear long-sleeved shirts/pants,” “sleep inside bed nets at home,” “refrain from going to the forest,” and “bring hammock nets to the forest”. A higher score was interpreted as indicating that a respondent had a greater tendency to perform self-implemented preventive measures against malaria. The total score was treated as a continuous variable.
2.1.4.6. Ability in malaria microscopy

Ability in malaria microscopy was measured with seven questions on “preparation and documentation,” 21 questions on “slide preparation and observation,” seven questions on “safe handling and disposal” of the smears, and 24 questions on “knowledge on the morphology of infected RBCs (red blood cells)” by *Plasmodium falciparum*, *Plasmodium vivax* and *Plasmodium malariae*. The sections “preparation and documentation,” “slide preparation and observation” and “safe handling and disposal” included three response levels: “always (2),” “sometimes (1),” and “never (0).” Regarding “knowledge on the morphology of infected RBCs,” eight questions were asked for each of the three species of parasite. The 24 questions could be answered with “correct (1)” or “incorrect “(0).” The sum of the scores for all questions was calculated and the total score was treated as a continuous variable.

2.1.4.7. Job satisfaction

To measure job satisfaction, the short form of the Minnesota Satisfaction Questionnaire was used. It included 20 questions with five response levels ranging from “very dissatisfied (1)” to “very satisfied (5).” A higher score indicated greater job satisfaction.
2.1.5. Statistical analysis

After confirming the accuracy of the entered data, two types of statistical analysis were conducted. First, descriptive analysis was conducted to gain an overview of the characteristics of the participants. Second, structural equation modeling (SEM) was used to identify the factors associated with the number of community awareness-raising activities for malaria prevention. SEM is a statistical technique for testing hypothesis using a combination of observed variables and qualitative causal assumptions (latent variables). Observed variables were classified, and conceptualized by using latent variables. By precisely analyzing the relationships and structures between these variables, associate factors with the outcome were determined. For example, in our study, one of observed variables was “service quality” which was then conceptualized by a latent variable, “microscopists’ capacity.” The relationship of the former and the latter variables was analyzed in the study. Multivariate analyses, including multiple linear regression analysis, are not suited to conceptualize multiple dimensional constructs.

The correlation of all variables was examined and a path model was built based on
the results of bivariate analysis (state model). The fit of the model was examined in terms of degree of freedom (df), chi-square (CMIN), comparative fit index (CFI), and root mean square error of approximation (RMSEA). According to conventional criteria, a good fit was indicated by $\frac{\text{CMIN}}{\text{df}} < 2$, $\text{CFI} > 0.97$, and $\text{RMSEA} < 0.05$, and an acceptable fit by $\frac{\text{CMIN}}{\text{df}} < 3$, $\text{CFI} > 0.95$, and $\text{RMSEA} < 0.08$ [65]. All statistical analyses were conducted using SPSS version 18.0 and Amos 18.0 (SPSS Inc., Chicago, IL, USA).

2.1.6. Ethical considerations

All participants had a clear understanding of the principles of confidentiality and voluntary participation. Written consent was obtained from all participants before the questionnaires were distributed. The present study was approved by the Research Ethics Committee of the University of Tokyo (3001) and upheld by the Palawan Provincial Health Office.

2.2. Results

2.2.1. Population distribution, confirmed malaria cases, API, and microscopist /
Table 1 shows each region’s population, confirmed malaria cases and percentage of *P. falciparum* cases, annual parasite index (API) per 1,000 population, and the distribution of microscopists and participants per region in the year 2011. The majority (3,803 of 4,984, 76.3%) of malaria cases in Palawan were *P. falciparum*. The API of the southern region was approximately 20 times higher than that of the northern region (*p* < 0.0001). The API was especially high in the southern-most municipalities of Balabac (21.5), Quezon (19.4) and Rizal (33.2). In the majority of the northern municipalities, the API was < 1.

In order to achieve an even distribution of microscopists, the organizers attempted to invite equal numbers of participants from the northern and southern regions. In total, 67 out of 115 northern microscopists (58.3%) and 60 out of 145 southern microscopists (41.4%) participated in the study. Because of the participation in the pre-tests, microscopists from central regions did not participated in the final study.

### 2.2.2. Socio-demographic status

Table 2 shows the results related to the socio-demographic status of respondents.
with respect to their places of assignment. To clarify the regional differences between northern region and southern region, in several socio-demographic variables, a Chi-square test or Fisher’s exact test was conducted. The participants’ ages ranged from 28–51 (mean 39.4 years, SD 7.4). The vast majority (about 90%) were female, of whom 82.7% were married. Forty-eight percent of the participants had graduated from high school and 48.8% had undertaken education beyond a high school level.

Homemakers comprised 73.2% of respondents. The remaining respondents were employed in jobs that included rice or coconut farmers, fishermen, in tourism-related businesses and midwives. The ethnicity and religion of respondents varied. Eleven ethnicities, with the Cuyunon and Bisaya indigenous groups making up the majority, are differently distributed from the northern to southern region (Fisher’s exact test, $p < 0.001$). The majority of the participants were Christian (67.7% Catholic, 27.6% other denominations) and 4.7% were Muslim. The Muslim respondents all came from the southern region of Palawan. Half of the participants had electricity, radio, television, and a house with tin or cement walls. About 20% had refrigerators, bicycles, and motorcycles. The participants from the southern region had higher household wealth than those from the northern region (Independent t-test, $p < 0.001$).
The average duration of experience as a microscopist was 94.3 months (about 8 years). Most participants (76.4%) had become microscopists within three years of the start of the project. Microscopists in the northern region had greater experience than those in the southern region (Welch test, \( p < 0.01 \)).

The average distance from a microscopist’s home to the nearest health center (where most microscopists treat patients) was 21.2 minutes on foot (SD 26.3).

Most participants became microscopists voluntarily (93.7%). The reasons that they stated for becoming microscopists included: interest in reducing malaria in the village (66.1%), interest in saving villagers’ lives (6.3%), interest in malaria treatment and prevention (9.4%), and other reasons (11.9%). The remaining 6.3% of respondents had been nominated by community members or community leaders. The northern district had more nominated people than the southern region (Fisher’s exact test, \( p = 0.065 \)).

2.2.3. Community awareness-raising activities for malaria prevention

Differences in numbers were found in the community awareness-raising activities for malaria prevention that were reported to have been implemented by the microscopists. Almost all (99%) of the participants reported that they had undertaken at
least one measure to prevent malaria infection in their community. More than 90% of the participants encouraged the community members to “sleep inside bet nets,” and “wear long-sleeve shirts/pants,” to avoid being bitten by infected mosquitoes and to “cover water jars and tanks.” Most participants (75.2%) reported always spraying their houses, while 22.4% reporting that they sometimes sprayed. However, some reported having passed on incorrect, stigma-based information: 15.7% told community members not to come close to malaria patients and 6.3% told community members not to share eating utensils with malaria patients. Only 68.5% of the participants explained the importance of bringing mosquito nets when people had to stay in the forest.

2.2.4. Service quality

The average length of time per week that the participants spent for preventive activities was 18.2 hours (SD 24.9) in the dry season and 16.3 hours (SD 21.6) in the wet season. For curative activities, participants spent 9.4 hours per week (SD 18.0) in the dry season and 8.4 hours (SD 21.6) in the wet season. The geographical difference did not significantly influence the length of time spent on these activities.

The majority (93%) of participants were able to properly perform the basic and
important task of making blood smears from febrile patients and diagnosing malaria infection. When they diagnosed people malaria positive, 87% of participants reported that they always gave anti-malarials.

As many as 91.3% of the participants reported that they either regularly or sometimes perform active detection. On a weekly basis, or sometimes several times per week, participants would visit patients in their community who had trouble with traveling to the nearest health center. Regarding prescription of anti-malarials, 91.3% of the participants successfully described the dosage and 92.9% of them could also explain the importance of compliance. A relatively small number (67.3%) explained to patients that compliance failure could result in incomplete treatment, while 88.2% could explain reasons for drug resistance. Regarding follow-up, 65% of the participants always checked if patients recovered and 89% reported that they always asked the patient’s family whether the patient had recovered satisfactorily.

2.2.5. Knowledge on malaria

The percentages of participants who could obtain full scores for knowledge on malaria transmission, vector species and most active time of the vector were 57.9%,
63.5%, and 67.9%, respectively. It is notable that far fewer respondents were able to correctly respond to the questions on malaria symptoms, with only 35% obtaining a full score, and with 45.7% including diarrhea as a symptom of malaria. The malaria knowledge scores did not differ significantly between the northern and southern regions of Palawan.

2.2.6. Self-implemented preventive measures against malaria

The percentage of participants that reported always coming home before dawn was 63.8%, but the responses from the northern region (46.3%) and the southern region (83.3%) differed markedly ($p < 0.01$). The majority (92.1%) of respondents reported that they always wore long-sleeve shirts and pants to avoid mosquito bites; of these 88.1% were from the northern region, and 96.7% were from the southern region. Almost all of the respondents (97.6%) reported always sleeping inside bed nets at home, this included 95.5% of respondents from the northern region and all (100%) of respondents from the southern region. Approximately half (51.2%) of the respondents (35.8% from the northern region, 68.3% from the southern region) always refrained from going into the forest and if it was necessary to go into the forest, 69.3% (62.7%
from the northern region, 76.7% from the southern region) reported that they always
took a mosquito net. Participants from the southern region of Palawan were taking more
preventive measures than participants from the northern region ($p < 0.001$).

2.2.7. Ability in malaria microscopy

Table 3 shows the details and results of ability in malaria microscopy index (name
of index, number of subscale, maximum score, content, participants’ mean score, SD,
and accuracy rate). Most participants were able to perform the preparation and
documentation, slide preparation and observation, safe handling and disposal of the
blood smears, with each of the factors showing high mean values and satisfactory
accuracy rates.

The questionnaire for knowledge on the morphology of infected RBCs and the
answers of participants are shown precisely in Table 4. Participants had a high ability to
discriminate $P. falciparum$, the most harmful species of the parasite, from the other
parasite species from the characteristics of infected RBCs.

2.2.8. Job satisfaction

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The average job satisfaction score in all participants was 83.4 (SD 8.9) out of 100 points. The participants reported that they were mostly satisfied to have the chance to contribute to their community: “the chance to do things for other people” (very satisfied/satisfied = 72.9%), “the chance to do something that makes use of my abilities” (very satisfied/satisfied = 67.3%), and “the chance to tell people what to do” (very satisfied/satisfied = 74.8%). The participants were also satisfied with the honor of being microscopists: “the chance to be “somebody” in the community” (very satisfied/satisfied = 64.8%), “the praise I get for doing a good job” (very satisfied/satisfied = 74.2%) and “the feeling of accomplishment I get from the job” (very satisfied/satisfied = 73%). They were satisfied with the way the jobs done: “the working conditions” (very satisfied/satisfied = 53.5%), “the chance for advancement in this job” (very satisfied/satisfied = 76.1%), “the way malaria control program policies are put into practice” (very satisfied/satisfied = 75.1%), and “the way my boss handles his/her workers” (very satisfied/satisfied = 61%). The lowest level of satisfaction noted among microscopists was in regard to the salary (high dissatisfaction 6.3%, dissatisfaction = 28.9%).
2.2.9. Factors associated with community awareness-raising activities for malaria prevention

Bivariate analyses were conducted between all variables and several significant correlations were found (Table 5 and Table 6). A significant positive correlation was found between the number of community awareness-raising activities for malaria prevention and service quality, ability in malaria microscopy, and general job satisfaction (Table 5). The place of assignment (1 = northern region, 2 = southern region) was positively and significantly correlated with API (Pearson’s r = 0.76, p < 0.01), self-implemented preventive measures against malaria (Pearson’s r = 0.31, p < 0.01), and general job satisfaction (Pearson’s r = 0.29, p < 0.01) (Table 6).

Based on these bivariate analyses, a hypothetical SEM was built to examine the relationship between community awareness-raising activities and other variables. The hypothetical SEM was selected from several models, with consideration of fitness between the data and the model, and of the usability obtained from the results. The latent variable was assembled from three similar observable variables. An upper latent variable (“microscopists’ capacity”) was set on “service quality,” “knowledge on malaria,” and “ability in malaria microscopy,” because these three indices account for
the “microscopists’ capacity” (Figure 4). The use of the latent variable promotes greater efficiency and productivity in analysis than directly using multiple observable variables. The correlations between “service quality” and both “knowledge on malaria” and “ability in malaria microscopy” were found to be significantly high ($p < 0.05$ and $p < 0.001$, respectively) (Table 6).

The results of the SEM are illustrated in Figure 4. In this model, the following directional paths were drawn: from place of assignment to API, microscopists’ capacity, general job satisfaction, and self-implemented preventive measures against malaria; from API to microscopists’ capacity, general job satisfaction, and self-implemented preventive measures against malaria; from general job satisfaction to microscopists’ capacity; from microscopists’ capacity to ability in malaria microscopy, knowledge on malaria, and service quality; from microscopists’ capacity, general job satisfaction, and self-implemented preventive measures against malaria to community awareness-raising activities. Bi-directional paths from general job satisfaction to self-preventive measures against malaria were drawn.

The hypothetical SEM fit the data: $\text{CMIN} / \text{df} = 0.97$, $\text{CFI} = 1.000$ and $\text{RMSEA} = 0.000$ (Figure 4). It revealed that the only significant and positive association between
community awareness-raising activities was with the microscopists’ capacity (path coefficient = 0.37; \( p < 0.05 \)). Microscopists’ capacity explained service quality (path coefficient = 0.52; \( p < 0.05 \)) and ability in malaria microscopy (path coefficient = 0.63; \( p < 0.05 \)). Job satisfaction explained microscopists’ capacity (path coefficient = 0.44; \( p < 0.05 \)), but failed to explain community awareness-raising activities. The place of assignment only impacted API (path coefficient = 0.76; \( p < 0.05 \)), which was twenty times higher in the southern region of Palawan, and the self-implemented preventive measures against malaria (path coefficient = 0.39; \( p < 0.05 \)), but did not impact the microscopists’ capacity or job satisfaction.

2.3. Discussion

2.3.1. Minor corrections of service quality are necessary

The results of the present study showed that the quality of service from microscopists in Palawan was high, but that some minor corrections of performance are necessary on an individual-by-individual basis. Regarding service quality, although participants were trying to spend more time to improve the health conditions of their communities, the rainy season and topography might have inhibited their activities due
to associated transportation difficulties. Efforts to create better road conditions might be financially difficult, but the building of higher-quality infrastructure to facilitate reliable transportation could have a positive impact on the health of the inhabitants of Palawan.

It should be noted, however, that the high follow-up coverage did not differ significantly between the northern and southern regions of the island. This might be indicative of close community relationships in Palawan - an intimacy which could play a substantial role in the microscopist intervention.

2.3.2. Inadequate knowledge on malaria

Inadequate knowledge on malaria remains a matter of concern. Only 68.5% of the participants explained the importance of bringing mosquito nets when people had to stay in the forest. This is a matter that should be addressed, given that most malaria patients from the southern region of the island were suspected to have been infected while working in the forest. In particular, microscopists are required to improve the self-implemented preventive measures of people going to the mountains for taking care of their rice paddies or fields, or working in the mines.
2.3.3. High job satisfaction

The job satisfaction of the microscopists was high in all respects except for that of salary. The work is basically unpaid, however, several municipalities give differing financial incentives, mainly to cover the cost of transportation. Some microscopists were using their own money to travel for active case detection and treatment. A strategy for improving this situation is considered necessary.

2.3.4. Microscopists’ capacity was the sole factor associated with a greater number of community awareness-raising activities

In the present study, the results of SEM analysis indicated that community awareness-raising activities were solely and significantly influenced by high microscopists’ capacity (service quality and ability in malaria microscopy). Knowledge did not explain microscopists’ capacity. This might be because microscopists’ capacity was considered to be a variable that reflected more practical capacity such as service or techniques of a microscopist. General job satisfaction had a significant and positive influence on microscopists’ capacity. Consequently, this has remotely influenced the community awareness-raising activities for malaria prevention. Regarding the
microscopists’ places of assignment, the present study found that it only impacted API
and self-implemented preventive measures against malaria. The findings indicated that
high microscopists’ capacity was the sole factor associated with a greater number of
community awareness-raising activities for malaria prevention. Enhancement of
microscopists’ capacity is the key to strengthening the community awareness-raising
activities for malaria prevention that they undertake. The results also suggest a
noteworthy possibility: that, with regard to microscopists’ capacity, service quality and
ability in malaria microscopy might be more important than knowledge on malaria.

Since both service quality and ability in malaria microscopy among microscopists on
Palawan were quite high, major interventions will not be needed to improve the
microscopists’ effectiveness. These improvements may be achieved with only minor
corrections that target the strengths and weaknesses of individual microscopists in
Palawan. One possible area for that could be strengthened is diagnostic accuracy. While
participants were able to differentiate \textit{P. falciparum} from other forms of \textit{Plasmodium},
but detailed identification of the other species could be better promoted.

2.3.5. Job satisfaction impacted on work performance
The present study supports the impact of job satisfaction on work performance. Although no research has been done with microscopists, the effect of job satisfaction has been investigated in relation to performance/productivity, demission/career change, and absence [66-68]. The correlation between job satisfaction and productivity is reported to be greater for those in professional jobs [69]. The position of microscopist in Palawan is a professional job that requires special skills, thus this might have impacted the outcome. Moreover, another study reported that, especially in women, job satisfaction was negatively correlated with workplace absences not due to sickness [70]. Since the majority of the microscopists were women, the relationship between job satisfaction and performance may be strengthened. If a person is satisfied with his or her job, this satisfaction presumably leads to better job quality. In any type of health facility, the mission is to achieve the highest attainable level of medical practice. For this purpose, employee job satisfaction among health facility staff is very important, not only for employee wellbeing but also for the health facility and the community. The job satisfaction of microscopists and other CHWs should be the subject of greater attention and emphasis.
3.3.6. The place of assignment did not impact awareness-raising activities

The place of assignment was only linked with API and self-implemented preventive measures against malaria. It was assumed that people who lived in highly endemic areas were taking more self-implemented preventive measures against malaria than those who lived in less endemic areas. The microscopists in the southern region had many more duties to perform than those in the northern region, but geographic location was found to have no significant impact on job satisfaction, microscopists’ capacity, and community awareness-raising activities for malaria prevention. This may be verified by the quality of the training program for microscopists. Alternatively, job satisfaction, microscopists’ capacity and involvement in community awareness-raising activities could be determined, not by the scale of the job, but by other elements such as trust or respect from the community. Further studies are needed to determine the effects of these elements.

In 2009, the API was 20 times higher in the southern region of the island than it was in the north. These results indicated that the activity-level of the microscopists in the southern region was high. However, they also indicated that appropriate treatment and diagnosis alone is not sufficient to achieve a decrease of malaria in the southern
region. The strengthening of malaria preventive measures in the southern region is still
necessary and thus the implementation of community awareness-raising activities by
microscopists should be of the highest priority.

2.3.7. Limitations

The limitations of the present study should be noted. Firstly, the nature of SEM
should be considered. SEM is a theory-driven (confirmatory) approach and is not a
causal approach, thus the possibility of an opposite directional path cannot be ruled out.
For example, the directional path from job satisfaction towards microscopists’ capacity
might be opposite or dual-directional (correlation). Despite these limitations, the fitness
of the model was satisfactory high, and moreover, only SEM permits us to realize the
conceptualizations as shown in Figure 4. Further longitudinal research might be needed
to examine the causality. The method of data collection was the second limitation. It
was not possible to conduct a random sampling because of the difficult geographical
situation and security problems in Palawan. Microscopists who did not participate in the
present study were mainly living in the remote islands of the province and had
transportation problems. However, few malaria cases were reported from the remote
islands, and it could be said that the present study was able to obtain the information from areas with a greater malaria burden. Present results may not be generalizable to the microscopists from the central region due to lack of participants from that area. The third limitation was that the Cronbach’s alpha reliability coefficients of “service quality index” and “self-implemented preventive measures against malaria index” were relatively low. The results implied that service quality and self-implemented preventive measures against malaria varied by individual, but further research is needed to explore this issue. The fourth limitation was the possibility of the answers to be biased by participants’ subjective judgments. Although a self-administered questionnaire is a valuable method of collecting a wide range of information, this bias cannot be totally avoided.

2.4. Conclusions

The present study was conducted to identify the associate factors of community awareness-raising activities for malaria prevention by microscopists in Palawan. Microscopists’ capacity was found to be a significant factor for community awareness-raising activities. The significance of microscopists’ capacity can be explained by its two sub-components: service quality and ability in malaria microscopy.
Job satisfaction also explained microscopists’ capacity; however, it did not affect community awareness-raising activities. Minor corrections depending on the strengths and weaknesses of individual microscopists are necessary in order to improve service quality and ability in malaria microscopy. The implementation of such corrections is an intervention that might succeed, not only in achieving an improvement in microscopists’ capacity, but also in achieving an increase in the number of community awareness-raising activities for malaria prevention that take place in the communities of Palawan. Microscopists’ awareness raising activities will lead to their ex-patients’ self-implemented preventive measures, which consequently achieve reducing malaria re-infection. These findings point towards the possibility of implementing some relatively simple, low-cost interventions to boost the effort to reduce the number of malaria cases in Palawan.
CHAPTER 3

Study 2: Determining the factors associated with self-implemented preventive measures against malaria among ex-patients

3.1. Methods

3.1.1. Study design and site

The present study was a cross-sectional study conducted from January to February in 2012, in 20 rural villages situated in four highly malaria-endemic provinces in Palawan, Philippines: 6 villages in Roxas (northern region), 7 villages in Puerto Princesa City (central region), and 2 and 5 villages in Bataraza and Brooke’s Point, respectively (southern region) (Figure 5). The study sites, which evenly cover the island of Palawan were chosen, with consideration for malaria transmission, following discussions with local malaria experts. All of the study villages chosen from the 137 villages of the four provinces were in highly endemic areas (at least two cases a year per 1,000 population). All of the ex-patients in each village were targeted. In 2011, the APIs of each targeted municipalities were: 2.98 in Roxas, 5.87 in Puerto Princesa City, 20.4
in Bataraza, and 9.59 in Brooke’s Point. The remaining high-transmission
municipalities (Quezon, Rizal, Sofronio Espanola, and Balabac) were not chosen due to
location (mountain or islands) and/or safety concerns (several active militant separatist
groups were based around these mountain areas). Since members of these separatist
groups were frequently the patients of the microscopists, the local facilitator strongly
suggested that I should not approach these municipalities.

3.1.2. Participants

The 141 participants, who comprised 15.1% of the ex-patients in the 4
municipalities, all had a history of malaria. After obtaining permission for the study
from the governor of the Palawan Provincial Health Office and each respective
Municipal Health Office, lists of malaria patients 2011 were collected from each of the
rural health units and village health units. The lists were used to select highly
malaria-endemic villages.

3.1.3. Data collection

Data collection in the villages was carried out with the support of the microscopists
and health center staff. Participants living near a health center were asked to assemble at
the health center; home visits were conducted for participants whose homes were more
distant. Farmers and gatherers living in distant mountains, migrant agricultural workers,
miners, and members of militant separatist groups were excluded from the study.

3.1.4. Measurements

An interviewer-administered structured questionnaire with 45 questions was
developed (Figure 2). The questionnaire addressed: (1) socio-demographic status, (2)
self-implemented preventive measures against malaria, (3) knowledge on malaria, (4)
participation in community awareness-raising activities for malaria prevention, (5)
satisfaction with microscopists. As well as Study 1, (2) self-implemented preventive
measures against malaria, and (3) knowledge on malaria were derived from the indices
developed by Yasuoka et al [61,62]. Pre-testing and reviewing by two local malaria
experts who were fully knowledgeable on the situation of microscopists in Palawan,
enhanced the validity and reliability of these questionnaires.

Data on malaria-endemicity was also collected in the Provincial Health Office of
Palawan. The questionnaire was developed in English and translated to Tagalog by local
malaria experts. Given that some of the participants were members of indigenous
groups and did not speak Tagalog, the questionnaire was also translated into indigenous
languages by health center staff members who were fluent in both Tagalog and the
languages to which they translated the questionnaires. The validity and reliability of the
questionnaire was enhanced by pre-tests in villages in Puerto Princesa City, and
repeated discussions with three malaria experts who were familiar with the situation in
Palawan.

3.1.4.1. Socio-demographic status

Ten questions were asked on socio-demographic status: age, gender, marital status,
educational status, ethnicity, religion, occupation, number of adults and children in the
household, household wealth. Economic status was measured by asking the items in the
household.

3.1.4.2. Self-implemented preventive measures against malaria

Attitudes toward the performance of self-implemented preventive measures against
malaria were measured by five questions with five response levels ranging from never
to always (1 – 5 points). The questions asked whether participants “sleep inside bed nets
at home,” “return back home before dawn,” “wear long-sleeved shirts/pants,” “refrain
from going to the forest,” “bring hammock nets to the forest.” A higher score was interpreted as indicating that a respondent had a greater tendency to perform self-implemented preventive measures against malaria. The total score (maximum 25 points) was treated as a continuous variable.

3.1.4.3. Knowledge on malaria

Knowledge on malaria was measured to quantify the participants’ understanding on the disease. This section contained 5 questions on “malaria symptoms,” 7 questions on “malaria transmission,” 6 questions on “vector species,” and 4 questions on “vector’s most active time.” Correct answers were coded as “1.” Incorrect answers were coded as “0.” Each of the 4 items was divided by its maximum number of points, to give a maximum score of 1, which was treated as a continuous variable.

3.1.4.4. Participation in community awareness-raising activities for malaria prevention

Participants were asked if they had participated in any kind of community awareness-raising activities for malaria prevention, based on 7 sources of awareness-raising activities: microscopists, parents, school education, television, book/magazine, information education community, and other. The questions could be
answered with “no,” which was coded as “0,” or “yes,” which was coded as “1.”

3.1.4.5. Satisfaction towards microscopist

Satisfaction with microscopists was measured by one question: “Are you satisfied with the work of your microscopist?” The question had five response levels, ranging from bad to very good (1 – 5 points). The score was treated as a continuous variable.

3.1.5. Statistical analysis

After confirming the accuracy of the entered data, two types of statistical analysis were conducted. First, descriptive analysis was conducted to overview the characteristics of the participants. Second, SEM was used to identify the factors associated with self-implemented preventive measures against malaria. I adopted SEM as multivariable analysis for the same reason as Study 1 (Page 18) and the fit of the model was examined in terms of df, CMIN, CFI, and RMSEA. All statistical analyses were conducted using SPSS version 18.0 and Amos 18.0 (SPSS Inc., Chicago, IL, USA).
3.1.6. Ethical considerations

The principles of confidentiality and voluntary participation were clearly understood by all participants. Written consent was obtained from all participants before the questionnaires were asked. The present study was approved by the Research Ethics Committee of the University of Tokyo (3001) and by the Palawan Provincial Health Office.

3.2. Results

3.2.1. Socio-demographic status

Of the 141 participants, 79.4% were female and 86.5% were married (Table 7). Religion, ethnicity, educational status, and occupation differed significantly between regions ($p < 0.001$, $p = 0.003$, $p = 0.001$, and $p = 0.002$, respectively). Most participants from the northern and central regions were Catholic (73.7% and 77.3%, respectively), in contrast with participants from the southern region who listed their religion as Christian except Catholic (59.5%) and Muslim (5.4%).

In the northern and central regions the numbers of participants who listed their ethnicity as Tagalog or an amalgamation that included Tagalog were, 68.5% and 83.4%,
respectively. In contrast, 51.4% of the participants listed ethnicities other than Tagalog, the Palawan ethnic group accounted for 32.4% of these participants.

Nearly half of the participants from the northern and central regions graduated from high school (55.3% and 48.5%, respectively), while 45.9% of participants from the southern region reported an elementary grade of educational attainment (45.9%).

Occupation also differed between regions: about half (52.6%) of the participants from the northern region were homemakers; 48.5% of the participants from the central region had jobs other than homemaker or farmer (such as shopkeeper or owner, personal business owner, or construction worker); 40.5% of the participants from the southern region were farmers.

Age, number of people in household, number of children, and household wealth did not differ between regions (Table 8). The average age of the participants was 39.3 years (SD 13.2), the average number of people in each household was 5.5 (SD 2.0), the average number of children per person was 3.0 (SD 1.8), and the average household wealth was 1.5 points (SD 5.2).

3.2.2. Self-implemented preventive measures against malaria
Self-implemented preventive measures against malaria did not differ between regions (Table 8). Interestingly, all of the participants (100%) reported that they always slept inside bed-nets when they were home (Table 9). Most participants (77.4%) stated that they always/mostly returned home before dawn, and 69.9% reported that they always/mostly wore long-sleeved shirts/pants to avoid mosquito bites. While 38.4% reported that they never/rarely refrain from going to the forest, only 15.0% stated that they always/mostly brought hammock nets to the forest.

3.2.3. Knowledge on malaria

Knowledge on malaria did not differ between regions except with regard to knowledge on malaria transmission ($p < 0.001$) (Table 8). The participants from the central region had significantly higher knowledge on malaria transmission than participants from the other regions. Knowledge on malaria transmission was higher than knowledge on any other aspect of malaria.

3.2.4. Participation in community awareness-raising activities against malaria

The majority of participants (80.9%) had participated in community
awareness-raising activities against malaria that had been established by a microscopist (Table 10). The other sources of awareness-raising activities were inactive: information education community (8.5%), school education (2.8%), book/magazine (2.1%), television (1.4%), parents (0.7%), and other (12.1%).

3.2.5. Satisfaction towards microscopist

The majority of participants were very satisfied with their microscopists, with an average of 4.6 points (SD 0.9) out of a maximum of 5 (Table 8). The satisfaction with microscopists was especially high in the northern region (4.9 points, SD 0.4, \( p = 0.037 \)).

3.2.6. Factors associated with self-implemented preventive measures against malaria

Bivariate analyses were conducted between all variables and several significant correlations were found (Table 11). A significant positive correlation was found between the number of self-implemented preventive measures against malaria and Tagalog ethnicity (Pearson’s \( r = 0.20, 0.01 \leq p < 0.05 \)), knowledge on malaria transmission (Pearson’s \( r = 0.48, p < 0.001 \)), knowledge on malaria species (Pearson’s \( r \)
= 0.28, $0.001 \leq p < 0.01$), knowledge on vector’s most active time (Pearson’s $r = 0.38, p < 0.001$), awareness-raising activities for malaria prevention by microscopists (Pearson’s $r = 0.46, p < 0.001$), and satisfaction towards microscopists (Pearson’s $r = 0.23$, $0.001 \leq p < 0.01$). There was a positive correlation between Tagalog ethnicity and better implementation self-preventive measures.

Based on these bivariate analyses, a hypothetical SEM was built to examine the relationship between self-implemented preventive measures against malaria and other variables. The hypothetical SEM was selected from several models, with consideration of the fitness between the data and the model, and of the usability obtained from the results.

The results of the SEM are illustrated in Figure 6. In this model, the following directional paths were drawn: ethnicity to self-implemented preventive measures against malaria (the pass-coefficient was set up as “1”); awareness-raising activities for malaria prevention by microscopist to self-implemented preventive measures against malaria; knowledge on malaria transmission to self-implemented preventive measures against malaria; knowledge on vector’s most active time to self-implemented preventive measures against malaria; knowledge on vector’s most active time to self-implemented
preventive measures against malaria; satisfaction towards microscopists to self-implemented preventive measures against malaria. Bi-directional paths from awareness-raising activities for malaria prevention by microscopists to satisfaction towards microscopists, knowledge on malaria transmission, and knowledge on vector’s most active time; knowledge on malaria transmission to ethnicity (Tagalog), and knowledge on vector species, and knowledge on vector’s most active time.

The hypothetical SEM fit the data (CMIN / df = 0.5842; CFI = 1.000; RMSEA = 0.000; Figure 6). Significant associated factors of self-implemented preventive measures against malaria were ethnicity (path coefficient = 1.00; p < 0.05), knowledge on malaria transmission (path coefficient = 4.90; p < 0.01), knowledge on vector species (path coefficient = 2.48; p < 0.05), knowledge on vector’s most active time (path coefficient = 2.45; p < 0.05), awareness-raising activities for malaria prevention by microscopists (path coefficient = 4.90; p < 0.05), and satisfaction towards microscopists (path coefficient = 1.26; p < 0.05).

These six factors explained 44.6% of self-implemented preventive measures against malaria. Knowledge on malaria had significant correlations with knowledge on vector species, knowledge on vector’s most active time, Tagalog ethnicity, and
awareness-raising activities for malaria prevention by microscopists.

Awareness-raising activities were also associated with knowledge on vector’s most active time, and satisfaction towards microscopists. Tagalog ethnicity was positively associated with better self-implemented preventive measures against malaria than being of an ethnicity that was not an amalgamation of Tagalog. Greater knowledge on malaria transmission, vector species, and vector’s most active time were positively associated with better self-implemented preventive measures. Knowledge on malaria symptoms did not affect the results. It is noteworthy that participants who experienced awareness-raising activities for malaria prevention by microscopists were found to take more preventive measures than those who did not experience such activities. Participants who were more satisfied with their microscopists also took a greater number of preventive measures against malaria than those who expressed less satisfaction.

Multiple comparisons were also performed for each pair of groups, with the comparisons denying multicollinearity (Table 11). Knowledge on malaria transmission was significantly and positively associated with knowledge on malaria species (r = 0.21, p < 0.05) and vector’s most active time (r = 0.24, p < 0.01). Participants who had taken
part in awareness-raising activities by microscopists had greater knowledge on malaria transmission \( (r = 0.19, p < 0.05) \) than those who had not. Finally, while Tagalog participants knew more about malaria transmission than participants who belonged to other ethnic groups, this ethnic disparity was only found in knowledge on malaria transmission \( (r = 0.22, p < 0.01) \).

### 3.3. Discussion

#### 3.3.1. Summary of Study 2

The present study was conducted to determine the factors associated with self-implemented preventive measures against malaria among ex-patients visited the microscopists. Six factors were determined by SEM: ethnicity, knowledge on malaria transmission, knowledge on vector species, knowledge on vector’s most active time, community awareness-raising activities for malaria prevention by microscopists, and satisfaction with microscopists.

#### 3.3.2. Ethnic gaps on self-implemented preventive measures against malaria

A vulnerability in malaria control among the ex-patients in Palawan was found in
relation to ethnicity, and not in education, poverty, or gender. Ex-patients who were Tagalog, which is the major ethnicity of the Philippines, took significantly more preventive measures than members of indigenous groups. Palawan is known to have several indigenous ethnicities. The inhabitants of the province are a mixture of different ethnic groups including several indigenous ethno-linguistic groups such as, Batak (mountain people), Tagbanua (people of the world), Tau’t Batu (people of the rock), and Palawanon tribes [71-73]. Throughout the centuries, Palawan has received constant migration of people of Tagalog, Visayan, Chinese, and Spanish descent, who forced most of the indigenous ethno-linguistic groups from lowland areas. At present, most of these indigenous ethno-linguistic groups live in remote and malaria-endemic villages in mountain and coastal areas. These ethno-linguistic groups were not only vulnerable due to the remoteness of their villages, but also due to lack of understanding national language, education, poor health and nutritional status, and lack of recognition from government policies.

Malaria control among these indigenous ethno-linguistic groups is the key to reducing malaria incidence in Palawan, as it is in most malaria-endemic Asian countries: Cambodia, China (Yunnan Province), the Lao People’s Democratic Republic,
Malaysia, and Vietnam [74, 75]. While the malaria control programs covering most of these countries have achieved many positive results, the situation among ethnic minorities groups in remote and hilly areas, where healthcare facilities are limited, demands greater attention [57, 76-78]. Interventions that target indigenous groups might have been very difficult due to language and transportation issues. To reduce incidence of malaria in Palawan and elsewhere, a focus on the ethnic gap in self-implemented preventive measures could be of benefit.

3.3.3. Enhancement of the knowledge on malaria transmission is the key

Greater knowledge on malaria (malaria transmission, species, and vector’s most active time) resulted in better self-implemented preventive measures against malaria. While knowledge by itself is a very important aspect of malaria prevention, knowledge alone is not enough to change human behavior. Self-efficacy theory suggests that behavioral modifications in individuals are associated with the expectation of both outcome and efficacy – both are needed for an individual to take action [77-79]. In the present study, all of the participants had suffered from malaria. By strengthening their outcome and efficacy expectations, these experiences, in combination with their new
knowledge, could have motivated modification of preventive behaviors. Several malaria control programs have pointed out a gap between knowledge and practice [75,80,81].

For example, the nuisance of mosquitoes was noted as being the greatest motivation for using personal protection in several surveys [75,82]. Thus, in Palawan, community awareness-raising activities by microscopists should focus on enhancing appropriate knowledge among inhabitants, and support them in translating this knowledge into practice.

Knowledge on malaria symptoms did not affect self-implemented preventive measures in the present study. Very few studies have identified specific types of knowledge associated with taking effective preventive measures. In the present study, knowledge of symptoms did not result in respondents taking more preventive measures. Knowledge on malaria transmission was the most significant aspect of malaria knowledge for the prevention of infection. This might be because malaria has been endemic in Palawan for centuries and the inhabitants are very familiar with the symptoms. Moreover, among all of the knowledge items, ethnic disparity was only found in knowledge on malaria transmission. Therefore, to strengthen the preventive measures taken by the inhabitants of Palawan, enhancement in knowledge on malaria
transmission is the key to achieving a similar increase in preventive measures among indigenous people who are mostly vulnerable in Palawan.

3.3.4. The effectiveness of community awareness-raising activities for malaria prevention by microscopist

Community awareness-raising activities for malaria prevention by microscopist were the major source of information that successfully increased self-implemented preventive measures against malaria among the ex-patients who visited the microscopists of Palawan. Moreover, ex-patients, who experienced awareness-raising activities by microscopists, had significantly greater knowledge on malaria transmission, which was the most important knowledge item for increasing preventive measures.

While all participants reported that they always slept under bed nets at home, 30.1% always had to go and/or stay in the forest because they had a garden to tend, and only 15.0% always brought mosquito nets to the forest. Since most malaria infections in Palawan occur in forests or adjacent areas during the night, an additional strategy is needed to enhance preventive measures implemented by people who go to the forests. Forest malaria is a complex phenomenon and remains a challenge for future research,
not only in Palawan, but also in the other malaria-endemic countries of Asia [83-86].

3.3.5. Limitations

The limitations of the present study should be noted. Firstly, the limitation of SEM should be noted. SEM is a theory-driven approach, thus the possibility of an opposite directional path cannot be ruled out. Despite these limitations, the fitness of the model was satisfactory high, and moreover, only SEM permits us to realize the conceptualizations as shown in Figure 6. Further longitudinal research might be needed to examine the causality. Secondary, the present study did not ask about some details of the activities, such as date and hour or content of the activities. The results of the present study, however, noted clearly the strong influence of awareness raising activities for malaria prevention by microscopists. Further research might be needed to understand their activities in greater detail. Thirdly, I could not conduct a random sampling because of the extended geographical situation, poor infrastructure, and security problems. The present study was conducted in four highly malarious provinces, which covered the whole island of Palawan and all types of ex-patients. However, the remaining four high transmission municipalities (Quezon, Rizal, Sofronio Espanola, and
Balabac) should not be forgotten. The inhabitants of these municipalities must not be left behind and further research and intervention based, with special attention paid to safety, must be conducted to reduce malaria incidence on the island. The fourth limitation was the possibility of the answers to be biased by participants’ subjective judgments. Although trained interviewers collected the data carefully, this bias cannot be totally avoided.

3.3.6. **Enhancement of awareness-raising activities by microscopist**

In conclusion, now that ITNs and IRS has been scaled-up throughout Palawan, enhancement of awareness-raising activities by microscopist should be the key strategy for improving the efficacy of preventive measures taken by the ex-patients of Palawan. These activities should aim to improve preventive measures among ex-patients going to or living in the mountains, and to enhance the knowledge on malaria transmission particularly among members of indigenous groups.

Community trust and satisfaction with microscopists were high and significantly associated with the taking of a greater number of preventive measures. The microscopists’ job is highly focused on malaria treatment, and the microscopists’
knowledge and sense of responsibility with regard to reducing malaria in Palawan are expected to be very high. Therefore, enhancement of community awareness-raising activities by microscopists should be a valid and feasible way to reduce malaria re-infection in Palawan.

3.4. Conclusions

Early diagnosis and prompt treatment have been extended throughout Palawan, and it is time for the inhabitants to take preventive measures against malaria by themselves in order to reduce malaria incidence through measures other than vector control with ITNs and IRS.

The present study was conducted to identify factors associated with the implementation of greater numbers of preventive measures against malaria by ex-patients in Palawan. Participants who had taken part in awareness-raising activities by microscopists, had greater knowledge on malaria transmission and were taking more preventive measures than participants who did not taken part in the activities. Thus, awareness-raising activities by microscopists could be effective in reducing malaria re-infection among ex-patients who visited the microscopists in Palawan. To further
improve this situation, these activities should be especially focused on improving the self-implemented preventive measurements among ex-patients going to the mountains, and to enhance the knowledge on malaria transmission, especially among indigenous ex-patients.
CHAPTER 4

Conclusions and Recommendations from Two Studies

The present study was conducted to determine a strategy to reduce malaria re-infection in Palawan, the Philippines. Besides early diagnosis, prompt treatment, and vector control, the ex-patients in Palawan should conduct preventive measures against malaria. For this purpose, the present study suggests the following additional strategies:

(1) Awareness-raising activities by microscopists could be effective and have to be strengthened to reduce malaria re-infection.

(2) These activities should be especially focused on improving the self-implemented preventive measurements among ex-patients going to the mountains, and to enhance the knowledge on malaria transmission especially among indigenous ex-patients.

(3) Enhancement of service quality and ability in malaria microscopy are the key to strengthening these activities, which are mainly undertaken by microscopists.

These findings point towards the possibility of implementing some relatively simple, low-cost interventions to boost the effort to reduce malaria re-infection, and consequently, malaria control in Palawan. Indeed, the participants in our study were
limited only to microscopists and ex-patients, they were very important players for passing on strong messages on malaria to their families and communities, as well as playing an important role to reduce malaria re-infection in Palawan, the Philippines.
CHAPTER 5

References


35. Bodenheimer T, Chen E, Bennett HD: Confronting the growing burden of chronic disease: can the U.S. health care workforce do the job? Health Aff (Millwood)


41. Mbuya MN, Menon P, Habicht JP, Pelto GH, Ruel MT: Maternal knowledge after nutrition behavior change communication is conditional on both health workers' knowledge and knowledge-sharing efficacy in rural Haiti. J Nutr 2013, [Epub ahead of print].


56. Lwetoijera DW, Kiware SS, Mageni ZD, Dongus S, Harris C, Devine GJ, Majambere S: A need for better housing to further reduce indoor malaria transmission in areas with high bed net coverage. Parasit Vectors 2013, 6:57.

57. Peeters Grietens K, Xuan XN, Van Bortel W, Duc TN, Ribera JM, Ba Nhat T, Van KP, Le Xuan H, D'Alessandro U, Erhart A: Low perception of malaria risk among


70. Metzner H, Mann FC: Employee attitudes and absence: Personnel Psychol 1953,


74. World Health Organization: Health topics: Malaria. [Available at 4 Feb. 2014] [http://www.wpro.who.int/topics/malaria/en]


83. Sharma VP and Kondrashin AV (Eds): Forest malaria in Southeast Asia:

84. Chaveepojnkamjorn W, Pichainarong N: Malaria infection among the migrant
population along the Thai-Myanmar border area. Southeast Asian J Trop Med

85. Erhart A, Thang ND, Toi LV, Hung le X, Tuy TQ, Cong le D, Speybroeck N,

86. Das NG, Talukdar PK, Das SC: Epidemiological and entomological aspects of
malaria in forest-fringed villages of Sonitpur district, Assam. J Vect Borne Dis
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grateful support.
### Tables

**Table 1**  
Distribution of population, confirmed malaria cases, API, microscopist / region

<table>
<thead>
<tr>
<th>Region</th>
<th>Population</th>
<th>Confirmed malaria cases</th>
<th>API</th>
<th>Microscopists</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(P. falciparum)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>872,390</strong></td>
<td><strong>4,984 (76.3%)</strong></td>
<td><strong>5.71</strong></td>
<td><strong>290</strong></td>
<td><strong>127 (43.8%)</strong></td>
</tr>
<tr>
<td>Northern Region</td>
<td>334,392</td>
<td>200 (57%)</td>
<td>0.60***</td>
<td>115</td>
<td>67 (58.3%)</td>
</tr>
<tr>
<td>Central Region</td>
<td>207,119</td>
<td>795 (71.2%)</td>
<td>3.84</td>
<td>30</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Southern Region</td>
<td>330,879</td>
<td>3,989 (78.3%)</td>
<td>12.1***</td>
<td>145</td>
<td>60 (41.4%)</td>
</tr>
</tbody>
</table>

*** Chi-square test between northern region and southern region ($p < 0.0001$). API, annual parasite index.
### Table 2-1

Socio-demographic status of participants (microscopists) with respect to place of assignment

<table>
<thead>
<tr>
<th>Socio-demographic status</th>
<th>Total (N =127)</th>
<th>Northern Region (n = 67)</th>
<th>Southern Region (n = 60)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (≤39.4)</td>
<td>62 (48.8%)</td>
<td>35 (52.2%)</td>
<td>27 (45%)</td>
<td>0.368a</td>
</tr>
<tr>
<td>High (&gt;39.4)</td>
<td>64 (50.4%)</td>
<td>31 (46.3%)</td>
<td>33 (55%)</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man</td>
<td>13 (10.2%)</td>
<td>7 (10.4%)</td>
<td>6 (10%)</td>
<td>1.000b</td>
</tr>
<tr>
<td>Woman</td>
<td>114 (89.8%)</td>
<td>60 (89.6%)</td>
<td>54 (90%)</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never married</td>
<td>12 (9.4%)</td>
<td>6 (9%)</td>
<td>6 (10%)</td>
<td>0.670b</td>
</tr>
<tr>
<td>Married</td>
<td>105 (82.7%)</td>
<td>56 (83.6%)</td>
<td>49 (81.7%)</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>2 (1.6%)</td>
<td>0 (0%)</td>
<td>2 (3.3%)</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>6 (4.7%)</td>
<td>3 (4.5%)</td>
<td>3 (5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No grade completed</td>
<td>3 (2.4%)</td>
<td>2 (3%)</td>
<td>1 (1.7%)</td>
<td>0.427b</td>
</tr>
<tr>
<td>Elementary</td>
<td>1 (0.8%)</td>
<td>0 (0%)</td>
<td>1 (1.7%)</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>61 (48%)</td>
<td>36 (53.7%)</td>
<td>25 (41.7%)</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>58 (45.7%)</td>
<td>28 (41.8%)</td>
<td>30 (50%)</td>
<td></td>
</tr>
<tr>
<td>Higher</td>
<td>4 (3.1)</td>
<td>1 (1.5%)</td>
<td>3 (5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homemakers</td>
<td>93 (73.2%)</td>
<td>49 (73.1%)</td>
<td>44 (73.3%)</td>
<td>0.501b</td>
</tr>
<tr>
<td>Farmer: coconut</td>
<td>6 (4.7%)</td>
<td>1 (1.5%)</td>
<td>5 (8.3%)</td>
<td></td>
</tr>
<tr>
<td>Farmer: rice</td>
<td>8 (6.3%)</td>
<td>5 (7.5%)</td>
<td>3 (5%)</td>
<td></td>
</tr>
<tr>
<td>Fishery</td>
<td>15 (11.8%)</td>
<td>8 (11.9%)</td>
<td>7 (11.7%)</td>
<td></td>
</tr>
<tr>
<td>Tourism-related</td>
<td>1 (0.8%)</td>
<td>1 (1.5%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>Midwife</td>
<td>2 (1.6%)</td>
<td>1 (1.5%)</td>
<td>1 (1.7%)</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicolana</td>
<td>7 (5.5%)</td>
<td>4 (6%)</td>
<td>3 (5%)</td>
<td>p &lt; 0.001b***</td>
</tr>
<tr>
<td>Bisaya</td>
<td>28 (22%)</td>
<td>11 (16.4%)</td>
<td>17 (28.3%)</td>
<td></td>
</tr>
<tr>
<td>Ceuano</td>
<td>7 (5.5%)</td>
<td>5 (7.5%)</td>
<td>2 (3.3%)</td>
<td></td>
</tr>
<tr>
<td>Cuyunon</td>
<td>33 (26%)</td>
<td>27 (40.3%)</td>
<td>6 (10%)</td>
<td></td>
</tr>
<tr>
<td>Ilocano</td>
<td>5 (3.9%)</td>
<td>0 (0%)</td>
<td>5 (8.3%)</td>
<td></td>
</tr>
<tr>
<td>Kagayan</td>
<td>3 (2.4%)</td>
<td>1 (1.5%)</td>
<td>2 (3.3%)</td>
<td></td>
</tr>
<tr>
<td>Mindanao</td>
<td>2 (1.6%)</td>
<td>0 (0%)</td>
<td>2 (3.3%)</td>
<td></td>
</tr>
<tr>
<td>Palawan</td>
<td>4 (3.1%)</td>
<td>0 (0%)</td>
<td>4 (6.7%)</td>
<td></td>
</tr>
<tr>
<td>Tagalog</td>
<td>14 (11%)</td>
<td>6 (9%)</td>
<td>8 (13.3%)</td>
<td></td>
</tr>
</tbody>
</table>
Table 2-2
Socio-demographic status of participants (microscopists) with respect to place of assignment
(Continued)

<table>
<thead>
<tr>
<th>Socio-demographic status</th>
<th>Total (N = 127)</th>
<th>Northern Region (n = 67)</th>
<th>Southern Region (n = 60)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ethnicity (Continued)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tagbanwa</td>
<td>5 (3.9%)</td>
<td>0 (0%)</td>
<td>5 (8.3%)</td>
<td></td>
</tr>
<tr>
<td>Mixed</td>
<td>4 (3.1%)</td>
<td>2 (3%)</td>
<td>2 (3.3%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4 (3.1%)</td>
<td>1 (1.5%)</td>
<td>3 (5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>86 (67.7%)</td>
<td>52 (77.6%)</td>
<td>34 (56.7%)</td>
<td>0.005**</td>
</tr>
<tr>
<td>Christian except Catholic</td>
<td>35 (27.6%)</td>
<td>15 (22.4%)</td>
<td>20 (33.3%)</td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>6 (4.7%)</td>
<td>0 (0%)</td>
<td>6 (10%)</td>
<td></td>
</tr>
<tr>
<td><strong>Household wealth</strong></td>
<td>(Median = 3, SD = 1.62, ( p = 0.000^{***} ))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (( \leq 3 ))</td>
<td>59 (46.5%)</td>
<td>19 (31.7%)</td>
<td>40 (59.7%)</td>
<td>0.002**</td>
</tr>
<tr>
<td>High (( &gt; 3 ))</td>
<td>68 (53.5%)</td>
<td>41 (68.3%)</td>
<td>27 (40.3%)</td>
<td></td>
</tr>
<tr>
<td><strong>Duration of work as microscopist (months)</strong></td>
<td>(Median = 104, SD = 38.7, ( p = 0.002^{***} ))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (( \leq 104 ))</td>
<td>71 (55.9%)</td>
<td>25 (41.7%)</td>
<td>46 (58.7%)</td>
<td>0.002**</td>
</tr>
<tr>
<td>High (( &gt; 104 ))</td>
<td>56 (44.1%)</td>
<td>35 (58.3%)</td>
<td>21 (31.3%)</td>
<td></td>
</tr>
<tr>
<td><strong>Distance from home to nearest health center (min)</strong></td>
<td>(Median = 15, SD = 26.3, ( p = 0.796^* ))</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low (( \leq 15 ))</td>
<td>73 (57.5%)</td>
<td>32 (53.4%)</td>
<td>41 (61.2%)</td>
<td>0.371^a</td>
</tr>
<tr>
<td>High (( &gt; 15 ))</td>
<td>54 (42.5%)</td>
<td>28 (46.7%)</td>
<td>26 (38.8%)</td>
<td></td>
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<tr>
<td><strong>Reason for becoming microscopist</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voluntary</td>
<td>119 (93.7%)</td>
<td>60 (89.6%)</td>
<td>59 (98.3%)</td>
<td>0.065^b</td>
</tr>
<tr>
<td>Nominee</td>
<td>8 (6.3%)</td>
<td>7 (10.4%)</td>
<td>1 (1.7%)</td>
<td></td>
</tr>
</tbody>
</table>

1 This scale scores from 1–8 points as follows, with 1 point each for the following: electricity, radio, television, refrigerator, bicycle, motorcycle, bike-car, and tin or cement wall. * Significant place of assignment difference (0.01 \( \leq p < 0.05 \)), ** Significant place of assignment difference (0.001 \( \leq p < 0.01 \)), *** Significant place of assignment difference (\( p < 0.001 \)).

\( a \) Chi-square test, \( b \) Fisher’s exact test, \( c \) Independent t-test, \( d \) Welch test, and \( e \) Mann–Whitney U test were conducted to clarify the place of assignment difference between the northern and the southern regions.
Table 3-1

Results of ability in malaria microscopy assessment indicators of participants (microscopists)

<table>
<thead>
<tr>
<th>Assessment indicator</th>
<th>Microscopists (n = 127)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Ability in malaria microscopy (n = 4, maximum score = 1)</td>
<td>0.78</td>
</tr>
<tr>
<td>Preparation and documentation (n = 7, maximum score = 1)</td>
<td>0.90</td>
</tr>
<tr>
<td>• Preparation of microscope, needle, methanol and first-aid dressings, Giemsa staining solution, slides and object slides</td>
<td>-</td>
</tr>
<tr>
<td>• Check the expiry dates of all solutions</td>
<td>-</td>
</tr>
<tr>
<td>• Write the names of the patient on the slides</td>
<td>-</td>
</tr>
<tr>
<td>• Write the date on each slide</td>
<td>-</td>
</tr>
<tr>
<td>• Select the 5th finger of the left hand to take the peripheral blood sample</td>
<td>-</td>
</tr>
<tr>
<td>• Clean the finger with alcohol swab and allow it to air dry</td>
<td>-</td>
</tr>
<tr>
<td>• Record the results in the CHW register</td>
<td>-</td>
</tr>
<tr>
<td>Slide preparation and observation (n = 21, maximum score = 1)</td>
<td>0.76</td>
</tr>
<tr>
<td>• Take patient's peripheral blood</td>
<td>-</td>
</tr>
<tr>
<td>• Prepare samples immediately after taking the blood</td>
<td>-</td>
</tr>
<tr>
<td>• Use clean slide</td>
<td>-</td>
</tr>
<tr>
<td>• Put one droplet of blood on the slide</td>
<td>-</td>
</tr>
<tr>
<td>• Using cover glass, spread the blood so as to obtain a thin layer of blood cells</td>
<td>-</td>
</tr>
<tr>
<td>• The angle of the cover glass is 30 degrees</td>
<td>-</td>
</tr>
<tr>
<td>• Dry immediately</td>
<td>-</td>
</tr>
<tr>
<td>• Fix with methanol for 2 to 5 minutes</td>
<td>-</td>
</tr>
<tr>
<td>• Too much drying damages the staining</td>
<td>-</td>
</tr>
<tr>
<td>• Keep the slides fixed with methanol horizontally and add the staining solution</td>
<td>-</td>
</tr>
<tr>
<td>• When numerous samples are used, use staining bottle</td>
<td>-</td>
</tr>
<tr>
<td>• Staining time depends on the concentration of the dyes (usually between 10 and 30 minutes)</td>
<td>-</td>
</tr>
<tr>
<td>• Maximum staining time is 45 minutes and even if you wait longer, the color does not change</td>
<td>-</td>
</tr>
</tbody>
</table>
### Table 3-2
Results of ability in malaria microscopy assessment indicators of participants (microscopists)

(Continued)

<table>
<thead>
<tr>
<th>Assessment indicator</th>
<th>Microscopists (n = 127)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td><strong>Slide preparation and observation (n = 21, maximum score = 1)</strong></td>
<td></td>
</tr>
<tr>
<td>(Continued)</td>
<td>0.76</td>
</tr>
<tr>
<td>• Wash with buffer</td>
<td>-</td>
</tr>
<tr>
<td>• If insoluble pigments are present at the surface of the solutions, take them off carefully</td>
<td>-</td>
</tr>
<tr>
<td>• Adjust the intensity of the staining through washing time with the buffer</td>
<td>-</td>
</tr>
<tr>
<td>• After washing, take off water quickly and dry with cold air</td>
<td>-</td>
</tr>
<tr>
<td>• Observe with microscope</td>
<td>-</td>
</tr>
<tr>
<td>• Nuclei of malaria parasite inside red blood cells will be stained in red</td>
<td>-</td>
</tr>
<tr>
<td>• The cytoplasm of malaria parasite inside red blood cells will be stained in blue</td>
<td>-</td>
</tr>
<tr>
<td>• When malaria parasite is found inside red blood cells, check the type of protozoa</td>
<td>-</td>
</tr>
</tbody>
</table>

| **Safe handling and disposal (n =6, maximum score = 1)**                   | 0.92 | 0.15|                  |
| • Put on a new pair of gloves when starting                               | -    | -   | 67               |
| • Do not touch patient blood                                              | -    | -   | 85               |
| • Use a sterile lancet to puncture the patient finger                     | -    | -   | 100              |
| • Discard the needle in sharps bins immediately after usage              | -    | -   | 100              |
| • Use a new needle for each patient                                       | -    | -   | 100              |
| • Discard glove wrappers, alcohol swab, desiccant and cassette in non-sharps container | -    | -   | 95               |

| **Knowledge on the morphology of infected RBCs (n = 27, maximum score = 1)** | 0.55 | 0.12|                  |
| Cited in Table 4                                                          |      |     |                  |
Table 4
Questionnaire on knowledge of the morphology of infected RBCs and answers of participants (microscopists)

<table>
<thead>
<tr>
<th>Point of discrimination</th>
<th>Plasmodium species</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P. falciparum</td>
<td>P. vivax</td>
<td>P. malariae</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Size of infected red blood cells</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>3</td>
<td>2.4</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>Small</td>
<td>49</td>
<td>38.6</td>
<td>5</td>
<td>3.9</td>
</tr>
<tr>
<td>Normal</td>
<td>74</td>
<td>58.3</td>
<td>4</td>
<td>3.1</td>
</tr>
<tr>
<td>Big</td>
<td>1</td>
<td>0.8</td>
<td>114</td>
<td>89.8</td>
</tr>
<tr>
<td>Spots inside infected red blood cells</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>5</td>
<td>3.9</td>
<td>4</td>
<td>3.1</td>
</tr>
<tr>
<td>Maurer's dots</td>
<td>104</td>
<td>81.9</td>
<td>22</td>
<td>17.3</td>
</tr>
<tr>
<td>Schuffner's dots</td>
<td>16</td>
<td>12.6</td>
<td>98</td>
<td>77.2</td>
</tr>
<tr>
<td>Ziemann's dots</td>
<td>2</td>
<td>1.6</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>Several parasites inside the same red blood cell</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>5</td>
<td>3.9</td>
<td>10</td>
<td>7.9</td>
</tr>
<tr>
<td>Always</td>
<td>72</td>
<td>56.7</td>
<td>40</td>
<td>31.5</td>
</tr>
<tr>
<td>Sometimes</td>
<td>47</td>
<td>37</td>
<td>55</td>
<td>43.3</td>
</tr>
<tr>
<td>Never</td>
<td>3</td>
<td>2.4</td>
<td>21</td>
<td>16</td>
</tr>
<tr>
<td>Parasite stages in the red blood sample</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>8</td>
<td>6.3</td>
<td>7</td>
<td>5.5</td>
</tr>
<tr>
<td>Only the ring form</td>
<td>59</td>
<td>46.5</td>
<td>32</td>
<td>25.2</td>
</tr>
<tr>
<td>All stages</td>
<td>60</td>
<td>47.2</td>
<td>87</td>
<td>68.5</td>
</tr>
<tr>
<td>Big ring structures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>8</td>
<td>6.3</td>
<td>7</td>
<td>5.5</td>
</tr>
<tr>
<td>Always</td>
<td>94</td>
<td>74.0</td>
<td>88</td>
<td>69.3</td>
</tr>
<tr>
<td>Never</td>
<td>25</td>
<td>19.7</td>
<td>32</td>
<td>25.2</td>
</tr>
<tr>
<td>Chromatin dots</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>9</td>
<td>7.1</td>
<td>9</td>
<td>7.1</td>
</tr>
<tr>
<td>Singular number</td>
<td>69</td>
<td>54.3</td>
<td>82</td>
<td>64.6</td>
</tr>
<tr>
<td>Plural number</td>
<td>49</td>
<td>38.6</td>
<td>35</td>
<td>27.6</td>
</tr>
<tr>
<td>Band structures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>2</td>
<td>1.6</td>
<td>5</td>
<td>3.9</td>
</tr>
<tr>
<td>Always</td>
<td>48</td>
<td>37.8</td>
<td>34</td>
<td>26.8</td>
</tr>
<tr>
<td>Never</td>
<td>77</td>
<td>60.6</td>
<td>88</td>
<td>69.3</td>
</tr>
<tr>
<td>Gametocytes in crescent form</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do not know</td>
<td>2</td>
<td>1.6</td>
<td>5</td>
<td>3.9</td>
</tr>
<tr>
<td>Always</td>
<td>118</td>
<td>92.9</td>
<td>9</td>
<td>7.1</td>
</tr>
<tr>
<td>Never</td>
<td>7</td>
<td>5.5</td>
<td>113</td>
<td>89</td>
</tr>
</tbody>
</table>

Correct answers are indicated with bold typeface.
Table 5
Factors associated with community awareness-raising activities for malaria prevention of participants (microscopists)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pearson's correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
</tr>
<tr>
<td></td>
<td>0.09</td>
</tr>
<tr>
<td>Socio-demographic status</td>
<td></td>
</tr>
<tr>
<td>Annual parasite index</td>
<td>0.02</td>
</tr>
<tr>
<td>Age of microscopist</td>
<td>0.70</td>
</tr>
<tr>
<td>Household wealth</td>
<td>−0.12</td>
</tr>
<tr>
<td>Duration of work as microscopist</td>
<td>−0.19</td>
</tr>
<tr>
<td>Distance from home to nearest health center</td>
<td></td>
</tr>
<tr>
<td>Service quality</td>
<td>0.21</td>
</tr>
<tr>
<td>Active detection</td>
<td>0.17</td>
</tr>
<tr>
<td>Diagnosis and treatment</td>
<td>0.19</td>
</tr>
<tr>
<td>Prescription of anti-malarials</td>
<td>0.01</td>
</tr>
<tr>
<td>Follow-up</td>
<td>0.11</td>
</tr>
<tr>
<td>Self-implemented preventive measures against malaria</td>
<td>0.16</td>
</tr>
<tr>
<td>Ability in malaria microscopy</td>
<td>0.27</td>
</tr>
<tr>
<td>Preparation and documentation</td>
<td>0.26</td>
</tr>
<tr>
<td>Slide preparation and observation</td>
<td>0.17</td>
</tr>
<tr>
<td>Knowledge on the morphology of infected RBCs</td>
<td>0.16</td>
</tr>
<tr>
<td>Safe handling</td>
<td>0.09</td>
</tr>
<tr>
<td>Knowledge on malaria</td>
<td>0.00</td>
</tr>
<tr>
<td>Malaria symptoms</td>
<td>0.09</td>
</tr>
<tr>
<td>Malaria transmission</td>
<td>−0.19</td>
</tr>
<tr>
<td>Vector species</td>
<td>0.04</td>
</tr>
<tr>
<td>Vector's most active time</td>
<td>0.25</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>0.19</td>
</tr>
<tr>
<td>General job satisfaction</td>
<td>0.15</td>
</tr>
<tr>
<td>Intrinsic job satisfaction</td>
<td>0.20</td>
</tr>
<tr>
<td>Extrinsic job satisfaction</td>
<td></td>
</tr>
</tbody>
</table>

* Significant difference (0.01 ≤ p < 0.05), ** Significant difference (0.001 ≤ p < 0.01), *** Significant difference (p < 0.001).
Table 6
Correlation matrix among variables of participants (microscopists)

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Community awareness-raising activities for malaria prevention</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Place of assignment (1 = northern region, 2 = southern region)</td>
<td>0.05</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Annual parasite index</td>
<td>0.09</td>
<td>0.76**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Service quality</td>
<td>0.21*</td>
<td>-0.02</td>
<td>0.05</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Knowledge on malaria</td>
<td>0.00</td>
<td>-0.05</td>
<td>-0.13</td>
<td>0.17*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Self-implemented preventive measures against malaria</td>
<td>0.16</td>
<td>0.31**</td>
<td>0.19*</td>
<td>0.08</td>
<td>0.16</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Ability in malaria microscopy</td>
<td>0.27**</td>
<td>-0.70</td>
<td>-0.06</td>
<td>0.31***</td>
<td>0.09</td>
<td>0.05</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8. General job satisfaction</td>
<td>0.19*</td>
<td>0.29**</td>
<td>0.32**</td>
<td>0.21*</td>
<td>0.01</td>
<td>0.20*</td>
<td>0.24**</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Skewness</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.59</td>
<td>0.19</td>
<td>1.67</td>
<td>0.733</td>
</tr>
<tr>
<td></td>
<td>7.11</td>
<td>8.19</td>
<td>1.15</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>3.26</td>
<td>0.58</td>
<td>-0.97</td>
<td>0.581</td>
</tr>
<tr>
<td></td>
<td>3.52</td>
<td>0.52</td>
<td>-1.05</td>
<td>0.545</td>
</tr>
<tr>
<td></td>
<td>4.19</td>
<td>0.89</td>
<td>-0.76</td>
<td>0.747</td>
</tr>
<tr>
<td></td>
<td>0.78</td>
<td>0.69</td>
<td>-0.50</td>
<td>0.667</td>
</tr>
<tr>
<td></td>
<td>84.00</td>
<td>8.77</td>
<td>-0.31</td>
<td>0.857</td>
</tr>
</tbody>
</table>

* Significant difference (0.01 ≤ p < 0.05), ** Significant difference (0.001 ≤ p < 0.01), *** Significant difference (p < 0.001).
Table 7
Nominal variables of participants with respect to place of residence of participants (ex-patients)

<table>
<thead>
<tr>
<th>Nominal Variables</th>
<th>Total (N = 141)</th>
<th>Northern Region (n = 37)</th>
<th>Central Region (n = 66)</th>
<th>Southern Region (n = 38)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Man</td>
<td>29 (20.6%)</td>
<td>11 (28.9%)</td>
<td>12 (18.2%)</td>
<td>6 (16.2%)</td>
<td>0.318¹</td>
</tr>
<tr>
<td>Woman</td>
<td>112 (79.4%)</td>
<td>27 (71.1%)</td>
<td>54 (81.8%)</td>
<td>31 (83.8%)</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never married</td>
<td>11 (7.6%)</td>
<td>4 (10.5%)</td>
<td>5 (7.6%)</td>
<td>2 (5.4%)</td>
<td>0.323²</td>
</tr>
<tr>
<td>Married</td>
<td>122 (86.5%)</td>
<td>34 (89.5%)</td>
<td>54 (81.8%)</td>
<td>34 (91.9%)</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>3 (2.1%)</td>
<td>0 (0.0%)</td>
<td>3 (4.5%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>5 (3.5%)</td>
<td>0 (0.0%)</td>
<td>4 (6.1%)</td>
<td>1 (2.7%)</td>
<td></td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic</td>
<td>88 (62.4%)</td>
<td>28 (73.7%)</td>
<td>51 (77.3%)</td>
<td>9 (24.3%)</td>
<td>p &lt; 0.001²***</td>
</tr>
<tr>
<td>Christian except Catholic</td>
<td>43 (30.5%)</td>
<td>7 (18.4%)</td>
<td>14 (21.2%)</td>
<td>22 (59.5%)</td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>3 (2.1%)</td>
<td>1 (2.6%)</td>
<td>0 (0.0%)</td>
<td>2 (5.4%)</td>
<td></td>
</tr>
<tr>
<td>No religion</td>
<td>7 (5.0%)</td>
<td>2 (5.3%)</td>
<td>1 (1.5%)</td>
<td>4 (10.8%)</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tagalog</td>
<td>38 (27.0%)</td>
<td>8 (21.1%)</td>
<td>25 (37.9%)</td>
<td>5 (13.5%)</td>
<td>0.003¹**</td>
</tr>
<tr>
<td>Tagalog and others</td>
<td>61 (43.3%)</td>
<td>18 (47.4%)</td>
<td>30 (45.5%)</td>
<td>13 (35.1%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>42 (29.8%)</td>
<td>12 (31.6%)</td>
<td>11 (16.7%)</td>
<td>19 (51.4%)</td>
<td></td>
</tr>
<tr>
<td><strong>Educational status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No grade completed</td>
<td>12 (8.5%)</td>
<td>1 (2.6%)</td>
<td>2 (3.0%)</td>
<td>9 (24.3%)</td>
<td>0.001²**</td>
</tr>
<tr>
<td>Elementary grade</td>
<td>52 (36.9%)</td>
<td>9 (23.7%)</td>
<td>26 (39.4%)</td>
<td>17 (45.9%)</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>62 (44.0%)</td>
<td>21 (55.3%)</td>
<td>32 (48.5%)</td>
<td>9 (24.3%)</td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>13 (6.0%)</td>
<td>6 (15.8%)</td>
<td>5 (7.6%)</td>
<td>2 (5.4%)</td>
<td></td>
</tr>
<tr>
<td>Higher</td>
<td>1 (0.7%)</td>
<td>0 (0.0%)</td>
<td>1 (1.5%)</td>
<td>0 (0.0%)</td>
<td></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homemakers</td>
<td>59 (41.8%)</td>
<td>20 (52.6%)</td>
<td>26 (39.4%)</td>
<td>13 (35.1%)</td>
<td>0.002¹**</td>
</tr>
<tr>
<td>Farmer</td>
<td>33 (23.4%)</td>
<td>10 (26.3%)</td>
<td>8 (12.1%)</td>
<td>15 (40.5%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>49 (34.8%)</td>
<td>8 (21.1%)</td>
<td>32 (48.5%)</td>
<td>9 (24.3%)</td>
<td></td>
</tr>
</tbody>
</table>

¹ Chi-square test between places of residence (northern region, central region, and southern region).
² Fisher’s exact test between places of residence.* Significant difference (0.01 < p < 0.05), ** Significant difference (0.001 < p < 0.01), *** Significant difference (p < 0.001).
Table 8
Continuous variables of participants with respect to place of residence of participants (ex-patients)

<table>
<thead>
<tr>
<th>Continuous Variables</th>
<th>Total Mean (SD)</th>
<th>Northern Region Mean (SD)</th>
<th>Central Region Mean (SD)</th>
<th>Southern Region Mean (SD)</th>
<th>ANOVA $^1$ (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socio-economic status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>39.3 (13.2)</td>
<td>38.0 (11.4)</td>
<td>41.4 (13.5)</td>
<td>37.0 (14.2)</td>
<td>0.228</td>
</tr>
<tr>
<td>Number of people in household</td>
<td>5.5 (2.0)</td>
<td>5.6 (1.8)</td>
<td>5.4 (2.2)</td>
<td>5.5 (1.9)</td>
<td>0.854</td>
</tr>
<tr>
<td>Number of children</td>
<td>3.0 (1.8)</td>
<td>3.3 (2.0)</td>
<td>2.8 (1.7)</td>
<td>3.1 (2.0)</td>
<td>0.357</td>
</tr>
<tr>
<td>Household wealth$^2$</td>
<td>1.5 (1.7)</td>
<td>1.9 (1.6)</td>
<td>1.4 (1.5)</td>
<td>1.3 (1.9)</td>
<td>0.237</td>
</tr>
<tr>
<td><strong>Self-implemented preventive measures against malaria</strong></td>
<td>19.2 (5.2)</td>
<td>19.1 (5.2)</td>
<td>20.0 (5.1)</td>
<td>17.9 (5.1)</td>
<td>0.125</td>
</tr>
<tr>
<td><strong>Knowledge on malaria</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaria symptoms</td>
<td>0.67 (0.23)</td>
<td>0.68 (0.25)</td>
<td>0.70 (0.19)</td>
<td>0.62 (0.27)</td>
<td>0.182</td>
</tr>
<tr>
<td>Malaria transmission</td>
<td>0.87 (0.27)</td>
<td>0.79 (0.31)$^a$</td>
<td>0.96 (0.14)$^{a,b}$</td>
<td>0.78 (0.36)$^b$</td>
<td>$p &lt; 0.001^{***}$</td>
</tr>
<tr>
<td>Vector species</td>
<td>0.42 (0.48)</td>
<td>0.52 (0.48)</td>
<td>0.34 (0.46)</td>
<td>0.46 (0.50)</td>
<td>0.142</td>
</tr>
<tr>
<td>Vector’s most active time</td>
<td>0.60 (0.49)</td>
<td>0.68 (0.47)</td>
<td>0.55 (0.50)</td>
<td>0.62 (0.49)</td>
<td>0.371</td>
</tr>
<tr>
<td><strong>Satisfaction with microscopists</strong></td>
<td>4.6 (0.9)</td>
<td>4.9 (0.4)$^c$</td>
<td>4.5 (1.0)$^c$</td>
<td>4.5 (1.0)</td>
<td>0.037$^*$</td>
</tr>
</tbody>
</table>

$^1$ ANOVA between places of residence (northern region, central region, and southern region).

$^2$ This scale scores from 1 - 8 points, with 1 point each for the following: electricity, radio, television, refrigerator, bicycle, motorcycle, bike-car, and tin or cement wall. * Significant difference (0.01 ≤ p < 0.05), ** Significant difference (0.001 ≤ p < 0.01), *** Significant difference (p < 0.001). $^a$, $^b$, and $^c$ Indicate the combination of two-places of residence that were significantly different by Tukey-Kramer test.
Table 9
Self-implemented preventive measures against malaria of participants (ex-patients)

<table>
<thead>
<tr>
<th>Self-implemented preventive measures against malaria</th>
<th>Never %</th>
<th>Rarely %</th>
<th>Sometimes %</th>
<th>Mostly %</th>
<th>Always %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep under bed nets at home</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Return home before dawn</td>
<td>12.0</td>
<td>1.5</td>
<td>9.0</td>
<td>16.5</td>
<td>60.9</td>
</tr>
<tr>
<td>Wear long-sleeved shirts/pants</td>
<td>8.3</td>
<td>2.3</td>
<td>19.5</td>
<td>9.0</td>
<td>60.9</td>
</tr>
<tr>
<td>Refrain from going to the forest</td>
<td>25.6</td>
<td>12.8</td>
<td>26.3</td>
<td>5.3</td>
<td>30.1</td>
</tr>
<tr>
<td>Bring hammock nets to the forest</td>
<td>51.9</td>
<td>28.6</td>
<td>4.5</td>
<td>0</td>
<td>15.0</td>
</tr>
</tbody>
</table>
Table 10
Participation in awareness-raising activates for malaria prevention of participants (ex-patients)

<table>
<thead>
<tr>
<th>Source for information</th>
<th>No (%)</th>
<th>Yes (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microscopists</td>
<td>19.1</td>
<td>80.9</td>
</tr>
<tr>
<td>Information education community</td>
<td>91.5</td>
<td>8.5</td>
</tr>
<tr>
<td>School education</td>
<td>97.2</td>
<td>2.8</td>
</tr>
<tr>
<td>Book/magazine</td>
<td>97.9</td>
<td>2.1</td>
</tr>
<tr>
<td>TV</td>
<td>98.6</td>
<td>1.4</td>
</tr>
<tr>
<td>Parents</td>
<td>99.3</td>
<td>0.7</td>
</tr>
<tr>
<td>Other</td>
<td>87.9</td>
<td>12.1</td>
</tr>
</tbody>
</table>
Table 11
Correlation matrix among variables of participants (ex-patients)

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Self-implemented preventive measures against malaria</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Ethnicity (Tagalog)</td>
<td>0.20*</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Knowledge on malaria transmission</td>
<td>0.48***</td>
<td>0.22**</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Knowledge on malaria species</td>
<td>0.28**</td>
<td>-0.02</td>
<td>0.21*</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Knowledge on vector’s most active time</td>
<td>0.38***</td>
<td>0.01</td>
<td>0.24**</td>
<td>0.13</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Awareness-raising activities for malaria prevention by microscopist</td>
<td>0.46***</td>
<td>0.11</td>
<td>0.19*</td>
<td>-0.10</td>
<td>-0.01</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>7. Satisfaction with microscopists</td>
<td>0.23**</td>
<td>-0.05</td>
<td>-0.01</td>
<td>-0.10</td>
<td>-0.01</td>
<td>0.42</td>
<td>1</td>
</tr>
</tbody>
</table>

* Significant difference (0.01 ≤ p < 0.05), ** Significant difference (0.001 ≤ p < 0.01), *** Significant difference (p < 0.001).
Figures

Figure 1
Distribution of confirmed malaria cases per municipalities (per 1,000 population)
(Made by author based on the data of Provincial Health Report 2009)
Study 1 hypothesize that an association exists between microscopists’ “community awareness-raising activities for malaria prevention” and the following multi-directional variables: “socio-demographic status,” “service quality,” “knowledge on malaria,” “ability in malaria microscopy,” “job satisfaction,” and “self-preventive measures against malaria.” Sub-variables of each variable are in the circles of the conceptual framework. API, annual parasite index.

Study 2 hypothesize that an association exists between ex-patients’ “self-implemented preventive measures against malaria” and the following multi-directional variables: “place of residence,” socio-demographic status,” “knowledge on malaria,” “participation in community awareness-raising activities for malaria prevention,” and “satisfaction with microscopists.” Sub-variables of each variable are in the circles of the conceptual framework.
Figure 3
Data collection of Study 1

Registered microscopists (N=290)

Malaria congress (November, 2010)

Attended (n=81)

Did not attend (n=209)

Participants (n=127)

Refresher courses (February, 2011)

Attended (n=46)

Did not attend (n=163)
Factors associated with community awareness-raising activities for malaria prevention

CMIN = 12.667, df = 13, CFI = 1.000, RMSEA = 0.000. Place of assignment is calculated as follows: the northern region is “1” and the southern region is “2.” API, annual parasite index.
Figure 5
Data collection of Study 2

Malaria cases in Palawan, 2011
(N = 5,000, 23 municipalities)

Malaria endemic municipalities
(n=4,724, 8 municipalities)

Comparatively practicable municipalities
(n=1,830, 4 municipalities, 137 villages)

Malaria endemic municipalities
(n=4,724, 8 municipalities)

Non-malaria endemic municipalities
(n=276, 16 municipalities)

Hard to reach municipalities
(n=2,894, 4 municipalities)
- Northern region (Queson, Rizal)
- Southern region (Sofronio Espanola, Balabac)

Highly endemic villages
(2>API)
(n=933, 20 villages)
- Northern region (Roxas; 6 / 31 villages)
- Puerto Princesa City; 7 / 66 villages
- Southern region (Brookespoint; 5 / 18 villages, Bataraza; 2 / 22 villages)

Less endemic villages (2<API)
(n=897, 117 villages)

Participants
(n=141)

Excluded
(n=792)
- Farmers/gatherers living in distant mountains
- Migrant agricultural workers/miners
- Members of separatist groups
- Other
Figure 6
Factors associated with self-implemented preventive measures against malaria

CMIN = 5.842, df = 10, CFI = 1.000, RMSEA = 0.000. The circles represent the observed variables. All relations and correlations are significant ($p < 0.05$). Ethnicity is calculated as follows: Tagalog is “3,” amalgamation of Tagalog is “2,” and other is “3.” The pass-coefficient between “ethnicity” and “self-implemented preventive measures against malaria” was set up as “1.”
Appendices

Appendix 1: Distribution of confirmed malaria cases per 1,000 populations in the Philippines (2012)

World Malaria Report 2012, WHO.
Appendix 2: Malaria trends of Palawan (1995-2010)

Microscopists were trained

Early diagnosis and prompt treatment have been extended all over the island

The decreasing is becoming slow

Made by author referring the data of Provincial Health Report, 1995-2010.

Made by author referring the data of Provincial Health Report, 1995-2009.
**Appendix 4:** Population and distribution of confirmed malaria cases per 1,000 population and age group of each municipality in Palawan (2009)

<table>
<thead>
<tr>
<th>Municipalities</th>
<th>Microscopists</th>
<th>Confirmed cases by age group</th>
<th></th>
<th>API</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>n</td>
<td>&lt;5</td>
<td>n</td>
</tr>
<tr>
<td>TOTAL</td>
<td>7,606</td>
<td>1,313</td>
<td>17.3</td>
<td>6,293</td>
</tr>
<tr>
<td><strong>Northern Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Araceli</td>
<td>488</td>
<td>54</td>
<td>11.1</td>
<td>434</td>
</tr>
<tr>
<td>Busuanga</td>
<td>15</td>
<td>0</td>
<td>0.0</td>
<td>15</td>
</tr>
<tr>
<td>Coron</td>
<td>9</td>
<td>0</td>
<td>0.0</td>
<td>9</td>
</tr>
<tr>
<td>Culion</td>
<td>12</td>
<td>1</td>
<td>8.3</td>
<td>11</td>
</tr>
<tr>
<td>Dumaran</td>
<td>43</td>
<td>6</td>
<td>14.0</td>
<td>37</td>
</tr>
<tr>
<td>El Nido</td>
<td>55</td>
<td>7</td>
<td>12.7</td>
<td>48</td>
</tr>
<tr>
<td>Linapacan</td>
<td>75</td>
<td>13</td>
<td>17.3</td>
<td>62</td>
</tr>
<tr>
<td>Roxas</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>San Vincente</td>
<td>85</td>
<td>7</td>
<td>8.2</td>
<td>78</td>
</tr>
<tr>
<td>Taytay</td>
<td>48</td>
<td>10</td>
<td>20.8</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>135</td>
<td>10</td>
<td>7.4</td>
<td>125</td>
</tr>
<tr>
<td><strong>Central Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puerto Princesa City</td>
<td>880</td>
<td>74</td>
<td>8.4</td>
<td>806</td>
</tr>
<tr>
<td><strong>Southern Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aborlan</td>
<td>434</td>
<td>37</td>
<td>8.5</td>
<td>397</td>
</tr>
<tr>
<td>Balabac</td>
<td>817</td>
<td>98</td>
<td>12.0</td>
<td>719</td>
</tr>
<tr>
<td>Bataraza</td>
<td>1,335</td>
<td>327</td>
<td>24.5</td>
<td>1,008</td>
</tr>
<tr>
<td>Brookespoint</td>
<td>304</td>
<td>58</td>
<td>19.1</td>
<td>246</td>
</tr>
<tr>
<td>Espanola</td>
<td>515</td>
<td>133</td>
<td>25.8</td>
<td>382</td>
</tr>
<tr>
<td>Narra</td>
<td>309</td>
<td>38</td>
<td>12.3</td>
<td>271</td>
</tr>
<tr>
<td>Quezon</td>
<td>805</td>
<td>123</td>
<td>15.3</td>
<td>682</td>
</tr>
<tr>
<td>Rizal</td>
<td>1,719</td>
<td>371</td>
<td>21.6</td>
<td>1,348</td>
</tr>
</tbody>
</table>

Data of population is from Census of Population and Housing, 2000. Data of malaria is from Provincial Health Report 2009.
### Appendix 5: Confirmed cases by species per region and municipality (2009)

<table>
<thead>
<tr>
<th>Municipalities</th>
<th>MICROSCOPISTS</th>
<th>Confirmed cases by species</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Total</td>
<td></td>
<td>n</td>
<td>Total</td>
<td></td>
<td>n</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>5,558</td>
<td>73.1</td>
<td>1,842</td>
<td>24.2</td>
<td>133</td>
<td>1.7</td>
<td>73</td>
<td>1.0</td>
<td>7,606</td>
</tr>
<tr>
<td><strong>Norther Region</strong></td>
<td>488</td>
<td>66.0</td>
<td>162</td>
<td>33.2</td>
<td>3</td>
<td>0.6</td>
<td>1</td>
<td>0.2</td>
<td></td>
</tr>
<tr>
<td>Araceli</td>
<td>14</td>
<td>93.3</td>
<td>1</td>
<td>6.7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Busuanga</td>
<td>4</td>
<td>44.4</td>
<td>5</td>
<td>55.6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>Coron</td>
<td>12</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Culion</td>
<td>42</td>
<td>97.7</td>
<td>1</td>
<td>2.3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>43</td>
</tr>
<tr>
<td>Dumaran</td>
<td>40</td>
<td>72.7</td>
<td>14</td>
<td>25.5</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>55</td>
</tr>
<tr>
<td>El Nido</td>
<td>58</td>
<td>77.3</td>
<td>17</td>
<td>22.7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>75</td>
</tr>
<tr>
<td>Linapacan</td>
<td>8</td>
<td>72.7</td>
<td>3</td>
<td>27.3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Roxas</td>
<td>46</td>
<td>54.1</td>
<td>38</td>
<td>44.7</td>
<td>1</td>
<td>1.2</td>
<td>0</td>
<td>0</td>
<td>85</td>
</tr>
<tr>
<td>San Vincente</td>
<td>26</td>
<td>54.2</td>
<td>22</td>
<td>45.8</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>48</td>
</tr>
<tr>
<td>Taytay</td>
<td>72</td>
<td>53.3</td>
<td>61</td>
<td>45.2</td>
<td>2</td>
<td>1.5</td>
<td>0</td>
<td>0</td>
<td>135</td>
</tr>
<tr>
<td><strong>Central Region</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Puerto princesa City</td>
<td>559</td>
<td>63.5</td>
<td>299</td>
<td>34.0</td>
<td>20</td>
<td>2.3</td>
<td>2</td>
<td>0.2</td>
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<td><strong>Southern Region</strong></td>
<td>6,238</td>
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<tr>
<td>Aborlan</td>
<td>294</td>
<td>67.7</td>
<td>134</td>
<td>30.9</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>1.4</td>
<td>434</td>
</tr>
<tr>
<td>Balabac</td>
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<td>77.0</td>
<td>167</td>
<td>20.4</td>
<td>2</td>
<td>0.2</td>
<td>19</td>
<td>2.3</td>
<td>817</td>
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<tr>
<td>Bataraza</td>
<td>1,093</td>
<td>81.9</td>
<td>211</td>
<td>15.8</td>
<td>22</td>
<td>1.6</td>
<td>9</td>
<td>0.7</td>
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<tr>
<td>Brookespoint</td>
<td>219</td>
<td>72.0</td>
<td>71</td>
<td>23.4</td>
<td>6</td>
<td>2.0</td>
<td>8</td>
<td>2.6</td>
<td>304</td>
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<tr>
<td>Espanola</td>
<td>441</td>
<td>85.6</td>
<td>63</td>
<td>12.2</td>
<td>9</td>
<td>1.7</td>
<td>2</td>
<td>0.4</td>
<td>515</td>
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<tr>
<td>Narra</td>
<td>239</td>
<td>77.3</td>
<td>59</td>
<td>19.1</td>
<td>9</td>
<td>2.9</td>
<td>2</td>
<td>0.6</td>
<td>309</td>
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<tr>
<td>Quezon</td>
<td>576</td>
<td>71.6</td>
<td>204</td>
<td>25.3</td>
<td>24</td>
<td>3.0</td>
<td>1</td>
<td>0.1</td>
<td>805</td>
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<tr>
<td>Rizal</td>
<td>1,186</td>
<td>69.0</td>
<td>472</td>
<td>27.5</td>
<td>38</td>
<td>2.21</td>
<td>23</td>
<td>1.3</td>
<td>1,719</td>
</tr>
</tbody>
</table>

Data of malaria is from Provincial Health Report 2009.
Appendix 6: Monthly incidence of malaria per each region in Palawan (2009)

Data about malaria is from Provincial Health Report 2009.
### Appendix 7. Trend of leading causes of morbidity from 2005 to 2009 at Palawan

<table>
<thead>
<tr>
<th>Causes of morbidity</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Top 10</td>
<td>n</td>
<td>Rate</td>
<td>Top 10</td>
<td>n</td>
</tr>
<tr>
<td>URTI/ARI&lt;sup&gt;2&lt;/sup&gt;</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>28,011</td>
<td>4,303</td>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>27,959</td>
</tr>
<tr>
<td>Influenza</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>17,085</td>
<td>2,625</td>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>16,091</td>
</tr>
<tr>
<td>Malaria&lt;sup&gt;3&lt;/sup&gt;</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>10,334</td>
<td>1,588</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>12,640</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>7,038</td>
<td>1,081</td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>8,932</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>4,800</td>
<td>737</td>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>7,908</td>
</tr>
<tr>
<td>Hypertension</td>
<td>6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>3,317</td>
<td>510</td>
<td>6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>4,843</td>
</tr>
<tr>
<td>Urinary Tract Infection</td>
<td>7&lt;sup&gt;th&lt;/sup&gt;</td>
<td>2,700</td>
<td>415</td>
<td>7&lt;sup&gt;th&lt;/sup&gt;</td>
<td>2,856</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>8&lt;sup&gt;th&lt;/sup&gt;</td>
<td>2,260</td>
<td>347</td>
<td>8&lt;sup&gt;th&lt;/sup&gt;</td>
<td>1,470</td>
</tr>
<tr>
<td>Anemia</td>
<td>9&lt;sup&gt;th&lt;/sup&gt;</td>
<td>1,447</td>
<td>222</td>
<td>10&lt;sup&gt;th&lt;/sup&gt;</td>
<td>858</td>
</tr>
<tr>
<td>Pulmonary TB</td>
<td>10&lt;sup&gt;th&lt;/sup&gt;</td>
<td>1,029</td>
<td>158</td>
<td>9&lt;sup&gt;th&lt;/sup&gt;</td>
<td>949</td>
</tr>
<tr>
<td>Skin Disease</td>
<td>9&lt;sup&gt;th&lt;/sup&gt;</td>
<td>1,261</td>
<td>143</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gastritis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accidents/Wounds/Injuries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Per 100,000 population. 2 URTI = Upper Respiratory tract Infections, ARI = Acute Respiratory infection. 3 Number dose not much with other appendixes because of different way of data collection. This collection was only made in provincial and private hospitals.

The table was made by author based on Annual Health Report of the Province of Palawan (2005 to 2009).
Appendix 8. Trend of leading causes of mortality from 2005 to 2009 at Palawan

<table>
<thead>
<tr>
<th>Causes of morbidity</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Top 10 n Rate</td>
<td>Top 10 n Rate</td>
<td>Top 10 n Rate</td>
<td>Top 10 n Rate</td>
<td>Top 10 n Rate</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>239 37.0</td>
<td>224 33.7</td>
<td>313 46.0</td>
<td>285 41.0</td>
<td>337 43.1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>155 24.0</td>
<td>101 15.2</td>
<td>78 11.5</td>
<td>108 13.8</td>
<td></td>
</tr>
<tr>
<td>Pulmonary TB</td>
<td>128 20.0</td>
<td>122 18.3</td>
<td>163 24.0</td>
<td>97 14.0</td>
<td>99 12.7</td>
</tr>
<tr>
<td>Unspecified natural cause</td>
<td>123 19.0</td>
<td>60 9.0</td>
<td>181 26.7</td>
<td>57 8.2</td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td>105 16.0</td>
<td>105 15.7</td>
<td>137 20.1</td>
<td>107 15.4</td>
<td>123 15.8</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>95 15.0</td>
<td>63 9.5</td>
<td>125 18.4</td>
<td>59 8.5</td>
<td>72 9.2</td>
</tr>
<tr>
<td>Cardiovascular accidents</td>
<td>83 13.0</td>
<td>147 22.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accidents/Wounds/Injuries</td>
<td>67 10.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Still birth</td>
<td>56 9.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Myocardial Infection</td>
<td>54 8.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congestive heart failure</td>
<td>87 13.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal failure</td>
<td>80 12.0</td>
<td>72 10.6</td>
<td>63 9.1</td>
<td>77 9.8</td>
<td></td>
</tr>
<tr>
<td>Peptic ulcer</td>
<td>105 16.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>295 43.4</td>
<td>103 14.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebrovascular accident</td>
<td>85 12.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myocardial infection</td>
<td>59 8.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hear disease</td>
<td>101 12.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>64 8.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Per 100,000 population.

The table was made by author based on Annual Health Report of the Province of Palawan (2005 to 2009).
This explains the research entitled “Malaria Control and Health System Strengthening; The Roles of Microscopists in Palawan Island, Philippines”. Please read this or we will read it for you so that you are fully aware of the research process.

**Objective of this study:** To obtain information from you about your activity and perception as Microscopists.

**Research procedure:** If you agree to participate in this study, we will take about 60 minutes of your time. During the time, we will ask you questions about your activity and perception as Microscopist.

**Risks, Discomforts, and Inconveniences:** There is no risk for participating in this study.

**Benefits:** The information obtained from you will help us to understand this topic. It can be also used to develop an effective strategy to promote health in the Philippines.

**Privacy and Confidentiality:** All the information will remain strictly confidential and your answer will not be identified.

**Volunteer agreement:** Your participation is completely voluntary. You can withdraw from answering questions at any time without any penalty. Also, you are not obliged to answer any questions you do not want to.

You may ask any questions about the study at this time. If you are willing to participate in this study, please sign your name on the informed consent form.

Thank you very much for your kind cooperation.

If you have any question, please ask the questioner.

**Principal investigator:** Masamine Jimba (The University of Tokyo), Shigeyuki KANO (International Medical Center of Japan), Emilie MATSUMOTO (The University of Tokyo)
Appendix 10: Informed consent sheet for ex-malaria-patients

Information Sheet for Participants
(Community-level)

This explains the research entitled “Malaria Control and Health System Strengthening; The Roles of Microscopists in Palawan Island, Philippines”. Please read this or we will read it for you so that you are fully aware of the research process.

Objective of this study: To obtain information from the community about your activity and perception about Malaria.

Research procedure: If you agree to participate in this study, we will take about 60 minutes of your time. During the time, we will ask you questions about your activity and perception about Malaria.

Risks, Discomforts, and Inconveniences: There is no risk for participating in this study.

Benefits: The information obtained from you will help us to understand this topic. It can be also used to develop an effective strategy to promote health in the Philippines.

Privacy and Confidentiality: All the information will remain strictly confidential and your answer will not be identified.

Volunteer agreement: Your participation is completely voluntary. You can withdraw from answering questions at any time without any penalty. Also, you are not obliged to answer any questions you do not want to.

You may ask any questions about the study at this time. If you are willing to participate in this study, please sign your name on the informed consent form.

Thank you very much for your kind cooperation.

If you have any question, please ask the questioner.

Principal investigator: Masamine Jimba (The University of Tokyo), Shigeyuki KANO (International Medical Center of Japan), Emilie MATSUMOTO (The University of Tokyo)
Appendix 11: Certificate of consent sheet for both microscopists and ex-malaria patients

Informed Consent Form for Participants

Study title: “Malaria Control and Health System Strengthening; The Roles of Microscopists in Palawan Island, the Philippines”

Principal investigator: Masamine Jimba (The University of Tokyo), Shigeyuki KANO (International Medical Center of Japan), Emilie MATSUMOTO (The University of Tokyo)

To the Dean of the Graduate School of Medicine, The University of Tokyo

1. (please write your name here), after reading and having explained to me the contents of this study, understand what is expected to me as a participant and agree with participating in the study.

I understand:
1. The purpose and procedures of the study,
2. That I will not be placed under any harm or discomfort,
3. That I can withdraw from the study in any time without giving a reason,
4. That any information I provide will be recorded anonymously and the data will be destroyed at the end of the study.

Signature / Name: __________________________

Date: (DAY) (MONTH) / 2010

I, the researcher, certify that I have explained to the above participant about the contents and procedure of the study according to the attached information page. I have covered all points listed on the consent form above.

Signature / Name: __________________________

Date: (DAY) (MONTH) / 2010
Appendix 12: Questionnaire for microscopists (English)

CODE —

Questionnaire on Malaria (Microscopists-level)

Date

Day / Month / Year

Starting (time)   Ending (time)   ➔   Total

: : ____________
Section 1: Socio-demographic characteristics

Q1 Where do you live? Barangay __________________________

Q2 When did you become Microscopists? Month ________ Year ________

Q3 Age __________________________ (YEARS OLD)

Q4 Gender □ Man / □ Woman

Q5 Marital status (Choose one) □ Never married / □ Married / □ Divorced / □ Widowed

Q6 Distance from home to nearest Health Center ________ minutes by □ Walk / □ Other (specify) ______

Q7 Religion (Choose one) □ Catholic / □ Protestant / □ 4 Square / □ LRC / □ Muslim
□ Traditional animism / □ Other (specify) __________

Q8 Ethnicity (Choose one)
□ Cebuano / □ Bisaya (binisaya) / □ Cuyunon (Cuyunan) / □ Bicolana / □ Mindanao
□ Kagayanan / □ Tagalog / □ Tagbanwa / □ Palawan (Pinalawan, Palawanon) / □ Other (specify) ______

Q9 Education status (Choose one)
□ No grade completed / □ Elementary Grade / □ High school Year / □ College Year / □ Higher

Q10 Occupation (Choose one. If there are more than 2, please check the one you spend more time.)
□ Housewife Farmer: Rice / □ Farmer: Coconut / □ Fishery / □ Shop keeper or owner /
□ Tourist business / □ Construction worker / □ Civil servant / □ Teacher / □ Other (specify) ______

Q11 Does your household own these items?
   11.1 Electricity □ Yes / □ No
   11.2 Radio □ Yes / □ No
   11.3 Television □ Yes / □ No
   11.4 Refrigerator □ Yes / □ No
   11.5 Bicycle □ Yes / □ No
   11.6 Motorcycle □ Yes / □ No
   11.7 Bike-Car □ Yes / □ No
   11.8 Tin or cement wall □ Yes / □ No
Section 2: Activities of Microscopists

Q12 What was the most important reason for you to become Microscopists? (Choose one)
   - 12.1. Interested in Malaria treatment
   - 12.2. Interested in Malaria prevention
   - 12.3. Recommended by villagers / village heads (Barangay Captain)
   - 12.4. Interested in additional income
   - 12.5. Interested in reducing Malaria in your village
   - 12.6. Interested in saving villagers' lives from Malaria
   - 12.7. Other (specify) ________________________________

Q13 How many patients did you see last week? __________ Person(s)

Q14 How many of your patients were Malaria last week? __________ Person(s) (If 0 → Q18)

Q15 If Q4 is Yes, please tell me about the kinds and the amount.
   - 15.1. Plasmodium. malariae
     - A. Yes (_______person/week)/ B. No
   - 15.2. Plasmodium. ovale
     - A. Yes (_______person/week)/ B. No
   - 15.3. Plasmodium. vivax
     - A. Yes (_______person/week)/ B. No
   - 15.4. Plasmodium. falciparum
     - A. Yes (_______person/week)/ B. No
   - 15.5. Unknown
     - A. Yes (_______person/week)/ B. No

Q16 How much time do you spend time on preventive activities on both seasons? (For example, vector control.)
   16.1. Dry season: ____________ days per week and ____________ hours in each day
   16.2. Wet season: ____________ days per week and ____________ hours in each day

Q17 How much time do you spend time on curative activities on both seasons? (For example, Microscopic test.)
   17.1. Dry season: ____________ days per week and ____________ hours in each day
   17.2. Wet season: ____________ days per week and ____________ hours in each day

Q18 Do villagers visit you to seek for health advice when they are sick? (Choose one)
   - A. Regularly / B. Sometimes / C. Rarely / D. Never

Q19 Do you visit villagers to find Malaria patients? (Choose one)
   - A. Regularly / B. Sometimes / C. Rarely / D. Never (if Never → Q21)

Q20 If Yes, when do you visit villagers to find Malaria patients? (Choose one)
   - A. Mainly in rainy season / B. Mainly in dry season / C. Both seasons
Q21. When you see a sick villager, what do you do to diagnose if he/she has Malaria?
   21.1. Observe his/her symptoms  □ A. Always / □ B. Sometimes / □ C. Never
   21.2. Ask symptoms from his/her family  □ A. Always / □ B. Sometimes / □ C. Never
   21.3. Take body temperature (by hand or thermometer)  □ A. Always / □ B. Sometimes / □ C. Never
   21.4. Use Microscope  □ A. Always / □ B. Sometimes / □ C. Never
   21.5. Rapid Diagnostic Test  □ A. Always / □ B. Sometimes / □ C. Never
   21.6. Take him/her to health center or hospital for Malaria diagnosis  □ A. Always / □ B. Sometimes / □ C. Never
   21.7. Other (specify) ____________________________________________

Q22. If you find out that he/she has Malaria, what do you do to treat him/her?
   22.1. Give anti-Malarial drugs  □ A. Always / □ B. Sometimes / □ C. Never
   22.2. Advise him/her to buy anti-Malarial drugs  □ A. Always / □ B. Sometimes / □ C. Never
   22.3. Refer to health center or hospital  □ A. Always / □ B. Sometimes / □ C. Never
   22.4. Other (specify) ____________________________________________

Q23. When you gave anti-Malarial drugs to Malaria patients, did you explain about the medicine? (Choose one)
   □ A. Yes / □ B. No (If No → Q25)

Q24. If Yes, what did you explain about the anti-Malarial drugs?
   24.1. Kinds/number of tablets the patient needs to take each day (on Day 1, 2 and 3)
         □ A. Always / □ B. Sometimes / □ C. Never
   24.2. As soon as the patient gets better, he/she can stop taking the anti-Malarial drugs
         □ A. Always / □ B. Sometimes / □ C. Never
   24.3. If the patient has left-over tablets, he/she can keep them or gave them to others
         □ A. Always / □ B. Sometimes / □ C. Never
   24.4. Even though the patient gets better, he/she has to take all the tablets you give
         □ A. Always / □ B. Sometimes / □ C. Never
   24.5. Other (specify) ____________________________________________

Q25. What do you think will happen if the Malaria patient does not take all the tablets you gave?
   25.1. They can save some tablets for the next Malaria infection
         □ A. Appropriate / □ B. Inappropriate / □ C. Don’t know
   25.2. They can save some tablets for family members or friends to treat Malaria in the future
         □ A. Appropriate / □ B. Inappropriate / □ C. Don’t know
   25.3. The patient’s Malaria cannot be treated completely
         □ A. True / □ B. False / □ C. Don’t know
   25.4. It will end up spreading drug resistance
         □ A. Possible / □ B. Impossible / □ C. Don’t know
   25.5. Other (specify) ____________________________________________

4 / 12
Q26 Have you referred any Malaria patients to health centers or hospitals? (Choose one)
   □ A. Yes / □ B. No (If No → Q28)

Q27 If Yes, why did you do so?
   27.1. Because he/she was tested positive and had severe symptoms
       □ A. Always / □ B. Sometimes / □ C. Never
   27.2. Because he/she was tested negative for Malaria
       □ A. Always / □ B. Sometimes / □ C. Never
   27.3. Because he/she was tested negative and had severe symptoms
       □ A. Always / □ B. Sometimes / □ C. Never
   27.4. Because I did not have Malaria medicine
       □ A. Always / □ B. Sometimes / □ C. Never
   27.5. Because the patient did not recover from Malaria
       □ A. Always / □ B. Sometimes / □ C. Never
   27.6. Because the patient was pregnant.
       □ A. Always / □ B. Sometimes / □ C. Never
   27.7. Other (specify) ____________________________

Q28 After you treated Malaria patients, did you make a home visit and check if he/she recovered? (Choose one)
   □ A. Always / □ B. Sometimes / □ C. Never

Q29 After you treated Malaria patients, did you ask him/her or family if he/she recovered? (Choose one)
   □ A. Always / □ B. Sometimes / □ C. Never

Q30 Have you ever explained to villagers how to prevent Malaria? (Choose one)
   □ A. Yes / □ B. No (If No → Q32)

Q31 If Yes, what did you explain about Malaria prevention?
   31.1. Don’t come close to malaria patients?
       □ A. Always / □ B. Sometimes / □ C. Never
   31.2. Don’t share utensils or dishes with Malaria patients
       □ A. Always / □ B. Sometimes / □ C. Never
   31.3. Avoid mosquito bites
       □ A. Always / □ B. Sometimes / □ C. Never
   31.4. Use mosquito coils
       □ A. Always / □ B. Sometimes / □ C. Never
   31.5. Spray your house
       □ A. Always / □ B. Sometimes / □ C. Never
   31.6. Clear bush around your house
       □ A. Always / □ B. Sometimes / □ C. Never
   31.7. Fill out water pools
       □ A. Always / □ B. Sometimes / □ C. Never
   31.8. Cover water jars/tanks
       □ A. Always / □ B. Sometimes / □ C. Never
   31.9. Wear long-sleeve shirts/pants
       □ A. Always / □ B. Sometimes / □ C. Never
   31.10. Sleep under bed-nets at home
       □ A. Always / □ B. Sometimes / □ C. Never
   31.11. Bring mosquito nets when you go to the forest
       □ A. Always / □ B. Sometimes / □ C. Never
Section 3: Knowledge of Malaria Epidemiology and Prevention

Q32 What are the major symptoms of Malaria?

32.1. Stomach ache
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

32.2. Diarrhea
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

32.3. Nausea
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

32.4. Fever
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

32.5. Shivering
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

32.6. Coma
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

32.7. Sweating
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

32.8. Convulsion
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

32.9. Anemia
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

32.10. Headache
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

32.11. Other (specify) ________________________________

Q33 How do you think Malaria is transmitted?

33.1. By cough or sneeze of Malaria patients
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

33.2. By touching blood of Malaria patients
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

33.3. By touching utensils that Malaria patients used
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

33.4. By sharing food with Malaria patients
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

33.5. By coming close to mosquitoes
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

33.6. By mosquito bites
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

33.7. Other (specify) ________________________________

Q34 Do you happen to know which mosquitoes transmit Malaria?

34.1. Male Culex
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

34.2. Female Culex
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

34.3. Male Anopheles
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

34.4. Female Anopheles
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

34.5. Male Aedes
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

34.6. Female Aedes
 ☐ A. Yes / ☐ B. No / ☐ C. Don’t know

Q35 When do you think mosquitoes are the most active? (Choose one)

☐ A. Morning / ☐ B. Afternoon / ☐ C. Evening-Night / ☐ D. Other (specify)________________________
Q36 How did you learn about disease transmission?

36.1. Parents    □A. Yes / □B. No
36.2. School education    □A. Yes / □B. No
36.3. TV    □A. Yes / □B. No
36.4. Book/Magazine    □A. Yes / □B. No
36.5. Microscopist’s training    □A. Yes / □B. No
36.6. Other (specify)__________________________

Q37 Do you take any preventive measures do you usually take for yourself? (Choose one)

☐A. Yes (If Yes→Don’t ask Q31) /  ☐B. No (If No→Q40)

Q38 If Yes, what preventive measures do you usually take for yourself?

38.1. Come back home before dawn
    □A. Always / □B. Most of the time / □C. Sometimes / □D. Rarely / □E. Never
38.2. Wear long-sleeve shirts/pants
    □A. Always / □B. Most of the time / □C. Sometimes / □D. Rarely / □E. Never
38.3. Sleep under bed-nets at home
    □A. Always / □B. Most of the time / □C. Sometimes / □D. Rarely / □E. Never
38.4. Refrain from going to the forest
    □A. Always / □B. Most of the time / □C. Sometimes / □D. Rarely / □E. Never
38.5. Bring mosquito nets to the forest
    □A. Always / □B. Most of the time / □C. Sometimes / □D. Rarely / □E. Never
38.6. Other (specify)__________________________

Q39 If Yes, how did you learn about disease prevention

39.1. Parents    □A. Yes / □B. No
39.2. School education    □A. Yes / □B. No
39.3. TV    □A. Yes / □B. No
39.4. Book/Magazine    □A. Yes / □B. No
39.5. Microscopist training    □A. Yes / □B. No
39.6. Other (specify)__________________________

Q40 If No, why is that you did not take preventive measures against Malaria?

40.1. Because I am not afraid of Malaria    □A. Yes / □B. No
40.2. Because I have Malaria Immunity    □A. Yes / □B. No
40.3. Because there is little chance of death from Malaria    □A. Yes / □B. No
40.4. Because I am not sure what kinds of preventive measures are effective    □A. Yes / □B. No
40.5. Other(specify)__________________________
Section 4: Job-satisfaction

Ask yourself; How satisfied am I with this aspect of my Microscopist job?

**Very Sat.** means I am very satisfied with this aspect of my job

**Sat.** means I am satisfied with this aspect of my job

**N.** means I can’t decide whether I am satisfied or not with this aspect of my job

**Disat.** means I am dissatisfied with this aspect of my job

**Very Dissat.** means I am very dissatisfied with this aspect of my job

<table>
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<tr>
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<tbody>
<tr>
<td>Q41 Being able to keep busy all the time</td>
<td>□</td>
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<td>Q42 The chance to work alone on the job</td>
<td>□</td>
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<td>Q43 The chance to do different things from time to time</td>
<td>□</td>
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<td>Q44 The chance to be “somebody” in the community</td>
<td>□</td>
<td>□</td>
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<tr>
<td>Q45 The way my boss handles his/her workers</td>
<td>□</td>
<td>□</td>
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<td>Q46 The competence of my supervisor in making decisions</td>
<td>□</td>
<td>□</td>
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<td>Q47 Being able to do things that don't go against my conscience</td>
<td>□</td>
<td>□</td>
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<td>Q48 The way my job provides for steady employment</td>
<td>□</td>
<td>□</td>
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<td>Q49 The chance to do things for other people</td>
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<td>□</td>
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<td>Q50 The chance to tell people what to do</td>
<td>□</td>
<td>□</td>
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<td>Q51 The chance to do something that makes use of my abilities</td>
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<tr>
<td>Q52 The way malaria control program (CHO) policies are put into practice</td>
<td>□</td>
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<tr>
<td>Q53 My pay and the amount of work I do</td>
<td>□</td>
<td>□</td>
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</tbody>
</table>
Section 5: Microscope Use

◆ Preparation and documentation

Q61 Preparation of microscope, needle, methanol and first-aid dressings, Gimza staining solution, slides and object slides  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never

Q62 Check the expiry dates of all the solutions  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never

Q63 Write the names of the patient on the slides  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never

Q64 Write the date on each slide  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never

Q65 Select the 4th finger of the left hand to take the peripheral blood sample  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never

Q66 Clean the finger with alcohol swab and allow it to air dry  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never

Q67 Record the results in the CHW register  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never

◆ Microscope usage

Q68 Take patients peripheral blood  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never

Q69 Prepare samples immediately after taking the blood  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never

Q70 Use clean slide glass  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never

Q71 Put one droplet of blood on the slide glass  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never
Q72 With cover glass spread the blood so as to obtain a thin layer of blood cells

Q73 The angle of the cover glass is 30 degrees

Q74 Dry immediately

Q75 Fix with methanol for 2 to 5 minutes

Q76 Too much drying damages the staining

Q77 Keep the slides fixed with methanol horizontally and add the staining solution

Q78 When lots of samples are used, use staining bottle

Q79 Staining time depends on the concentration of the dyes (usually between 10 and 30 minutes)

Q80 Maximum staining time is 45 minutes and even if you wait longer, the color does not change

Q81 When you want to stain strongly you stain again with newly prepared staining solutions

Q82 Wash with buffer

Q83 If insoluble pigments are present at the surface of the solutions, take them off carefully

Q84 Adjust the intensity of the staining by the washing time with the buffer

Q85 After washing, take off the water quickly and dry with cold air

Q86 Observe with microscope

Q87 Nuclei of malaria protozoa inside red blood cells will be stained in red

Q88 The cytoplasm of malaria protozoa inside red blood cells will be stained in blue

Q89 When malaria protozoa is found inside red blood cells, check which kind of protozoa it is

☐ A. Always / ☐ B. Sometimes / ☐ C. Never
Identification of the kind of malaria protozoa

Q90  In the case of *Plasmodium falciparum*, how do you identify?

1. The size of infected red blood cells
2. The spike on the surface of infected red blood cells
3. The spots inside the infected red blood cells
4. Several protozoa inside a same red blood cell
5. Protozoa stages on the red blood sample
6. Big ring structures
7. Chromatin dots
8. Band structures
9. Proliferative bodies in sausage shapes

Q91  In the case of *Plasmodium vivax*, how do you identify?

1. The size of infected red blood cells
2. The spike on the surface of infected red blood cells
3. The spots inside the infected red blood cells
4. Several protozoa inside a same red blood cell
5. Protozoa stages on the red blood sample
6. Big ring structures
7. Chromatin dots
8. Band structures
9. Proliferative bodies in sausage shapes

Q92  In the case of 4-days fever malaria, how do you identify?

1. The size of infected red blood cells
2. The spike on the surface of infected red blood cells
3. The spots inside the infected red blood cells
4. Several protozoa inside a same red blood cell
5. Protozoa stages on the red blood sample
6. Big ring structures
7. Chromatin dots
8. Band structures
9. Proliferative bodies in sausage shapes
Q93 In the case of egg-shape fever malaria, how do you identify?

1. The size of infected red blood cells
   - A. Small / B. Normal / C. Big
2. The spike on the surface of infected red blood cells
   - A. Yes / B. No
3. The spots inside the infected red blood cells
   - A. Maurer dots / B. Schuffner dots / C. Ziemann dots
4. Several protozoa inside a same red blood cell
   - A. Always / B. Sometimes / C. Never
5. Protozoa stages on the red blood sample
   - A. Only the ring form / B. All stages
6. Big ring structures
   - A. Always / B. Never
7. Chromatin dots
   - A. Always / B. Never
8. Band structures
   - A. Always / B. Never
9. Proliferative bodies in sausage shapes
   - A. Always / B. Never

◆ Safe handling and disposal

Q94 Put on a new pair of gloves when starting
   - A. Always / B. Sometimes / C. Never
Q95 Do not touch patient blood
   - A. Always / B. Sometimes / C. Never
Q96 Use a sterile lancet to puncture the patient finger
   - A. Always / B. Sometimes / C. Never
Q97 Discard the needle in sharps bins just after usage
   - A. Always / B. Sometimes / C. Never
Q98 Use a new needle for each patient
   - A. Always / B. Sometimes / C. Never
Q99 Discard glove wrappers, alcohol swab, desiccant and cassette in non-sharps container
   - A. Always / B. Sometimes / C. Never

Thank you very much for your cooperation!
Questionnaire on Malaria (Microscopists-level)

Date

Day / Month / Year

Starting (time) Ending (time) ➔ Total

: : _____
Section 1: Socio-demographic characteristics

Q1 Tirahan Barangay ____________________________

Q2 Kailan naging BMM? Buwan_________ Taon_________

Q3 Edad ____________________ (YEARS OLD)

Q4 Kasarian □Lalaki / □Babae

Q5 Karayuan (Pumili ng isa) □Di nag-asawa / □May-asawa / □Diborsyo / □Balo

Q6 Layo ng bahay sa Health Center ____________ minuto kung maglalakad/ Iba pa (specify)________________

Q7 Relihiyon (Pumili ng isa) □Katoliko / □Protestante / □4 Square / □LRC / □Muslim
□Pagano / □Iba pa (specify)________

Q8 Etniko (Pumili ng isa)
□Cebuano / □Bisaya (binisaya) / □Cuyunon (Cuyunan) / □Bicolana / □Mindanao
□Kagayanan / □Tagalog / □Tagbanwa / □Palawan(Pinalawon, Palawanon) / □Iba pa (specify)_______

Q9 Pinag-aralan (Pumili ng isa)
□ Di nakapag-aral / □Elementarya / □Mataas na Paaralan / □Kolehiyo / □Higher

Q10 Hanapbuhay (Pumili; kung higit sa 2 piliin ang mas mahabang oras na ginugugol)
□ Housewife / □Farmer: Rice / □Farmer: Coconut / □Fishery / □Shop keeper or owner / □ Tourist business / □Construction worker / □Civil servant / □Teacher / □Other (specify)________

Q11 Does your household own these items?

11.1 Elektrisidad □A. Oo / □B. Hindi
11.2 Radyo □A. Oo / □B. Hindi
11.3 Telebisyon □A. Oo / □B. Hindi
11.4 Refrigerator □A. Oo / □B. Hindi
11.5 Bisikleta □A. Oo / □B. Hindi
11.6 Motorsiklo □A. Oo / □B. Hindi
11.7 Bisikleta may sidecar □A. Oo / □B. Hindi
11.8 Yero o Semento) □A. Oo / □B. Hindi
**Section 2: Activities of Microscopists**

**Q12** Ano ang pinakamahalagang dahilan para maging BMM 9Pumili ng isa) (Pumili ng isa)

- □ 12.1. Interesado sa panggagamot ng malaria
- □ 12.2. Interesado sa pag-iwas sa malaria
- □ 12.3. Rekomendasyon ng barangay o ng Kapitan
- □ 12.4. Interesado sa dagdag na kita
- □ 12.5. Interesadong mapababa ang malaria sa barangay
- □ 12.6. Interesadong mailigtas ang buhay ng mga kabarangay sa malaria
- □ 12.7. Iba pa (specify) ________________________________

**Q13** Ilan ang pasyente na nagpatingin noong nakaraang lingo? __________ Person(s)

**Q14** Ilan sa mga ito ay Malaria? _______ Person(s) (Kung wala → Q16)

**Q15** Kung OO Ano klase ng Malaria at ilan?

- 15.1. *Plasmodium. malariae*  □ A. Oo (_______person/week) / □ B. Hindi
- 15.2. *Plasmodium. ovale*  □ A. Oo (_______person/week) / □ B. Hindi
- 15.3. *Plasmodium. vivax*  □ A. Oo (_______person/week) / □ B. Hindi
- 15.4. *Plasmodium. falciparum*  □ A. Oo (_______person/week) / □ B. Hindi
- 15.5. Unknown  □ A. Oo (_______person/week) / □ B. Hindi

**Q16** Gaanong oras ang ginugugol ninyo sa nga gawain para sa pag-iwas ng malaria: Tag-ulan? Tag-araw?

- 16.1. Tag-init: _______ araw sa 1 lingo at _______ oras sa 1 araw
- 16.2. Tag-ulan _______ araw sa 1 linggo at _______ oras sa 1 araw

**Q17** Gaanong oras ang ginugugol sa mga gawain para sa pagpapagaling ng malaria: Tag-ulan? Tag-init?

- 17.1. Tag-init: _______ araw sa 1 lingo at _______ oras sa 1 araw
- 17.2. Tag-ulan _______ araw sa 1 linggo at _______ oras sa 1 araw

**Q18** Ang mga kabarangay ninyo ba ay humuhingi ng payong pangkalusugan kung sila ay may sakit? (Pumili ng isa)

- □ A. Palagi / □ B. Minsan / □ C. Madalang / □ D. Hindi

**Q19** Bumibisita ka ba sa mga kabarangay upang magtingin ng may sakit ng malaria? (Pumili ng isa)

- □ A. Palagi / □ B. Minsan / □ C. Madalang / □ D. Hindi (Kung Hindi → Q21)

**Q20** Kung Oo, Kailan ka bumibisita sa mga taga barangay para alamin ang may malaria? (Pumili ng isa)

- □ A. Tuwing Tag-ulan / □ B. Tuwing tag-init / □ C. Parehong panahon
Q21 Kung may matagpuan kang may sakit, ano ang ginagawa upang malalaman kung siya ay may malaria?

21.1. Obserbahan ang simtomas
21.2. Tinatanong ang simtomas sa kasambahay
21.3. Kinukuha ang temperature (gamit ang kamay o thermometer)
21.4. Sinisilip sa microscope
21.5. Gamit ang RDTs
21.6. Dinadala sa Health Center o sa Ospital upang malaman kung may malaria
21.7. Iba pa (specify) ____________________________________________________

Q22 Kung malaman na may malaria, ano ang ginagawa para gamutin?

22.1. Binibigyan ng gamot sa malaria
22.2. Pinabibili ng gamot sa malaria
22.3. Pinapupunta sa health center o hospital
22.4. Iba pa (specify) ____________________________________________________

Q23 Kapag ibinibigay ang gamot sa malaria, ipinaliliwanag ba kung ano ang mga gamot? (Pumili ng isa)

□ A. Oo / □ B. Hindi (Kung Hindi → Q25)

Q24 Kung Oo, Ano ang ipinaliliwanag tungkol sa gamot?

24.1. Ano/ dami ng tableta na kailangang inumin ng pasyente araw-araw
24.2. Kapag gumaling na ang pasyente pwede na niyang itigilang pag-inom ng gamot
24.3. Kung may matirang gamut pwede niyang itago o ipamigay sa iba
24.4. Kung ang pasyenta ay magaling na, kailangan ubusin niya ang lahat ng gamot
24.5. Iba pa (specify)______________________________________________________

Q25 Ano sa palagay ninyo ang mangyayari kung hindi uususin ang lahat ng ibinigay na gamot?

25.1. Pwede nilang itabi ang natirang gamot para sa susunod na pagkakasakit
25.2. Pwedeng itabi para sa kapamilya o kaibigan na magkakasakit ng malaria sa darating na panahon
25.3. Ang pasyente na may malaria ay di na magagamot
25.4. Magiging sanhi ng paglagananap ng “drug resistance”
25.5. Iba pa (specify)______________________________________________________
Q26 Nagpadala ka na ba ng pasyente sa health center o sa ospital? (Pumili ng isa)
□ A. Oo / □ B. Hindi (Kung Hindi → Q28)

Q27 Kung Oo bakit mo pinadala?
27.1. May malaria at malala na □ A. Palagi / □ B. Minsan / □ C. Hindi
27.2. Walang malaria □ A. Palagi / □ B. Minsan / □ C. Hindi
27.3. Walang malaria ngunit malala ang sintomas □ A. Palagi / □ B. Minsan / □ C. Hindi
27.4. Wala akong gamot sa malaria □ A. Palagi / □ B. Minsan / □ C. Hindi
27.5. Hindi gumaling ang pasyente sa malaria □ A. Palagi / □ B. Minsan / □ C. Hindi
27.6. Ang pasyente ay buntis □ A. Palagi / □ B. Minsan / □ C. Hindi
27.7. Iba pa (specify) ___________________________________________________________________________________

Q28 Pagkatapos mong mabigyan ng gamot ang pasyente, binibisita mo ba para alamin kung siya ay gumaling? (Pumili ng isa)
□ A. Palagi / □ B. Minsan / □ C. Hindi

Q29 Pagkatapos mong mabigyan ng gamot ang pasyente, tinatanong mo ba ang kapamilya o ang pasyente kung gumaling? (Pumili ng isa)
□ A. Palagi / □ B. Minsan / □ C. Hindi

Q30 Ipinaliwanag mo ba sa mga taga barangay kung paano maiiwasan ang malaria? (Pumili ng isa)
□ A. Oo / □ B. Hindi (Kung Hindi → Q32)

Q31 Kung Oo, ano ang ipinaliwanag ninyo tungkol sa pagiwas sa malaria?
31.1. Huwag lalapit sa may sakit na malaria □ A. Palagi / □ B. Minsan / □ C. Hindi
31.2. Huwag gagamit ng kagamitan ng may sakit ng malaria □ A. Palagi / □ B. Minsan / □ C. Hindi
31.3. Iwasan ang kagat ng lamok □ A. Palagi / □ B. Minsan / □ C. Hindi
31.4. Gumamit ng "mosquito coils" □ A. Palagi / □ B. Minsan / □ C. Hindi
31.5. Magisprey ng bahay □ A. Palagi / □ B. Minsan / □ C. Hindi
31.6. Linisin ang dawag sa paligid □ A. Palagi / □ B. Minsan / □ C. Hindi
31.7. Alisin ang mga maipon na tubig □ A. Palagi / □ B. Minsan / □ C. Hindi
31.8. Takpan ang imbakan ng tubig □ A. Palagi / □ B. Minsan / □ C. Hindi
31.9. Magsuot ng mahabang manggas □ A. Palagi / □ B. Minsan / □ C. Hindi
31.10. Matulog sa loob ng kulambo □ A. Palagi / □ B. Minsan / □ C. Hindi
31.11. Magdala ng kulambo kung pupunta sa gubat □ A. Palagi / □ B. Minsan / □ C. Hindi
Section 3: Knowledge of Malaria Epidemiology and Prevention

Q32 What are the major symptoms of Malaria?
32.1. Sakit ng tiyan  □ A. Oo / □ B. Hindi / □ C. Di alam
32.2. Nagtatae  □ A. Oo / □ B. Hindi / □ C. Di alam
32.3. Nagsusuka  □ A. Oo / □ B. Hindi / □ C. Di alam
32.4. Nilalagnat  □ A. Oo / □ B. Hindi / □ C. Di alam
32.5. Giniginaw  □ A. Oo / □ B. Hindi / □ C. Di alam
32.6. Walang malay  □ A. Oo / □ B. Hindi / □ C. Di alam
32.7. Pinagpapawisan  □ A. Oo / □ B. Hindi / □ C. Di alam
32.8. Hinihimatay  □ A. Oo / □ B. Hindi / □ C. Di alam
32.9. Namumutla  □ A. Oo / □ B. Hindi / □ C. Di alam
32.10. Masakit ang ulo  □ A. Oo / □ B. Hindi / □ C. Di alam
32.11. Iba pa (specify) ________________________________

Q33 Paano nasasalin ang malaria?
33.1. Pag-ubo at bahin ng may sakit na malaria  □ A. Oo / □ B. Hindi / □ C. Di alam
33.2. Sa paghawak sa dugo ng may malaria  □ A. Oo / □ B. Hindi / □ C. Di alam
33.3. Paghawak sa kagamitan na gamit ng may sakit na malaria  □ A. Oo / □ B. Hindi / □ C. Di alam
33.4. Makihati sa pagkain ng may sakit na malaria  □ A. Oo / □ B. Hindi / □ C. Di alam
33.5. Paglapit sa lamok  □ A. Oo / □ B. Hindi / □ C. Di alam
33.6. Kagat ng lamok  □ A. Oo / □ B. Hindi / □ C. Di alam
33.7. Iba pa (specify) ________________________________

Q34 Alam ba ninyo kung anong lamok ang nagdadala ng malaria?
34.1. Lalaking Culex  □ A. Oo / □ B. Hindi / □ C. Di alam
34.2. Babaeng Culex  □ A. Oo / □ B. Hindi / □ C. Di alam
34.3. Lalaking Anopheles  □ A. Oo / □ B. Hindi / □ C. Di alam
34.4. Babaeng Anopheles  □ A. Oo / □ B. Hindi / □ C. Di alam
34.5. Lalaking Aedes  □ A. Oo / □ B. Hindi / □ C. Di alam
34.6. Babaeng Aedes  □ A. Oo / □ B. Hindi / □ C. Di alam

Q35 Kailan ang mga lamok ay aktibo? (Pumili ng isa) □ A. Umaga / □ B. Hapon / □ C. Gabi / □ D. Iba pa ______

Q36 Paano mo nalaman ang tungkol sa pagsalin ng sakit na malaria?
36.1. Magulang  □ A. Oo / □ B. Hindi
36.2. Napag-aralan sa eskuwelahan  □ A. Oo / □ B. Hindi
36.3. Telebisyon  □ A. Oo / □ B. Hindi
36.4. Libro/Magazine  □ A. Oo / □ B. Hindi
36.5. Pagsasanay bilang Microscopist  □ A. Oo / □ B. Hindi
36.6. Iba pa (specify) ________________________________
Q37 May ginagawa ka bang paraan ng pag-iwas sa iyong sarili?

☐ A. Oo (Kung Oo→huwag itanong Q40) / ☐ B. Hindi (Kung Hindi → Q40)

Q38 Kung Oo, Ano ang mga paraan na ginagawa?

38.1. Bumabalik sa bahay bago magdapa ng gaton

☐ A. Palagi / ☐ B. Di palagi / ☐ C. Minsan / ☐ D. Bihira / ☐ E. Hindi

38.2. Magsuot ng mahabang manggas

☐ A. Palagi / ☐ B. Di palagi / ☐ C. Minsan / ☐ D. Bihira / ☐ E. Hindi

38.3. Matulog sa loob ng kulambo

☐ A. Palagi / ☐ B. Di palagi / ☐ C. Minsan / ☐ D. Bihira / ☐ E. Hindi

38.4. Iwasan ang pagpunta sa gubat

☐ A. Palagi / ☐ B. Di palagi / ☐ C. Minsan / ☐ D. Bihira / ☐ E. Hindi

38.5. Magdala ng kulambo kung pupunta sa gubat

☐ A. Palagi / ☐ B. Di palagi / ☐ C. Minsan / ☐ D. Bihira / ☐ E. Hindi

38.6. Iba pa (specify)

Q39 Kung Oo, paano mo nalaman ang paraan ng pag-iwas?

39.1. Magulang

☐ A. Oo / ☐ B. Hindi

39.2. Sa pag-aaral

☐ A. Oo / ☐ B. Hindi

39.3. Telebisyon

☐ A. Oo / ☐ B. Hindi

39.4. Libro/magazine

☐ A. Oo / ☐ B. Hindi

39.5. Pagsasanay bilang microscopist

☐ A. Oo / ☐ B. Hindi

39.6. Iba pa (specify)

Q40 If No, why is that you did not take preventive measures against Malaria? Kung hindi, bakit hindi ka gumagamit ng paraan upang makaiwas sa Malaria?

40.1. Because I am not afraid of Malaria

☐ A. Oo / ☐ B. Hindi

Hindi ako natatakot sa malaria

40.2. Because I have Malaria Immunity

☐ A. Oo / ☐ B. Hindi

Meron akong pananggalang laban sa malaria

40.3. Because there is little chance of death from Malaria

☐ A. Oo / ☐ B. Hindi

Kakaunti lamang ang namamatay sa malaria

40.4. Because I am not sure what kinds of preventive measures are effective

☐ A. Oo / ☐ B. Hindi

Hindi ako sigurado kung alin sa pamamaraan ng pag-iwas ang epektibo

40.5. Iba pa (specify)


Section 4: Job-satisfaction

Ask yourself; How **satisfied** am I with this aspect of my Microscopist job?

- **Very Sat.** means I am very satisfied with this aspect of my job
- **Sat.** means I am satisfied with this aspect of my job
- **N.** means I can’t decide whether I am satisfied or not with this aspect of my job
- **Disat.** means I am dissatisfied with this aspect of my job
- **Very Dissat.** means I am very dissatisfied with this aspect of my job

### Bilang microscopist , ito ang aking mga nararamdaman...

<table>
<thead>
<tr>
<th>Question</th>
<th>Very Sat.</th>
<th>Sat.</th>
<th>N.</th>
<th>Disat.</th>
<th>Very Dissat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q41 Laging may pinagkakaabalahan</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q42 Nagkaroon ng pagkakataaon na magtrahong mag-isa</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q43 Nagkaroon ng pagkakataoan na magtrabaho ng ibang bagay</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q44 Nagkaroon ng makilala o maiba sa komunidad</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q45 Paraan ng pinuno sa pakikitungo sa mga kawani</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q46 Ang pagiging kompiyansa ng pinuno na gumawa ng desisyon</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q47 Magkaroon ng pagkakataoan na gawin ang mga bagay na di labag sa kalooban</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q48 Ang trabaho ay nagging permanente</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q49 Makagawa ng ibang bagay sa kapwa</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q50 Nagkaroon ng pagkakataon na makapagbigay payo sa ibang tao kung ano ang dapat gawin</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q51 Ang pagkakataon na gumawa ng ibang bagay na gamitin and sariling abilidad</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q52 Nagkaroon ng pagkakataon na ang mga patakaran sa programa sa pagsugpo ng malaria ay maipatupad</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Q53 Ang aking tinatanggap na kabayaran/dami ng gawain na ginagampanan</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
Q54  Pagkakataon na mapalawak ang kaalaman sa sa gawaing ito

Q55  Ang kalayaan na gamitlib ang sariling paghusga

Q56  Pagkakataon na gamitin ang sariling pamamaraan sa pagtupad ng tungkulin

Q57  Ang kondisyon ng pinagtatrabuhuan

Q58  Ang magandang samahan ng mga katrabaho

Q59  Mga papuri na nakukuha sa maayos na trabaho

Q60  Ang pakiramdam ng katuparan na nakukuha sa trabaho

Section 5: Paggamit ng microscope

◆ Preparation and documentation

Q61  Paghahanda ng microscope, pantusok, methanol, first-aid dressing, giemsa, slides at iba pang kagamitan

Q62  Pag-alam kung paso na gamit sa pag "stain"

Q63  Paglagay ng pangalan ng pasyente sa slide

Q64  Paglagay ng petsa sa slide

Q65  Pagpili ng ikaapat na daliri ng kaliwang kamay para tusukin at gumawa ng smear

Q66  Paglinis ng daliri ng bulak na mag alcohol at patuyuin

Q67  Pagrekord ng resulta sa CHW register
Microscope usage

Q68 Pagkuha ng dugo

Q69 Gawin agad ang sample pagkatapos kunin

Q70 Paggamit ng malinis at bagong slides

Q71 Paglagay ng isang patak na dugo sa slides

Q72 Pagkalat ng dugo sa slide upang makagawa ng magandang thin smear

Q73 Ang angulo ng pangkalat ng dugo ay 30°

Q74 Patuyuin agad ang dugo

Q75 Lagyan ng methanol

Q76 Ang sobrang pagpatuyo ay makasisira ng stain

Q77 Kung ang slide ay nilalagyan ng methanol dapat ito ay nakatagiliid

Q78 Kung marami ang sample maaring gumamit ng staining rack o jar

Q79 Ang tagal ng paglalagay ng stain ay depende sa konsentrasyon ng stain (karaniwan 10-30 minuto)

Q80 Ang pinakamatagal na pag stain ay 45 minuto, kahit tagalan pa ito ay din a magbabago ang kulay

Q81 Kung gusting maging matingkad ang kulay pwede pang ulutin ang pagstain kahit ito ay na stain na

Q82 Hugasan ng buffer

Q83 Kung may mga maliliit na dumi sa ibabaw ng stain, alinsin ito ng dahan-dahan
Q84 Maiiba ang tindi ng kulay sa pamamagitan ng tagal sa paghugas

Q85 Pagkatapos hugasan, alisin agad sa tubigat patuyuin

Q86 Silipin sa microscope

Q87 Ang nuclei ng malaria ay nagiging kulay pula pagkatapos malagyan ng stain

Q88 Ang pinaka katawan ng malaria ay nagiging kulay asul

Q89 Kung makitang malaria, alaming kung anong klasw

**Identification of the kind of malaria**

Q90 Kung may makitang *P. malariae*, paano makikilala

1. Ang laki ng red blood cells
2. May mga spikes sa paligid ng red blood cells
3. May mga tuldok sa loob ng red blood cells
4. Marami sa loob ng red blood cells
5. Iba ibang stage sa loob ng red blood cells
6. May malaking stage sa loob ng red blood cells
7. May chromatin dot
8. May hugis pahalang sa red blood cells (band form)
9. May hugis sausage o saging

Q91 Kung may makitang *P. ovale*, paano makikilala

1. Ang laki ng red blood cells
2. May mga spikes sa paligid ng red blood cells
3. May mga tuldok sa loob ng red blood cells
4. Marami sa loob ng red blood cells
5. Iba ibang stage sa loob ng red blood cells
6. May malaking stage sa loob ng red blood cells
7. May chromatin dot
8. May hugis pahalang sa red blood cells (band form)
9. May hugis sausage o saging

*Proliferative bodies in sausage shapes*
Q92 Kung may makitang *P. vivax*, paano makikilala

91.1 Ang laki ng red blood cells  
91.2 May mga spikes sa paligid ng red blood cells  
91.3 May mga tuldok sa loob ng red blood cells  
91.4 Marami sa loob ng red blood cells  
91.5 Iba ibang stage sa loob ng red blood cells  
91.6 May malaking hugis singsing  
91.7 May chromatin dot  
91.8 May hugis pahalang sa red blood cells (band form)  
91.9 May hugis sausage o saging Proliferative bodies in sausage shapes

☐ A. Small / ☐ B. Normal / ☐ C. Big  
☐ A. Yes / ☐ B. No  
☐ A. Maurer dots / ☐ B. Schuffner dots / ☐ C. Ziemann dots  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never  
☐ A. Only the ring form / ☐ B. All stages  
☐ A. Always / ☐ B. Never  
☐ A. Singular number / ☐ B. Plural number  
☐ A. Always / ☐ B. Never  
☐ A. Always / ☐ B. Never

Q93 Kung may makitang *P. falciparum*, paano makikilala

91.1 Ang laki ng red blood cells  
91.2 May mga spikes sa paligid ng red blood cells  
91.3 May mga tuldok sa loob ng red blood cells  
91.4 Marami sa loob ng red blood cells  
91.5 Iba ibang stage sa loob ng red blood cells  
91.6 May malaking hugis singsing  
91.7 May chromatin dot  
91.8 May hugis pahalang sa red blood cells (band form)  
91.9 May hugis sausage o saging Proliferative bodies in sausage shapes

☐ A. Small / ☐ B. Normal / ☐ C. Big  
☐ A. Yes / ☐ B. No  
☐ A. Maurer dots / ☐ B. Schuffner dots / ☐ C. Ziemann dots  
☐ A. Always / ☐ B. Sometimes / ☐ C. Never  
☐ A. Only the ring form / ☐ B. All stages  
☐ A. Always / ☐ B. Never  
☐ A. Singular number / ☐ B. Plural number  
☐ A. Always / ☐ B. Never  
☐ A. Always / ☐ B. Never

◆ Safe handling and disposal  (Paraan ng paghawak at pagtapon ng mga ginamit)

Q94 Magsuot ng bagong glove kung magsisimula  
☐ A. Palagi / ☐ B. Minsan / ☐ C. Hindi

Q95 Huwag hawakan ang dugo ng pasyente  
☐ A. Palagi / ☐ B. Minsan / ☐ C. Hindi

Q96 Gumamit ng bagong lancet sa pagtusok sa pasyente  
☐ A. Palagi / ☐ B. Minsan / ☐ C. Hindi

Q97 Magkaroon ng tapunan ng lancet pagkatapos gamitin  
☐ A. Palagi / ☐ B. Minsan / ☐ C. Hindi

Q98 Gumamit ng bagong pantusok sa bawat pasyente  
☐ A. Palagi / ☐ B. Minsan / ☐ C. Hindi

Q99 Ang pagtapon ng gloves, bulak at iba pang kagamitan ay ihiwalay sa mga lancet.  
☐ A. Palagi / ☐ B. Minsan / ☐ C. Hindi

Thank you very much for your cooperation!
Appendix 14: Questionnaire for ex-malaria-patients (English)

CODE __

Questionnaire on Malaria (Community-level)

Date

TIME (Section 1 to 3)

■ Starting (time)  ■ Ending (time)  ➔ Total

:        :        :
Section 1: Socio-demographic characteristics

AREA
- Municipality ___________________________ Barangay ___________________________

PARTICIPANT
- Name of mother (First) ___________________________ (Last) ___________________________
- Age ___________________________ (years old)

- Occupation (Choose one. If there are more than 2, please check the one you spend more time.)
  □ Farmer: Rice / □ Farmer: Coconut / □ Fishery / □ Shop keeper or owner / □ Tourist business / □ Construction worker / □ Civil servant / □ Housewife / □ Other (specify) ___________________________

- Marital status (Choose one) □ Never married / □ Married / □ Divorced / □ Widowed

- Religion (Choose one) □ Roman Catholic / □ Muslim / □ Traditional animism / □ Other (specify) ___

- Ethnicity (Choose one)
  □ Cuyunon (Cuyunan) / □ Tagalog / □ Hiligaynon (Ilonggo) / □ Palawan (Pinalawon, Palawanon) / □ Cebuano / □ Ilocano / □ Bisaya (binisaya) / □ Kagayanan / □ Tagbanwa / □ Other (specify) ______

- Education status (Choose one)
  □ No grade completed / □ Elementary Grade / □ High school Year / □ College Year / □ Higher

HOUSEHOLD
- Number of human in your household ___________________________ person

- Number of children ___________________________ person

- What kinds of medical facility are there near your house? If Yes, how much minutes does it takes from your house?
  □ Traditional healer □ A. Yes (____ minutes) / □ B. No
  □ Regional hospital □ A. Yes (____ minutes) / □ B. No
  □ Governmental health center □ A. Yes (____ minutes) / □ B. No
  □ Microscopist □ A. Yes (____ minutes) / □ B. No
  □ Private clinic / practitioner □ A. Yes (____ minutes) / □ B. No
  □ Private pharmacy □ A. Yes (____ minutes) / □ B. No
  □ Drug seller □ A. Yes (____ minutes) / □ B. No
  □ NGO clinic or hospital □ A. Yes (____ minutes) / □ B. No
Does your household own these items?

- Electricity □A. Yes / □B. No
- Radio □A. Yes / □B. No
- Television □A. Yes / □B. No
- Refrigerator □A. Yes / □B. No
- Bicycle □A. Yes / □B. No
- Motorcycle □A. Yes / □B. No
- Bike-Car □A. Yes / □B. No
- Tin or cement wall □A. Yes / □B. No

Section 2: Health seeking behavior

Q1 Who in your household most recently suffered from fever?  (Choose one)

□A. Yourself
□B. Your spouse (__________ years old)
□C. Your son (__________ years old)
□D. Your daughter (__________ years old)
□E. Other (specify)____________________ (__________ years old)

Q2 When was this most recent fever episode?  ___________ days ago

Q3 Did you / your family has symptoms other than fever during most recent fever episode?

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>That episode</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1. Stomach ache</td>
<td>□A. Yes / □B. No</td>
</tr>
<tr>
<td>3.2. Diarrhea</td>
<td>□A. Yes / □B. No</td>
</tr>
<tr>
<td>3.3. Nausea</td>
<td>□A. Yes / □B. No</td>
</tr>
<tr>
<td>3.4. Fever</td>
<td>□A. Yes / □B. No</td>
</tr>
<tr>
<td>3.5. Shivering</td>
<td>□A. Yes / □B. No</td>
</tr>
<tr>
<td>3.6. Coma</td>
<td>□A. Yes / □B. No</td>
</tr>
<tr>
<td>3.7. Sweating</td>
<td>□A. Yes / □B. No</td>
</tr>
<tr>
<td>3.8. Convulsion</td>
<td>□A. Yes / □B. No</td>
</tr>
<tr>
<td>3.9. Anemia</td>
<td>□A. Yes / □B. No</td>
</tr>
<tr>
<td>3.10. Other (specify)__________</td>
<td>□A. Yes / □B. No</td>
</tr>
<tr>
<td>3.11. Don’t know</td>
<td>□A. Yes / □B. No</td>
</tr>
</tbody>
</table>

Q4 During your / your family's most recent fever episode, did your family seek treatment outside home?  (Choose one)

□A. Yes (If Yes→Q5) / □B. No (If No→Q31) / □C. Don’t know (If Don’t know→Section3)
Q5 Where, outside home, did you / your family first seek advice / treatment? (Choose one)
   □ A. Traditional healer / □ B. Regional hospital / □ C. Governmental health center
   □ D. Microscopist / □ E. Private clinic / practitioner / □ F. Private pharmacy
   □ G. Drug seller / □ H. NGO clinic or hospital / □ I. Friend / Neighbor
   □ J. Other (specify)______________________________

Q6 What was the reason for the first provider preference? Please choose all that apply.
   □ A. Quality of treatment provided / □ B. Experience of health provider
   □ C. Provider is polite / □ D. Good equipment
   □ E. Treatment being cheap or free / □ F. Provider is nearby
   □ G. Other (specify)________________________________________

Q7 Who made a decision to visit the first provider you answered? (Choose one)
   □ A. Patient himself / herself / □ B. Patient's father
   □ C. Patient’s mother / □ D. Patient’s son / □ E. Patient’s daughter
   □ F. Other (specify)________________________________________

Q8 How long after the fever started did you / your family first receive treatment? (Choose one)
   □ A. Same day
   □ B. Next day
   □ C. 2 days after the illness started
   □ D. 3 or more days after the illness started
   □ E. Don’t know or Don’t remember

Q9 What kind of treatment did you / your family receive? Please tick all that apply.
   □ A. Anti-malarial drug
   □ B. IM injection
   □ C. IV infusion
   □ D. Plants
   □ E. Traditional Medicine
   □ F. Other (specify)________________________________________
   □ G. Don’t know
Q10 What kind of Plants did you use? Please tick all that apply.
- □ A. Anona reticulata (custard apple)
- □ B. Areca catechu (areca of betelnut palm)
- □ C. Quisqualis indica (niyog-niyogan or Chinese honeysuckle)
- □ D. Leucaena leucocephala (ipil-ipil)
- □ E. Carica papaya (papaya)
- □ F. Cassia alata (alapulko or ringworm bush)
- □ G. Ananas comosus (pinya or pineapple)
- □ H. Other (specify)
- □ I. Don’t know
- □ J. Didn’t use any Plants.

Q11 What kind of Traditional medicine did you use? Please tick all that apply.
- □ A. Melaleuca leucadendron (cajeput oil tree)
- □ B. Tinospora crispa (makabuhay)
- □ C. Phyllanthus nirui (sampasampalukan or egg woman)
- □ D. Cissampelos pareira (sinsaw-sinsawan)
- □ E. Gliricidia sepium (kakawati)
- □ F. Cassia alata (akapulko or ringworm bush)
- □ G. Cassia alata (akapulko or ringworm bush)
- □ H. Cassia alata (akapulko or ringworm bush)
- □ I. Plumeria acutifolia (kalatsutsi or frangipani)
- □ J. Anona squamosa (atis or custard apple).
- □ K. Other (specify)
- □ L. Don’t know
- □ M. Didn’t use any traditional medicine

Q12 Did the person who had fever most recently have a blood test for malaria? (Choose one)
- □ A. Yes, dipstick. → Q13
- □ B. Yes, by microscope. → Q13
- □ C. Yes, but don’t know / don’t remember which one. → Q13
- □ D. No. → Q15
- □ E. Don’t know or Don’t remember. → Q15

Q13 Where did you / your family gets the blood test? (Choose one)
- □ A. Traditional healer /
- □ B. Regional hospital /
- □ C. Governmental health center
- □ D. Microscopist /
- □ E. Private clinic / practitioner /
- □ F. Private pharmacy
- □ G. Drug seller /
- □ H. NGO clinic or hospital /
- □ I. Friend / Neighbor
- □ J. Other (specify)
Q14 What was the result of blood test? (Choose one)
   □ A. Negative / □ B. Positive / □ C. Impossible to diagnose / □ D. Don’t know

Q15 Were you / your family diagnosed as Malaria? (Choose one)
   □ A. Yes / □ B. No / □ C. Impossible to diagnose / □ D. Don’t know or Don’t remember

Q16 Did you / your family takes any anti-Malarial drugs? (Choose one)
   □ A. Yes→ Q17 / □ B. No→ Q22 / □ C. Don’t know or Don’t remember→Q22

Q17 Who advised you / your family to take anti-malarial drugs? (Choose one)
   □ A. Traditional healer / □ B. Regional hospital / □ C. Governmental health center
   □ D. Microscopist / □ E. Private clinic / practitioner / □ F. Private pharmacy
   □ G. Drug seller / □ H. NGO clinic or hospital / □ I. Friend / Neighbor
   □ J. Yourself / □ K. Other (specify) ____________________________
   □ L. Don’t know or Don’t remember

Q18 Do you remember which anti-malarial drugs you / your family took? Please tick all that apply.
   □ A. Artemisinin / □ B. Artemether / □ C. Aetesunate
   □ D. Chloroquine / □ E. A+M / □ F. Fansidar
   □ G. Mefloquine / □ H. Malarine / □ I. Paracetamol
   □ J. Primaquine / □ K. Tetracycline
   □ L. Vitamins / □ M. Other (specify) ____________________________
   □ N. Don’t know / Don’t remember

Q19 Do you remember how many days you continued taking the anti-malarial drugs?
   1st anti-malarial drugs □ A. Yes(______ days) / □ B. Don’t remember
   2nd anti-malarial drugs(if there is) □ A. Yes(I used______ for______days) / □ B. Don’t remember

Q20 Did health provider of first health facility tell you / your family tell about
   20.1. Treatment schedule of anti-Malarial drugs □ A. Yes / □ B. No
   20.2. Possible adverse events of anti-Malarial drugs □ A. Yes / □ B. No
   20.3. Importance of completing full regimen of anti-Malarial drugs □ A. Yes / □ B. No
   20.4. What to do if you / your family did not get better □ A. Yes / □ B. No

Q21 Did you / your family gets better after consulting first treatment provider? (Choose one)
   □ A. Yes→ Section 3 / □ B. No→ Q22 / □ C. Don’t know→ Section 3

Q22 Did you seek further treatment outside home? (Choose one)
   □ A. Yes→ Q23 / □ B. No→ Section 3 / □ C. Don’t know or Don’t remember→ Section 3
Q23 Which health provider, outside home, did you / your family visit as second treatment source? (Choose one)

- A. Traditional healer
- B. Regional hospital
- C. Governmental health center
- D. Microscopist
- E. Private clinic
- F. Private pharmacy
- G. Drug seller
- H. NGO clinic or hospital
- I. Friend / Neighbor
- J. Other (specify)

Q24 What was the reason for the second provider preference? Please choose all that apply.

- A. Quality of treatment provided
- B. Experience of health provider
- C. Provider is polite
- D. Good equipment
- E. Treatment being cheap or free
- F. Provider is nearby
- G. Other (specify)

Q25 Who made a decision to visit the second provider you answered? (Choose one)

- A. Patient himself / herself
- B. Patient’s father
- C. Patient’s mother
- D. Patient’s son
- E. Patient’s daughter
- F. Other (specify)

Q26 How long after the fever started did you / your family first receive treatment? (Choose one)

- A. Same day
- B. Next day
- C. 2 days after the illness started
- D. 3 or more days after the illness started
- E. Don’t know or Don’t remember

Q27 What kind of treatment did you / your family receive? Please tick all that apply.

- A. Anti-malarial drug
- B. IM injection
- C. IV infusion
- D. Plants
- E. Traditional Medicine
- F. Other (specify)
- G. Don’t know
Q28 What kind of Plants did you use? Please tick all that apply.

- □ A. Anona reticulata (custard apple)
- □ B. Areca catechu (areca of betelnut palm)
- □ C. Quisqualis indica (niyog-niyogan or Chinese honeysuckle)
- □ D. Leucaena leucocephala (ipil-ipil)
- □ E. Carica papaya (papaya)
- □ F. Cassia alata (alapulko or ringworm bush)
- □ G. Ananas comosus (pinya or pineapple)
- □ H. Other (specify) ________________________________________________
- □ I. Don’t know
- □ J. Didn’t use any Plants.

Q29 What kind of Traditional medicine did you use? Please tick all that apply.

- □ A. Melaleuca leucadendron (cajeput oil tree)
- □ B. Tinospora crispa (makabuhay)
- □ C. Phyllanthus nirui (sampsampalukan or egg woman)
- □ D. Cissampelos pareira (sinsaw-sinsawan)
- □ E. Gliricidia sepium (kakawati)
- □ F. Cassia alata (akapulko or ringworm bush)
- □ G. Cassia alata (akapulko or ringworm bush)
- □ H. Cassia alata (akapulko or ringworm bush)
- □ I. Plumeria acutifolia (kalatsutsi or frangipani)
- □ J. Anona squamosa (atis or custard apple).
- □ K. Other (specify) ________________________________________________
- □ L. Don’t know
- □ M. Didn’t use any traditional medicine

Respondents who sought treatment outside home 3 or more times → Q30
Respondents who sought treatment outside home 1 to 2 times → Section 3

Q30 Which health facility, if any, did you visit as third treatment source? (Choose one)

- □ A. Traditional healer / □ B. Regional hospital
- □ C. Governmental health center / □ D. Microscopist
- □ E. Private clinic / practitioner / □ F. Private pharmacy
- □ G. Drug seller / □ H. NGO clinic or hospital
- □ I. Friend / Neighbor / □ J. Other (specify) ____________________________________________

Please go to Section 3
Q31 Why you didn’t seek treatment outside home? (Choose one)
- □ A. Did not have enough money / too expensive
- □ B. Too far
- □ C. Got better soon
- □ D. Other (specify)

→ Please go to Section 3

Section 3: Knowledge of Malaria Epidemiology and Prevention

Q32 Have you ever heard about Malaria?
- □ A. Yes → Q33 / □ B. No → Section 4 / □ C. Don’t know → Section 4

Q33 What are the major symptoms of Malaria?
- 33.1. Stomach ache □ A. Yes / □ B. No / □ C. Don’t know
- 33.2. Diarrhea □ A. Yes / □ B. No / □ C. Don’t know
- 33.3. Nausea □ A. Yes / □ B. No / □ C. Don’t know
- 33.4. Fever □ A. Yes / □ B. No / □ C. Don’t know
- 33.5. Shivering □ A. Yes / □ B. No / □ C. Don’t know
- 33.6. Coma □ A. Yes / □ B. No / □ C. Don’t know
- 33.7. Sweating □ A. Yes / □ B. No / □ C. Don’t know
- 33.8. Convulsion □ A. Yes / □ B. No / □ C. Don’t know
- 33.9. Anemia □ A. Yes / □ B. No / □ C. Don’t know
- 33.10. Other (specify) □ A. Yes / □ B. No / □ C. Don’t know
- 33.11. Don’t know □ A. Yes / □ B. No / □ C. Don’t know

Q34 How do you think Malaria is transmitted?
- 34.1. By cough or sneeze of Malaria patients □ A. Yes / □ B. No / □ C. Don’t know
- 34.2. By touching blood of Malaria patients □ A. Yes / □ B. No / □ C. Don’t know
- 34.3. By touching utensils that Malaria patients used □ A. Yes / □ B. No / □ C. Don’t know
- 34.4. By sharing food with Malaria patients □ A. Yes / □ B. No / □ C. Don’t know
- 34.5. By coming close to mosquitoes □ A. Yes / □ B. No / □ C. Don’t know
- 34.6. By mosquito bites □ A. Yes / □ B. No / □ C. Don’t know
- 34.7. Other (specify) ____________________________

Q35 When do you think mosquitoes are the most active? (Choose one)
- □ A. Morning / □ B. Afternoon / □ C. Evening-Night / □ D. Other (specify)______________________
Q36 How did you learn about disease transmission?

36.1. Parents  □ A. Yes / □ B. No
36.2. School education  □ A. Yes / □ B. No
36.3. TV  □ A. Yes / □ B. No
36.4. Book/Magazine  □ A. Yes / □ B. No
36.5. Microscopist’s training  □ A. Yes / □ B. No
36.6. Other (specify) __________________________

Q37 Do you take any preventive measures do you usually take for yourself? (Choose one)

□ A. Yes (If Yes → Don’t ask Q40) / □ B. No (If No → Q40)

Q38 If Yes, what preventive measures do you usually take for yourself?

38.1. Come back home before dawn
   □ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never
38.2. Wear long-sleeve shirts/pants
   □ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never
38.3. Sleep under bed-nets at home
   □ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never
38.4. Refrain from going to the forest
   □ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never
38.5. Bring hammock nets to the forest
   □ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never
38.6. Other (specify) __________________________

Q39 If Yes, how did you learn about disease prevention

39.1. Parents  □ A. Yes / □ B. No
39.2. School education  □ A. Yes / □ B. No
39.3. TV  □ A. Yes / □ B. No
39.4. Book/Magazine  □ A. Yes / □ B. No
39.5. Microscopist training  □ A. Yes / □ B. No
39.6. Other (specify) __________________________

Q40 If No, why is that you did not take preventive measures against Malaria?

40.1. Because I am not afraid of Malaria  □ A. Yes / □ B. No
40.2. Because I have Malaria Immunity  □ A. Yes / □ B. No
40.3. Because there is little chance of death from Malaria  □ A. Yes / □ B. No
40.4. Because I am not sure what kinds of preventive measures are effective  □ A. Yes / □ B. No
40.5. Other ¥(specify) __________________________
Section 4: Community perception of the Microscopists

Q41 Do you have a Microscopists in your village?
   □ A. Yes / □ B. No → END / □ C. Don't know → END

Q42 Are you satisfied with the work of Microscopists? (Choose one)
   □ A. Very well / □ B. Well / □ C. Reasonable level / □ D. Not so good / □ E. Bad

Q43 Why you choose Q33? What was the most important reason? Chose all reason)
   □ A. Quality of treatment provided / □ B. Experience of health provider
   □ C. Politeness of the provider / □ D. Quality of the equipment
   □ E. Cost of treatment / □ F. The distance to the provider
   □ G. Other (specify) ________________________________

Q44 Do you think there is an important difference between the perceptions in the treatment of Microscopist? (For example, by ethnic group, age, sex) (Choose one) □ A. Yes / □ B. No → END

Q45 If Yes, who are likely to get treatment form Microscopists?(Chose all person)
   □ A. Boy/ □ B. Girl / □ C. Men / □ D. Women / □ E. Specific ethnicity (specify)______________
   □ F. The rich / □ G. The poor / □ H. Microscopist relatives / □ I. Non-relatives of Microscopist /
   □ J. Other (specify)________________________________________

Q46 If Yes, who are not likely getting treatment from Microscopists? (chose every person)
   □ A. Boy/ □ B. Girl / □ C. Men / □ D. Women / □ E. Specific ethnicity (specify)______________
   □ F. The rich / □ G. The poor / □ H. Microscopist relatives / □ I. Non-relatives of Microscopist /
   □ J. Other (specify)________________________________________

Thank you very much for your cooperation!
Questionnaire on Malaria (Community-level)

Date

- Day / Month / Year
- Starting (time) → Ending (time) → Total

CODE: —
Section 1: Socio-demographic characteristics

AREA
Q1 Munisipyo __________________________ Barangay __________________________

PARTICIPANT
Q2 Name (Pangalan) __________________________ (Apelyido) __________________________
Q3 Edad __________________________ (taon gulong)
Q4 Kasarian □ Lalaki / □ Babae

Q5 Hanapbuhay (Pumili ng isa. Kung mahigit sa dalawa, markahan ang mas may mahabang oras na ginugugol)
□ Magsasaka, pala / □ magsasaka, sa niyugan / □ Mangsingisda / □ May ari ng tindahan o nagbabantay / □ Turista / □ manggagawa / □ kawani / □ / maybahay / □ Barangay Kagawad / □ Guro sa pampublikong paaralan / □ Iba pa (specify)________________________

Q6 Katayuan sa buhay (pumili ng isa) □ Di nagasawa / □ may asawawa / □ hiwalay / □ balo

Q7 Relihiyon (pumili ng isa) □ Katoliko Romano / □ Muslim / □ Tradistional animisya / □ Baptist Baptist / □ Iba pa __________________________

Q8 Etniko (pumili ng isa)
□ Cuyunon (Cuyunan) / □ Tagalog / □ Hiligaynon (Ilonggo) / □ Palawan (Pinalawon, Palawanon) / □ Mindanao / □ Cebuano / □ Ilocano / □ Bisaya (binisaya) / □ Kagayanon / □ Tagbanwa / □ Iba pa (specify) __________________________

Q9 Natapos sa pag-aaral (pumili ng isa)
□ No grade completed / □ Elementary Grade / □ High school Year / □ College Year / □ Higher
Walang natapos/ Mababang paaralan/ mataas na paaralan/ Kolehiyo/mas mataas sa Kolehiyo

Kabahayan
Q10 Ilan ang nakatira sa inyong kabahayan? __________ person

Q11 Ilan ang bata __________ person
Q12 Anong uri ng nga pasilidad na pangkalusugan malapit sa inyong tirahan? Kung ilang minuto ang layo sa inyong tirahan?

Q12-1 Albularyo □A. Oo (____ minuto) / □B. Hindi

Q12-2 Satellite Clinic □A. Oo (____ minuto) / □B. Hindi

Q12-3 RHU □A. Oo (____ minuto) / □B. Hindi

Q12-4 Microscopist □A. Oo (____ minuto) / □B. Hindi

Q12-5 Pribadong Klinika/doctor □A. Oo (____ minuto) / □B. Hindi

Q12-6 Pribadong parmasiya □A. Oo (____ minuto) / □B. Hindi

Q12-7 Nagbebenta ng gamut □A. Oo (____ minuto) / □B. Hindi

Q12-8 Klinika ng NGO o Hospital □A. Oo (____ minuto) / □B. Hindi

* Q13 Ang inyo bang tahanan ay mayroong mga susumusunod ng kagamitan?

Q13-1 Elektrisidad □A. OO/ □B. Hindi

Q13-2 Radyo □A. OO/ □B. Hindi

Q13-3 Telebisyon □A. OO/ □B. Hindi

Q13-4 Reprigerator □A. OO/ □B. Hindi

Q13-5 Bisikleta □A. OO/ □B. Hindi

Q13-6 Motorsiklo □A. OO/ □B. Hindi

Q13-7 Bisikleta na may side-car □A. OO/ □B. Hindi

Q13-8 Il Ang tahanan ay gawa sa Yero at semei □A. OO/ □B. Hindi
Section 2: Health seeking behavior

Q14 Sino sa miyembro ng pamilya ang nagkalagnat ng mga nakaraang ilang araw? (pumili ng isa)
- □ A. ang iyong sarili
- □ B. ang iyong asawa (___________ years old)
- □ C. ang iyong anak (___________ years old)
- □ D. Ibang / sino (___________ years old)

Q15 Kailan itong nakaraang lagnat? ______________ araw

Q16 Kayo ba o ang miyembro ng pamilya ay nakaramdam ng ibang simtom maliban sa lagnat?

<table>
<thead>
<tr>
<th>Simtomas</th>
<th>That episode</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q16-1 Sakit ng tiyan</td>
<td>□ A. OO / □ B. Hindi</td>
</tr>
<tr>
<td>Q16-2 Pagtatae</td>
<td>□ A. OO / □ B. Hindi</td>
</tr>
<tr>
<td>Q16-3 Naduduwal</td>
<td>□ A. OO / □ B. Hindi</td>
</tr>
<tr>
<td>Q16-4 Sakit ng Ulo</td>
<td>□ A. OO / □ B. Hindi</td>
</tr>
<tr>
<td>Q16-5 Panginginig</td>
<td>□ A. OO / □ B. Hindi</td>
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<tr>
<td>Q16-6 Walang malay</td>
<td>□ A. OO / □ B. Hindi</td>
</tr>
<tr>
<td>Q16-7 Pagpapawis</td>
<td>□ A. OO / □ B. Hindi</td>
</tr>
<tr>
<td>Q16-8 Kombulsiyon</td>
<td>□ A. OO / □ B. Hindi</td>
</tr>
<tr>
<td>Q16-9 Pamumutla</td>
<td>□ A. OO / □ B. Hindi</td>
</tr>
<tr>
<td>Q16-10 Iba pa (specify)___________</td>
<td>□ A. OO / □ B. Hindi</td>
</tr>
<tr>
<td>Q16-11 Di alam</td>
<td>□ A. OO / □ B. Hindi</td>
</tr>
</tbody>
</table>

Q17 Noon bang nagkalagnat ang sinuman sa pamilya, kayo ba kumunsulta sa iba?
- □ A. OO / □ B. Hindi (tumungo sa Q20) / □ C. Di alam (tumungo sa Sec 3)

Q18 Saan kayo unang kumunsulta o humingi ng payo? (pumili ng isa)
- □ A. Albularyo / □ B. Satellite Clinic / □ C. RHU
- □ D. Microscopist / □ E. Pribadong Klinik/ doktor / □ F. pribadong parmasiya □ G. sa mga nagbebenta ng gamot / □ H. Klinika o hospital ng NGO / □ I. Kaibigan / □ J. Kapitbahay
- □ K. Di alam / □ L. Iba pa (specify)____________________________

Q19 Ano ang dahilan kung bakit ka pumunta sa… (sagot sa Q18) pumili ng lahat na sasabihin
- □ A. Paraan ng paggamot na ibinigay / □ B. provider Karanassan ng nagbigay lunas
- □ C. Magalang ang nagbigay lunas / □ D. May mahusay na kagamitan □ E. Ang mga gamot ay mura o libre / □ F. Malapit lang sa / □ G. Iba pa (specify)____________________________
Q20  Sino ang nagdesisyon para magpatingin o pumunta sa (sagot sa Q18) o hindi magpagamot (pumili ng isa)
□ A. Ang pasyete mismo  □ B. Ang Tatay ng pasyente
□ C. Ang nanay ng pasyente / □ D. Anak ng pasyente
□ E. Iba pa (specify)________________________________________________

Q21  Gaano na katagal na nilalagnat bago nakatanggap ng gamot? (pumili ng isa)
□ A. Parehong araw na nakaramdam ng sakit
□ B. Sumunod na araw
□ C. Makalipas ang 2 araw ng magsimula ang karamdaman
□ D. 3 o higit pang araw ng magsimula ang karamdaman
□ E. Di alam o di matandaan
□ F. Di ginamot

Q22  Ang tao bang nagkalagnat ay kamakailan ay nagpasuri ng dugo para sa malaria? (pumili ng isa)
□ A. OO, paggamit ng ‘dipstick’
□ B. Oo, sa pamamagitan ng pagsilip sa microscope
□ C. OO, di alam ang paraan o nakalimutan
□ D. Hindi (Tumungo sa Q25)
□ E. Di alam, di matandaan

Q23  Saan kayo nag pasuri ng dugo?
□ A. Albularyo / □ B. Satellite Clinic / □ C. RHU
□ D. Microscopist / □ E. Pribadong klinik/doktor / □ F. Pribadong parmasiya □ G. Nagbebenta ng gamot /
□ H. Klinik o hospital ng NGO/ □ I. Kaibigan/ □ J. Kapitbahay
□ K. Di alam / □ L. Iba pa (specify)________________________________________________

Q24  Ano ang resulta? (pumili ng isa)
□ A. Negative / □ B. Positive / □ C. Di madiagnose / □ D. Hindi nagpatingin ng dugo / □ E. Di alam

Q25  Kayo o miyembro ban g pamilya ay na (pumili ng isa)
□ A. Oo / □ B. Hindi / □ C. Di madiagnose / □ D. Hindi nagpatingin ng dugo / □ E. Di alam

Q26  Paano nalaman na may lagnat ? (pumili ng isa)
□ A. SA paghipo sa katawan / □ B. Sa paggamit ng termometro / □ C. Di nalaman na may lagnat/ □ D. Iba pa
(Specify) ____________________________________________

Q27  Uminom ban g gamut para sa malaria? (pumili ng isa)
□ A. OO / □ B. Hindi / □ C. Di alam o nakalimutan

Q28  May roon nab a kayong gamut para sa malaria sa inyong tahanan? (pumili ng isa)
Q29 Nakainom na ba ng gamut para sa malaria bago nagpakunsulta o nagpagamot. (pumili ng isa)
□ A. OO / □ B. Hindi / □ C. Di alam o nakalimutan

Q30 Sino ang nagpayo na uminom ng gamut para sa malaria? (pumili ng isa)
□ A. Albularyo/ □ B. Satellite Clinic / □ C. RHU
□ D. Microscopist / □ E. Pribadong klinika o doktor/ □ F. Pribadong parmasiya □ G. nagbebenta ng gamot / □ H. Klinika o hospital ng NGO/ □ I. Kaibigan/ □ J. Kapitbahay □ K. Di nakainom ng gamot para sa malaria / □ L. Di alam / □ M. Iba pa (specify)________________

Q31 Anu-ang gamot laban sa malaria ang naimon? Markahan ang lahat na sasabihin
□ A. Artemisinin / □ B. Artemether / □ C. Aetesunate
□ D. Chloroquine / □ E. A+M / □ F. Fansidar
□ G. Mefloquine / □ H. Malarine / □ I. Paracetamol
□ J. Primaquine / □ K. Tetracycline
□ L. Vitamins / □ M. Iba pa (specify)________________________________
□ O. Don’t know Di alam

Q32 Natatandaan ba ninyo kung ilang araw na inimon ang mga gamot? (pumili ng isa)
□ A. Oo (_________ days) / □ B. nakalimutan / □ C. Hindi uminom ng gamot.

Q33 Pinayuhan ba kayo ng inyong kinunsulta ng mga sumusunod?
33.1. Kung kailang dapat inumin ang gamot para sa malaria □ A. Oo / □ B. Hindi
33.2. Mga epekto o mararamdaman sa paginom ng gamot □ A. Oo / □ B. Hindi
33.3. Ang kabutihang dulot kung iinumin lahat ang gamot □ A. Oo / □ B. Hindi
33.4. Ano ang dapat gawin kung hindi bumuti o gumaling sa sa □ A. Oo / □ B. Hindi

Q34 Gumaling ba o bumuti ang lagay pagkatapos kumunsulta sa unang kinunsulta? (pumili ng isa)
□ A. Oo (Tumungo sa Sec 3) / □ B. Hindi / □ C. Di alam

Q35 Kumunsulta ba kayo sa iba pa? (pumili ng isa)
□ A. Oo / □ B. Hindi (Tumungo sa Q38) / □ C. Di alam o Nakalimutan

Q36 Kanino kayo kumunsulta sa ikalawang pagkakataon? (Tumungo sa Q39) (pumili ng isa)
□ A. Albularyo / □ B. Satellite Clinic / □ C. RHU
□ D. Microscopist / □ E. Pribadong Klinika o doktor / □ F. Pribadong Parmasiya
□ G. Nagbebenta ng gamot / □ H. Klinika o doktor ng NGO/ □ I. Kaibigan/ □ J. Kapitbahay
□ K. Hindi kumunsulta sa ikalawang pagkakataon (Tumungo sa Q37)/ □ L. Di alam
□ M. Iba pa (specify)________________
Q37  Kanino kayo kumunsulta sa ikatlong pagkakataon? (pumili ng isa)

☐ A. Albularyo / ☐ B. Satellite Clinic / ☐ C. RHU
☐ D. Microscopist / ☐ E. Pribadong klinika o doktor / ☐ F. Pribadong Parmasiya
☐ G. Nagbebenta ng gamot / ☐ H. Klinika o doctor ng NGO / ☐ I. Kaibigan / ☐ J. Kapitbahay
☐ K. Hindi kumunsulta sa ika-3 pagkakataon / ☐ L. Di alam / ☐ M. Iba pa (specify)____________________

Q38  Bakit di kayo kumunsulta sa iba.? (pumili ng isa)

☐ A. Hindi na kumunsulta sa iba
☐ B. Walang sapat na pera o masyadong mahal
☐ C. Malayo
☐ D. Gumaling kaagad
☐ E. Iba pa (specify)__________________________________________

Q39  Anong klaseng gamot ang inyong tinanggap?

☐ A. IM injection
☐ B. IV infusion
☐ C. Plants  (Tumungo sa Q 40)
☐ D. Traditional Medicine  (Tumungo sa Q 41)
☐ E. Iba pa (specify)__________________________________________
☐ F. Di alam

Q40  Anong klaseng halaman ang inyong ginamit?

☐ A. Anona reticulata (custard apple)
☐ B. Areca catechu (areca of betelnut palm)
☐ C. Quisqualis indica (niyog-niyogan or Chinese honeysuckle)
☐ D. Leucaena leucocephala (ipil-ipil)
☐ E. Carica papaya (papaya)
☐ F. Cassia alata (alapulko or ringworm bush)
☐ G. Ananas comosus (pinya or pineapple)
☐ H. Iba pa (specify)__________________________________________
☐ I. Did not had any plants for the treatment
☐ J. Di alam

Q41  What kind of Traditional medicine did you use?

☐ A. Melaleuca leucadendron (cajeput oil tree)
☐ B. Tinospora crispa (makabuhay)
☐ C. Phyllanthus nirui (sampasampalukan or egg woman)
☐ D. Cissampelos pareira (sinsaw-sinsawan)
☐ E. Gliricidia sepium (kakawati)
Section 3: Knowledge of Malaria Epidemiology and Prevention

Q42 Alam napo ba ninyo ang tungkol sa malaria?
- [ ] A. Oo (Tumungo sa Q43) / [ ] B. Hindi (Tumungo sa Sec 4) / [ ] C. Di alam (Tumungo sa Sec 4)

Q43 Anu-ano ang simptomas ng malaria?
- [ ] A. Sakit ng tiyan / [ ] B. Pagtatae / [ ] C. Pagduduwal / [ ] D. Lagnat / [ ] E. Pagduduwal
- [ ] F. Walang malay / [ ] G. Pagpapawis / [ ] H. Kumbulsiyon / [ ] I. Pamumutla
- [ ] J. Iba pa (specify)

Q44 Paano nakukuha ang sakit na malaria?
- [ ] A. Sa pag-ubo at bahin ng may sakit ng malaria / [ ] B. Sa paghawak ng dugo ng may sakit ng malaria / [ ] C. Sa paghawak ng mga gamit ng may sakit ng malaria
- [ ] D. Makisalo sa pagkain ng may sakit ng malaria / [ ] E. Sa paglapit sa lamot / [ ] F. Sa paghawak ng mga gamit ng may sakit ng malaria
- [ ] G. Pagkain ng may sakit ng malaria / [ ] H. Sa paghawak ng dugo ng may sakit ng malaria / [ ] I. Sa paghawak ng mga gamit ng may sakit ng malaria
- [ ] J. Iba pa (specify)

Q45 Alam ba ninyo kung anong klase ng lamok ang nagdadala ng i
- [ ] A. Babaeng Culex / [ ] B. Lalaking Culex / [ ] C. Lalaking Anopheles / [ ] D. Babaeng Anopheles
- [ ] E. Lalaking Aedes / [ ] F. Babaeng Aedes
- [ ] G. Di alam

[ ] F. Cassia alata (akapulko or ringworm bush)
[ ] G. Plumeria acutifolia (kalatsutsi or frangipani)
[ ] H. Anona squamosa (atis or custard apple).
[ ] I. Iba pa (specify)
[ ] J. Didn't use any traditional medicine
[ ] K. Di alam
Q46  Kailan sa tingning ninyo kumakagat ang nga lamok na nagdadala ng malaria? (pumili ng isa)

□ A. Umaga / □ B. Hapon / □ C. gabi / □ D. Iba pa (specify)

Q47  Paano ninyo nalaman ang tungol sa pagkalat ng sakit na malaria?

Q47-1 Magulang

□ A. Oo / □ B. Hindi

Q47-2 Sa paaralan

□ A. Oo / □ B. Hindi

Q47-3 Telebisyon

□ A. Oo / □ B. Hindi

Q47-4 Libro o mga babasahin

□ A. Oo / □ B. Hindi

Q47-5 Babasahin na ipinamimigay, nga patalastas

□ A. Oo / □ B. Hindi

Q47-6 Iba pa (specify)

□ A. Oo / □ B. Hindi

Q48  Kayo ba ay gumagamit ng paraan upang umiwas sa sakit na malaria? (pumili ng isa)

□ A. Oo / □ B. Hindi  (Tumungo sa Q51)

Q49  Anu-ano nga paraan ang inyong ginagamit?

Q49-1 Bumabalik sa bahay bago gumabi

□ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never

Q49-2 Pagsusuot ng damit/ polo na mahabang mangas/pantalon

□ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never

Q49-3 Pagtulog sa loob ng kulambo

□ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never

Q49-4 Pag-iwas sa pagpunta sa gubat

□ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never

Q49-5 Magdala ng kulambo kung pupunta sa gubat

□ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never

Q49-6 Paglagay ng nga kitikiti sa sapa

□ A. Always / □ B. Most of the time / □ C. Sometimes / □ D. Rarely / □ E. Never

Q49-7 Iba pa (specify)

□ A. Oo / □ B. Hindi

Q50  Saan ninyo nalaman ang mga paraan sa pag-iwas sa sakit na malaria?

Q50-1 Magulang

□ A. Oo / □ B. Hindi

Q50-2 Sa paaralan

□ A. Oo / □ B. Hindi

Q50-3 Telebisyon

□ A. Oo / □ B. Hindi

Q50-4 Libro/ babasahin

□ A. Oo / □ B. Hindi

Q50-5 Babasahin na ipinamimigay, nga patalastas

□ A. Oo / □ B. Hindi

Q50-6 Iba pa (specify)

□ A. Oo / □ B. Hindi

Q51  Bakit hindi kayo gumagamit ng mga pamamaraan sa pag-iwas sa sakit na malaria?

Q51-1. Dahil hindi ako natatakot sa sakit na malaria  □ A. Oo / □ B. Hindi / □ C. I took preventative measures
Q51-2. Dahil meron akong panaggalang laban sa malaria □A. Oo / □B. Hindi / □C. I took preventative measures
Q51-3. Dahil konti lang ang namamatay sa malaria □A. Oo / □B. Hindi / □C. I took preventative measures
Q51-4. Dahil hindi ako sigurado kung alin sa mga pamamaraan ng pag-iwas ang epektibo □A. Oo / □B. Hindi / □C. I took preventative measures
Q51-5. Iba pa (specify)

Section 4: Community perception of the Microscopists

Q52 Mayroon ba kayong barangay microscopists? (pumili ng isa) □A. Oo → Q66 / □B. Hindi → Q71 / □C. Di alam → Q71

Q53 Kayo ba ay kontento sa serbisyo ng inyong microscopists? □A. Very well / □B. Well / □C. Reasonable level / □D. Not so good / □E. Bad


Q55 SA inyong palagay, mayroon bang pagkakaiba ang pagbibigay lunas ng microcopist sa mga taga barangay? Halimbawa: sa mga netibo o ethnilko o isang grupo (pumili ng isa) □A. Oo / □B. Hindi → END


Q58 May gusto pa ba kayong isabihin?

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SALAMAT PO SA INYONG PANAHON

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Appendix 16: Ethical approvals from the Research Ethics Committee of the Graduate School of Medicine of the University
Appendix 17: A photograph of the first trained microscopist (right) in Palawan, examining blood-smear of febrile patients in the village