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An Evaluation of Training and Supervisory Support for Healthcare Workers Treating Malaria in Some Health Facilities in Nigeria

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Abstract

This study was an off-shoot of a nationally representative Health Facility Assessment survey in Nigeria conducted to evaluate the training and supervision received by healthcare workers involved in malaria control by assessing their knowledge and practice of managing malaria in Global Fund-supported public health facilities. The study was a comparative-observational study conducted in twelve states of Nigeria and by stratified methodology, with data collection using structured questionnaires. Community Health Extension Workers (CHEW) comprised a higher percentage of health workers studied (51.5%). The majority (48.7%) of staff have had over 14 years of experience but majority of the health workers were not trained on malaria case management, commodity logistics system and health management information system in the 2 years preceding the survey. This resulted in a mixed (majorly good) outcome of knowledge and practice of the health workers. Giving the negative impact the health workers with poor knowledge and practice would create on health systems outcomes, there is a need to ensure training support for the healthcare workers in the public sector.

Keywords

Training, Malaria, Case Management

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1. Introduction

Globally, malaria still remains a huge public health burden, with Nigeria bearing the largest burden, contributing 25% of the 219 million malaria cases and 19% of the 435,000 malaria deaths globally (WMR 2018) [1]. Malaria is often suspected in endemic areas based on the manifestation of fever or a history of fever. This presumptive diagnosis gives rise to a propensity to offer unnecessary malaria treatment, thereby over-treating malaria in many instances [2]. This is often as a result of inadequate training of the health worker and/or poor attitude of the health worker towards adherence to recommended case management guidelines. Other reasons include the danger of delayed commencement of antibiotics for non-malaria fevers resulting from sepsis or other febrile illnesses [3]. The Global Malaria Technical Strategy recommends that all fever cases be tested before treatment in order to forestall abuse of the recommended Artemisinin-based Combination Therapy (ACT) for uncomplicated malaria [4].

The first pillar of Global Malaria Technical Strategy aims to achieve a universal access to malaria prevention, diagnosis and treatment; thus the prescription is: 'All patients who are suspected to have malaria should have the diagnosis confirmed by parasite detection methods such as quality-assured microscopy or a rapid diagnostic test …before administering antimalarial treatment.'' In addition, the health system should ‘’provide quality assured treatment to all patients, (such that) …every patient with uncomplicated P. falciparum malaria should be treated with quality-assured

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artemisinin-based combination therapy [4].” This strategy is operationalized for the health worker through appropriate guidelines.

Training on malaria control interventions among healthcare workers has been documented, with mixed outcomes, in a number of studies. In a cross-sectional study of 105 healthcare workers (mainly Community Health Extension Workers – CHEW) in Plateau state, even though 70% of them had not received any recent case management training, 95% were able to correctly define malaria and 98% were able to list the symptoms of malaria. However, only 55% of the respondents had adequate knowledge of the recommended treatment for severe malaria [5]. A prospective study in Guinea-Bissau found reduced mortality after a training and implementation of standardized guidelines for malaria management in a hospital setting [6]. Similarly, in an Indian study by Kishore J et al, training of health workers resulted in increased testing of blood slides of 46.21% of the cases to 87.50% ($p < 0.001$) [7]. In the same study treatment was given to fewer (49.57%) of the actual malaria cases in pre-training period; this increased to 93.75% of cases after training and it was found to be statistically significant. In another Nigerian study where training of health workers on malaria microscopy was evaluated, the knowledge of basic malariology (theory) at pre- and post-tests were 34% (95% CI 31.7-36.3%) and 74.9% (95% CI 71.8-78.0%), respectively ($P<0.001$). The mean slide reading detection, species and counting agreements in pre-training assessment were 48.9%, 27.9% and 0%, respectively, and in post-training 56.8%, 39.2% and 25%, respectively [8]. However, in another setting in Tanzania, where some training preceded introduction of malaria rapid diagnostic tests, there was no observed reduction in overuse of antimalarial drugs [9].

Quality of care in relation to supervision may be correlated. In emphasising the importance of follow-up visits, findings from a study by Pariyo indicate that the quality of care was higher at facilities with at least one supervisory visit every six months compared with other facilities [10].

The aim of this study was to evaluate the training and supervision received by healthcare workers involved in malaria control in Nigeria by assessing their knowledge and practice in Global Fund-supported public health facilities. The Global Fund is an international financing mechanism that aims to provide additional resources to countries to help fight the burden of HIV/AID, Tuberculosis and Malaria. It is the major donor supporting the malaria control programme in Nigeria.

2. Methodology

This paper is an off-shoot from a bigger nationwide Health Facility Assessment survey.

2.1. Study Design

This was an observational study conducted in 2014. Health workers’ knowledge and practices in GF-supported public health facilities were assessed.

2.2. Study Area

The study was conducted in twelve states of Nigeria with two states selected by simple random sampling from each of the six geopolitical zones across the country.

2.3. Study Population/Study Subjects

Healthcare workers and visiting caregivers of children under five years old with fever in the selected health facilities.

2.4. Sampling Technique

In each of the selected twelve states, the Local Government Areas (LGAs) were listed and classified into urban and rural LGAs. Three LGAs were then selected (1 urban and 2 rural). To calculate the number of Global Fund (GF)-supported health facilities to be sampled per LGA, 42% (being the proportion of public facilities supported by the GF grant in all 30 states it covered) was applied thus giving a sample of 10 supported health facilities per LGA and 15 non-supported facilities per LGA. Within each selected LGA, 25 public health facilities were selected by simple random sampling to participate in the study. Being an observational study, the selected public health facilities were grouped into GF supported and non-GF supported facilities. In each of the selected facilities, health workers who reported that they have been trained on any of the supported interventions, and who were working in the facility from October 2011 were invited to participate in the study. In each selected facility, clients presenting with fever to the facilities were observed while receiving care from the health worker; they were also interviewed upon exiting the facility.

2.5. Selection Criteria

States/LGAs: by the inclusion criteria, only Global Fund-supported states were included in the sampling frame. Also, only LGAs with at least twenty-five (25) public health facilities were included in the sample to allow for adequate numbers of both GF and non-GF supported facilities to be sampled. The exclusion criteria had LGAs with less than twenty-five (25) public health facilities excluded from the sampling frame for the above-mentioned reason. Additionally, seven states which were receiving support from the World Bank-funded Malaria Control Booster project were excluded from the study as these states had not benefited from GF support.

Health Workers: the inclusion criteria considered workers who reported that they had been trained on any malaria-related interventions, and who were working in the facility from October 2011. The exclusion criteria excluded health workers that had been newly recruited / transferred / redeployed into the health facility, and reporting that they had not been trained with GF support.

2.6. Sample Size Estimation

In 2011, at the commencement of Phase 2 Global Fund malaria grant implementation, 15 public health facilities were supported by the Global Fund per LGA in 30 states across the country. This constituted 47% of all facilities in the 30 states as listed in the Federal Ministry of Health's Department of Planning, Research and Statistics (DPRS) Compendium of Health Facilities (HF) in Nigeria (2011). In order to determine the sample size, the WINPEPI application, version 2.62, was used to calculate the number of HFs to be sampled using a cluster sampling methodology, taking into account the total number of health facilities, the proportion supported by Global Fund grant, study design effect and 95% confidence interval. This gave a required sample size of 492. However, in order to provide a sample size high enough to detect differences between the study sites and the comparison sites, the number of facilities to be sampled was multiplied by the design effect of 1.5, thus bringing the total number to 738 public health facilities. However, 900 health facilities were selected to participate in the study in order to increase the power of the sample, and for ease of sampling from the 36 LGAs.

In order to calculate the sample size of health workers, the same software was used to calculate for a simple random sample assuming that 50% of those expected to have been trained were trained, using a 95% confidence interval. This gave a sample size of 385 health workers for study sites and 385 for comparison sites. Since the number of HFs to be sampled was 738, an average of one health worker per facility was interviewed to get the required sample size of health workers, from both study and comparison sites to get a total of 738 health workers.

To calculate the required sample size of clinical cases and exit interviews, the same application was used assuming 60% of out-patient department cases were fever cases, with population from the 2006 National Population Census, and an assumption that 26% of the population sought care from public health facilities (MIS 2010) [11], at 95% confidence interval. A total of 1150 clients were observed and interviewed from both comparison and study sites: this required an average of two clients to be observed and interviewed per participating health facility. Two clinical cases that met the criteria (child 1-59 months whose reason for visit is fever) were observed per facility visited in both the study and comparison sites resulting in a total of 1,476 cases as well as interviewees.

2.7. Data Collection and Management

A structured questionnaire was administered to representatives of the selected facilities under investigation.

2.8. Data Analysis

Descriptive analysis was carried out with respect to frequencies and proportions.

Ethical considerations: Protocol for this study was approved by the National Health Research Ethics Committee of Nigeria and oral informed consent was obtained from willing participants.

3. Results

Table 1 presents the demographics of the respondents. Results reveal that 90.4% of the facilities visited were primary health facilities while 7.5% were secondary health facilities. Equal number of 150 respondents (17.1%) was recruited from each of the six geopolitical zones except for the North-east where 125 respondents (14.3%) were selected. Majority of the respondents were female (53.3%), and married (87.0%). In terms of their religious affiliation, a higher percentage were Christians (71.5%), and majority (38.5%) were between 31-40 years of age. A higher percentage of the respondents were permanent staff (93.5%), Community Health Extension Workers [CHEW] (51.5%) and with 14 or more years of experience (48.7%).

Table 1. Summary of the Demographic Characteristics of the Health Worker.

Demographic variables	Categories	Frequency	Percentage (%)
Type of facilities			
	Primary health facility	791	90.4
	Secondary health facility	66	7.5
	No response	18	2.1
LGA Classification			
	Urban	268	30.6
	Rural	600	68.6
	No response	7	0.8
Geo Political Zone			

Demographic variables	Categories	Frequency	Percentage (%)
	North Central	150	17.1
	North East	125	14.3
	North West	150	17.1
	South East	150	17.1
	South-South	150	17.1
	South-West	150	17.1
Sex			
	Male	379	43.3
	Female	466	53.3
	No response	30	3.4
Marital Status			
	Single	77	8.8
	Married	761	87
	Divorced	3	0.3
	Widowed	11	1.3
	Separated	3	0.3
	No response	20	2.3
Religion			
	Christianity	626	71.5
	Islam	237	27.4
	Traditional religion	1	0.1
	No response	11	1.3
Age (Years)			
	20.3	92	10.5
	31-40	337	38.5
	41-50	294	33.6
	Above 50	94	10.7
	No response	58	6.6
Employment Status	Permanent	818	93.5
	Volunteer	15	1.7
	Part-time	7	0.8
	Contract	11	1.3
	Other	11	1.3
	No response	13	1.5
	Doctor	24	2.7
Professional Cadre	Nurse/Midwife	96	11
	Nurse	26	3
	Midwife	3	0.3
	CHO	64	7.3
	CHEW	451	51.5
	J/CHEW	115	13.1
	EHO	15	1.7
	Others	53	6.1
	No response	28	3.2
Years of Professional Experience	< 2 yrs	15	1.7
	2-5 yrs	81	9.3
	6-9 yrs	149	17
	10-13 yrs	193	22.1
	≥ 14 ψρσ	426	48.7
	No response	11	1.3

Table 2 presents responses from the respondents that had received training on Rapid Diagnostic Test (RDT), malaria case management, malaria logistics management, as well as the harmonized National Health Management Information Systems (NHMIS). Result reveals that majority of the respondents had been trained on RDT in the preceding 7-12 months (27.2%) while for malaria case management, a high percentage had not been trained (59.8%); and majority of the respondents who were trained on malaria case management were trained 13-18 months prior to the survey (17.0%), while for Malaria Commodity Logistic System and NHMIS, they were trained 7-12 months (17.7%) and 7-12 months prior to the survey (22.5%), respectively. Two hundred and ninety-five respondents (33.7%) had not been trained on Malaria Commodity Logistic System.

Table 2. Training on RDT, Malaria Case Management, Malaria Commodity Logistics System and Health Management Information System

Questions	Categories	Frequency	Percentage (%)
	Yes, in the preceding 6 months	125	20.2
Has the person conducting RDT test been trained	Yes, 7-12 months	168	27.2
	Yes, 13-18 months	163	26.4

Questions	Categories	Frequency	Percentage (%)
	Yes, 19-24 months	40	6.5
	Yes, >24 months	42	6.8
	No response	80	12.9
	Yes, in the preceding 6 months	98	11.2
	Yes, 7-12 months	137	15.7
Have you been trained on malaria case management?	Yes, 13-18 months	149	17.0
	Yes, 19-24 months	57	6.5
	Yes, >24 months	77	8.8
	No	357	59.8
	Yes, in the preceding 6 months	88	10.1
	Yes, 7-12 months	155	17.7
Have you been trained on Malaria Commodity Logistics System?	Yes, 13-18 months	141	16.1
	Yes, 19-24 months	78	8.9
	Yes, >24 months	118	13.5
	No	295	33.7
	Yes, in the preceding 6 months	74	8.5
Have you been trained on the harmonized National	Yes, 7-12 months	197	22.5
Health Management Information System (NHMIS)	Yes, 13-18 months	160	18.3
tools?	Yes, 19-24 months	46	5.3
	Yes, >24 months	39	4.5
	No	1	0.1
	No response	358	40.9

Table 3 presents results of the knowledge and practice of trained health workers on malaria case management. Results show that a higher percentage of respondents (89.8%) felt that fever in the previous 24 hours with confirmation by parasitology are indications whether someone has malaria or not. A higher percentage also identified the use of Artemether-Lumefantrine (94.7%) as the first line treatment for uncomplicated malaria, and that adults should take four doses of AL (94.8%), for two times (92.1%) and for a period of 3 days (93.2%). For 2-year-old children, majority of the trained health workers prescribed one tablet (90.0%), twice (92.1%) for three days (94.2%). More than half of the trained health workers believed that malaria cases should be referred to a higher-level facility if there was no improvement after completing malaria treatment course (64.9%), severe anemia (68.1%) and convulsion (62.5%). The result also reveals that more than half of the respondents said they would ask if the child had fever (76.8%), and age of the child (64.3%). In terms of danger signs, more than half of the trained health workers stated 4 or more danger signs correctly (55.8%) and that for a child with symptom of fever, they would carry out a blood test (88.4%) and give ACT if the test was positive for malaria (60.8%). When they were asked what kind of test they would conduct, majority said they would carry out malaria RDT (93.4%). More than half the respondents indicated that once the treatment had been prescribed, they would give information to the mother on: how to give the medicine (84.4%), the need to return to clinic if there was no improvement after 2 days (62.0%) and emphasis on the need to sleep inside insecticide treated net (68.5%).

Table 3. Knowledge and practice of trained health care providers trained Malaria Case Management.

Questions	Categories	Frequency	Percentage (%)
How will you know if someone has Malaria?	Fever in the previous 24 hours with parasitology confirmation	465	89.8
	Fever in the previous 24 hours without parasitological confirmation of malaria	52	10
	No response	1	0.2
What is the first line treatment for uncomplicated malaria?	Artemether-Lumefantrine	490	94.7
	Artesunate-Amodiaquine	19	3.7
	Artesunate + Sulphadoxine-Pyrimethane	2	0.4
	Chloroquine	1	0.2
	Others	3	0.6
	No response	3	0.6
Which first line anti-malarial do you prescribe?	Artemether-Lumefantrine	488	94.2
	Artesunate-Amodiaquine	21	4.1
	Artesunate + Sulphadoxine-Pyrimethane	1	0.2
	Chloroquine	5	1
	Others	2	0.4
	No response	1	0.2
How many tablets of AL should an ADULT take at a time?	One	14	2.7
	Two	7	1.4
	Three	5	1.6
	Four	491	94.8

Questions	Categories	Frequency	Percentage (%)
How many times should AL be taken by an ADULT per day?	Don't know	1	0.2
	One	7	1.4
	Two	477	92.1
	Three	10	1.9
	Four	22	4.2
Over how many days should an ADULT take AL?	Don't know	1	0.2
	No response	11	1
	One	5	1
	Two	8	1.5
	Three	483	93.2
	Four	20	3.9
How many tablets of AL should a 2-yr old take at a time?	Don't know	1	0.2
	No response	1	0.2
	One	466	90
	Two	34	6.6
	Three	8	1.5
	Four	2	0.4
	Other s	3	0.6
How many times should a 2-yr old take AL per day?	Don't know	2	0.4
	No response	3	0.6
	One	25	4.8
	Two	477	92.1
	Three	13	2.5
	Others	1	0.2
Over how many days should a 2-yr old take AL?	Don't know	2	0.4
	One	2	0.4
	Two	12	2.3
	Three	488	94.2
	Four	4	0.8
	Other s	3	0.6
Under what conditions should a Health Worker in a PHC refer cases of malaria to a higher facility?	Don't know	2	0.4
	No response	7	1.4
	No improvement after completing malaria treatment	336	64.9
	Severe Anemia	353	68.1
	Convulsion	324	62.5
	Persistent/excessive vomiting	208	40.2
	Breathlessness	123	23.7
	Impaired consciousness	127	24.5
	Others	21	4.1
Possible questions to ask a mother of a sick child	Has the child got fever	398	76.8
	Has child taken any anti-malaria	314	60.6
	Has child had bad reaction to anti-malarial in the preceding	121	23.4
	Age of the child	333	64.3
	Weight of the child	155	29.9
	Did child vomit immediately after taking the drug	202	39
	Danger signs	98	18.9
Danger signs	State 4 or more correctly	289	55.8
	State less than 4 correctly	212	40.9
	Non correct	4	0.8
	No response	13	2.5
A child under five comes to your clinic with symptom of fever. The child has no other symptoms. What would you do?	Do a blood test	458	88.4
	Give ACT is test is positive to malaria	315	60.8
	Give ACT, no mention of test	68	13.1
	Give Paracetamol	245	47.3
	Give a prophylaxis	50	9.7
	Give other antimalaria	38	7.3
	Others	22	4.2
What test will you do?	Malaria RDT	428	93.4
	Blood film for microscopy	11	2.4
	Both	12	2.6
	No response	7	1.5
What other information will you give the mother once you have prescribed this treatment?	How to give the medicine	437	84.4
	Importance of compliance	227	43.8
	Return to clinic if no improvement after 2 days	321	62
	Sleeping insecticide treated Net	355	68.5
	Preventing exposure to mosquito bite	216	41.7
	Others	43	8.3

Table 4 presents the quality of data captured with the HMIS tools. Result reveals that in most of the health facilities, Out-Patient Department (OPD) register (89.8%), Immunization monthly summary (81.0%), Ante-Natal Clinic (ANC) register (73.5%), monthly summary register (80.5%) were observed (seen). But for In-patient care, register was not observed in most health care facilities, with only 39.8% having an In-patient care register. Result also reveals that the most recent entry in these registers were imputed within the preceding 7 days and that more than half of the OPD registers examined contained age of the patient (86.1%), signs and symptoms (80.1%), and treatment record (78.6%). Majority (44.3%) of the respondents had no wall charts displayed.

Table 4. Quality of data captured with the HMIS tools at the facility level post-training of health facility record officers on the harmonized HMIS data capturing tools.

Variables	Categories	Frequency	Percentage (%)
Is there any OPD Register	Observed	786	89.8
	Reported not seen	20	2.3
	No Register	62	7.1
	No response	7	0.8
How recent is the data of the most recent entry	Within the preceding 7 days	659	83.8
	More than 7 days	102	13
	No response	25	3.2
Immunization monthly summary	Observed	709	81
	Report not seen	38	4.3
	No monthly summary form	72	8.2
	Not applicable	36	4.1
	No response	20	2.3
How recent is the data of the most recent entry	Within the preceding 7 days	519	73.2
	More than 7 days old	164	23.1
	No response	26	3.7
ANC Register	Observed	643	73.5
	Report not seen	36	4.1
	No monthly summary form	110	12.6
	Not applicable	46	5.3
	No response	40	4.6
How recent is the date of the most recent entry.	Within the preceding 7 days	498	77.4
	More than 7 days old	130	20.2
	No response	15	2.3
In Patient Care Register	Observed	348	39.8
	Report not seen	58	6.6
	No monthly summary form	230	26.3
	Not applicable	179	20.5
	No response	60	6.9
How recent is the date of the most entry	Within the preceding 7 days	248	71.3
	More than 7 days old	83	23.9
	No response	17	4.9
Monthly Summary Register	Observed	704	80.5
	Report, not seen	50	5.7
	No monthly summary form	93	10.6
	No response	28	3.2
How recent is the data of the most recent entry	Within the preceding 7 days	405	57.5
	More than 7 days old	278	39.5
	No response	21	3
Information contains in the OPD Register	Age of patient Information Complete	753	86.1
	Symptoms and signed record complete	701	80.1
	Diagnosis record complete	696	79.5
	Treatment record complete	688	78.6
	None of above complete	139	15.9
Wall Chart	Wall chart summarizing MSR data	313	35.8
	Graph summarizing MSR data	163	18.6
	Meeting to discuss MSR data in previous 3 months	288	32.9
	None of the above	388	44.3

4. Discussion

The majority of staff have had over 14 years of experience, with the highest proportion of staffing being in the category of Community Health Extension Workers (CHEW) (51.5%), which is similar to a Malawi study where 74.9% were medical assistants [12]; but in contrast to a study conducted

in Kenya, where the major category of primary health care staff were formally trained nurses (76.8%) [13]. Nigeria obviously still grapples with issues of appropriate staffing for healthcare facilities. In 2006, WHO had called for countries to urgently address Human Resources for Health gaps to avert a crisis situation. In the interim, low –middle level trained health staff are used to fill in gaps, especially in the rural communities [14]. These category of health workers, with proper and sustained training, are usually able to handle mild clinical cases, albeit, with adherence to designated standing orders and guidelines.

Most of the respondents had not received training on malaria case management, MCLS, and HMIS. This is similar to the Kenya study which recorded 44% in-service training among health workers [14]. Conversely, 82.5% of health workers had received some type of training on the 2007 malaria case management guidelines in the Malawian study cited above [12]. The findings in this study demonstrate the need for trainings to be systematically planned to be content-relevant to the health workers in order for the health systems to be adequately strengthened.

The health workers generally demonstrated a mixed (but majorly good) knowledge and practice of recommended case management policies in terms of testing before treatment, drugs of choice, treatment regimen, and referral practices. This is in tandem with findings from studies by Onwujekwe O et al, and Fawole O et al where health workers demonstrated good knowledge of malaria treatment practices [15, 16]. Conversely, a study by Bello DA et al demonstrated poor knowledge and practice among health workers, in spite of trainings received in managing and referring, as indicated, malaria cases [17]. The implication of this mixed knowledge and practise among the health workers is the need for structured supportive supervision for health workers, in spite of regularity of trainings received. Because human lives are involved, the proportion of health workers with poor knowledge could create a negative impact in terms of outcomes, in health systems.

In determining the correlation between training and supportive supervision, training has been documented to make supportive supervision more effective, since knowledge is better reinforced when there is an appreciable background [18]. Supportive supervision, which may be conducted as a standalone intervention using supervisory checklists, or by training and supervision, as well as supervision and other interventions such as quality assurance management, have been shown to be effective in sustaining knowledge, and translating knowledge to good practice [19-21]. It is commendable that majority of the trained health workers properly counselled care-givers of sick children on monitoring for progress, and indications for returning to seek additional care.

Majority of the trained health workers made proper use of service registers which were properly completed in a timely manner. Particularly, immunization, ANC and malaria management cases were properly recorded. A good proportion, 47.4%, of the respondents had over 14 years work experience, and the HMIS data which monitors service delivery coverage was appreciably well managed. This correlates with a study by Schmidt et al which relates increasing job experience with proper record keeping [22]. This study found that majority of the respondents had no wall charts, which, if present, would require regular updates. There is, interestingly, a documented association of wall charts with treatment error [23]. Wall chart summarizing monthly summary report was only done by 18.6% of health facilities, this is in contrast to an Ethiopian study which reported use of wall charts in 99% of health facilities [24]; this indicates that even in Africa, data appreciation and use is implementable. Worse still, meeting to discuss monthly summary report data in 3 months prior to this study was said to be organized only by 32.9% of the respondents. In a Malawian study, Health Surveillance Assistants (HSAs) mentioned that they used the data from the wall charts to inform their community health education activities. ‘’For instance, if HSAs noticed an increase of malaria cases, the HSA would sensitize communities to sleep under mosquito nets [25].” This transformation of monitoring and evaluation data into improvement of programme performance is highly recommended and should be reinforced through supportive supervisory activities, on a regular basis.

5. Conclusion

The health workers generally showed a good practice of recommended case management policies in terms of testing before treatment, drugs of choice, treatment regimen, and referral practices. The record keeping practice among the health workers was also good. Similarly, the post-treatment counselling was commendable. Trainings should be regularly structured among health workers in primary healthcare facilities to ensure keep-up with standard practice.

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Data Availability

The data used to support the findings of this study is available on request to the corresponding author.

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