Health workers' compliance to Implementation of Test, Treat and Track Strategy for Malaria Control in Northern Uganda

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Abstract

Introduction: *Malaria is a major cause of fever and a leading public health problem in Uganda, causing significant morbidity, mortality and negative socio-economic impact. However, malaria is not the only cause of fever; there are other none malaria causes of fever that must be ruled out before treatment with expensive Artemisinin-based Combination Therapy (ACTs). In 2010 and 2011 World Health Organisation (WHO) and Ministry of Health (MOH) Uganda respectively recommended that all fever cases be subjected to malaria test, provided an appropriate treatment according to test results and tracked. This study assessed the compliancy of health workers in public and private health facilities in four Northern districts of Uganda i.e. Apac, Dokolo, Gulu and Nwoya in implementation of Test, Treat and Track (T3) strategy for malaria.*

Methods and materials: *Across sectional descriptive study design was adopted. Both quantitative and qualitative data collection approaches were applied to ascertain the extent health workers in the targeted districts adhere to the T3 policy. The study was conducted in 115 public, 22 PNFP and 20 private health facilities. In total 489 health workers, 63 community health workers (CHWs) and seven district officials participated in the study as respondents. Quantitative data were entered and cleaned in EpiData 3.1 and analysed using Stata 12.0. Qualitative data were audio-recorded, transcribed and entered into Nvivo 10 for analysis and coded based on both pre-determined themes as well as those that emerged from the data.*

Results: *The study showed that adherence to testing was excellent in public (97.1%) as compared to 70.3% in the PFP (P < 0.001). Averagely, 95% of positive cases across the four districts were treated with recommended antimalarial medicines (ACTs). The study found that senior health workers had poorer adherence to T3 compared to their junior counterparts. For instance, on average 64% of malaria negative confirmed patients seen by medical officers received antimalarial medicines compared to 23% and 5% that were seen by nurses and Community Health Workers (CHWs) respectively. We also found that adherence to T3 reduces as you ascend from low level to high level facilities. As such adherence to testing all suspected cases of malaria was highest (100%) at CHWs and lowest (70.1%) at hospital level*

Conclusion: *Adherence to T3 strategy was found to be dependent to the Health facility level, ownership and level of education and seniority of health workers.*

Keywords and abbreviations: *Adherence, Community health Workers (CHW), Private for Profit (PFP), Private Not for Profit (PNFP), Ministry of Uganda (MOH), World Health Organisation (WHO)*

Introduction

Malaria remains number one cause of morbidity and mortality globally. In 2017, an estimated 219 million cases of malaria occurred worldwide, compared with 239 million cases in 2010 and 217 million cases in 2016 (1). Sub-Saharan Africa contributes 92% (200 millions) of the total malaria cases and 93% of malaria deaths globally (1). Relatedly, five African countries contribute nearly half of all malaria cases worldwide: Nigeria (25%), the Democratic Republic of the Congo (11%), Mozambique (5%), India (4%) and Uganda (4%) (2). Whereas everyone is at risk of contracting the disease, children under five years of age and pregnant women are more vulnerable group due to their low levels of malaria immunity (WHO, 2017). Though they are studies showing changing epidemiology of malaria from children under five years to those between 6 and 12 years (3).

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Until recently, presumptive treatment commonly referred to as clinical treatment of malaria was common practice in many African countries including Uganda. Misdiagnosis of malaria results in overtreatment, potentially delaying diagnosis and treatment of other causes of illness and reducing availability of Artemisinin-based Combination Therapy (ACTs) for true malaria cases (4). In response, in 2010, the World Health Organization (WHO) recommended that all malaria cases be confirmed with a diagnostic test before treatment is given (5). This was followed by another recommendation that widen this to include tracking of the patients that have been tested, treated "T3s strategy" (6). In 2011 Uganda followed suit and shifted from presumptive to parasite-based diagnosis and treatment of malaria (7). This policy is more operational in public health sector facilities and some formal private health. The main goal of the T3 strategy is to address the inaccessibility to diagnostic testing, improve quality early treatment of malaria and non-malaria febrile illness, reduce antimalarial misuse, (8,9) as well as enhancing malaria case-reporting (6,10). However, the implementation of the strategy faced many challenges such as non-adherence by health workers which varies from country to country (11). For example, 94.6% and 38% adherence rates were observed in Zambia and Kenya respectively (12,13). In Uganda, the uptake of parasite based diagnosis is known to be about 80% (14) but no information on the T3 strategy has been documented. The Uganda National Malaria Reduction strategy of 2014-2020 only hints on strengthening the capacity of health workers to implement the T3 strategy but does not give guidelines on how this strategy will be rolled out (14).

This study was therefore conducted to assess the implementation of the T3 strategy for malaria in selected public, private and community service delivery points in the four districts in mid-northern Uganda namely, Apac, Nwoya, Dokolo and Gulu.

Methods and material

Study setting

A cross sectional descriptive study was conducted in four high malaria burden districts in Mid-northern Uganda including Gulu, Apac, Dokolo and Nwoya. Both quantitative and qualitative data collection methods were applied to ascertain the extent health workers in the targeted districts adhere to the T3 policy. The total population of the four districts is 1,121,570 with approximately 224,314 children under the age of five (15).The selection of the 4 districts was based on the fact that these districts have high malaria prevalence as well as heterogeneous malaria epidemiology between the four districts.

Sampling

A non-probability (convenience) sampling technique was used to select the study sites including 115 public,22 PNFP, 20 PFP and 63 CHWs. Using Probability Proportional to size sampling strategy, distribution of the sample in each district was determined. In total 444 health workers comprising of 384 health workers (318 from public and 66 from private) and 60 community Health workers were sampled for this study. Additionally, total of 8 Key Informants interviews (4 district malaria and 4 laboratory focal persons) and 4 Focus Group Discussions (FGDs) one in each study district with in charges of high-level health facilities and district diagnostic officers were conducted.

Data collection

Data was collected in June and July 2019. Data collection tools which included structured questionnaires, semi-structured and open-ended interview guides were developed and pre-tested at Health Centres (HCs) in one neighbouring district. Six social scientist research assistants with a range of language skills for the context were recruited and received two days training.

Data collection were conducted through health workers interviews, observation of patient-health worker interaction during suspected malaria case management, in-depth interviews with key informants, exit interviews and focus group discussions. Structured and semi-structured questionnaires were used to collect quantitative data while other study tools were used to collect majorly qualitative data.

Data management and analysis

Quantitative data were entered and cleaned in EpiData 3.1 and analysed using Stata 12.0. Health provider's characteristics and mean performance were summarized and descriptive statistics; frequencies, percentages and graphs generated using descriptive analysis. Inferential statistics were also used to measure the study hypotheses in order to ascertain the association and strength of independent to the dependent variables. Thematic analysis of transcribed observation and interview data followed the 'framework' approach [37], whereby a pre-existing coding frame was developed based on the scope of enquiry to which codes were added on review of the data. All data were coded and indexed in Excel (Microsoft) and analysed according to the most salient themes.

Ethical approval

Institutional approval of the study was obtained from the supervisors and Texila American University Guyana. The Uganda National Council for Science and Technology granted ethical clearance for the study (UNCST HS 2476).

Findings and discussion

Response rate

Overall, this study had an excellent response rate as summarized in the table below:

Table1. Respondents interviewed during the study

Response Category	Target	Achieved				
		Public	PNFP	PFP	Total	%
Health workers	384	159	72	101	332	86.5
Exit interviewees	236	98	21	51	170	72
Health facility in-charges	118	115	22	20	157	133
CHWs	60	NA	NA	NA	63	105
Observations	40	15	8	14	37	92.5
Key Informant	8	NA	NA	NA	7	87.5
Focus group discussions	8	NA	NA	NA	8	100

Burden of malaria

The study findings show that fever is the main reason why patients seek health care (figure 2 below). Majority of study respondents unanimously agreed that malaria was the major disease why people seek healthcare. Furthermore, the study findings showed that 75% of the fever patients seen in health facilities visited tested positive for malaria while 25% tested negative. However, of those who were tested positive, 17% had no fever.

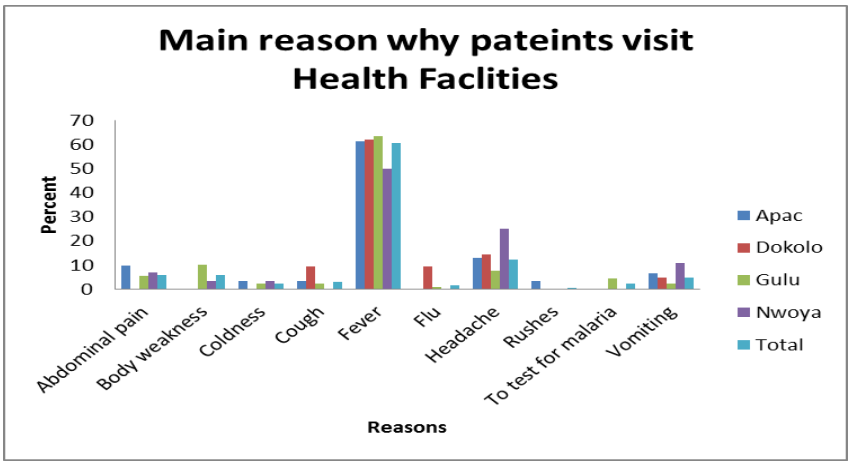

Figure 1. Reasons for seeking care at health facilities

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From qualitative study components many respondents testify to this

"The current status for malaria as per now is 70%, because when you sample like ten people, you analyze them, you find around 7/10 have malaria (positive) or even more so in average its 70%. (District Laboratory Focal Person, Nwoya).

"The most common patients who come here mostly people with malaria. From maternity we are also receiving a lot of malaria cases in pregnancy. (Apac District)."

Knowledge of test, treat and track

As seen in table 6 below, 97%, 84% and 54% of the health workers in public, PNFP and PFP health facilities respectively were aware of testing all fever patients before treatment and which medicines and care are recommended for patients who turn positive and negative on testing. The knowledge among health workers in PFP is significantly lower than that of their counterparts in the public facilities ($P < 0.001$). However, the study findings showed a significant low knowledge of the Track component among all health workers e.g. 26% (Public), 15% (PNFP) and 8% (PFP). Overall, 55% of all respondents during the FGD and KIs don't know at all what tracking involves while 45% confuse it with patient follow-up not the context of surveillance.

Table 2. Study respondents' knowledge on components of T3 strategy

Ownership	**Knowledge Test & Treat**	**Knowledge Track**	***P-value for TT***	***P-value for Track***
Public	97%	26%	**-**	**-**
PNFP	84%	15%	***0.011***	***0.270***
PFP	54%	5%	***<0.001***	***0.039***

"Then also about the T3's, I think some health workers they still lack knowledge gap there. At the hospital here what is more prominence is the first 2T's i.e. (Test and Treat) the third one to me it only stop at the ward "Tracking only stop at the ward" where after administering the three doses of IV Artsunate somebody is reset to see the amount of parasites which is still remaining but at the community component is still very weak that is what I see". (FGD, HW Apac District)."

"To me I haven't heard but what we are doing is related to the strategy (CHW Gulu)"

"Is my first time to hear about the Test, Treat and Track" (HW Apac District)"

"Tract is to follow up the child you have treated to find whether there is improvement or not mainly after three days of treatment; if there is improvement, you thank the patient for responding to treatment but in case there is no improvement, you refer the patient for more examination at the health facility where there are more machine for examination (HW, Apac District)".

As can be deduced from the above quotes, many health workers do not know about the third 'T'. This could be attributed to the fact that the third 'T' was introduced later into the strategy.

Attitudes of health workers towards the T3 policy

We applied Likert scales to assess the attitude of 510 health workers interviewed during this on the Ministry of Health (MOH) and WHO's recommended T3 strategy. Health workers were asked to rate their level of agreement or disagreement with the statements pertaining to motivation on a scale of 1 to 5. Where 5 represents "strongly agree" and 1 "strongly disagree". The variable, attitude was measured based on 11 questions. The results in table 10 below present the descriptive findings. The results show that the overall aggregate mean score for attitude stands at 4.5 and the standard deviation at 0.82. This implies that, on average, health workers who participated in the study had good attitude towards the T3 strategy.

For instance, the results obtained from the focused group discussion with community health workers indicated that they are motivated to comply with the new changes in the policy

I love being a CHW, we have reduced the deaths. And the new testing before treatment for malaria has enabled us to save many children. (FGD CHW Apac)

Table 3. Attitudes of health workers towards the T3 policy

No	Measurement Statement	N	Strongly disagree (SD)	Disagree (D)	Neither agree nor Disagree (NS)	Agree (A)	Strongly Agree (SA)	Measures of Central Tendency				Interpreting the Mean
			%	%	%	%	%	Min	Max	Mean	SD	
1	Overall you are satisfied with your role as a health worker?	510	0.6	0.8	1.5	17.7	79.4	1	5	4.74	0.59	Strongly agree
2	The work you are asked to do is worthwhile/ has value	510	0.8	2.3	3.3	26.3	67.3	1	5	4.57	0.74	Strongly agree
3	Malaria is not the only cause of fever	510	0	0	1.7	22.1	76.3	3	5	4.75	0.47	Strongly agree
4	It's important to test all fever cases before you treat	510	0	0.8	2.7	17.9	79.2	2	5	4.75	0.54	Strongly agree
5	Testing improves the management of patients with fever	510	13.3	7.5	5.6	20.8	52.7	1	5	3.92	1.44	Agree
6	Confirmed malaria is best treated with ACTs as recommended by WHO and MOH Uganda	510	0.4	1	2.1	19	77.5	1	5	4.72	0.6	Strongly agree
7	Confirmed negative cases should never be treated with antimalarial medicines	510	1.3	2.1	3.5	34.4	58.8	1	5	4.47	0.77	Strongly agree
8	Sometimes as a CBD you asked to do work which doesn't make sense	510	10.8	10.8	11.7	31.5	35.2	1	5	3.69	1.34	Agree
9	All patients tested and treated for malaria should be registered well	510	1.9	5.8	7.3	25.6	59.4	1	5	4.35	0.98	Strongly agree
10	Tracking is very key component of malaria care and all patients should tracked	510	1.5	2.1	5.4	28.1	62.9	1	5	4.49	0.81	Strongly agree
11		510	0.8	1.3	7.5	20.8	69.6	1	5	4.57	0.76	Strongly agree
Global Mean and Average Standard Deviation										4.5	0.82	Strongly agree

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Adherence to T3 strategy

Adherence by district

Overall, as seen in table 4 below, we found high testing rates for malaria in most health facilities in all the four districts. Averagely, 95% of positive cases across the four districts were treated with recommended antimalarial medicines (ACTs). Apac district was once again the poorest performer on this at 84.9% and Dokolo district the best at 100%. This good practice was also picked from the FGD with health workers.

"Not all fever that comes is caused by malaria, this is one thing that we always look at but before you star handling any fever, you have to rule out malaria. There other fevers that are cause by bacterial infections and currently during working hours we able to run CBCs to try to know what could be the cause of this fever. If the fever is because of malaria then appropriate treatment is given but, if it is fever not because of malaria we look for other cause of fever, if it is bacterial then some antibiotics are given but, if it persists, we always advise them to come back to the facility. (HW Dokolo)."

It's true that not all that come to hospital turn out positive for malaria. The result will be taken out to the clinician and the clinician will always assess the other fever causing infections as my colleagues have said not forgetting TB and other causes of sicknesses (FGD health worker Nwoya).

However, we also found that some health workers' practices were not conforming to the MOH and WHO recommendation. For instance, of the confirmed negative patients, 13% were treated with antimalarial medicines. This none adherence to treatment policy was the highest in Gulu district at 29.4%. This practice was also commented on by district supervisors.

"Yes, some health workers still give antimalarial medicines to patients have tested negative for malaria (KIIs Malaria focal person Gulu District)."

Table 4. Adherence to T3 strategy by health workers in different districts in the study

	Gulu (N=89)	**Nwoya (N=19)**	**Apac (N=29)**	**Dokolo (N=20)**	**P-value Gulu vs Nwoya**	**P-value Gulu vs Apac**	**P-value Gulu vs Dokolo**
Proportion of all patients cared for in a month that are malaria suspects	64.1	88.1	78.6	55.2	0.041	0.147	0.458
Proportion of suspected malaria tested	95.2	96.3	78.7	92.6	0.836	0.007	0.638
Proportion of suspected cases confirmed positive	78.5	77.6	66.4	40.5	0.931	0.188	0.001
Proportion of positive cases treated with antimalarial medicine	94.0	99.5	84.9	100.7	0.319	0.122	0.261
Proportion of treated cases that were negative	29.4	0.8	0.1	0.3	0.008	0.001	0.006

Adherence by health facility ownership

Fur On overall, the HMIS secondary data extracted from health facility registers during the health facility assessment showed that 90.7% of suspected malaria patients that sought care at the health facilities across the 4 districts were tested to confirm the disease. As can be seen in the table 8 below adherence to testing was excellent in public (97.1%) as compared to 70.3% in the PFP (P < 0.001).

Table 5. Adherence to T3 strategy by health workers by health facility ownership

	Public (N=115)	**PNFP (N=22)**	**PFP (N=20)**	**P-value Public vs PNFP**	**P-value Public vs PNFP**
Proportion of patients cared for in a month that are malaria suspects	72.0	66.5	58.4	0.602	0.221
Proportion of suspected malaria tested	97.1	90.3	70.3	0.136	<0.001
Proportion of suspected cases confirmed positive	69.1	80.8	62.0	0.268	0.530
Proportion of positive cases treated with antimalarial medicine	92.9	94.8	96.9	0.746	0.503
Proportion of treated cases that were negative	0.8	0.0	21.0	0.674	<0.001

Adherence by the cadre of health worker

By cadre, the study has found that compliance levels to the TTT policy of senior health workers with higher levels of education such as medical doctors were poorer than their junior counterparts with low levels of education (table 5) below:

Table 6. Adherence to T3 by HW cadre

District	**Health worker Cadre**	**Total (N=20 per district)**	**Number tested for malaria**	**Confirmed malaria positive**	**Confirmed malaria negative**	**Confirmed Negative given ACTs**	**Testing rate**	**Proportion of Negative given ACT**
Apac	Community Health worker		19	9	10	1	95%	10%
Dokolo			19	10	9	1	95%	11%
Gulu			17	10	17	0	85%	0%
Nwoya			18	18	2	0	90%	0%
Apac	Nurses		18	7	13	2	90%	15%
Dokolo			18	12	6	1	90%	17%
Gulu			19	9	10	2	95%	20%
Nwoya			20	12	8	3	100%	38%
Apac	Clinical officers		15	4	11	7	75%	64%
Dokolo			19	9	10	6	95%	60%
Gulu			19	6	13	7	95%	54%
Nwoya			20	7	13	7	100%	54%
Apac	Medical officer		18	8	10	7	90%	70%
Dokolo			19	8	11	6	95%	55%
Gulu			17	9	8	6	85%	75%
Nwoya			20	11	9	5	100%	56%

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Adherence by health facility level

We also found that adherence to T3 reduces as you ascend from low level to high level facilities. As such adherence to testing all suspected cases of malaria was highest (100%) at CHW and lowest (70.1%) at hospital level (table 9 below). This could be attributed to high load of fever patient, few laboratory staff unavailability of malaria Rapid Diagnostic Tests (mRDTs) at higher health facilities which is in line with the Uganda MOH's policy recommendation of supplying mRDTs only to lower health facilities where malaria microscopy and laboratory technicians are lacking.

Table 7. Adherence to T3 strategy by health workers in different health facility levels

	CHW (U5) (N=63)	**HCII (N=78)**	**HCIII (N=29)**	**HCIV (N=2)**	**Hospital (N=6)**
Proportion of patients cared for in a month that are malaria suspects	92.60	68.50	66.90	51.70	88.80
Proportion of suspected malaria tested	100.00	92.30	95.30	90.20	70.00
Proportion of suspected cases confirmed positive	81.10	75.80	58.20	53.10	58.90
Proportion of positive cases treated with antimalarial medicine	97.00	93.60	92.30	100.00	104.10
Proportion of treated cases that were negative	0.00	2.10	4.00	4.20	1.90
P-value comparing against Public	-	***0.323***	***0.290***	***0.651***	***0.619***

Conclusion

Conclusively, this study found that adherence to the T3 strategy is dependent on health facility ownership e.g. was found excellent among health workers at the community level (CHWs), very good for those in public health facilities, good for health workers in PNFPs and sub-optimal among PFP health workers; level of education and seniority of health workers e.g. was high among the juniors and very low among the seniors and on level of health facility e.g. was high at community and lower health facilities and low in high level health facilities.

Of the T3, "Track" is least known and adhered too by all health workers irrespective of the level and ownership of health facilities where they are stationed.

This is attributed to the T3 policy not being fully disseminated to inform the implementers, and logistical factors such as stock outs of testing kits. The Government of Uganda and partners should endeavor to address these bottlenecks if the T3 policy is to be successfully implemented.

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