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## Prescription practices for non-malaria febrile illnesses among under-fives in the Lake Zone, Tanzania

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## ABSTRACT

**Objective:** To determine prescription practices for non-malarial fever cases among febrile under-fives in the Lake Zone of Tanzania.**Methods:** A health facility-based study was conducted in health facilities of the Lake Zone regions targeting 1080 medical records. From patients' medical records, we collected information on how non-malarial fever was managed. Statistical analyses involved descriptive statistics and comparisons of proportions of prescribing medications between clinicians working in health facilities supported by Tibu Homa Project against others. Logistic regression analysis was used to assess independent variables associated with irregular prescription of antimalarials to non-malarial fever cases.**Results:** The main clinical diagnoses among febrile under-fives tested negative for malaria were respiratory tract infections (17%), pneumonia (15%) and urinary tract infections (10%). Over-prescription of antimalarial was to 12% (95% confidence interval: 10%–14%) and only 14% (95% confidence interval: 12%–16%) under-fives were correctly prescribed antibiotics based on correct final diagnosis. Health care providers from non-Tibu Homa Project supported health facilities, those working in hospitals and inpatient febrile under-fives were independent predictors of prescribing anti-malarial drugs to febrile under-fives with no malaria.**Conclusions:** The proportion of clinicians prescribing antimalarial medications and over-prescribing antibiotics to malaria negative-tested under-fives in the Lake Zone is high, 11%, and as low as 14% of clinicians prescribed antibiotics correctly based on correct final diagnoses. Training of health care workers, health managers and regular supportive supervision may significantly improve prescription practices among clinicians attending under-fives.

## 1. Introduction

It is estimated that more than 9 million children under the age of five die each year and the risk of dying is more than 10 times among children from developing countries. The reported leading causes of under-five mortality are pneumonia, diarrhoea and several complications for newborns[1]. With a progressive decline of under-five mortality rate in Tanzania from 137 in 2006 to 81 per 1000 live-birth in 2010, yet the major three reported causes of mortality continue to be malaria (29%), pneumonia (28%) and diarrhoea (15%)[1,2].

In developing countries, febrile illnesses are among the leading

morbidities and mortality in children aged below five years[3,4]. For that matter, fever-related illnesses in children are some of the main reasons for most parents and caretakers to seek health care services in health facilities[5,6]. In Tanzania, like in other malaria endemic regions, non-malarial febrile illnesses in children remain the most common clinical symptom associated with bacterial or viral infections[7,8]. The etiology of most fevers, between 50% to 90% is due to acute respiratory infections and between 10% to 15% is due to gastroenteritis (diarrhea)[9].

The World Health Organization and Integrated Management of Childhood Illness guideline direct, among other things, children with fever to be treated for malaria upon laboratory evidence of malaria and guide them how to appropriately manage other malaria negative patients for other causes of fever. However, anti-malaria prescription to malaria with negative test results and those not tested is still practiced in Tanzania despite the universal malaria testing policy. When it comes to non-malarial febrile children, there are always great concerns of poor management by either over-diagnosis

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or over-treatment including wrong treatment[9-12]. Although there are no clear explanations for unexpected management of non-malarial fevers, hypothesized reasons include poor pediatric health care infrastructure, misinterpretation of the treatment algorithms, lack of belief in laboratory results, and lack of sufficient knowledge in management of non-malaria fevers[13]. Furthermore, besides members of the community in Tanzania perceiving fevers to always implying malaria, patient pressure to get antimalarials has also been implicated among health workers[14].

With intensive training about management of fever and non-fever related illnesses by several stakeholders in the Lake Zone, it is not clear if this practice has changed. Therefore, this study was conducted in the Lake Zone of Tanzania to determine prescription practices for non-malarial fever cases among febrile under-fives in the Lake Zone of Tanzania.

## 2. Materials and methods

### 2.1. Study design

This was a comparative cross-sectional hospital-based study. Medical records of children aged at less than five years with fever but negative for malarial were retrieved from the medical records departments. For comparison purpose, we considered under-fives from health facilities supported by Tibu Homa Project and those were not supported by the project.

### 2.2. Study settings

The Lake Zone is situated in the North-West of Tanzania along the Lake Victoria. It comprises of six administrative regions, namely, Geita, Kagera, Mara, Mwanza, Shinyanga and Simiyu. The zone has an estimated total population of 11.8 million (26.3% of the national's population) of which about 11.5% are children below five years[15]. By the time of the study, the zone had a total of 37 districts (an administrative sub-division of a region). For the purpose of this study, the three regions, namely, Kagera, Mwanza and Shinyanga were selected. These regions were supported by Tibu Homa Project. One of the aims of the project was to reduce childhood morbidity and mortality by improving diagnosis and treatment of childhood illnesses in the project area. The under-five mortality rate in the zone was estimated to be 109 per 1000 live-births[2]. This rate was significantly higher compared to the national average of 81 deaths per 1000 live births.

### 2.3. Study population

The study included records of children aged less than five years brought to health facilities (hospitals, health centres and dispensaries) by parents or care-givers. The main inclusion criterion was a child reported to have fever, tested for malaria rapid diagnostic test (mRDT) or blood slide for microscopy and the laboratory diagnostic showed that they had no malaria.

### 2.4. Sample size and sampling procedure

We stratified health facilities into either Tibu Homa Project (THP)-supported health facilities or non-THP-supported health facilities. This prior stratification was meant to make comparisons of

prescription practices of under-fives between clinicians from the two groups.

In each group, we applied a three-stage selection of health facilities. First, we selected randomly one public and one private district hospital. Second, we selected one public and one private health centre and finally, we selected two public and two private dispensaries. We estimated a minimum sample of 1080 records of children aged less than five years. This number was split equally between the two groups to make 540 per study group. We allocated 220, 160 and 160 records for the two hospitals, two health centres and four dispensaries respectively in each group.

### 2.5. Process

In two study groups, there was no random selection of records per site. However, to have a common starting point, records were retrieved and reviewed backward from date of our visit until the required sample size per health was achieved. Nevertheless, selection of a record of under-five in the health facility supported by THP, the review did not go to the time before the Tibu Homa Project was initiated in the respective facility.

Registered qualified medical personnel extracted data for each child included in the study to the data compilation sheets. Data included on background information of the child reported symptoms at admission, provincial and differential diagnoses, type of investigations or laboratory requested and their results, final diagnosis and a list of medications prescribed to the child. Age of the child was computed based on the date of birth as it appeared on the medical record otherwise by as reported by parent/caregiver.

### 2.6. Data processing and analysis

An independent reviewer (a pediatrician) assessed if the child was examined correctly, if the child's final diagnosis was correct based on the examination results and whether the medications were correct based on the final diagnosis. Data were entered in the computer software (SPSS) and checked for consistencies. Frequencies were used for descriptive statistics and cross-tabulations to assess associations using *Chi-square* test. Factors with *P* values less than 0.2 were included in the multivariable logistic regression model to assess independent predictors of irrational prescription of antimalarials to febrile under-fives who were tested negative for malaria.

### 2.7. Ethical consideration

Since the study did not involve contact with patients, no institutional review process was requested. But permissions to conduct the study were requested from regional medical officers and district medical officers and health facility in-charges of selected facilities. However, during data collection for purpose of confidentiality, no names or other identifying information of patients were recorded in the data compilation sheets such that there was not any possibility to link the results of the assessment and individual patient. Furthermore, no patient case files assessed were removed from the respective health facilities.

### 2.8. Recruitment and training of research assistants

The four research assistants with medical degrees and at least

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