THE QUALITY OF MALARIA CASE MANAGEMENT UNDER DIFFERENT TRANSMISSION SETTINGS IN TANZANIA MAINLAND

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By

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A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science (Applied Epidemiology) of the

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled "***The Quality of Malaria Case Management under Different Transmission Settings in Tanzania Mainland***" in partial fulfillment of the requirements for the MSc Degree (Applied Epidemiology) of Muhimbili University of Health and Allied Sciences.

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Prof. Donath Tarimo

(Supervisor)

Date _____

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Dr. Rogath Kishimba

(Supervisor)

Date _____

DECLARATION AND COPYRIGHT

I, **Ally Kassim Hussein**, declare that I am the sole author of this **Dissertation** as my own original research work, and that it has not been presented and it will not be presented to any other University for the similar or any other degree award; and where other people's research was used, they have been dully acknowledged.

Signature_____ Date _____

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ABSTRACT

Background: Tanzania is currently under an epidemiological transition of malaria transmission with parts of the country having <1% (hypoendemic; pre-elimination) and >10% malaria prevalence (mesoendemic). Hypoendemic areas in the pre-elimination phase require high testing rates for fever cases and appropriate treatment of cases. There is paucity of information on the quality of malaria case management in pre-elimination settings. This study examined the influence of endemicity on the quality of malaria case management.

Methods: An analytical cross-sectional study was conducted amongst 1,713 health facilities (HF) from all 26 regions of Tanzania Mainland during January through March 2019. Secondary data were collected following introduction of an assessment tool for HF readiness and performance of malaria case management by the National Malaria Control Programme. HF performance were mapped according to malaria endemicity. Using standard readiness indicators, mean scores from facilities in the different transmission settings were compared by a student t-test. Simple and multiple linear regression analyses were performed to determine the association between HF performance and endemicity (mesoendemic vs. hypoendemic).

Results: HFs located in hypoendemic settings fared poorly than those in mesoendemic settings in terms of the overall quality of services [Difference in mean scores = -2.52; (95 % CI -3.91, -1.12)], readiness [Difference in mean scores = -2.97; (95 % CI -4.61, -1.30)], availability of malaria reference materials [Difference in mean scores = -4.91; (95 % CI -7.76, -2.05)], information system tools [Difference in mean scores = -5.86; (95 % CI -7.92, -3.80)] and client satisfaction [Difference in mean scores = -6.61; (95 % CI -9.48, -3.75)]. HFs in mesoendemic settings performed better than those in hypoendemic settings after controlling for facility level and location [β: -2.12; (95 % CI -3.50, -0.73)]. HFs in rural areas were also found to perform better than those in urban areas after controlling for malaria endemicity and facility level [β: -4.12; (95 % CI -5.89, -2.34)].

Conclusion and Recommendations: Health Facilities located in Malaria Hypoendemic settings performed poorly compared to those in Mesoendemic settings. The findings have major implications for areas aiming at eliminating malaria. Further studies are required to establish factors associated with poor quality of malaria case management in Hypoendemic settings.

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ABBREVIATIONS

ACT	Artemisinin based Combination Therapy
ALu	Artemether Lumefantrine
BS	Blood Slide
CHMT	Council Health Management Team
CO	Clinical Officer
DHIS2	District Health Information System 2
GPS	Global Positioning System
HFR	Health Facility Registry
HMIS	Health Management Information System
HRH	Human Resource for Health
IMCI	Integrated Management of Childhood Illness
LLINs	Long Lasting Insecticidal Treated Nets
M-RDT	Malaria Rapid Diagnostic Test
MCAR	Missing Completely At Random
MCH	Maternal and Child Health
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly & Children
MSDQI	Malaria Services and Data Quality Improvement
MUHAS	Muhimbili University of Health and Allied Sciences
NIMR	National Institute for Medical Research
NMCP	National Malaria Control Programme
OPD	Out Patient Department
PORALG	President's Office Regional Administration and Local Government
RHMT	Regional Health Management Team
SP	Sulphadoxine-Pyrimethamine
TFELTP	Tanzania Field Epidemiology and Laboratory Training Program
TMA	Tanzania Meteorological Agency
WHO	World Health Organization

DEFINITION OF TERMS:

Quality of health care is defined as a degree of performance in relation to a defined standard of interventions known to be safe and have the capacity to improve health within available resources (1–3). Quality of malaria case management uses this definition but in the context of malaria management.

Hypoendemic Settings- Areas with a malaria prevalence among children (6-59 months) ranging between 0 - <10% as detected by using a rapid diagnostic test.

Mesoendemic Settings – Areas with a malaria prevalence among children (6-59 months) ranging between 10-50% as detected by using a rapid diagnostic test.

MSDQI - Malaria Services and Data Quality Improvement package is a National approach for monitoring malaria services provided in the Health Facilities and validation of routine malaria data. The tool was developed by MoHCDGEC through National Malaria Control Programme (NMCP) and Partners in line with the National Health and Social Welfare Quality Improvement Strategic Plan, The Tanzania Quality Improvement Framework in Health Care and Situation Analysis of Quality Improvement in Health Care. The Package has 7 Checklists (Modules) i.e. Outpatient Department, Malaria Rapid Diagnostic Test, Antenatal Clinic, Severe Malaria, Logistic Supply Chain, Microscopy, Data Quality Audit and a Tool for Supervising Council Health Management Teams.

Outpatient Department Checklist – Is one of the checklists in the MSDQI package, it assesses the Out Patient Department on adherence to National guidelines on testing & treatment of febrile/malaria patients.

1.0 INTRODUCTION

1.1 BACKGROUND

Malaria, a febrile disease caused by Plasmodium parasites transmitted by female Anopheles is the most important public health parasitic disease of human beings. Nearly half of the world's population is at risk of malaria. Global efforts to control malaria dates back to 1993 (4) and over two decades of using effective control tools for morbidity and transmission control major achievements had been recorded (5).

According to the World Malaria Report (2018) there were approximately 219 million cases and 435000 deaths reported globally compared to the previous year where 217 million cases and 451000 deaths were reported, showing that, there is a stagnation in the progress of controlling malaria (6). Majority of the morbidity (90%) and mortality (92%) occurring in Sub Saharan Africa, the groups most at risk being children under the age of five years, pregnant women and non-immune travelers (6).

Tanzania has recorded an impressive decline in the overall prevalence of malaria over the past decade; thus, surveys conducted in 2007/2008 and 2016/2017 show a decline by almost 50% from 18.1% to 7.3%. This achievement was made possible following the wide scale deployment of effective malaria interventions which include indoor residual spraying (IRS), use of insecticide treated nets and effective case management (7). However, a large majority (96%) of Tanzania Mainland population is still at risk for contracting malaria (7,8).

The epidemiology of malaria varies geographically depending on the local malaria transmission intensity or endemicity class. Parasite prevalence or spleen rates are used to define levels of endemicity in children aged 2–9 years, i.e. hypoendemic: 0–10%; mesoendemic: 10–50%, hyperendemic: constantly > 50% and holoendemic: constantly ≥ 75% with a low adult spleen rate (9).

Symptoms of Malaria are not specific and malaria is often the most common cause of fever in countries where it is endemic. Malaria can be classified as either being uncomplicated or complicated (severe).

Symptoms of uncomplicated malaria may include a vague absence of wellbeing, headache, fatigue, muscle aches, and abdominal discomfort. Nausea, vomiting and orthostatic hypotension can also occur.

Severe malaria which is often caused by *P. falciparum,* is associated with life threatening complications like serious organ failures or abnormalities in the patients' blood or metabolism. Cerebral malaria a form of severe malaria is characterized with abnormal behavior, impairment of consciousness, seizures, coma, or other neurologic abnormalities.

In pregnant women, malaria might be asymptomatic or associated with anaemia, an increased risk of severe malaria, spontaneous abortion, stillbirth, prematurity and low birth weight depending on the transmission setting.

There are two routine laboratory tests used in Tanzania for the diagnosis of malaria. These include the Malaria Rapid Detection Test (m-RDT) and blood slide examination by light microscopy.

Tanzania has adopted the WHO recommendation of using artemisinin-based combination therapy (ACT) as the first-line treatment of malaria. ACTs are highly effective against drug-resistant *Plasmodium falciparum.* The ACTs are made available through external support. The use of ACTs has to be monitored to ensure it is rational, so as to prevent development of parasite resistance.

Globally and similarly in Tanzania Mainland, 80% of patients are attended as Outpatients (10). Data from the HMIS show that although there has been a downward trend for the past 3 years in the annual number of uncomplicated malaria cases caused by *Plasmodium falciparum* seen at health facilities in Tanzania Mainland, 5.6 million malaria cases were attended in 2017. This corresponds to a 16% of the patient burden at the OPD. The number of severe malaria patients admitted has similarly declined from approximately 530000 to 334500 in 2015 and 2017 respectively.

Prompt diagnosis and treatment with an effective antimalarial reduces morbidity and prevent mortality (11) and is one of the core interventions in controlling malaria (12). Appropriate malaria case management might also reduce the transmission by reducing the human parasite reservoir and prevent the emergence of drug resistance (13–15). Furthermore improving case management may also contribute to improved treatment of non-malarial febrile illnesses, which are often misdiagnosed and treated presumptively as malaria (16,17).

Due to the importance of monitoring interventions in place to control malaria, the National Malaria Control Program and Partners developed the Malaria Services and Data Quality Improvement (MSDQI) package, it is a National approach which monitors malaria services provided in the Health Facilities and validates routine malaria data.

1.2 PROBLEM STATEMENT

In Tanzania, a major decline in malaria has been witnessed with some areas reaching a < 1% prevalence, while in other areas prevalence has remained high at ≥ 10% (7,18). The global malaria strategy requires a stratification of such areas so as to strategize malaria interventions (12). In the pre- to elimination stage, malaria interventions focus on rigorous case management and transmission control (19). Though there is a decline of malaria fevers in these settings, patients still consult health facilities on account of non-malarial fevers (17). Since fever is the entry point for malaria case management (20), the precedence of non-malaria fevers might compromise the quality of malaria case management (21). In areas in the pre- to elimination stages it is not known the extent to which non-malaria fevers affects the quality of malaria case management. Though diagnostics could be in place, the decline in malaria prevalence would conceivably limit the detection limit of the tests (22). Furthermore clinicians, out of precaution, may disregard test results and give presumptive antimalarial treatment (23). Stock outs of ACTs would also oblige clinicians to prescribe non-ACT drugs, thus compromising quality (17). Likewise, stock out of diagnostics would compromise quality as clinicians will be obliged a presumptive treatment (24). The quality of malaria case management in areas in the pre- to elimination stages have not been explored. This study aimed to compare the quality of malaria case management between areas with high prevalence to those with low malaria prevalence. The goal being to assess service readiness and performance of Outpatient departments in providing malaria case management in hypoendemic versus mesoendemic settings (25).

1.3 CONCEPTUAL FRAMEWORK

Information concerning the quality of malaria case management can be drawn from factors which are grouped into 3 categories of structure, process and outcome according to the Donabedian model(3). These factors directly affect the quality of malaria case management.

Structural factors describe the context in which care is delivered. For this study, they include availability of human resources for health, staff training on malaria case management, availability of malaria case management reference materials, essential equipment for physical examination of a febrile patient and health management information system tools.

Process factors, include all transactions made between the patients and health service providers from the time of history taking up to when the patient exits the facility.

Finally, outcome factors, refer to the effects of healthcare on the health status of patients and populations. This includes client satisfaction and reduction in Malaria morbidity.

In this study, the outcome factor of malaria endemicity was used to categorize the facilities into the comparison groups i.e. those in Malaria Hypoendemic or Mesoendemic settings.

Other Factors that were also studied included the ownership and level of the Health Facility, its location and the season when the Health Facility was surveyed. These factors might affect the quality of malaria case management indirectly.

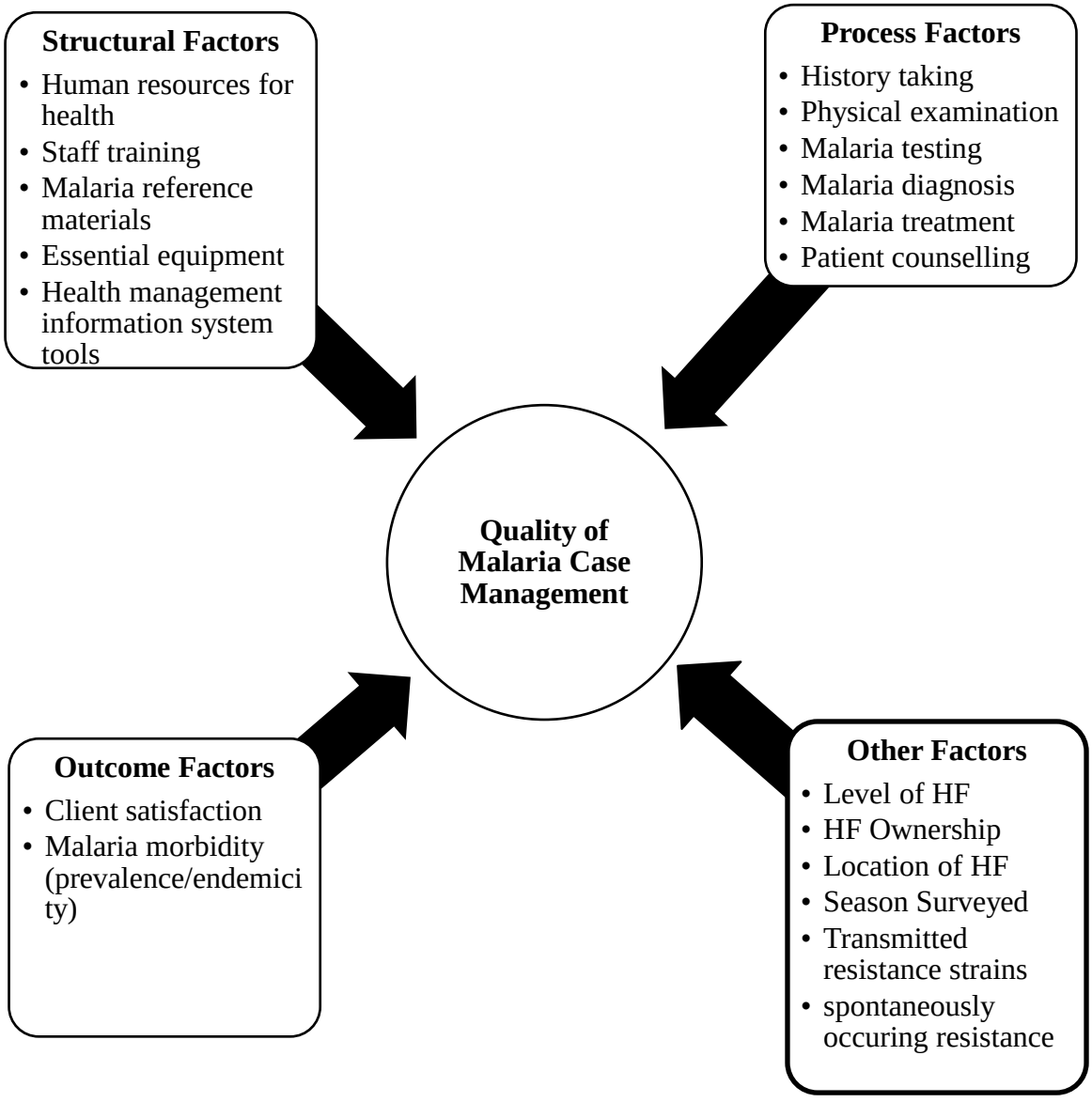

Figure 1: Conceptual framework for the quality of malaria case management

Source: Hussein, 2018 (Adapted from the Donabedian Model (1,3))

1.4 RATIONALE

Findings of this study shall inform policy makers, the Ministry of Health, Community, Development, Gender, Elderly and Children (MoHCDGEC) through the National Malaria Control Programme (NMCP) and policy implementers, the President's Office Regional Administration and Local Government (PORALG) on the performance of provision of quality services for malaria case management under differing endemicities. Furthermore, the results will shed light on the quality of data generated from the facilities and the clients' satisfaction on services received.

The information generated will facilitate in targeting the services quality improvement strategies already in place in the low performing areas.

1.5 RESEARCH QUESTION

How does endemicity influence the quality of malaria case management?

HYPOTHESES

Ho: The quality of case management of malaria does not differ according to endemicity.

Ha: The quality of case management of malaria differs according to endemicity.

1.6 OBJECTIVES

1.6.1 Broad Objective

To determine the influence of endemicity on the quality of case management of malaria in different transmission settings in Tanzania Mainland 2017-2018.

1.6.2 Specific Objectives

1. To determine the influence of endemicity on the structural factors of the quality of malaria case management in hypoendemic and mesoendemic settings.
2. To determine the influence of endemicity on the process factors of the quality of malaria case management in hypoendemic and mesoendemic settings.
3. To determine the influence of endemicity on client's satisfaction with malaria services offered in hypoendemic and mesoendemic settings.

2.0 LITERATURE REVIEW

Quality of health care is defined as a degree of performance in relation to a defined standard of interventions known to be safe and have the capacity to improve health within available resources (1–3). Quality of malaria case management uses this definition but in the context of malaria management.

Factors affecting quality of malaria case management can be broadly categorized into 3:

2.1 Structural Factors

A recent study that evaluated the readiness of facilities in providing services in 10 low and middle income countries including Tanzania showed that hospitals, privately owned facilities, being in an urban area and receiving donor funding were associated with a higher service readiness index (26).

These results were contradicting the findings from the Service Availability and Readiness Assessment conducted in Tanzania in 2012 where it was observed that lower level health facilities scored highly compared to Hospitals in staffing and training, diagnostics and readiness to provide services. It was also observed that the facilities owned by the government performed better on meeting the requirements for staffing and training, medicines and commodities. Another point of difference was that facilities located in rural areas were better off in all the readiness parameters assessed (27).

A comparative study amongst 826 health facilities in Kenya, Namibia and Senegal conducted to look at the relationship between malaria endemicity and health facility readiness to deliver services, found out that there was improved readiness associated with higher malaria burden in rural areas, but not in urban areas. Public facilities had a higher readiness index compared to private for profit facilities (28).

Globally there is a geographical imbalance in the distribution and retention of human resource for health (HRH). Only 3% of the global HRH serves Sub-Saharan Africa where 11% of the global population resides and where there is a 24.3% of the global burden of diseases. The situation is worse in rural areas (29). Some of the reasons given for the unequal distribution

included unfavorable working conditions, unsupportive environment in the community, and different retention strategies by managers (30).

In five regions of Southern Tanzania (among the regions with high prevalence of malaria), it was found that only one fifth (20%) of the recommended clinical staff had been employed in the facilities (31). This was further supported by the findings from the Tanzania Service Provision Assessment for Malaria reveal that more than half (55%) of the staff attending patients at the OPD were clinical officers (CO), followed by Nurses and other Cadres 15%. Assistant Medical Officers 10% and Medical Doctors 6% were managing patients in a minority of OPD especially in Hospitals and Health Centers (32). Another study revealed similar findings that medical doctors, laboratory technicians, clinical officers were difficult to retain (33).

In Tanzania, essential equipment for the examination of febrile patients including functional thermometers and weighing scales were found to be available in about a third of the health facilities included in the Service Provision Assessment for Malaria, in particular it was observed that hospital OPDs were not better equipped compared to other facility levels (32).

There are issues observed in the quality of data generated from all health facilities in the Tanzania despite the high coverage of reporting tools (32). A recent study conducted in Ilemela located in Mwanza Region for four common illnesses including malaria found that the completeness of data was at 62%, the timely reporting at 40%.There were differences observed by ownership of facilities, privately owned submitted reports later compared to public owned facilities (34).

Similar findings were also reported from the study conducted in Kenya, Namibia and Senegal, that Private for profit facilities and those managed by NGO/FBOs were significantly more likely to have missing data than public facilities. Facilities located in areas with higher malaria endemicity were seen to have higher odds of having missing data (28).

2.2 Process Factors

A study done in 8 Low and Medium Income Countries including Tanzania, which utilized data from 4300 facilities involved in the Service Provision Assessments reported that there was a weak correlation between structural factors and the adherence to standard treatment guidelines. Facilities with similar level provided varying care and even hospitals lacked essential equipment and medications (35).

Findings from a study done in a low malaria transmission setting in Vanuatu revealed that there was inadequate history taking and clinical examination of febrile patients. Only a third of the febrile patients were tested for malaria despite all facilities having the capacity to perform the diagnostic tests. Among the factors found to be associated with a relatively higher testing rate included being attended by a health worker who was trained on malaria case management, presenting with fever as the chief complaint and upon examination if the patient was found to be febrile (36). A similar situation was observed in another study done in Angola, which was evaluating the quality of malaria case management between 2 provinces with different malaria transmission. It was realized that febrile patients were tested for malaria at a lower rate in the low transmission province (30% versus 69%) and less than a third of the patients confirmed to have malaria were treated with a correct dose ACT in the low transmission province, despite having a similar availability of diagnostic tests and antimalarials. The researchers recommend trainings and supervision of clinicians on malaria case management especially in the low malaria transmission settings so as to mitigate the effects of the increased malaria transmission observed in Angola (37).

In the Service Provision Assessment for Malaria in Tanzania, m-RDTs were found to be available in all OPDs (100%) of hospitals and health centers, in dispensaries however the availability was lower (94%). More than half of the clinicians attending patients had received formal trainings on performing m-RDT. Patients who had a main complaint of fever or found to be febrile during the examination were tested in 79% of the health facilities. Health Centers were seen to perform better in testing the suspected malaria patients compared to hospitals and dispensaries (91% versus 69% and 78% respectively) (32).

As per expectations, Artemether Lumefantrine (ALu) was found to be the treatment of choice in almost all health facilities (99%) and 91% of the staff were familiar with its dosage schedule. More than half (60%) of the health facilities included in the assessment reported to provide the 1st dose of ALu under direct observed treatment. However, this was the case for less than a third (29%) of the hospitals. A reason for failure to implement this was reported to be the lack of facilities to administer medication. There was another challenge noted, that in about a quarter (24%) of the facilities, there was a reported stock out of ALu for more than a week in the preceding quarter (32). On observations of the interaction between the patients and clinicians, it was noted that there was a poor history taking in general across all health facility levels, even for danger signs like convulsions. The situation was the same for the quality of the physical examinations where the clinicians felt the body hotness by hand in only about half of the patients despite the high availability of functional thermometers (71%). Hospitals tested a smaller proportion of the suspected cases (28%) compared to health centers (62%) and dispensaries (66%) with mRDT. Majority (84%) of the clinicians however were seen to wait for laboratory results before prescribing medication (32). Among the patients tested and diagnosed with malaria, less than half (47%) were prescribed with the appropriate antimalarials, and amongst them only in half (50%) was the correct dose prescribed (32). On patient counselling, 79% of the patients/caretakers were told about the illness they suffered. About half (51%) of the patients were advised on using antipyretics at home if fever developed. A quarter were advised on giving extra fluids and food during the illness. More than a third (37%) were advised on when to return immediately to the health facility (32).

2.3 Outcome Factors

In the Service Provision Assessment for Malaria in Tanzania, more than 60% of clients were found to be satisfied with the quality of services received (32). In another study that was conducted in Dar es Salaam at Mwananyamala hospital with the aim of measuring the level of client satisfaction on services received reported that majority of the patients were dissatisfied, however the researchers used a different approach to measure satisfaction compared to what was used in the previous study. They used a questionnaire that had questions on five quality

domains (reliability, empathy, tangibles, responsiveness and assurance) comparing expectations and perceptions (10).

Issues identified by patients that affected the quality of care received in Kilosa District Hospital and households (Morogoro) included the inadequate number of human resources for health, the unavailability of drugs and the quality of physical examinations performed by clinicians (38). These findings were similar to those found in another study done in Muheza District households (Tanga) among caretakers of sick children who visited primary health facilities (39).

A study done in Arusha showed that clients were more satisfied by the quality of services received when clinicians followed guidelines when they were being observed. This made it difficult to correctly assess the quality of services provided as it might have been just a short term reaction to being observed. This phenomenon is known as the Hawthorne effect (40).

3.0 METHODOLOGY

3.1 Study Design

This was an analytical cross sectional study comparing the quality of malaria case management provided by Health Facilities in Malaria hypoendemic and mesoendemic settings.

3.2 Study population, sample size and selection

3.2.1 Study Area

The study involved all 26 regions of Tanzania Mainland. The regions have varied geographical and climatic conditions, ranging from tropical coastal lowlands to arid and mountainous highlands. The areas surrounding lakes Victoria, Tanganyika and Nyasa have relatively high temperatures, humidity and heavier rainfall conditions which favour the breeding of the vectors and transmission of malaria. The remaining parts of Tanzania consists of the Central Plateau, Southern and Northern Highlands, with an altitude ranging between 900m to 1800m above sea level. Despite the differences observed, the climatic conditions remain favorable for malaria transmission throughout almost the entire Country, with close to 96% of the population being at risk (7,18).

The figure below(8) shows the distribution of prevalence of malaria by Region in Tanzania. The Southern East and Northern West Regions have a higher malaria prevalence compared to the Central parts of the Country.

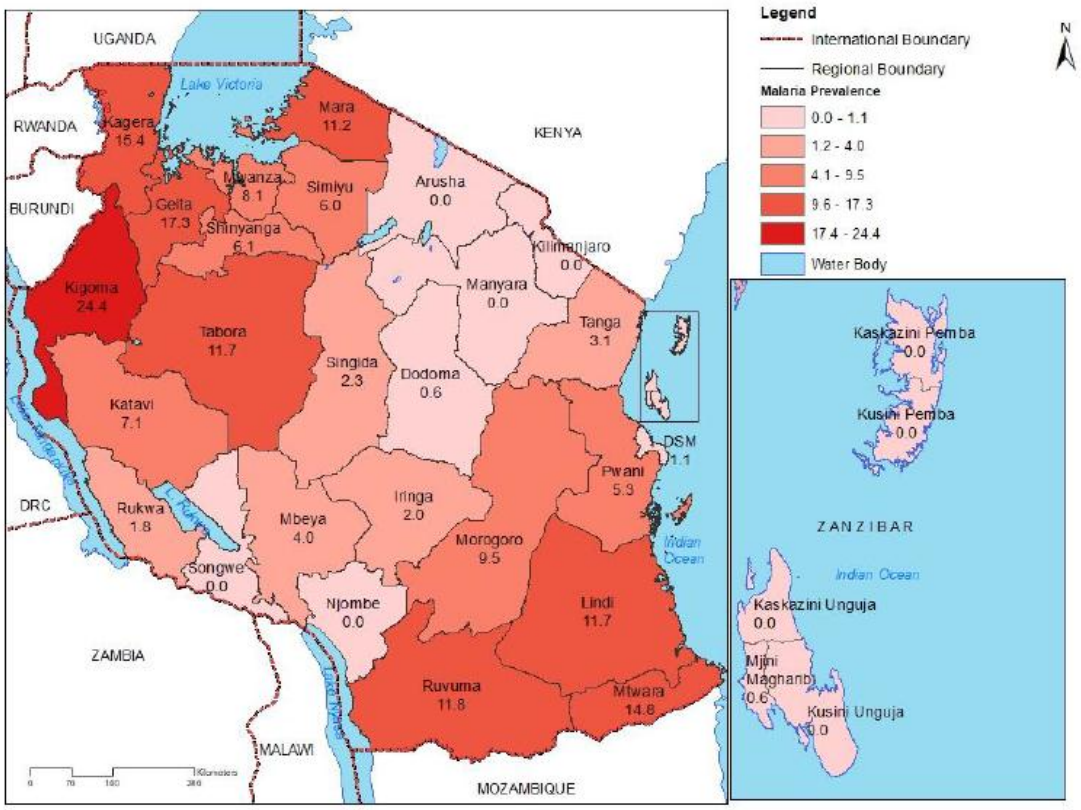

Figure 2: Malaria prevalence by Region, Tanzania 2017

Source: Tanzania National Bureau of Statistics, 2017

3.2.2 Study Duration

The study was conducted from January through March 2019. Health facility data was extracted for the period 1st September 2017 to 31st December 2018.

3.2.3 Study Population

The study focused on all health facilities providing services for malaria patients which had been evaluated using the MSDQI package (OPD checklist/module).

3.2.4 Sample Size and Power Estimation

A total of 1713 health facilities were included in this study.

A post-hoc power analysis was performed using GPower version 3.1.9.2 to determine the power achieved by the study in calculating the difference of the outcome variable (Quality of

Malaria Case Management using the Overall OPD Score) by malaria endemicity (Hypoendemic/ Mesoendemic).

Using the t-test family, comparing the difference of 2 independent sample means,

The following data were used for the power calculation:

α error probability= 0.05

Sample size group 1 (mesoendemic) n_1= 987 health facilities

Mean (Overall OPD Score) group 1 μ_1 = 76.7

Sample size group 2 (hypoendemic) n_2= 726 health facilities

Mean (Overall OPD Score) group 2 μ_2= 74.2

Pooled standard deviation σ= 13.89

Cohens Effect Size Index *d* was calculated using the formula:

$$d = \frac{\mu_1 - \mu_2}{\sigma} = 0.179$$

Non Centrality Parameter δ was calculated using the formula:

$$\delta = d\sqrt{\frac{n_1 n_2}{n_1 + n_2}} = 3.68$$

Power π (1-β error) was calculated using the formula:

$$\pi = \Phi\left(\frac{\delta}{\sigma D} - Z_{1-\alpha/2}\right) + \Phi\left(-\frac{\delta}{\sigma D} - Z_{1-\alpha/2}\right) = 0.957 = 95.7\%$$

3.2.5 Sampling Technique

There was no sampling technique utilised. The study involved all the health facilities which had been evaluated using the MSDQI package (OPD checklist) whose data was available in DHIS2.

3.2.6 Inclusion Criteria

All Health facilities in Tanzania Mainland providing services for malaria patients which had been evaluated using the MSDQI package.

3.2.7 Exclusion Criteria

Facilities where the MSDQI OPD checklists had not been administered or whose results have not been uploaded into DHIS2 where excluded from the study.

3.3 Variables

Hypoendemic Settings- Areas found to have a malaria prevalence among children (6-59 months) ranging between 0 - <10% as detected by using a rapid diagnostic test in the 2017 Tanzania Malaria Indicator Survey.

Mesoendemic Settings –Areas found to have a malaria prevalence among children (6-59 months) ranging between 10-50% as detected by using a rapid diagnostic test in the 2017 Tanzania Malaria Indicator Survey.

Table 1: List of Quantitative Variables (dependent)

Category	Factors	Explanation
Structural factors	Human Resource for Health	availability of the minimum number of staff required at that level of HF
	Staff training	Availability of clinical staff who have received malaria case management training
	Malaria reference materials	availability of malaria reference materials e.g. National treatment guidelines, IMCI chart etc.
	Essential equipment	availability and functionality of equipment required for managing a febrile patient e.g. thermometers, weighing scale etc.
	HMIS tools	Availability of HMIS book 5 (register, tally sheet, summary forms)
	Overall Site Readiness	Composite score, average of all structural factor scores
Process Factors	History taking	The clinicians history taking skills while attending a febrile patient e.g. age, duration of fever, diarrhea, convulsions etc.
	Physical examination	The clinicians physical examination skills e.g. signs of anemia, neck exam, measurement of temperature etc.
	Malaria testing	Whether the clinician orders/conducts a test for malaria, and whether he/she waits for the results before prescribing medication or making the final diagnosis
	Malaria diagnosis	Whether the clinician made a clinical or confirmed diagnosis, whether the test results were interpreted correctly e.g. (negative MRDT with a non-malaria cause of fever)
	Malaria treatment	Whether the patient was given the right dose of an ACT if found to be positive for malaria. Or not prescribed an ACT if found negative.
	Patient counselling	Whether the patient was counselled on how to take medicine at home, when to return, use of LLIN etc.
	Overall OPD Clinical Management	Composite score, average of all process factor scores
Outcome Factor	Client satisfaction	patients level of satisfaction with the services received
Quality of Malaria Case Management	Overall OPD performance	Composite score, average of structural, process and outcome factors scores

Detailed elaborations of how individual variables are calculated are attached as appendix 2
All variables listed previously are numerical in nature and range from 0-100. The quantitative variables will be graded into 3 categories as follows:

Table 2: Interpretation of Quantitative Variables (dependent)

Score	Grade	Performance
75 - 100	A	Good
50 - <75	B	Average
0 - <50	C	Poor

Table 3: List of Qualitative Variables (Independent)

Variable	Values
Malaria Endemicity	Hypoendemic / Mesoendemic
Location of health facility	Urban/ Rural
Level of health facility	Dispensary / Health center / Hospital
Ownership of health facility	Public/ Private for profit/ Private FBO or NGO
Season	Wet / Dry

3.4 Data Collection Methods

A data extraction form was used to retrieve health facility data from DHIS2 and the HFR. Data was merged in Microsoft Excel 16.

3.4.1 Description of Data Source

MSDQI Health facility data was retrieved from DHIS2. This system is being managed by the Health Management Information System (HMIS) unit of the Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC). The Unit is located within the Monitoring and Evaluation Section of the Directorate of Policy and Planning.

Information on the quality of malaria services provided by the health facilities was collected by trained supervisors from the Council Health Management Teams.

There were 2 methods by which this information was collected:

A paper based checklist was filled by the supervisors during the assessment. They later filled an electronic data sheet and entered the information into DHIS 2.

The second method was by using Electronic Data System (EDS) checklists operating on android tablets. The information was automatically uploaded into DHIS 2.

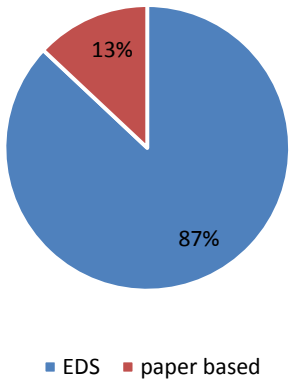

Figure 3: Distribution of MSDQI OPD data by type of collection method

Geographical coordinates of the health facilities were obtained from the Health Facility Registry Public Portal accessed via http://hfrportal.ehealth.go.tz/. The MoHCDGEC owns and maintains the data in the HFR database.

Information about health facilities were collected by a member of Council Health Management Team or the Health Management Information System focal person of each council. The information were collected using a data collection form and Global Position System (GPS) receiver.

Regional rainfall seasonality patterns were obtained from the Tanzania Meteorological Agency Maproom accessed via: www.maproom.meteo.go.tz/maproom/climatology/index.html

The Maproom provides a dataset which has over 30 years' worth of climate data. It is being managed by the International Research Institute for Climate and Society of Columbia University in partnership with the Tanzania Meteorological Agency.

3.5 Data Analysis

The merged data was analyzed using Stata version 15. Descriptive statistics were summarized by frequencies, percentages, means and maps where appropriate. The means of scores for the facilities in the malaria hypoendemic and mesoendemic settings were compared using a t-test with unequal variances to test whether there was a difference or not in the structural, process and outcome factors of the quality of malaria case management.

Simple linear regression analysis was performed using an α of 0.05 to determine the association between the quality of case management (dependent) and malaria endemicity (independent).

Potential confounders of the relationship between malaria endemicity and the quality of malaria case management based from a priori knowledge that were also studied included the location of the health facility (urban/rural), facility type according to the level of care provided (hospitals, health centers and dispensaries), ownership of the health facility (public, private for profit, private-Non Governmental Organizations or Faith Based Organisations) and the season when the facility was surveyed based on the evidence of seasonal pattern of malaria transmission (wet/ dry season).

Standard multiple linear regression was used. The standard method entered all independent variables simultaneously into the model. Variables were evaluated by what they added to the prediction of the dependent variable which is different from the predictability afforded by the other predictors in the model. The *F*-test was used to assess whether the set of independent variables collectively predicts the dependent variable. R-squared (the multiple correlation coefficient of determination) was reported and used to determine how much variance in the dependent variable could be accounted for by the set of independent variables. The *t* test was

used to determine the significance of each predictor and beta coefficients were used to determine the magnitude of prediction for each independent variable.

3.6 Ethical Consideration

Ethical clearance was obtained from the Institutional Ethical Review Board of the Muhimbili University of Health and Allied Sciences (MUHAS). Permission to conduct the study and use the extracted programmatic data was obtained from the National Malaria Control Programme. Permission to conduct Data Verification was obtained from the respective Regional Medical Officers.

4.0 RESULTS

The Study included a total of 1713 health facilities from all 26 regions of Tanzania Mainland. Regions in the Lake Zone and South of Tanzania contributed a large number of facilities. The region with the highest number of health facilities was Kagera (214) followed by Mwanza (206). Regions with the least number of facilities were Dar es Salaam and Tanga (4 facilities each).

Figure 1 shows the distribution of health facilities by Region and Malaria Endemicity.

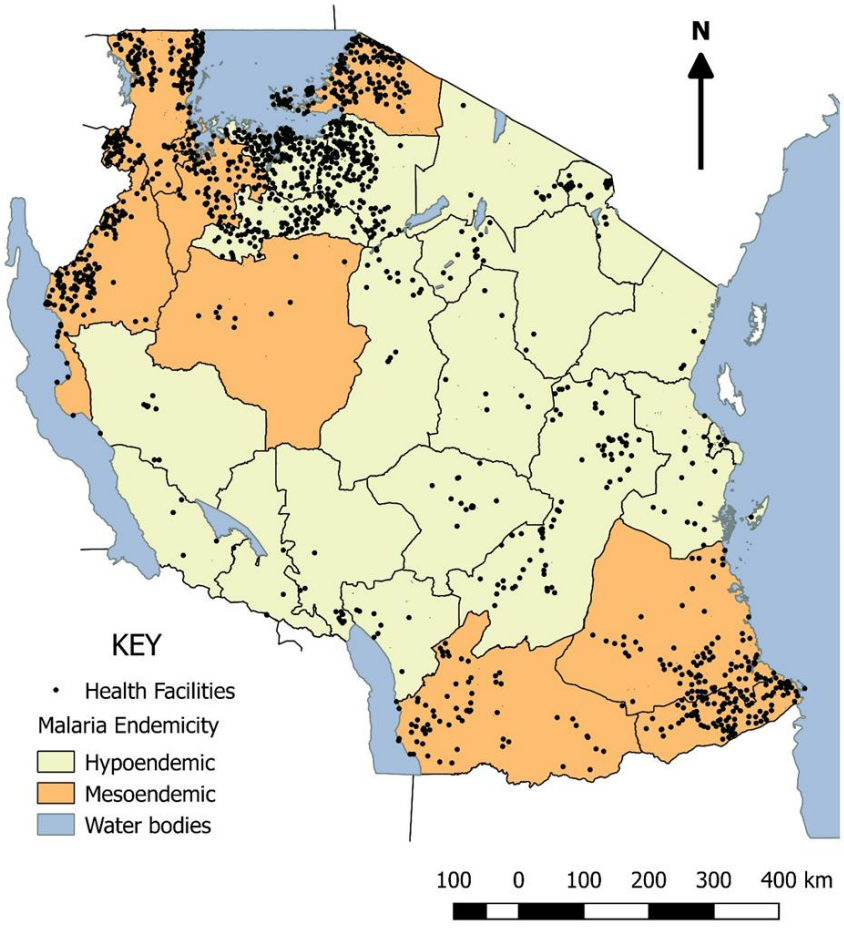

Figure 4: Distribution of Health Facilities by Region and Malaria Endemicity

More than Half (57.6%) of the Facilities were located in Malaria Mesoendemic Settings.

Table 4: Health Facility characteristics in the analytic sample by Malaria Endemicity

Variables	Categories	Malaria Hypoendemic Settings (n=726) n (%)	Malaria Mesoendemic Settings (n= 987) n (%)	Total (n= 1713) n (%)
Health facility Level	Hospital	49 (6.8)	42 (4.3)	91 (5.3)
	Health Center	109 (15.0)	117 (11.8)	226 (13.2)
	Dispensary	568 (78.2)	828 (83.9)	1396 (81.5)
Health Facility managing authority	Public	605 (83.3)	820 (83.1)	1425 (83.2)
	NGO/FBO	69 (9.5)	83 (8.4)	152 (8.9)
	Private for profit	52 (7.2)	84 (8.5)	136 (7.9)
Health Facility location	Urban	133 (18.3)	187 (18.9)	320 (18.7)
	Rural	593 (81.7)	800 (81.1)	1393 (81.3)
Season surveyed	Wet	266 (36.6)	505 (51.2)	771 (45.0)
	Dry	460 (63.4)	482 (48.8)	942 (55.0)

The majority (81.5%) of the health facilities were public dispensaries located in rural settings. The distribution of health facility by level, managing authority and location were similar between hypoendemic and mesoendemic settings.

Table 5: Health Facility Distribution based on Performance Grades by Malaria Endemicity

Variables	Categories	Malaria Hypoendemic Regions (n=726) n (%)	Malaria Mesoendemic Regions (n=987) n (%)	Total (n=1713) n (%)
Overall	Good	404 (55.7)	596 (60.4)	1000 (58.4)
	Average	266 (36.6)	370 (37.5)	636 (37.1)
	Poor	56 (7.7)	21 (2.1)	77 (4.5)
Site Readiness	Good	460 (63.4)	691 (70.0)	1151 (67.2)
	Average	220 (30.3)	270 (27.4)	490 (28.6)
	Poor	46 (6.3)	26 (2.6)	72 (4.2)
Clinical Management	Good	271 (37.3)	290 (29.4)	561 (32.7)
	Average	233 (32.1)	366 (37.1)	599 (35.0)
	Poor	222 (30.6)	331 (33.5)	553 (32.3)
Patient Satisfaction	Good	469 (64.6)	702 (71.1)	1171 (68.4)
	Average	129 (17.8)	184 (18.7)	313 (18.3)
	Poor	128 (17.6)	101 (10.2)	229 (13.3)

The majority (>95%) of the Health Facilities scored good or average in the overall score and site readiness domain (structural factors). About a third (32.3%) of the Facilities performed poorly in the clinical management domain (process factors). The distribution of performance between the Endemicity settings were similar.

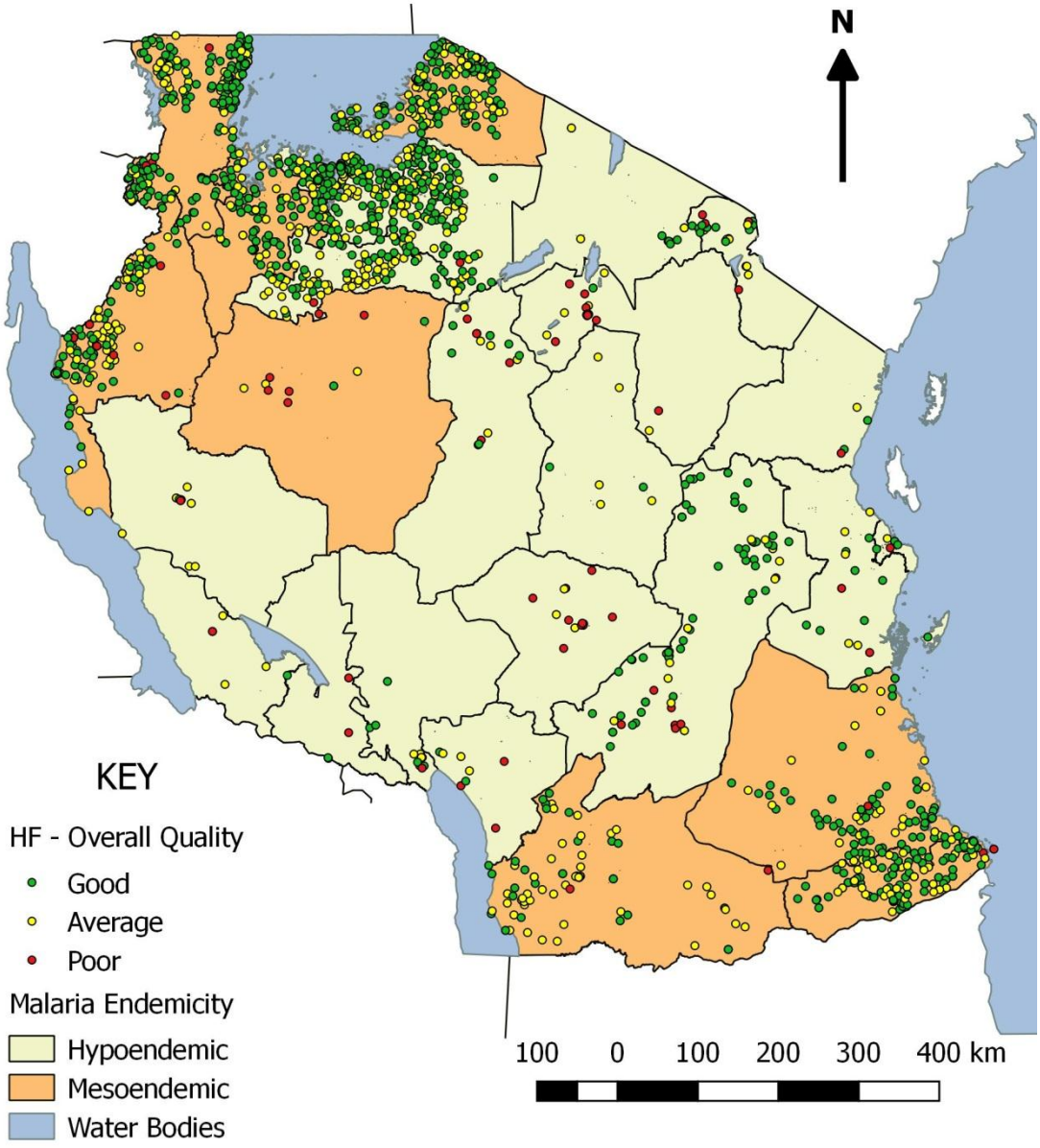

Figure 5: Distribution of Health facilities Overall Performance by Region and Endemicity

More than half (58.4%) of the facilities had a good grade in the overall Performance. There were more facilities that scored poorly in the Hypoendemic settings compared to the Mesoendemic settings (7.7% vs 2.1% Health Facilities respectively).

Table 6: Difference of Overall OPD Score Means between Malaria Hypoendemic and Mesoendemic Regions

Variable	Malaria Hypoendemic Regions Mean (SD)	Malaria Mesoendemic Regions Mean (SD)	Difference in Means (95% CI)	t-value	P value
Overall OPD Score	74.2 (16.26)	76.72 (11.74)	-2.52 (-3.91, -1.13)	-3.55	**<0.001**

There was a significant difference in the mean scores of the facilities located in the Hypoendemic settings (M= 74.2, SD= 16.26) compared to those in the Mesoendemic settings (M=76.72,

SD=11.74). Conditions t (1711) = -3.55, p = <0.001.

Facilities in Malaria Mesoendemic settings had a higher mean Overall OPD Score compared to those in Hypoendemic settings.

Table 7: Difference of Structural Factor Score Means between Malaria Hypoendemic and Mesoendemic Regions

Structural Factors	Malaria Hypoendemic Regions Mean (SD)	Malaria Mesoendemic Regions Mean (SD)	Difference in Means (95% CI)	t-value	P value
Human Resource for Health	75.4 (30.17)	73.31 (29.53)	2.09 (-0.77, 4.95)	1.43	0.15
Staff training	57.64 (34.0)	57.50 (33.10)	0.14 (-3.15, 3.43)	0.08	0.94
Malaria reference materials	62.81 (31.33)	67.72 (27.60)	-4.91(-7.76, -2.05)	-3.37	**<0.001**
Essential equipment	80.30 (22.84)	79.13 (18.56)	1.17 (-0.87, 3.19)	1.12	0.26
Information System tools	88.26 (24.97)	94.11 (15.55)	-5.86 (-7.92, -3.80)	-5.58	**<0.001**
Overall Site Readiness	77.20 (19.59)	80.17 (13.48)	-2.97 (-4.61, -1.31)	-3.50	**<0.001**

Facilities scored highest in the availability of Information system tools and lowest in staff training on malaria case management.

There were 3 structural factors that showed a statistically significant difference. Facilities in Mesoendemic settings scored higher in availability of Malaria reference materials, HMIS (Information System) tools and the Overall Site readiness.

There was a significant difference in the mean scores of Malaria reference materials in the facilities located in the Hypoendemic settings (M= 62.81, SD= 31.33) compared to those in the Mesoendemic settings (M=67.72, SD=27.60). Conditions; t (1711) = -3.37, p = <0.001.

There was a significant difference in the mean scores of HMIS (Information system) tools in the facilities located in the Hypoendemic settings (M= 88.26, SD= 24.97) compared to those in the Mesoendemic settings (M=94.18, SD=15.55). Conditions; t (1711) = -5.58, p = <0.001.

There was a significant difference in the mean scores of Overall site readiness in the facilities located in the Hypoendemic settings (M= 77.20, SD= 19.59) compared to those in the Mesoendemic settings (M= 80.17, SD= 13.48). Conditions; t (1711) = -3.50, p = <0.001.

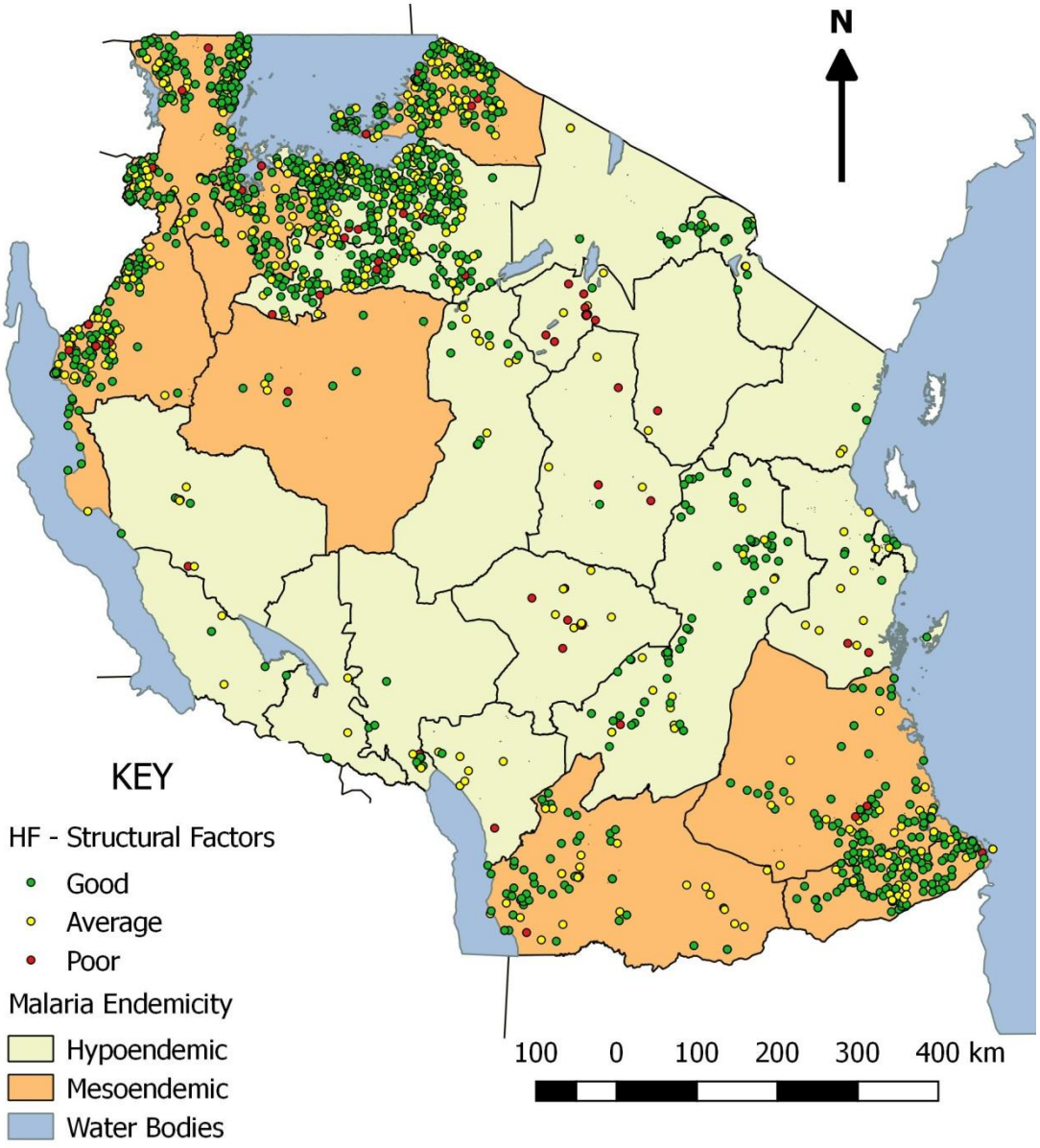

Figure 6: Distribution of Health facilities Structural Factors Performance by Region and Endemicity

About two thirds (67.2 %) of the facilities were seen to have a good performance on the Structural factors. There were more facilities in the hypoendemic settings that scored poorly in comparison to those in mesoendemic settings (6.3% vs 2.6% respectively).

Table 8: Difference of Process Factor Score Means between Malaria Hypoendemic and Mesoendemic Regions

Process Factors	Malaria Hypoendemic Regions Mean (SD)	Malaria Mesoendemic Regions Mean (SD)	Difference in Means (95% CI)	t-value	P value
History taking	50.77 (29.08)	49.51 (25.42)	1.26 (-1.35, 3.90)	0.93	0.35
Physical examination	46.19 (31.30)	43.80 (28.23)	2.38 (-0.49, 5.26)	1.62	0.10
Malaria testing	69.04 (34.19)	69.81 (29.68)	-0.76 (-3.87, 2.34)	-0.48	0.62
Malaria diagnosis	76.04 (34.68)	74.16 (31.15)	1.88 (-1.31, 5.07)	1.16	0.25
Malaria treatment	69.78 (32.85)	67.76 (31.21)	2.02 (-1.06, 5.10)	1.28	0.20
Patient counselling	47.94 (33.44)	47.38 (31.62)	0.56 (-2.56, 3.70)	0.36	0.72
Overall Clinical Management	59.96 (28.17)	58.74 (25.31)	1.22 (-1.36, 3.81)	0.92	0.35

Facilities in the Hypoendemic settings were seen to have higher mean scores in all the process factors except malaria testing. However none of these observed differences were statistically significant.

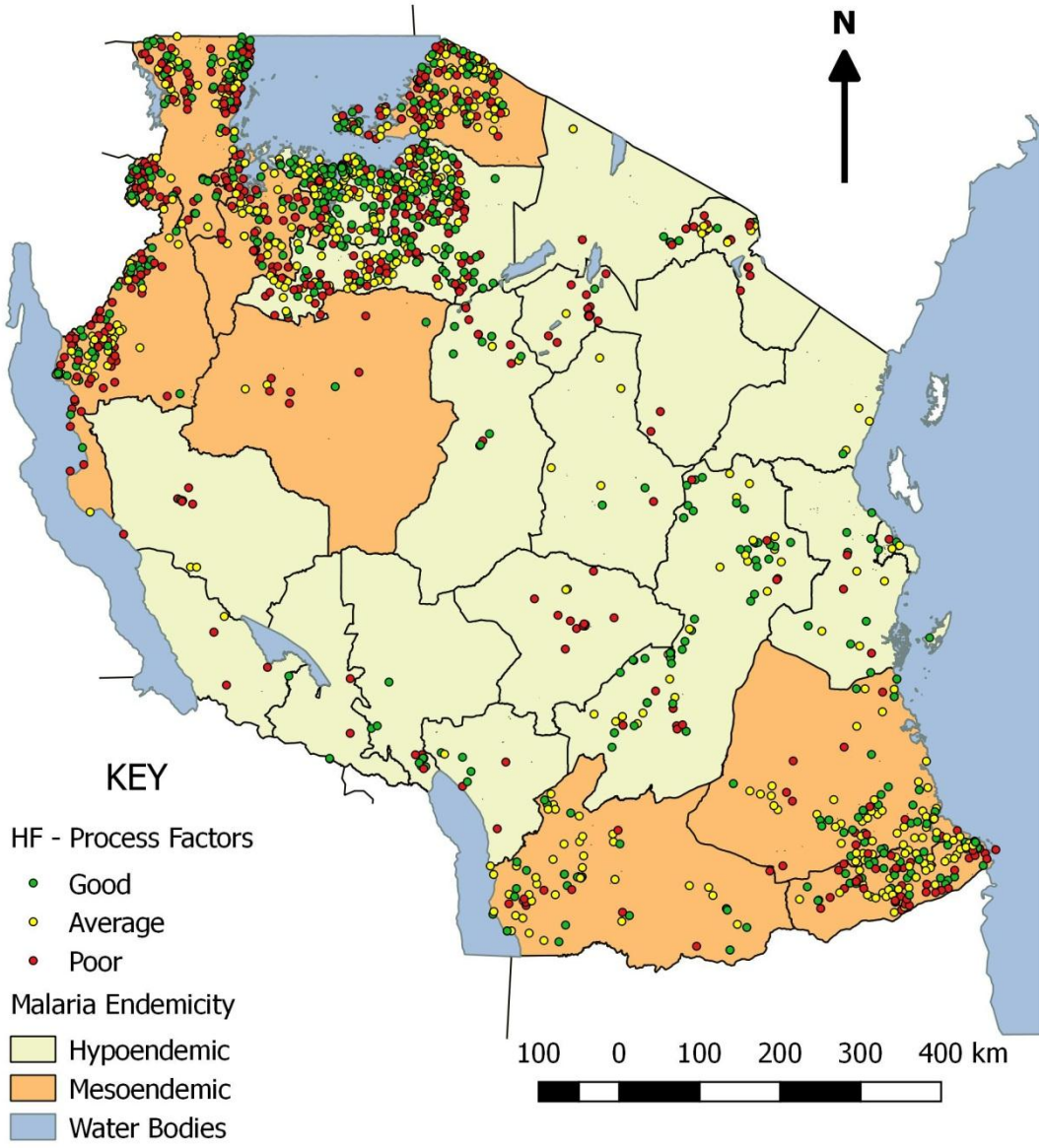

Figure 7: Distribution of Health facilities Process Factors Performance by Region and Endemicity

About a third (32.3%) of the facilities performed poorly. There was almost an equal distribution of facilities in the 3 performance grades.

Table 9: Difference of Client Satisfaction Score Means between Malaria Hypoendemic and Mesoendemic Regions

Outcome Factor	Malaria Hypoendemic Regions Mean (SD)	Malaria Mesoendemic Regions Mean (SD)	Difference in Means (95% CI)	t-value	P value
Client Satisfaction	70.14 (32.28)	76.75 (26.25)	-6.61 (-9.48, -3.75)	-4.53	**<0.001**

There was a significant difference in the mean scores of the facilities located in the Hypoendemic settings (M= 70.14, SD= 32.28) compared to those in the Mesoendemic settings (M=76.75, SD=26.25). Conditions t (1711) = -4.53, p = <0.001.

Facilities in Malaria Mesoendemic settings had higher mean scores of client satisfaction.

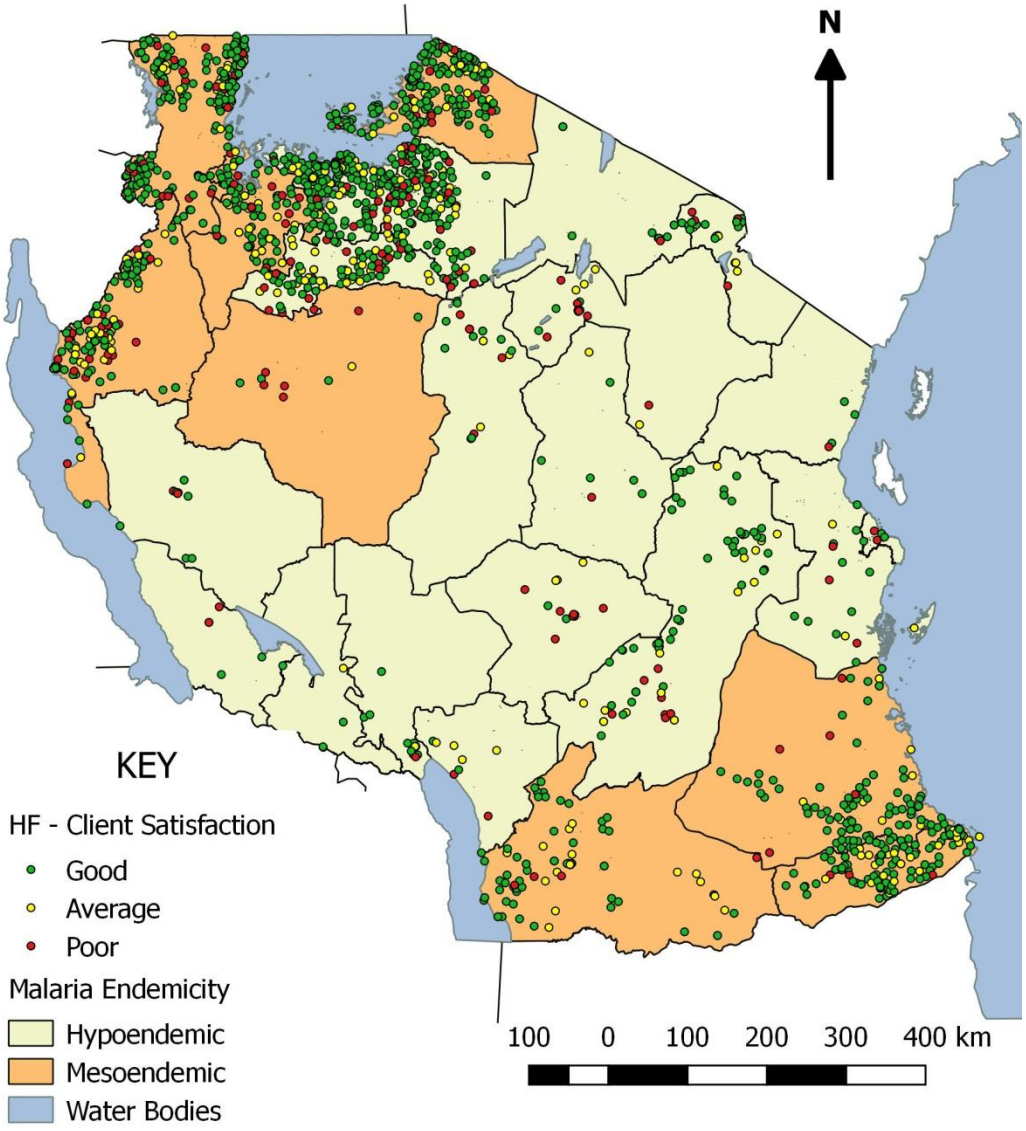

Figure 8: Distribution of Health facilities Client Satisfaction performance by Region and Endemicity

More than half (68%) of the facilities scored Good on Client satisfaction**.** There were more facilities in the hypoendemic settings that scored poorly in comparison to those in mesoendemic settings (17.6% vs 10.2% respectively).

Table 10: Results of unadjusted and pooled adjusted linear regression analysis

Variable	Unadjusted		Adjusted (R^2:0.02)	
	Estimated β coefficient (95% CI)	P value	Estimated β coefficient (95% CI)	P value
Malaria				
Endemicity				
Mesoendemic	Ref	Ref	Ref	Ref
Hypoendemic	-2.52 (-3.85, -1.19)	**<0.001**	-2.12 (-3.50, -0.73)	**<0.01**
Facility Level				
Dispensary	Ref	Ref	Ref	Ref
Health Center	-1.00 (-2.96, 0.95)	0.31	-	-
Hospital	-2.33 (-5.28, 0.61)	0.12	-1.40 (-4.26, 1.46)	0.33
Authority				
Public	Ref	Ref	Ref	Ref
NGO/FBO	-1.31 (-3.63, 1.02)	0.27	-	-
Private	-2.18 (-4.61, 1.30)	0.31	-	-
Location				
Rural	Ref	Ref	Ref	Ref
Urban	-4.04 (-5.72, -2.37)	**<0.001**	-4.12 (-5.89, -2.34)	**<0.001**
Season surveyed				
Dry	Ref	Ref	Ref	Ref
Wet	0.399 (-0.92, 1.72)	0.55	-	-

Simple Linear Regression

Simple linear regressions were calculated to predict the Overall OPD Score based on malaria endemicity, health facility level, managing authority, location and the season when the facility was surveyed.

There were 2 predictors of the OPD Score that were found to be statistically significant. These were Malaria Endemicity and Facility location.

Overall OPD scores in Health facilities located in hypoendemic settings will be lower by 2.52 points compared to those in mesoendemic settings (CI:-3.85, -1.19 ; $p < 0.001$)

Overall OPD scores in Health facilities located in the urban areas will be lower by 4.04 points compared to those in rural settings (CI:-5.72, -2.37 ; $p < 0.001$)

Multiple Linear Regression

A multiple linear regression was calculated to predict the Overall OPD score based on Malaria Endemicity, Location (Urban/Rural) and level of facility (Hospital/Dispensary).

A Significant Regression equation was found ($F (3, 1483) = 10.59$, $p < 0.0001$) with an R^2 of 0.02.

Two independent predictors of the OPD Score were found to be statistically significant at the multiple linear regression level, these were malaria endemicity and health facility location.

Overall OPD scores in health facilities located in hypoendemic settings were lower by 2.12 points (CI:-3.50, - 0.73; $p < 0.01$) compared to those in mesoendemic settings after controlling for facility level and location.

Overall OPD scores in health facilities located in urban areas were lower by 4.12 points (CI:-5.89, -2.34; $p < 0.001$) compared to those in rural areas after controlling for malaria endemicity and facility level.

5.0 DISCUSSION

In this study we found that health facilities located in malaria mesoendemic settings fared better than those in hypoendemic settings in terms of the overall quality of services provided for malaria, overall readiness to provide care, presence of malaria reference materials, presence of information system tools and client satisfaction. However, there was no difference in the process factors (clinical management) between the endemicity settings. Facilities located in rural areas were also found to perform better than those in urban areas. The study results are consistent and yet with some differences from other previous studies.

5.1 Structural factors

Facilities located in malaria mesoendemic settings were found to have higher readiness scores compared to those in hypoendemic settings, this finding is similar to what the comparative study amongst 826 health facilities in Kenya, Namibia and Senegal (28) found.

The level of the health facility and its ownership did not influence the readiness of the facilities to provide care for malaria patients, this contradicts previous findings from studies conducted in 10 low and middle income countries including Tanzania (26) and the Service Availability and Readiness Assessment conducted in 2012(27).

The average availability of malaria reference materials was found to be similar to the figures found in studies conducted in Malawi(41) and Vanuatu(36). Moreover, facilities in settings with a higher endemicity were found to have a higher availability, a possible explanation for the observed difference could be due to the number of reference materials used in the calculation of the indicator. This indicator comprised of 5 different reference materials, some of which might not be used commonly in the low endemicity settings.

In both settings, health facilities performed best in the availability of Information system tools. This could be explained by the recent health systems strengthening efforts made especially for improving the health management information system in Tanzania. The tools evaluated by this indicator were however not specific for malaria. The facilities in the mesoendemic settings were seen to perform better, contrary to findings in the study done in Kenya, Namibia and Senegal(28).

Staff training on malaria case management was the lowest performing domain among the structural factors in both endemicity settings. One would have expected that health staff in a higher burden setting would have received more on job training for malaria compared to those in a lower burden setting. However, similar findings in staff training were reported by a study conducted in the low malaria transmission setting(42).

5.2 Process Factors

In both settings facilities performed the lowest in this domain compared to the others assessed. Facilities seemed to perform poorly in history taking and clinical examinations conducted for the febrile patients in the 2 settings, this could be explained by the complexity of the assessment tool used. The tool required the observer to assess fine details that might easily be skipped in a clinical setting with a high burden/ turnover of patients.

Health facilities performed better in the testing rate for patients suspected to have malaria. There was however no difference in performance between the endemicity settings. This was not the case as reported in the study done in Angola (37) which found that there was a lower testing rate in the low transmission setting.

In both settings, about 1 out of 4 times the malaria test results were not properly interpreted or the patient was diagnosed clinically to have malaria as shown by the malaria diagnosis and malaria treatment scores. This rate is lower compared to the previous findings reported in the Service Provision Assessment for Malaria (32) conducted in 2016. However, this indicates that prescription of anti-malarial drugs for patients with negative test results and those not tested is still practiced in Tanzania. This practice is contrary to the guidelines of the Country and the recommendations of WHO, which require treatment with anti-malarial drugs be confined to parasitologically confirmed cases (16,20,43).

5.3 Patient Satisfaction

The level of patient satisfaction was high, it was better than that found in the Service Provision Assessment for Malaria (32). Patients were better satisfied with the services received in the mesoendemic settings compared to the hypoendemic settings. However, the tool used an exit interview to measure this level of satisfaction, this could be subject to recall and courtesy biases. The tool also gave scores for when the patient could explain the use of dispensed drugs

at home correctly, a situation that favors the facilities in mesoendemic settings to score higher as they are more likely to prescribe medication.

5.4 Strengths and Limitations

This study shed light on the quality of malaria case management services provided across the Country by utilizing routine health facility assessment data. Countrywide analysis prior to this study could not be performed because data was collected by different methods and stored in separate servers.

The analysis methods used enabled comparison between different malaria endemicity settings, this comparison may help decision makers to identify areas that need to be targeted for improvement.

Findings from this study may serve as a baseline that could facilitate monitoring of facilities performance as assessment data collection continues.

This study has several limitations to note.

Majority of the data used in the analysis was collected by Electronic Checklists, a data consistency check performed during the study in 2 regions (Kigoma and Arusha) revealed that DHIS2 had data from only about a third of the health facilities assessed by the CHMT. This situation could affect the validity of the findings.

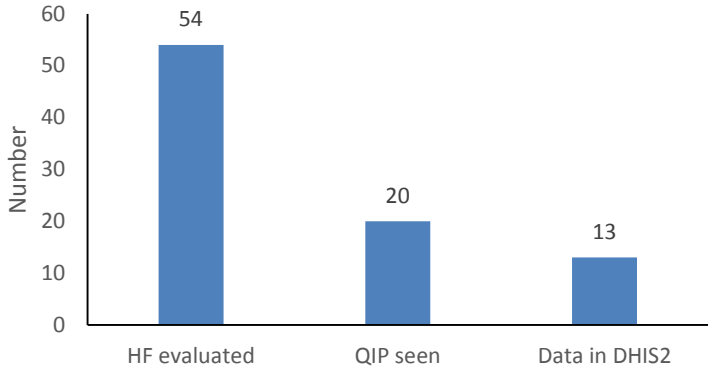

Figure 9: Data Consistency in Kigoma and Arusha

DHIS2 had data from less than a third of the health facilities evaluated by the CHMTs in Kigoma DC and MC.

The main reason given for the observed discrepancy was network issues during uploading of the MSDQI data from the EDS mobile devices to the DHIS2.

Missing data was treated as missing completely at random (MCAR) and complete case analysis was performed.

The variables used in the analysis and their interpretations/ categorizations might be limited in their scope and require a reader to be familiar with them before fully understanding the meaning of the results.

The study also assigned facilities into either being located in urban or rural settings, however misclassification might have occurred in differentiating between this gradient for facilities located in peri urban settings.

This study also used cross sectional health facility data collected at a different time and linked it to estimates of malaria survey data conducted in the previous year. A better approach could have been to use real time surveillance data that would have enabled the detection of epidemics/ hot spots especially in the hypoendemic settings.

About 30 facilities in the study did not have geographical coordinates and were thus omitted from the maps. These were recently opened facilities, their information was not updated in the Health Facility Registry.

6.0 CONCLUSION

There exists differences in the quality of case management for malaria between hypoendemic and mesoendemic regions in Tanzania Mainland. Facilities located in malaria hypoendemic settings performed poorly compared to those in mesoendemic settings. There is a need to target improvement efforts to the low performing areas.

7.0 RECOMMENDATIONS

In light of these findings, it is hereby recommended that more efforts should be put in and targeted to underperforming settings so as to improve the case management for malaria. This includes distribution of malaria reference materials and information system tools.

Clinicians should improve on history taking skills and performing thorough physical examinations, testing malaria suspected cases, proper interpretation of and adherence to the test results before prescribing an appropriate Antimalarial.

The NMCP and implementing partners should harmonize the data collection tools and servers for storage.

A solution needs to be found for retrieving the missing health facility data which was not uploaded to DHIS2 after assessments by the electronic (EDS) checklists were conducted.

HMIS section should regularly update the Health Facility Registry once new facilities are registered and start functioning.

Further studies are required to explore the reasons for the observed differences between the endemicity settings.

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APPENDICES

APPENDIX 1: DATA EXTRACTION TOOL

1. HEALTH FACILITY IDENTITY

Name: Level: Region:

Council: Urban/Rural: Ownership:
GPS coordinates: Season: Malaria Endemicity:

2. SCORES

OVERALL OPD PERFORMANCE SCORE: _____

Factors	Indicators	Score
Structure	OPD staffing	
	Staff training	
	Malaria reference materials	
	Essential equipment	
	HMIS tools	
	Overall Site Readiness	
Process	History taking	
	Physical examination	
	Malaria Testing	
	Malaria Diagnosis	
	Malaria Treatment	
	Patient counselling	
	Overall OPD observation Performance	
Outcome	Client satisfaction	

APPENDIX 2: MSDQI QUESTIONS FROM OPD CHECKLIST

Section A. Health Facility Identifier

Council	_____
Facility Name	_____
Date of supervision visit	|dd|mm|yyyy|
Start time of supervision visit	|hh|mm| ☐ AM/ ☐ PM
Name of interviewer	_____
Title of interviewer (Choose one)	**Regional:** ☐ Malaria and IMCI focal person ☐ Quality improvement focal person ☐ Laboratory technologist ☐ Pharmacist **District:** ☐ Malaria and IMCI focal person ☐ Quality improvement focal person ☐ Laboratory technologist ☐ Pharmacist ☐ HMIS focal person ☐ RCH Coordinator **Other:** ☐ Medical officer in charge of the district hospital ☐ Other, specify: _____
Phone number of interviewer	+255_____
Name of interviewee	_____
Title of interviewee (Choose one)	☐ Head of facility ☐ Medical officer ☐ Laboratory Manager ☐ Head of OPD Dept ☐ Pharmacist ☐ Laboratory Technologist ☐ Nurse ☐ Other, specify: _____
Phone number of interviewee	+255_____

Does this facility offer ANC services? ☐Yes ☐No

Has this facility conducted malaria microscopy at any point in the last three months? ☐Yes ☐No

If yes, is this facility offering this service today? ☐Yes ☐No

If no, why is this facility not conducting malaria microscopy today?

☐Lack of supplies/equip ☐Lack of power ☐ No lab staff who conduct malaria microscopy

STRUCTURAL FACTORS

D.1 Staffing Levels

Instructions: Determine the number of staff members present <u>on the day of the visit</u> for the facility depending on its level.		
Is this facility a dispensary?	☐Yes	☐No
If yes, is there at least one (1) Clinical Officer/Assistant available in this OPD?	☐Yes [3]	☐No [0]
If yes, is there at least one (1) Nurse available in this OPD?	☐Yes [3]	☐No [0]
Is this facility a health center or hospital?	☐Yes	☐No
If yes, is there at least one (1) Medical Doctor available in this OPD?	☐Yes [1]	☐No [0]
If yes, is there at least one (1) Assistant Medical Officer available in this OPD?	☐Yes [1]	☐No [0]
If yes, are there at least two (2) Clinical Officers available in this OPD?	☐Yes [1]	☐No [0]
If yes, is there at least one (1) Assistant Nursing Officer available in this OPD?	☐Yes [1]	☐No [0]
If yes, is there at least one (1) Nurse available in this OPD?	☐Yes [1]	☐No [0]
If yes, is there at least one (1) Medical Attendant available in this OPD?	☐Yes [1]	☐No [0]
SUB-SCORE: D.1 Staffing Levels	**[__]/6 =**	**_____%**

D.2 Staff Training

How many total clinical staff are at this OPD?	A._____
How many clinical staff received formal (e.g. seminar) malaria case management training including artesunate injectable prescription?	B._____ **C. B/A=_____%**
How many clinical staff received on-job (e.g. mentorship) malaria case management training including artesunate injectable prescription?	D._____ **E. D/A=_____%**
SUB-SCORE: D.2 Staff Training	**[C+E]/2= _____%**

D.3 Malaria Reference Materials

Are the following available in the OPD? Please verify.		
2014 Malaria Diagnosis and Treatment Guideline	☐Yes [2]	☐No [0]
2014-15 Training manual	☐Yes [2]	☐No [0]
2016 IMCI Chart booklet	☐Yes [2]	☐No [0]
Fever case management algorithm poster	☐Yes [2]	☐No [0]
Artesunate injection job aid/SOP	☐Yes [2]	☐No [0]
SUB-SCORE: D.3 Malaria Reference Materials	**[___]/10 =**	**_____%**

D.4 Essential Equipment

Are the following available and functioning in this OPD?		
Thermometer	☐Yes [2]	☐No [0]
Timing device (e.g. ARI timer)	☐Yes [2]	☐No [0]
Stethoscope	☐Yes [2]	☐No [0]
BP machine	☐Yes [2]	☐No [0]
Weighing scale	☐Yes [2]	☐No [0]
SUB-SCORE: D.4 Essential Equipment	**[___]/10 =**	**_____%**

D.5 OPD Information System Tools

Check the following information system tools:

Information System	Available	Std Format	Properly Filed/Stored
MTUHA Register #5	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
Tally sheets	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
Monthly summary	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
SUB-SCORES	**[__]/6**	**[__]/6**	**[__]/6**
SUB-SCORE: D.5 OPD Information System Tools			**[___]/18 = _____%**

Section D. OPD Site Readiness: Score

Instructions: Calculate Total Section Score by averaging section Scores				
1.1 Staffing Levels	**1.2 Staff Training**	**1.3 Malaria Reference Materials**	**1.4 Essential Equipment**	**1.5 OPD Information System Tools**
_____%	**_____%**	**_____%**	**_____%**	**_____%**
SCORE: Section D. OPD Site Readiness				**[___]/5 = _____%**

PROCESS FACTORS

Section E. OPD Observations:

E.1: Patients <5 years of age

Observe the health service provider while attending under five patients with fever. If a facility has more than one health service provider doing consultations, observations should be made to different health service providers. If there is only one health service provider doing consultations then all observations should be done on the available health service provider. Do not interrupt unless the patient is severely ill or if the practice of the clinician will put the patient in danger. If a patient is severely ill then the supervisor should assist in giving treatment while doing mentorship to the available clinicians and other health service providers.

HEALTH PROVIDER INFORMATION	Observation 1	Observation 2
What is the cadre of the observed health provider?	☐Clinician ☐Nurse Officer/Nurse Midwife/Enrolled Nurse ☐Medical Attendant ☐Other	☐Clinician ☐Nurse Officer/Nurse Midwife/Enrolled Nurse ☐Medical Attendant ☐Other
Has this health provider received formal training in malaria case management and/or IMCI?	☐Yes ☐No	☐Yes ☐No
If yes, type of training received	☐Formal class ☐On the job	☐Formal class ☐On the job
If yes, what year did the training occur?	_____	_____

E1.1 CLINICAL HISTORY	Observation 1	Observation 2
Did the health provider ask/check the following?		
Age of patient	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]
Fever	☐Yes [0.5] ☐No [0]	☐Yes [0.5] ☐No [0]
Duration of fever (Answer no if clinician did not ask about fever)	☐Yes [0.5] ☐No [0]	☐Yes [0.5] ☐No [0]
Diarrhea	☐Yes [0.5] ☐No [0]	☐Yes [0.5] ☐No [0]
Asked if diarrhea was bloody	☐Yes [0.5] ☐No [0]	☐Yes [0.5] ☐No [0]

(N/A if patient does not have diarrhea) (No if clinician did not ask about diarrhea)	☐N/A [0.5]	☐N/A [0.5]
Cough	☐Yes [0.5] ☐No [0]	☐Yes [0.5] ☐No [0]
Duration of cough (N/A if patient does not have cough) (No if clinician did not ask about cough)	☐Yes [0.5] ☐No [0] ☐N/A [0.5]	☐Yes [0.5] ☐No [0] ☐N/A [0.5]
Ear problems	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]
Vomiting everything	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]
Not able to drink or breastfeed	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]
History of convulsions in this illness or convulsing now	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]
Altered consciousness or coma	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]
Treatment given prior to arrival at a facility	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]
SUB-SCORE	**A. [_____]**	**B. [_____]**
SUB-SCORE: E.1.1 Clinical History	**[A+B]/10=_____%**	
E2.2 PHYSICAL EXAMINATION	**Observation 1**	**Observation 2**
Did the health provider check for the following?		
Weight of the patient	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
Evidence of anaemia (Palmar/conjunctiva/tongue pallor)?	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
Temperature taken	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
ENT examination and/or respiratory rate	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]
Evidence of convulsion	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]
Evidence of altered consciousness or coma. Health service provider measures patient's alertness, voice, pain and unresponsiveness (AVPU)	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]
Neck exam (stiffness)	☐Yes [1] ☐No [0]	☐Yes [1] ☐No [0]

SUB-SCORE	**C. [_____]**	**D. [_____]**
SUB-SCORE: E.1.2 Physical Exam	**[C+D]/10=_____%**	
E1.3 MALARIA TESTING	**Observation 1**	**Observation 2**
Does the health service provider order/conduct a malaria test?	☐Yes [5] ☐No [0]	☐Yes [5] ☐No [0]
If yes, does the health service provider wait for the test results before the final diagnosis/prescription?	☐Yes [5] ☐No [0]	☐Yes [5] ☐No [0]
If no, was the test not done because of one of the following reasons?	☐ N/A patient tested [no score] ☐ No RDT/microscopy available [5] ☐ Patient had signs of severe febrile illness [5] ☐ Other reason [0]	☐ N/A patient tested [no score] ☐ No RDT/microscopy available [5] ☐ Patient had signs of severe febrile illness [5] ☐ Other reason [0]
SUB-SCORE	**E. [_____]**	**F. [_____]**
SUB-SCORE: E1.3 Malaria Testing	**[E+F]/10=_____%**	
E1.4 DIAGNOSIS	**Observation 1**	**Observation 2**
Malaria test results	☐ Positive ☐ Negative ☐ Test result not available ☐ Not tested	☐ Positive ☐ Negative ☐ Test result not available ☐ Not tested
Was there a clinical or confirmed malaria diagnosis?	☐ Clinical malaria ☐ Confirmed malaria (mRDT or BS +ve) ☐ Other febrile illness (no malaria diagnosis)	☐ Clinical malaria ☐ Confirmed malaria (mRDT or BS +ve) ☐ Other febrile illness (no malaria diagnosis)

Did the health service provider make correct diagnosis according to malaria test? - If positive malaria test (Pos), diagnosis to be *malaria confirmed = yes* (other febrile illnesses might also be yes) - If negative, malaria test (Neg), diagnosis to be *other febrile illnesses = yes* - If malaria test was not done (NT) or result not available (N/A), all diagnosis are acceptable except *malaria confirmed = yes*	☐ Yes [10] ☐ No [0]	☐ Yes [10] ☐ No [0]
SUB-SCORE	**G. [_____]**	**H. [_____]**
SUB-SCORE: E1.4 Diagnosis	**[G+H]/10=_____%**	
E1.5 TREATMENT	**Observation 1**	**Observation 2**
Was the patient diagnosed with malaria?	☐ Yes ☐ No	☐ Yes ☐ No
If yes, was an ACT given?	☐ Yes [10] ☐ No [0]	☐ Yes [10] ☐ No [0]
If yes, was ACT dosage prescribed according to body weight or age if applicable?	☐ Yes [5] ☐ No [0]	☐ Yes [5] ☐ No [0]
If yes, was ACT regimen prescribed according to recommended frequency (e.g. for ALu twice per day for three days)?	☐ Yes [5] ☐ No [0]	☐ Yes [5] ☐ No [0]
Was the patient diagnosed as **NOT** having malaria?	☐ Yes ☐ No	☐ Yes ☐ No
If yes, was an ACT **not** given?	☐ Yes [10] ☐ No [0]	☐ Yes [10] ☐ No [0]
If yes, was the medicament dosage for non-malaria diagnosis prescribed according to body weight or age if applicable?	☐ Yes [5] ☐ No [0]	☐ Yes [5] ☐ No [0]

If yes, was the medicament regimen for non-malaria diagnosis prescribed according to the recommended frequency (e.g. for Amoxicillin 500 mg TDS for 5 days)?	☐ Yes [5] ☐ No [0]	☐ Yes [5] ☐ No [0]
SUB-SCORE	**I. [_____]**	**J. [_____]**
SUB-SCORE: E1.5 Treatment	**[I+J]/20=_____%**	
E1.6 PATIENT COUNSELING	**Observation 1**	**Observation 2**
Does the provider discuss the following with the patient:		
How to give/take medicines at home?	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
When to return?	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
Use of LLIN?	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
Checked to confirm understanding of client?	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
Asked if client has any questions?	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
SUB-SCORE	**K. [_____]**	**L. [_____]**
SUB-SCORE: E1.6 Patient Counselling	**[K+L]/10=_____%**	
Reason if unable to complete RDT observation: 1. No febrile patient available 2. No clinician available 3. Patient referred out 4. Stopped consultation due to potential patient harm 5. Not enough time during facility visit 6. Other (explain)	☐ Other:_____	☐ Other:_____

Section E. OPD Observations:

E.2: Patients >=5 years of age

Observe the health service provider while attending patients over five with fever. If a facility has more than one consultation room, observations should be made to different health service providers, if there is only one consultation room then all observations should be done in that available health care provider. Do not interrupt unless the patient is severely ill or if the practice of the clinician will put the client in danger. If a patient is severely ill then the supervisor should assist in giving treatment while doing mentorship to the available clinicians and other health service providers.

HEALTH PROVIDER INFORMATION	**Observation 3**	**Observation 4**
What is the cadre of the observed health provider?	☐Clinician ☐Nurse Officer/Nurse Midwife/Enrolled Nurse ☐Medical Attendant ☐Other	☐Clinician ☐Nurse Officer/Nurse Midwife/Enrolled Nurse ☐Medical Attendant ☐Other
Has this health provider received formal training in malaria case management and/or IMCI?	☐Yes ☐No	☐Yes ☐No
If yes, type of training received	☐Formal class ☐On the job	☐Formal class ☐On the job
If yes, what year did the training occur?	_____	_____

E2.1 CLINICAL HISTORY	**Observation 3**	**Observation 4**
Did the health provider ask/check the following?		
Whether the patient is pregnant? (if female 15-49)	☐Yes [1] ☐No [0] ☐N/A [1]	☐Yes [1] ☐No [0] ☐N/A [1]
Fever	☐Yes [0.5] ☐No [0]	☐Yes [0.5] ☐No [0]
Duration of fever (Answer no if clinician did not ask about fever)	☐Yes [0.5] ☐No [0]	☐Yes [0.5] ☐No [0]
Cough	☐Yes [0.5] ☐No [0]	☐Yes [0.5] ☐No [0]
Duration of cough (N/A if patient does not have cough)	☐Yes [0.5] ☐No [0] ☐N/A [0.5]	☐Yes [0.5] ☐No [0] ☐N/A [0.5]

Headache; joint pain/body ache	☐Yes [1]	☐No [0]	☐Yes [1]	☐No [0]
Dizziness/malaise	☐Yes [1]	☐No [0]	☐Yes [1]	☐No [0]
History of convulsion	☐Yes [1]	☐No [0]	☐Yes [1]	☐No [0]
Behavioral change	☐Yes [1]	☐No [0]	☐Yes [1]	☐No [0]
Severe abdominal pain	☐Yes [1]	☐No [0]	☐Yes [1]	☐No [0]
Treatment given prior to arrival at the facility	☐Yes [1]	☐No [0]	☐Yes [1]	☐No [0]
Drug allergy	☐Yes [1]	☐No [0]	☐Yes [1]	☐No [0]
SUB-SCORE	**A. [_____]**		**B. [_____]**	
SUB-SCORE: E2.1 Clinical History	**[A+B]/10=_____%**			
E2.2 PHYSICAL EXAMINATION	**Observation 3**		**Observation 4**	
Did the health provider check for the following?				
Weight and temperature recorded/taken	☐Yes [2]	☐No [0]	☐Yes [2]	☐No [0]
Evidence of anaemia (Palmar/conjunctiva/tongue pallor and/or jaundice)?	☐Yes [2]	☐No [0]	☐Yes [2]	☐No [0]
ENT examination	☐Yes [2]	☐No [0]	☐Yes [2]	☐No [0]
All other system examinations (chest, abdomen, limbs)	☐Yes [2]	☐No [0]	☐Yes [2]	☐No [0]
At least one sign of severe disease: respiratory distress, altered consciousness or coma (eye opened, verbal and motor response), neck exam (stiffness)	☐Yes [2]	☐No [0]	☐Yes [2]	☐No [0]
SUB-SCORE	**C. [_____]**		**D. [_____]**	
SUB-SCORE: E.2.2 Physical Exam	**[C+D]/10=_____%**			
MALARIA TESTING	**Observation 3**		**Observation 4**	
Does the health service provider order/conduct a malaria test?	☐Yes [5]	☐No [0]	☐Yes [5]	☐No [0]
If yes, does the health service provider wait for the test results before the final diagnosis/prescription?	☐Yes [5]	☐No [0]	☐Yes [5]	☐No [0]

If no, was the test not done because of one of the following reasons?	☐ Patient not tested for other reason [0] ☐ N/A – patient was tested [no score] ☐ No RDT or microscopy available [5] ☐ Patient had signs of severe febrile illness [5]	☐ Patient not tested for other reason [0] ☐ N/A – patient was tested [no score] ☐ No RDT or microscopy available [5] ☐ Patient had signs of severe febrile illness [5]
SUB-SCORE	**E. [_____]**	**F. [_____]**
SUB-SCORE: E.2..3 Malaria Testing	**[E+F]/10=_____%**	
E2.3 DIAGNOSIS	**Observation 3**	**Observation 4**
Malaria test results	☐ Positive ☐ Negative ☐ Test result not available ☐ Not tested	☐ Positive ☐ Negative ☐ Test result not available ☐ Not tested
Was there a clinical or confirmed malaria diagnosis?	☐ Clinical malaria ☐ Confirmed malaria (mRDT or BS +ve) ☐ Other febrile illness (no malaria diagnosis)	☐ Clinical malaria ☐ Confirmed malaria (mRDT or BS +ve) ☐ Other febrile illness (no malaria diagnosis)
Did the health service provider make correct diagnosis according to malaria test? - If positive malaria test (Pos), diagnosis to be *malaria confirmed = yes* (other febrile illnesses might also be yes) - If negative, malaria test (Neg), diagnosis to be *other febrile illnesses = yes* - If malaria test was not done (NT) or result not available (N/A), all diagnosis are acceptable except *malaria confirmed = yes*	☐ Yes [10] ☐ No [0]	☐ Yes [10] ☐ No [0]
SUB-SCORE	**G. [_____]**	**H. [_____]**
SUB-SCORE: E.2.4 Diagnosis	**[G+H]/10=_____%**	

E2.5 TREATMENT	**Observation 3**		**Observation 4**	
Was the patient diagnosed with malaria?	☐ Yes	☐ No	☐ Yes	☐ No
If yes, was an ACT given?	☐ Yes [10]	☐ No [0]	☐ Yes [10]	☐ No [0]
If yes, was ACT dosage prescribed according to body weight or age if applicable?	☐ Yes [5]	☐ No [0]	☐ Yes [5]	☐ No [0]
If yes, was ACT regimen prescribed according to recommended frequency (e.g. for ALu twice per day for three days)?	☐ Yes [5]	☐ No [0]	☐ Yes [5]	☐ No [0]
Was the patient diagnosed as **NOT** having malaria?	☐ Yes	☐ No	☐ Yes	☐ No
If yes, was an ACT not given?	☐ Yes [10]	☐ No [0]	☐ Yes [10]	☐ No [0]
If yes, was the medicament dosage for no malaria diagnosis prescribed according to body weight or age if applicable?	☐ Yes [5]	☐ No [0]	☐ Yes [5]	☐ No [0]
If yes, was the medicament regimen for no malaria diagnosis prescribed according to the recommended frequency (e.g. for Amoxicillin 500 mg TDS for 5 days)?	☐ Yes [5]	☐ No [0]	☐ Yes [5]	☐ No [0]
SUB-SCORE	**I. [_____]**		**J. [_____]**	
SUB-SCORE: E.2.5 Treatment	**[I+J]/20=_____%**			
E2.6 PATIENT COUNSELING	**Observation 3**		**Observation 4**	
Does the provider discuss the following with the patient:				
How to give/take medicines at home?	☐Yes [2]	☐No [0]	☐Yes [2]	☐No [0]
When to return?	☐Yes [2]	☐No [0]	☐Yes [2]	☐No [0]
Use of LLIN?	☐Yes [2]	☐No [0]	☐Yes [2]	☐No [0]
Checked to confirm understanding of client?	☐Yes [2]	☐No [0]	☐Yes [2]	☐No [0]
Asked if client has any questions?	☐Yes [2]	☐No [0]	☐Yes [2]	☐No [0]

SUB-SCORE	K. [_____]	L. [_____]
SUB-SCORE: E.2.6 Patient Counselling	**[K+L]/10=_____%**	
Reason if unable to complete RDT observation: 7. No febrile patient available 8. No health service provider available 9. Patient referred out 10. Stopped consultation due to potential patient harm 11. Not enough time during facility visit 12. Other (explain)	☐ Other:_____	☐ Other:_____

Section E. OPD Observations: Score

Instructions: Calculate Total Section Score by averaging section Scores			
	Patient Under 5	**Patients Over 5**	**Total**
E1. Clinical History	**SE.1.1: _____%**	**SE.2.1: _____%**	**[SE.1.1+SE.2.1]/2=_____%**
E2. Physical Exam	**SE.1.2: _____%**	**SE.2.2: _____%**	**[SE.1.2+SE.2.2]/2=_____%**
E3. Malaria Testing	**SE.1.3: _____%**	**SE.2.3: _____%**	**[SE.1.3+SE.2.3]/2=_____%**
E4. Diagnosis	**SE.1.4: _____%**	**SE.2.4: _____%**	**[SE.1.4+SE.2.4]/2=_____%**
E5. Treatment	**SE.1.5: _____%**	**SE.2.5: _____%**	**[SE.1.5+SE.2.5]/2=_____%**
E6. Patient Counseling	**SE.1.6: _____%**	**SE.2.6: _____%**	**[SE.1.6+SE.2.6]/2=_____%**
SCORE: Section E.-F OPD Observations			**[SE1-SE6]/6= _____%**

OUTCOME FACTOR

Section F. Patient Satisfaction

Ask 2 different patients/caretakers that are about to leave the facility. These patients should have been tested for malaria, diagnosed to have malaria, or prescribed antimalarial.		
	Interview 1	**Interview 2**
Did you get all the medicines prescribed for your illness at this facility?	☐Yes [2] ☐Partially [1] ☐No [0]	☐Yes [2] ☐Partially [1] ☐No [0]
Ask patient/care taker: "Can you explain to me how to use these medicines?"		
Supervisor, could the client/caretaker explain use of dispensed drugs at home correctly?	☐Yes [2] ☐Partially [1] ☐No [0]	☐Yes [2] ☐Partially [1] ☐No [0]
Ask patient/care taker: "Can you explain to me when you should return to the health facility?"		
Supervisor, could the client/caretaker explain when to return to health correctly?	☐Yes [2] ☐Partially [1] ☐No [0]	☐Yes [2] ☐Partially [1] ☐No [0]
How long did you wait to get all the services?	☐<1 hour [2] ☐1-2 hours [1] ☐>3 hours [0]	☐Yes [2] ☐Partially [1] ☐No [0]
Are you satisfied with the services provided by the health facility staff?	☐Yes [2] ☐No [0]	☐Yes [2] ☐No [0]
SUB-SCORE	**A. [_____]**	**B. [_____]**
SCORE: **Section F Patient Satisfaction**	**[A+B]/20=_____%**	

APPENDIX 3: ETHICAL CLEARANCE APPROVAL

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES

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Ref. No. DA.287/298/01A/

2nd January, 2019

Dr. Ally K. Hussein
MSc. Applied Epidemiology
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED: "THE QUALITY OF MALARIA CASE MANAGEMENT UNDR DIFFERENT TRANSMISSION SETTINGS IN TANZANIA MAINLAND"

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has, on behalf of the Senate, approved ethical clearance for the above-mentioned study. Hence you may proceed with the planned study.

The ethical clearance is valid for one year only, from 2nd January, 2019 to 1st January, 2020. In case you do not complete data analysis and dissertation report writing by 1st January, 2020, you will have to apply for renewal of ethical clearance prior to the expiry date.

Dr. Emmanuel Balandya
ACTING: DIRECTOR OF POSTGRADUATE STUDIES

cc: Director of Research and Publications
cc: Dean, School of Public Health and Social Sciences, MUHAS

JAMHURI YA MUUNGANO WA TANZANIA

WIZARA YA AFYA, MAENDELEO YA JAMII, JINSIA, WAZEE NA WATOTO

Anwani ya Simu: "AFYA" DODOMA
Simu Na: 255-26-2323267
Nukushi Na:
(Barua zote ziandikwe kwa Katibu Mkuu)

Chuo Kikuu cha Dodoma
Kitivo cha Sanaa na Sayansi ya Maendeleo ya Jamii
Jengo Na. 11
S. L. P. 7

14

KumbNa: GA.209/426/04B/335

11 Feb, 2019.

RMO-KIGOMA,
S.L.P 125,
KIGOMA.

YAH: UTAMBULISHO WA DKT ALLY KASSIM HUSSEIN

Tafadhali rejea kichwa cha habari hapo juu.

Mtajwa hapo juu ni mwanafunzi wa Msc Applied Epidemiology-MUHAS, Dkt Ally Kassim Hussein ambaaye anafanya utafiti wa **"QUALITY OF MALARIA CASE MANAGEMENT UNDER DIFFERENT TRANSMISSION SETTINGS IN TANZANIA MAINLAND".**

Katika utafiti huo atahitaji kupitia OPD Checklist za MSDQI za vituo vilivyotembelewa na CHMT au Wadau katika Halmashauri za Kigoma MC na Kigoma DC.

Dkt Ally Hussein amekuwa akifanya mafunzo kwa vitendo NMCP, ana ujuzi wa kutosha wa zoezi la MSDQI.

Tunaomba apate ushirikiano toka kwenye ofisi yako.

Dismas Shao
Kny: Meneja Mpango
Mpango wa Taifa wa Kudhibiti Malaria.

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS TAWALA ZA MIKOA NA SERIKALI ZA MITAA

Mkoa wa Kigoma:
Tel: "REGCOM"
Simu: 028-2802287/2330
Fax: 028-2802330
Email: ras@kigoma.go.tz
Unapojibu tafadhali taja:
Kumb.Na. HDA.73/274/01C/14

Ofisi ya Mkuu wa Mkoa,
S. L. P. 125,
KIGOMA.

18 February 2019

Mkurugenzi wa Manispaa,
Kigoma UJIJI.

Mkurugenzi Mtendaji H/W,
KIGOMA.

YAH: UTAMBULISHO WA DKT ALLY KASSIM HUSSEIN

Tafadhali rejea mada tajwa hapo juu

Mtajwa hapo juu ni mwanafunzi wa Msc Applied Epidemiology – MUHAS ambaye anafanya utafiti wa "QUALITY OF MALARIA CASE MANAGEMENT UNDER DIFFERENT TRANSMISSION SETTINGS IN TANZANIA MAINLAND". Katika utafiti huo atahitaji kupitia checklist za MSDQI za vituo vilivyotembelewa na CHMT au wadau katika halmashauri za Kigoma MC na Kigoma DC.

Kwa barua hii, namtambulisha kwenu Dkt Ally Hussein ambaye atafanya kazi hiyo kuanzia tarehe 18 – 22 Februari 2019 hivyo naomba apate ushirikiano toka kwenye ofisi yako.

Asante kwa ushirikiano wako.

Dkt Paul Chaote
Kny Katibu Tawala Mkoa
KIGOMA

Nakala: Katibu Tawala Mkoa – aione ndani ya jalada