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ADHERENCE TO MALARIA CASE MANAGEMENT GUIDELINES IN THE TREATMENT OF UNCOMPLICATED MALARIA IN PUBLIC HEALTH FACILITIES IN KENYA, 2023

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ABSTRACT

***Objective*: To establish the level adherence to malaria treatment guidelines among of health workers in public health facilities in Kenya.**
***Design Setting*: This was a cross-sectional, cluster sample health facility assessment.**
***Subjects*: Health facilities offering outpatient services, health workers deployed there and febrile patients seeking services in those health facilities at the time the study.**
***Main outcome*: Level of adherence to malaria treatment guidelines in the treatment of uncomplicated malaria.**
***Results*: Overall, 170 health facilities offering outpatient services were recruited in the study, 223 health workers and 567 febrile patients were interviewed. Malaria parasitological diagnosis was provided in 86.5% of the facilities. Majority (77.7%) of the facilities stocked with at least one Artemether-Lumefantrine pack while 20% experienced total stock. The proportion of health workers exposed to in-service training on uncomplicated malaria case management, Artesunate use, access to malaria case management guidelines and received any supportive supervision during 3 months was 23.3%, 64.6%, 55.2% and 46.2%, respectively. Availability of malaria diagnostics and Artemether-Lumefantrine adherence was 54.5%. The proportion of febrile patents tested for malaria was 93.8% in high malaria risk areas and 27.6% in low malaria risk areas. The proportion of febrile patents managed in accordance with malaria guidelines was 88.8% in high malaria risk and 25.8% in low malaria risk areas.**

Conclusion: **The study indicated that health workers exhibited sub-optimal adherence to test and treat guidelines for uncomplicated malaria. There is a need to implement strategies aimed at bolstering adherence to treatment guidelines for uncomplicated malaria among health workers.**

BACKGROUND

Despite significant progress in the past 2 decades, Africa still accounts for 90% of malaria deaths worldwide with higher incidence in children less than five years of age (1). The effective malaria case-management, disease surveillance and programmatic trainings for health workers are the key components of all malaria control programs(2). In 2012, the World Health Organization (WHO) launched T3: *Test. Treat. Track*. initiative to ensure all suspected malaria cases were properly tested, treated and registered (3). In Kenya, these components are directly relevant for two objectives of the Kenya Malaria Strategy 2019-2023 including; to strengthen malaria surveillance and use of the information for decision making to improve program performance and to ensure that 100% of suspected malaria cases are managed according to the recommended Kenya malaria case-management guidelines(4).

Since 2010, the malaria case-management policy recommending artemisinin-based combination therapy (ACT) based on confirmed parasitological diagnosis for uncomplicated malaria has been implemented in Kenya(5). The first-line drug for uncomplicated malaria is artemether-lumefantrine (AL) and is recommended for patients across all age groups and areas of malaria endemicity. The effectiveness of malaria treatment depends on healthcare worker's adherence to malaria case-management guidelines when attending to suspected cases(6).

This manuscript presents the 2023 malaria health facility assessment conducted in Kenya to establish the performance levels of health worker adherence to malaria treatment guidelines and audit commodity supplies necessary to support care of uncomplicated malaria.

Objectives

The overall objective of the malaria health facility assessment survey was to assess adherence to national malaria case management guidelines and malaria commodities necessary for care of malaria patients in public health facilities in Kenya, 2023. Specifically, the study sought to determine, among public health facilities

In Kenya, the level of health workers' adherence to national malaria case management guidelines for patients with uncomplicated malaria as well as the availability of commodities necessary for management of patients with uncomplicated malaria.

METHODS

Context and general study design

This was a cross-sectional, cluster sample health facility assessment survey comprising of 170 heath facilities from all the 47 counties assessing adherence to national malaria treatment guidelines when managing uncomplicated malaria. To assess outpatient malaria case-management, patient exit interviews were conducted, and data was collected from the patient's cards/outpatient records. At each of the assessed facilities providing outpatient care data were collected over one assessment day. The assessment teams arrived at the facility before the official opening time and stayed until the official closing time or until the time when the night shift would take over duties in facilities operating on a 24-hour basis. During the assessment day, three methods of data

collection were applied. First, all patients' cards/records for patients seen at the outpatient departments underwent rapid screening after the clinician had treated the patient. After the screening, all non-referred and non-pregnant patients with fever or history of fever presenting for an initial visit and weighing ≥5kg were reviewed during which information was collected about main patients' characteristics, diagnostics requested, results reported, and medications prescribed. Second, each facility was assessed to determine the assessment day and 3-month retrospective availability of medicines, Rapid Diagnostic Tests (RDTs), malaria microscopy, the support tools such as basic equipment and job-aids. All health workers who saw outpatients on the assessment day were interviewed about their demographics, pre-service training, access to guidelines, retrospective exposure to in-service training, and supervision.

Sample size determination

The sample size of health facilities and patients included in each assessment was calculated to detect a 15% points difference in health workers' compliance with the composite "test and treat" indicator between two assessments. To address the primary objective of health workers' compliance measurement and homogeneity of practices within facilities the sample was adjusted for clustering effect at the health facility level and the likelihood of practices at facilities without case-management commodities. Assuming 50% of health facilities may lack malaria diagnostics and AL on the assessment day, a sample size of 680 in each age group (below and above five years of age) was required. With an assumption of recruiting an average of 4 patients per facility per day, a minimum of 170 health facilities was required per assessment(7).

Sampling procedure

A stratified random sample was drawn from all public health facilities taking into consideration the level of the facility, ownership (government or Faith Based Organization or Non-Governmental Organization), and administrative boundaries (counties) to ensure national representativeness. An updated list of all public health facilities was obtained from the MoH and included all facilities owned by the Ministry of Health, local authorities, Faith Based Organizations, Non-Governmental Organizations, and the local communities. Level six hospitals, as they serve as referral facilities, mobile clinics and government facilities providing services to special patient groups (e.g., military or prisoners) were excluded from the sample. The distribution of the sample for each of the health facilities was determined using probability proportionate to the population size approach (8).

Data management and statistical analysis

Data was collected using ODK (Open Data Kit) app by the University of Washington. Data management and cleaning was undertaken on completion of the fieldwork. The analysis was performed in Stata, version 14 (Stata Corp. LP., College Station, TX, USA). The analysis of indicators was undertaken at health facility, health worker and patient levels. Descriptive statistics formed the basis of analysis through frequencies and proportions.

RESULTS

Study populations and Demographics of febrile outpatients

In total the assessment included 170 health facilities offering outpatient services of which 19 (11.2%) were hospitals, 43 health centres (25.3%) and 108 dispensaries (63.5%). At the assessed health facilities, 223 health workers were interviewed and 567 consultations for febrile patients from outpatient were evaluated.

In total 567 outpatient consultations for febrile patients were evaluated of which about half (50.2%) were at dispensary level, 36% at the health Centre level and 13.8% at the hospital

level. Figure 1 shows the main characteristics of patients by gender and age across different health facilities. Majority of the febrile patients were females in dispensaries and health centers9 (59% and 52% respectively) while a higher proportion of males presenting with febrile illnesses were recorded in hospitals (53%). Most of the study patients were above the age of 15 years across all health facility level (Figure 1).

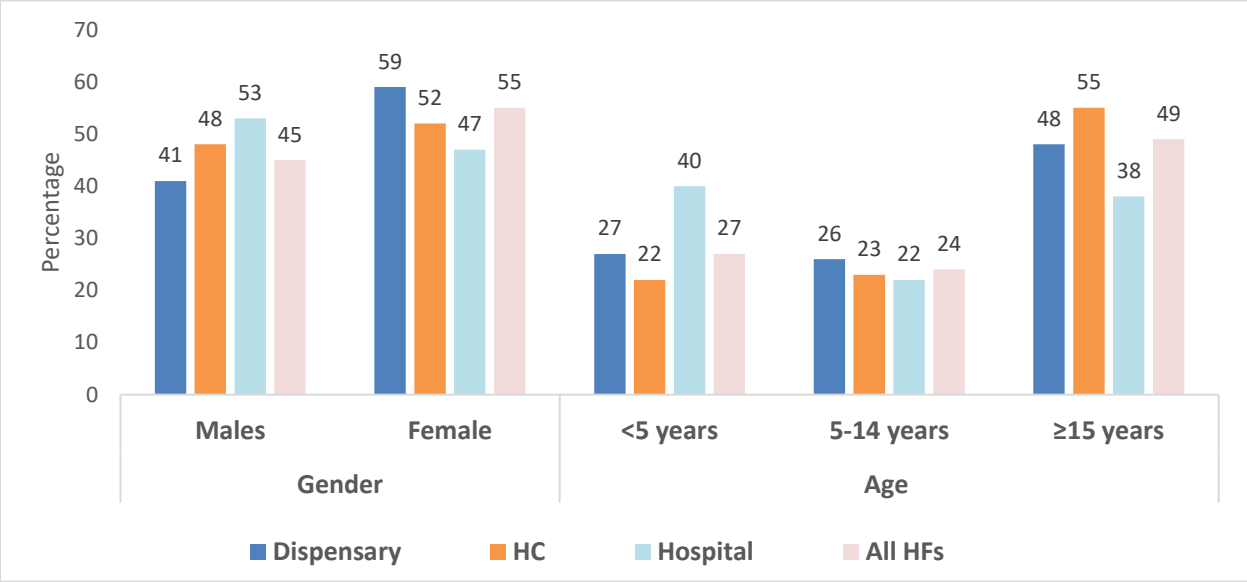

Figure 1: Main characteristics of febrile outpatients, by level of care

Policy performance and adherence to malaria guidelines for uncomplicated malaria case-management.

Figure 2 shows health workers adherence to the "test and treat" guidelines with respect to malaria risk. In total 567 outpatient consultations for febrile patients were evaluated of which 87% provided malaria diagnostics and had AL. Despite having commodities for testing, 42% were not tested for malaria of which, three of the patients were given AL. The febrile patients tested for malaria were 58% and 90% of patients with positive test were treated with recommended AL. The test negative and not tested patients, only one patient who tested negative was inappropriately treated with an antimalarial as well as only 1.4% of the febrile patients not tested for malaria (Figure 2).

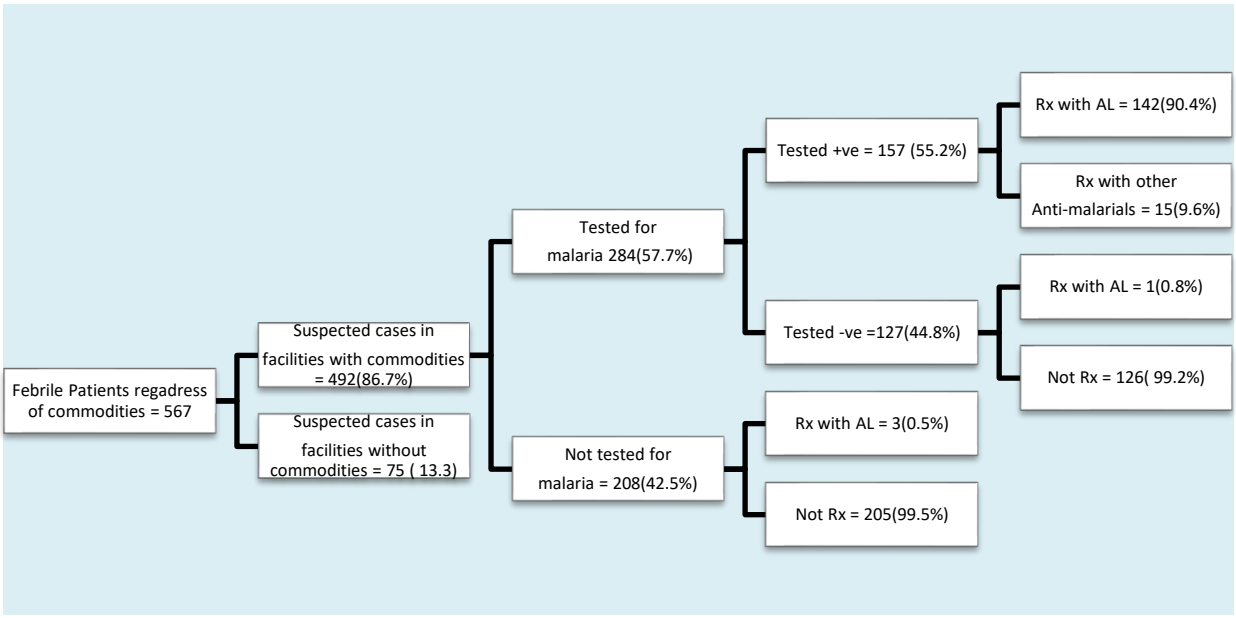

Figure 2: Adherence to the treatment guidelines on uncomplicated malaria

**Rx – Treatment, *-Ve – Negative, *AL – Artemether Lumefantrine,*

Figure 3 shows the comparison between low and high malaria risk areas with the analysis revealing that a higher proportion of patients with fever were seen at facilities in high-risk areas were tested for malaria (93.8% versus 26%, respectively). The treatment of those who turned positive with AL as recommended by the case management guidelines was 92.6% and 77.3% for high-risk and low risk respectively. Similarly, there was low treatment of result negative patients with antimalarials for both the high and low risk regions. The overall adherence to malaria case management guidelines was 89% and 26% in high and low risk regions, respectively. There was a reported treatment of patients where test was not conducted in high-risk region at 21%. Majority of the patients were not treated with any anti-malarial if the test was not conducted. These was higher in low-risk areas compared to high-risk areas at 100% and 79%, respectively.

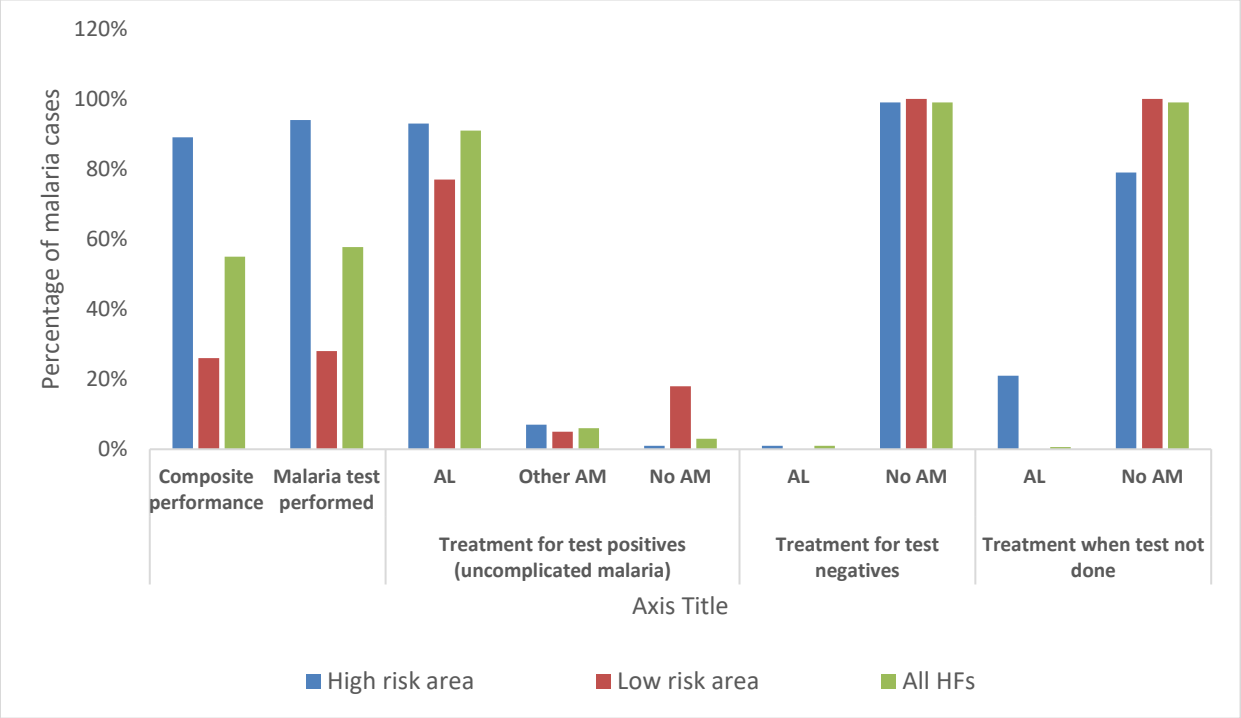

Figure 3: Health workers adherence to guidelines-diagnostic and treatment practices for febrile patients presenting to facilities where malaria diagnostic services were available and AL was in stock, by malaria endemicity

Health systems readiness to implement outpatient malaria case management

Table 1 displays the health facility readiness for test and treat policy for malaria by level of care. The 2023 capacity of facilities to provide any parasitological malaria diagnosis (microscopy and/or RDTs) was found to be 87% of the total facilities that were assessed. The physical stock assessments of medicines found that at least one AL pack was stocked by 78% of facilities. Health facilities in high-risk areas had any malaria diagnostic compared to 82% in low-risk areas. Any AL tablet pack was stocked in 78% of the health facilities. The AL stock outs reported in the last three months was 20% of the surveyed health facilities.

Table 1

Health facility readiness for test and treat policy for malaria by level of care

	Health facility characteristics	Dispensary (%)	HC (%)	Hospital (%)	All HFs (%)
Availability of malaria diagnostic services	Any malaria diagnostics (RDT or microscopy)	82	95	95	87
	Functional malaria microscopy	29	81	90	49
	Non-expired RDTs in stock	69	63	26	63
Availability of antimalarials	Any injectable anti-malarial drug in stock	40	51	74	47
	Artesunate injections	37	47	68	43
	Any AL tablet pack in stock	71	88	90	78
	DHA-PPQ tablets in stock	2	2	0	2
	Quinine tablets in stock	1	2	0	1
Retrospective stock-outs of antimalarials	AS stock-out experienced in past 3 months	47	46	26	45
	Total AL stock-out experienced in past 3 months.	25	14	5	20

**HC – Health centres, HF – Health facilities, AL – Artemether Lumefantrine, AS - Artesunate, DHA – PPQ – Dihydro-artemisinin Piperaquine, RDT – Rapid Diagnostic Tests.*

Malaria microscopy and laboratory support

Rapid assessment of malaria microscopy practices was undertaken in 83 laboratories providing malaria microscopy. Seventy eight percent of all laboratories routinely prepared both thick smear and thin smear. The assessment of slide staining methods also found high use of recommended Giemsa solution (98.8%). Overall, majority of facilities were conducting parasite count (88%), and this was higher in hospitals as compared to health centres and dispensaries (85% and 88%, respectively).

Table 2

Characteristics of malaria diagnostics services by level

		Dispensary		HC		Hospital		All HFs	
		n	%	n	%	n	%	n	%
Smear preparation	Thick blood smear only	8	26	7	20	1	6	16	19
	Thin blood smear only	2	7	0	0	0	0	2	2
	Both thick and thin smear	21	68	28	80	16	94	65	78
Blood smear staining method routinely used	Giemsa only	100	100	100	100	16	94	9	9
	Field stain only	0	0	0	0	1	6	1	1
	Parasite species differentiation routinely done	17	55	23	66	14	82	54	65
Parasite count reporting	Counts per microliter only	21	88	23	85	15	94	59	88
	Plus, system only	2	8	4	15	1	6	7	11

	No parasite counts performed	7	23	8	23	1	6	16	19
	Availability of all SOPs for malaria parasitology	9	29	10	29	3	8	22	27
	All 8 SOPs available								
	2020 Guideline for parasitological diagnosis available	7	23	8	23	5	29	20	24
	Participate in EQA scheme	11	36	16	46	12	71	39	47

**HC – Health centres, HF – Health facilities SOPs – Standard Operating Procedure, EQA – External Quality Assurance.*

Health worker readiness to support outpatient malaria case management

Of the 223 health workers interviewed females constituted the majority (53.8%). Three major exposures in support of case management were assessed including; trainings, exposure to national guidelines and support supervision. Majority of the health workers (65%) had been trained or oriented on injectable artesunate while minority reported being exposed to Integrated Management for Childhood Illnesses (IMCI) training including AL (14%). The IMCI guidelines, malaria case management guidelines and malaria chart booklets were available in 66%, 55% and 45% of the health facilities, respectively. Less than half (46%) of the health workers had received supportive supervision in the last 3 months with malaria case management (Figure 4).

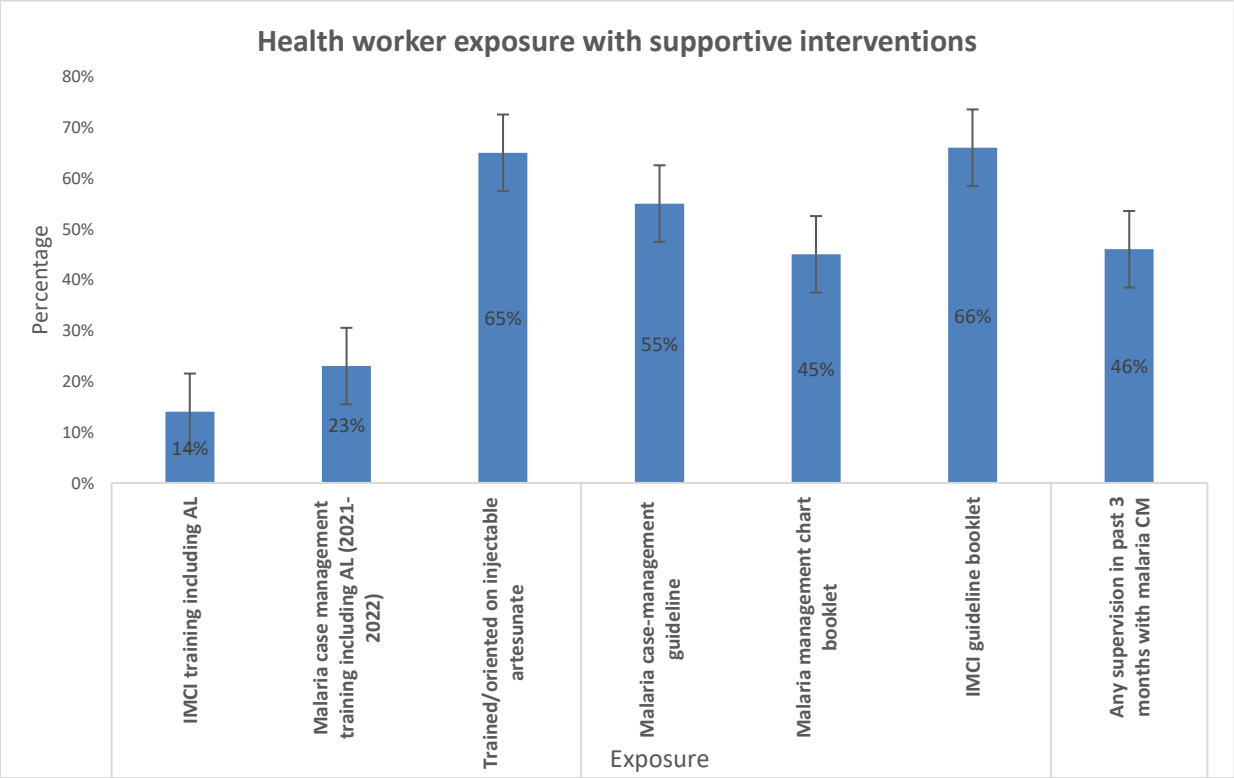

Figure 4: Health workers coverage with supportive interventions (Error bars, represent confidence intervals)

DISCUSSION

The study sought to provide the level of adherence to the case management guidelines in the treatment of uncomplicated malaria. The overall testing of all the suspected cases was below the targeted level. This is in concordance to the research conducted in Kenya (9). Slightly more than a third of the facilities routinely performed parasite species differentiation and 80.7% of the facilities reported parasite count. The assessment revealed that, less than a quarter of the laboratories had National Guidelines for Parasitological Malaria Diagnosis (5) while slightly less than half reported participating in malaria External Quality Assurance (EQA) schemes (10).

Overall, the findings of the 2023 malaria assessment in Kenya pointed strengths and challenges to improve the quality of malaria case-management, disease surveillance and programmatic trainings. While not optimal, universal availability of test and treat commodities and services, quality assurance of malaria microscopy, facility-based malaria supportive supervision and targeted in-service case-management training accompanied with dissemination of guidelines and job aids for health workers should be programmatic priority for malaria program. High level of policy performance and health worker adherence to test and treat guidelines for malaria was observed for uncomplicated malaria patients commensurate with the findings in Busoga sub region, Uganda(11).

Study limitations

The current study is not without limitations. First, the study deployed a cross section, cluster survey design hence failing to capture the temporal variations in the parameters of interest. On the other hand, a key strength of the study is that reporting in the present study was done in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines (12) Further, the survey followed the principle of sample size determination and sampling including those defined by WHO guidelines for minimum sample size determination and sampling (13) hence making the findings generalizable in this and similar settings.

CONCLUSIONS AND RECOMMENDATIONS

The data from the study demonstrated high level of adherence to case management guidelines among health workers in Kenya. High level of policy performance and health worker adherence to test and treat guidelines for malaria was observed in all aspects of outpatient malaria case-management, except in testing rates of malaria suspected patients that was suboptimal. Focus of programmatic interventions needs to be directed towards universal testing of all febrile patients.

Universal availability of test and treat commodities and services, quality assurance of malaria microscopy, facility-based malaria supportive supervision and targeted in-service case-management training accompanied with dissemination of guidelines and job aids for health workers should be programmatic priority for malaria control. There is a need to focus on programmatic interventions directed towards universal testing of all febrile patients.

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