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Impact of training of mothers, drug shop attendants and voluntary health workers on effective diagnosis and treatment of malaria in Lagos, Nigeria

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Abstract

Background: The National Malaria Eradication Program and international agencies are keen on scaling up the use of malaria rapid diagnostic tests (mRDTs) and artemisinin-based combination therapies (ACTs) for effective diagnosis and treatment of the disease. However, poor diagnostic skills and inappropriate treatment are limiting the efforts. In Nigeria, a large proportion of infected patients self-diagnose and treat while many others seek care from informal drug attendants and voluntary health workers.

Aims: This study describes the impact of training voluntary health workers, drug shop attendants, and mothers on effective case detection and treatment of malaria in Lagos, Nigeria. **METHODS:** We trained mothers accessing antenatal care, drug shop attendants, and voluntary health workers selected from the three districts of Lagos, on the use of histidine-rich protein-2-based mRDTs and ACTs. Pre- and post-training assessments, focus group discussions (FGDs), and in-depth interviews (IDIs) were carried out.

Results: The knowledge, attitude, and skill of the participants to achieve the goal of “test, treat, and track” using mRDT and ACTs were low (11%–55%). There was a low awareness of other non-malaria fevers among mothers. Self-medication was widely practiced (31.3%). FGDs and IDIs revealed that health-care providers administered antimalarials without diagnosis. Training significantly improved participants’ knowledge and expertise on the use of mRDTs and ACTs ($P = 0.02$). The participants’ field performance on mRDT use was significantly correlated with their category (bivariate $r = 0.51$, $P = 0.001$). There was no statistically significant association between the participants’ level of education or previous field experience and their field performance on mRDT ($r = 0.12$, $P = 0.9$; $\chi^2 = 38$, $df = 2$ and $P = 0.49$).

Conclusion: These findings suggest that training of stakeholders in malaria control improves diagnosis and treatment of malaria. However, a broader scope of training in other settings may be required for an effective malaria control in Nigeria.

Keywords: Artemisinin, histidine-rich protein, malaria, Nigeria, rapid diagnostic test

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INTRODUCTION

Malaria is a protozoan parasitic disease caused by *Plasmodium* parasites transmitted through the bite of infected female *Anopheles* mosquitoes. *Plasmodium falciparum* malaria is the most prevalent in Nigeria, with stable transmission all around the year.^[1] In Nigeria, malaria is the most common cause of outpatient visits to health-care facilities and accounts for 60% OPD (Nigeria Malaria Operational Plan, 2015) and it is one of the leading causes of mortality, accounting for up to 40% of deaths in children <5 years in Nigeria, with a prevalence of 14% in Lagos, Nigeria.^[2]

Effective case management of malaria consists of accurate diagnosis, prompt access to efficacious treatment, provider compliance to treatment guidelines, and patient adherence to medication.^[3] Microscopy is the gold standard for malaria diagnosis. However, lack of trained personnel, equipment, and reagents for microscopy in rural areas in Africa with high malaria burden make the malaria rapid diagnostic test (mRDT), a suitable diagnostic tool.^[4] RDTs are lateral flow immunochromatographic test kits which confirm the presence of malaria parasites in suspected patients by detecting one or a combination of the following three *Plasmodium* antigens: *Plasmodium* histidine-rich protein 2 for *Plasmodium falciparum*; pan-specific aldolase to detect other species, such as *Plasmodium vivax*; and *Plasmodium* lactate dehydrogenase variants (with clonality specific to the various *Plasmodium* species infecting humans).^[5-7] Artemisinin-based combination therapy (ACT) became the recommended treatment for uncomplicated malaria following the emergence of resistance and high therapeutic failure associated with previous drugs, including sulfadoxine-pyrimethamine, chloroquine, and amodiaquine.^[8-10]

Facility-based services alone often do not provide adequate access to treatment within the crucial window of 24 h after the onset of symptoms. Integrated community case management of malaria (iCCM), implemented at community levels, increases access to detection and treatments leading to a reduction in mortality.^[11,12] Community case management of malaria (previously known as home management of malaria) consists of a voluntary health worker with no formal health training providing malarial diagnostic or therapeutic care outside of a formal health-care establishment.^[13,14] Self-treatment is the most common form of treatment in rural areas of Africa.^[15] However, there is only little known precedence of blood testing for malaria at drug shops and private homes as seen in blood sugar testing.

Parasitological confirmation of malaria infection currently employs three techniques: blood smear microscopy, polymerase chain reaction, and mRDTs.^[16-21] Access to diagnosis is limited by shortages of trained microscopists and reliable equipment.^[22] A panoramic view of this circumstance revealed that individuals seeking care for malaria at retail drug shops are usually presumptively treated.^[23] Drug retailers are the first source of care for 77% of children with febrile illnesses^[24] and for 35%–55% of adults with suspected malaria.^[25,26]

Community use of RDTs is not well documented, and the few studies carried out indicate that a much smaller fraction of patients (5.8%) are prescribed ACTs when RDTs are negative.^[27-30] Mothers are naturally the closest to infected children and even the family as a whole and are in this context the usual culprit of ineffective diagnosis and presumptive treatment.^[31]

We hypothesize that training of drug shop attendants, voluntary health workers, and mothers on effective malaria case detection and efficacious treatment would improve adoption of mRDTs and ACTs. We present here the report of the impact of our training on effective case detection and treatment of malaria using mRDTs and ACTs.

MATERIALS AND METHODS

Study design

The study was designed as a mixed pre-post study with qualitative and quantitative methods comprising focus group discussions (FGDs) and pre- and posttraining assessments. The FGDs explored the following areas: experiences with diagnosis and treatment of malaria, affordability of malaria treatment, and RDTs. The participants were taught the usefulness of malaria diagnosis before treatment, “test, treat, and track” of malaria. They thereafter were given hands-on training on the use of mRDTs and appropriate use of ACTs (1, 2, 3, and 4) and referral of pregnant women to secondary health facilities. They were then given the kits (each given a pack of mRDT (25 cassettes) to take home for practical use in their homes and areas while educating people around them about malaria, the diagnosis and treatment with ACT, and were evaluated over 4 months. Patients bought their ACTs if tested positive. The 1-day comprehensive training emphasized the practical use of ACTs and RDTs. The training was led by Ajibaye Olusola and other trainers were selected among trainers who equally participated in the train-the-trainers program in the Society for Family Health/Global Fund Round 8 malaria training programs.

Study participants

The participants were drawn from three areas representing places with major health-care facilities in rural, peri-urban, and urban settlements in Lagos State, Nigeria. The study population consisted of male and female drug shop operators, mothers attending ANC clinics, and voluntary health workers or community health workers who were purposively selected from the three districts of Lagos State (Lagos East, Lagos West, and Lagos Central). The drug shop attendants were selected at their zonal meetings and the voluntary health workers through the zonal coordinators covering all the districts in Lagos State.

Mothers attending ANC

Pregnant women who were registered at ANC clinics and were in their 16th–20th week of pregnancy were asked if they wanted to be included in the study.

Drug shop operators/attendants

These are study participants who own drug shop/private patent medicine vendors (PPMVs) or serve as attendants in a drug shop/PPMV and have been selling antimalarials prior to training.

Voluntary health workers

These are study participants who had basic knowledge of community health care and have a good rapport with community dwellers.

Study setting: Study site and location

The study was done in Nigeria, a West African country, one of the largest in the region with an estimated population of over 150 million people. It is classified as a low-income country with child (<5 years) mortality of 183/1000.^[32] Malaria is seasonally holoendemic in Lagos with the highest incidence in the rainy season (April–November).

The health facilities selected have relatively high number of outpatients and coverage of population and settlements in the categories. Ijede General Hospital is located in Ijede Local Council Development Area (LCDA). It is one of the centers characterized in 2011 as sentinel sites for malaria research in Nigeria. Ajeromi General Hospital located in Ajeromi, a densely populated peri-urban settlement located in Ajeromi-Ifelodun LCDA, Lagos West. Surulere General Hospital, however, is located in a densely populated urban center of Lagos state within the Surulere LCDA.

Sampling

The study included 30 voluntary health workers, 30 drug shop operators, and 152 pregnant women at ANC centers drawn each from the three districts. Participants were

selected purposively: the registered drug shop operators/attendants were selected at their zonal associational meetings. The voluntary health workers through the community social and religious leaders and the mothers were chosen at the ANCs of the selected general hospitals, with only mothers having delivery dates above 4 months selected.

Ethical considerations

This work was approved by the Institutional Review Board of the Nigerian Institute of Medical Research (NIMR) (Approval No: IRB/13/239). The study was conducted in accordance with the principles laid down by the World Assembly of 1975 on Ethics in Human Experimentation and the Helsinki Declaration.^[33] Informed and written consent was obtained from every participant including verbal consent where necessary – those who refused to participate or comply with the project requirements and guidelines were excluded and refusal did not attract any penalties.

Inclusion and exclusion criteria

Private patent medicine vendors

The included PPMVs were either owner of drug shops or attendants in a drug shop who will not change status until after the study. Those who did not operate a drug shop (hawkers) and wholesalers were excluded.

Mothers

The included mothers were those registered at the ANC as at the time of the study.

Those whose date of delivery fell below 4 months from the time of recruitment were excluded.

Voluntary health workers

They were those who never had a formal training in health education but were known in the communities as health-care givers.

Patients

The patients were febrile subjects who felt and had symptoms and/or signs of malaria.

Qualitative study

The qualitative study involved data collection through the use of FGDs and in-depth interviews (IDIs) as described by Krueger.^[34] A total of 10 FGD sessions were done with 6–10 participants per session, 2 for voluntary health workers, 2 for drug shop operators, and 6 for the mothers attending ANC. Five IDIs (1 with patent medicine sellers, 3 with mothers, and 1 with voluntary health workers) were held. The main objectives of the homogenous FGD and

IDI sessions were to assess participants' knowledge, attitude, and practice (KAP) of malaria prevention by long-lasting insecticidal nets (LLINs), diagnosis by mRDTs, and treatment especially with regard to ACTs. The sessions were recorded on tape and moderated in the English language with participants' consent. Key questions for discussion in the FGD and IDI are shown in Appendixes 1 and 2.

Monitoring/Follow-up

Participants were monitored/followed up monthly for 4 months during which their expertise on the practical use of mRDT (HRP2-based SD Bioline, India) and ACTs on the field was assessed and evaluated. During the period, participants filled a patient form for each cassette of mRDT used to capture the information required for the evaluation. Information about drug use before the test, the type of drug used, whether a patient is pregnant, age, sex, the outcome of test result, and whether referral was done were collected. The study was concluded in 12 months and carried out in collaboration with the National Malaria Elimination Program.

Data analysis

Data analysis was done using SPSS version 20 software (IBM Corp, Armonk, NY, USA) and EPI Info version 3.5 (Epi CDC, USA). Data generated from the study were analyzed using paired *t*-testing to test the effectiveness of training while test for association was carried out using Chi-square test, Pearson's correlation, and bivariate analysis. Test of statistical significance was set at $P < 0.05$ at 95% confidence interval (CI) while qualitative data were analyzed using NVivo data analysis.^[35]

RESULTS

A total of 176 participants, out of 212, completed the study [Table 1], in which 36 were lost to follow-up (30 mothers attending ANC, 5 voluntary health workers, and 1 PPMV). Nineteen mothers attending ANC, four voluntary health workers, and one PPMV declined participation in the study.

Overall performance of participants

Participants were assessed on KAP of malaria mRDT and ACTs before and after they were trained using a set of

structured questions as pretest and posttest. The sets of questions for the pre- and posttests examined the knowledge of the participants about malaria, cause, signs and symptoms, home management, and mRDT and ACT use and reporting.

Table 2 shows that bivariate analysis of the participants' field performance on mRDT use revealed a significant correlation between their categories and field performance, $r = 0.51$; $P = 0.001$. However, some of the mothers and voluntary health workers did not have good (up to 50%) general knowledge about malaria (what to do when one has malaria, prevention, and cure) until after the training (with + 32% and + 8.0% improvement, respectively). Overall, the PPMV category recorded a significant improvement in performance ($P = 0.008$).

Participants' field performance

Table 3 reveals findings and analysis from field performance of the participants included and trained in the study. In total, 11,229 patients were seen during the 4 months by all participants.

After training, on-the-field practical application by the participants showed perfect understanding (100%), especially of referral conditions. Pearson Chi-square analysis also revealed that there was no significant association between mRDT use of the participants and their previous malaria training experience ($\chi^2 = 38$; $df = 2$; $P = 0.49$; $CI = 95\%$). Moreover, their field performance of mRDT use was not associated with the participants' level of education with correlation coefficient $r = 0.12$ and $P = 0.9$.

Qualitative data

The selected participants for the IDI and FGD sessions were male patent medicine sellers, female voluntary health workers, and pregnant mothers attending antenatal clinics in Lagos. In general, the participants' ages ranged from 25 to 54 years with an average age of 39 years. A high literacy level was reported among the participants as virtually all had a minimum of secondary education.

Unlike the female focus groups, all the participants in the male group have had previous training on malaria diagnosis in the past (74% vs. 100%, $P = 0.003$) [Table 4]. Majority (98%) of the FGD participants had good knowledge of malaria considering their ability to vividly state and describe the cause and route of malaria transmission, the signs/symptoms of the disease, and how one can prevent the infection.

All the groups mentioned using the back of the hand to feel the temperature of the forehead and/or the neck of a febrile

Table 1: Participants' distribution

Category	Ajeromi	Ijede	Surulere	Total
ANC	40	46	36	122
LHWs	8	9	8	25
PPMV	10	10	9	29
Total	58	65	53	176

A total of 176 participants were included into the study. ANC: Mothers attending ante-natal clinics, LHWs: Lay health workers, PPMV: Private patent medicine vendors (drug shop operators)

Table 2: Performance of participants before and after the training

Assessment	Pretest (before training) (n=176)			Posttest (after training) (n=176)			Performance (%Δ)		
	ANC (%) ^a	LHWs (%) ^b	PPMV (%) ^c	ANC (%) ^a	LHWs (%) ^b	PPMV (%) ^c	ANC (%) ^{a-a}	LHWs (%) ^{b-b}	PPMV (%) ^{c-c}
Knowledge of cause of malaria	87.7	84.0	100	97.5	100	100	+9.8	+16	+0.0
Knowledge of symptoms and signs of malaria	99.2	100	96.6	100	100	100	+0.8	+0.0	+3.4
General knowledge of malaria	62.3	84.0	93.1	94.3	92.0	100	+32.0	+8.0	+6.9
Care of pregnant women with malaria	96.7	80.0	100	100	100	100	+3.3	+20.0	+0.0
Knowledge of home management of malaria	48.4	44.0	75.9	97.5	80.0	96.6	+49.1	+36.0	+20.7
Knowledge of malaria RDT	45.1	44.0	93.1	96.7	88.0	100	+51.6	+44	+6.9
Ability to use mRDT	17.2	16.0	93.1	90.2	92.0	100	+73.0	+76.0	+6.9
Proficiency in mRDT use	18.0	8.0	75.9	86.1	84.0	100	+68.1	+76.0	+24.1
Source and supply of mRDTs	45.1	16.0	82.8	95.9	88.0	96.6	+50.8	+72.0	+13.8
Knowledge of appropriate mRDT use	19.7	12.0	89.7	94.3	88.0	100	+74.6	+82.0	+10.3
Knowledge of mRDT cassette use	2.5	12.0	79.3	100	10	96.6	+97.5	+94.0	+17.3
Knowledge of ACTs	50.8	64.0	79.3	100	100	100	+49.2	+36	+20.7
Knowledge of types and examples of ACTs	33.6	52.0	79.3	98.4	96.0	100	+64.8	+44	+20.7

^{a,b,c}Before the training; ^{a,b,c}: After training. All the participants (100%) referred symptomatic patients with negative RDT results and pregnant women correctly; * $P < 0.05$. Paired *t*-test (pre-post) $P = 0.02$; bivariate analysis (category vs. performance) $r = 0.51$, $P = 0.001$. No=Number of participants that showed correct knowledge/ability on the field. Cutoff score=50%, > 50%=Good knowledge, <50%=Poor knowledge. RDTs: Rapid diagnostic tests, mRDT: Malaria RDT, ACTs: Artemisinin-based combination therapies, ANC: Antenatal clinic, PPMVs: Private patent medicine vendors, LHWs: Lay health workers

Table 3: Assessment of mRDT and artemisinin-based combination therapy use by participants (field performance) over 4 months

Item	ANC (n=122)	PPMV (n=29)	LHWs (n=25)	Total
Total number of patients	7598	1939	1692	11,229
Median age (years) of patients	20	21	19	20
Sex				
Male	3711	984	854	5549
Female	3887	955	838	5680
Fever	111 (90.9)	24 (82.8)	21 (84)	156
Symptoms				
Headache	106 (86.9)	24 (82.8)	17 (68)	147
Chills	40 (32.8)	20 (69.0)	14 (56)	74
Nausea	13 (10.7)	2 (6.9)	6 (24)	21
Vomiting	61 (50)	12 (41.4)	10 (40)	83
Others	61 (50)	11 (37.9)	14 (56.0)	86
Total RDTs done	7617	1939	1694	11,250
Total RDTs positive	1043 (13.7)	301 (15.5)	351 (20.7)	1695 (15.1)
Total RDTs negative	6555 (86.3)	1638 (84.5)	1341 (79.3)	9534 (84.7)
Total Invalid RDT results	19	-	2	21 (0.19)
Patients who took drug (antimalarial) before test	2716 (35.7)	463 (23.9)	336 (19.9)	3515 (31.3)
Patients who took drug after test	3188 (42)	1016 (52.4)	607 (35.9)	4811 (42.8)
Use of ACT (percentage of participants)	121 (99.2)	29 (100)	25 (100)	175 (99.4)
Correct use of ACTs (percentage of participants)*	119 (97.5)	29 (100)	25 (100)	173 (98.3)
Number of referral	3289	741	908	4938
Correct referrals (percentage of participants)	100	100	100	100

*Correct referrals: Pregnant women, patients with symptoms but negative RDT results correctly referred to hospitals for further test. ACT: Artemisinin-based combination therapies, ANC: Antenatal clinic, PPMVs: Private patent medicine vendors, LHWs: Lay health workers, RDTs: Rapid diagnostic tests

individual. Only a few of the PPMVs have actually been using the RDT kits for malaria diagnosis before treating clients at their shops charging a fee between US \$ 0.66 and US \$ 1.64 per test. They worried that the cost of malaria test would scare away their clients who are low-income earners.

DISCUSSION

To contribute to improved community case management of malaria implemented at community levels in Nigeria through effective case detection and treatment using mRDT and ACT, we have trained selected members of the community (drug

shop attendants, voluntary health workers, and mothers attending ANC) in Lagos State on mRDT, ACTs, and their use. The main outcome of our study was that a vast majority of the key players/stakeholders (members of the community involved in malaria detection, treatment, prevention, and/or control or as patients) in the implementation of the “test, treat, and track” strategy^[36-38] in Lagos State using mRDTs and ACTs, lack the basic required knowledge, awareness, and skill to achieve this goal.

The FGDs and IDIs revealed that the PPMVs actually charge varying fees for conducting mRDT for some

Table 4: Participants' status and demographic profile

Parameters	ANC (%)	VHWs (%)	PPMVs (%)
Age (years)	33.84±4.68	31.84±6.35	41.03±8.20
Age range (years)	23-54	26-47	20-58
Sex			
Male	-	8 (28)	19 (65.52)
Female	122	17 (72)	10 (34.48)
Marital status			
Single	2 (1.64)	5 (20)	9 (31.03)
Married	113 (92.62)	20 (80)	19 (65.52)
Separated	5 (4.1)	-	1 (3.45)
Widowed	2 (1.64)	-	-
Occupation			
Unemployed	9 (7.38)	-	-
Student	10 (8.2)	2 (8)	-
Housewife	28 (22.95)	4 (16)	-
Trader	35 (28.69)	4 (16)	-
Civil servant	5 (4.1)	2 (8)	-
Professional	9 (7.38)	2 (8)	29 (100)
Artisan	10 (8.2)	5 (20)	-
Others	16 (13.11)	6 (24)	-
Level of education			
Primary	3 (2.6)	5 (20)	2 (6.9)
Secondary	48 (39.34)	16 (64)	16 (55.17)
Tertiary	55 (45.08)	4 (16)	11 (37.93)
None	16 (13.11)	-	-
Malaria training experience			
Yes	26 (21.31)	12 (48)	25 (86.21)
No	96 (78.69)	13 (52)	4 (13.79)
Mean number of years since training	3	2	5
Trainer	LSG, LGAs, NGOs	Private Hsp, LSG	LSG, SFH, PPMV
Frequency of training	1	1	1

Mothers (ANC) $n=122$; LHW, $n=25$; PPMVs, $n=29$. ANC: Antenatal clinic, LHWs: Lay health workers, LGS: Lagos State Government, LGA: Local government area, NGOs: Nongovernmental organizations, Hsp: Hospital, PPMVs: Private patent medicine vendors

patients before selling drugs; however, the addition of such charges to cost of treatment limits the use of ACTs in malaria treatment as monotherapies are cheaper. It could be inferred that if a reliable supply chain is provided, for both mRDTs and ACTs, there will be improved access to appropriate iCCM.^[39] The implication of this study as a significant addition to the iCCM is that parasitological detection of malaria will be encouraged to prevent the emergence of drug resistance and reduce the menace of overdiagnosis of malaria. Findings from the quantitative part of the study revealed that the participants' categories were strongly correlated with their KAP of malaria, RDTs, ACTs, and field performance. The PPMVs and voluntary health workers by virtue of their vocations were relatively better accustomed and given the spread of knowledge in the use of RDTs for home testing and management of diseases such as diabetes which similarly required expressing blood for use in an RDT kit. An equally important observation from this study is the very high rate of indiscriminate use of drug by patients before visiting health-care facilities. This is representative of the general practice nationally. The danger of this abuse of antimalarial drugs in Nigeria is a hastened appearance of resistance to artemisinin-based drugs.^[9]

A major weakness of the study is the inability to follow-up on the results of referred cases. It is worthy to note that the patients expressed concern over negative RDT results in the presence of symptoms which were suggestive of malaria. The patients were referred. Results of the Widal test, however, agreed with the symptoms in few cases that were followed up. This further corroborates the necessity of training mothers on other causes of fever other than malaria consequent upon negative mRDT results. This is vital as the rate of overdiagnosed malaria cases is alarming among urban and rural dwellers in Nigeria.^[40] Analysis of the field performance of participants showed that about 28% of patients they saw and tested with RDTs took drug after the test with negative results. This is a strong indication that a large proportion of Nigerians may not have adequate knowledge about malaria, the symptoms, and diagnosis which could be very injurious to the process of malaria elimination if not properly handled. Many of the patients were reported to have commented that "health-care professionals in some facilities" give them antimalarials to use even when the tests have not been carried out. None of the participants' categories has had such training as this with the opportunity to practically apply the lessons learned and skills acquired from the training, which is most needed if the goal of malaria elimination efforts is to be achieved. Moreover,

the participants' field performance on the use of mRDT was not associated with their training experience ($\chi^2 = 38$; $df = 4$; $P = 0.49$; $CI = 95\%$) nor their level of education ($P > 0.05$).

This result is consistent with the reports from the qualitative study (FGD and IDI) where majority of the respondents have always known malaria diagnosis and treatment to be by the symptoms and signs of malaria at home.^[41,42] The general consensus was that drugs are not different, whether from hawkers, chemists, or pharmacies. Whereas, major malaria elimination goals include: (1) an annual parasite incidence (API) below 1 per 1000 population, (2) absence of indigenous cases, and (3) active surveillance.^[43] One significance of this intervention study is that it supports the achievement of a key determinant of malaria elimination indices, API, without which elimination is unachievable.

The strength of this study is the revelation that interventions targeted at improving adoption of mRDTs and ACTs, especially by mothers and PPMVs in villages, and other low socioeconomic settings in the country by incorporating trainings similarly may go a long way in hastening elimination in Nigeria.

We conclude from the results of this study that if drug shop attendants (PPMVs), mothers attending ANC, and voluntary health workers are trained on malaria KAP, mRDT, and ACT use, the CCM component of the drive to malaria elimination will be achieved speedily. However, other structural barriers are also important. These include improved availability and subsidized costs of mRDTs and good quality ACTs.

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Conflicts of interest

There are no conflicts of interest.

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APPENDIX

Appendix 1: Questions for FGD and IDI

1. Have you had any previous training on malaria diagnosis and/or treatment?
2. What are the causes and signs/symptoms of malaria that you know?
3. What are the ways to prevent malaria?
4. Do you have/use long-lasting insecticidal nets (LLIN)?
5. How do you know if it is malaria someone has?
6. Have you used malaria rapid diagnostic test (mRDT) kits before?
7. Do you know artemisinin-based combination therapies (ACTs)?
8. What do you think are the benefits of mRDT, ACTs, and LLIN?

Questions for Pre-Post Tests

These included whether they have seen or used mRDTs before, where the mRDTs can be sourced, what to do when an mRDT result for a pregnant woman is positive, what to do when a patient is febrile and mRDT result is negative and the appropriate drug for the treatment of uncomplicated malaria.

Appendix 2: Questionnaire

The questionnaire titled “Improving Adoption and use of mRDTs and ACTs for effective case detection and treatment” sought information from participants including their, age, sex, gender, marital status, vocations, level of education, whether or not the participants have attended similar training before, the frequencies and the organizers. The pre- and post-test questions further assessed the participants’ knowledge, attitude, and practice of malaria diagnosis and treatment.