

## Original Research Article

# Clinicians' knowledge and practices in the diagnoses and management of non-malarial fever illnesses among under 5 children in Kisii County, Kenya

Samwel Amka Onywoki<sup>1\*</sup>, Samuel Mong'are<sup>2</sup>, Obwocha Evans Obare<sup>2</sup>, John Gachohi<sup>1,3</sup>

<sup>1</sup>School of Public Health, Jomo Kenyatta University of Agriculture and Technology, Nairobi, Kenya

<sup>2</sup>School of Health Sciences, Kisii University, Kisii, Kenya

<sup>3</sup>Washington State University, Global Health Kenya, Kenya

**Received:** 09 November 2021

**Accepted:** 21 December 2021

### \*Correspondence:

Dr. Samwel Amka Onywoki,

E-mail: samwelamka@gmail.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## ABSTRACT

**Background:** Indiscriminate fever management using antimalarial drugs escalates patients' health risk, especially those <5 years old, with the likelihood of accelerating the emergence and spread of drug-resistant malaria parasites. We assessed clinicians' knowledge and practices in diagnosing and managing non-malarial fever illnesses among children <5 years in Kisii County, Kenya.

**Methods:** 193 nurses and clinical officers working in selected public health facilities in Kisii County were recruited into the study. Semi-structured questionnaires and individual interviews were used in collecting data. Chi-square was used in testing associations between categorical variables.

**Results:** 94% (n=181) of the respondents were aware of other infectious illnesses other than malaria, 71% (n=137) were aware of fever as the primary clinical sign of malaria while 61% (n=118) of the respondents were aware of non-infectious sources where fever is the leading symptom. The frequently prescribed antipyretic drugs were paracetamol and Ibuprofen. Under the hematinic and vitamins category, clinicians commonly prescribed multivitamin syrups and iron blood tonics. 91% (n=176) of the study respondents reported that they occasionally-prescribed anti-malaria drugs for malaria negative diagnostic results. Knowledge and practices in diagnosis management of non-malaria illnesses, varied significantly among clinician's who were in the rural and urban facilities (p=0.025, OR: 1.16, 95% CI: 0.02-0.28). However, there was no association between level of knowledge of the enrolled nurses, registered nurse and clinical officer {(p=0.21, OR: 0.88, 95% CI: -0.32-0.07), (p=0.89, OR: 0.98, 95% CI: -0.26-0.23)}

**Conclusions:** Clinicians in Kisii County reported prescribing anti-malarial drugs for malaria negative diagnostic results, highlighting the need for continuous field training in differentiating malarial and non-malarial fevers.

**Keywords:** Non-malaria, Fever, Clinician, Knowledge, Practices, Diagnosis

## INTRODUCTION

In developing countries, where diagnostic facilities are limited, acute febrile illness aetiologies remain mostly unidentified, yet case fatality rates remain high.<sup>1</sup> In settings with limited diagnostic capacities, infection with bacteria, viruses, or protozoa that cause respiratory and

gastro-intestinal illnesses could present febrility similar to that encountered in malaria among children.<sup>2,3</sup> There is evidence of morbidity and mortality burden accrued from non-malarial febrile illnesses in malaria-endemic areas.<sup>2</sup> Since fevers commonly attributed to malaria could have disparate causes, experts recommend that a formal diagnosis precedes antimalarial treatment.<sup>4</sup> Nevertheless,

the over-diagnosis of malaria in hospitals and health centres continue to be widely reported.<sup>5</sup> Fever, the most common symptom in malaria, is detected-when the body temperature rises above 37°C (98.6°F).<sup>6</sup> Child survival strategies should direct resources toward the leading causes of child mortality, with attention focusing on infectious and neonatal causes.<sup>7</sup> Over diagnosis and overtreatment of malaria is a major problem in children in malaria-endemic countries. Malaria diagnosis has been largely done clinically. The implication is the likely over diagnosis of malaria when diagnosis is done solely on the basis of symptoms.<sup>8</sup> Non-malarial febrile illnesses comprise of almost half of all fever presenting morbidities, among under-five children in sub-Saharan Africa. Studies have reported cases of prescription of antimalarial medications to these febrile under-fives who were negative for malaria. The treatment of these children with antimalarial medications increases incidences of antimalarial drug resistance as well as further morbidities and mortalities, due to failure to treat the actual underlying causes of fever.<sup>9</sup> In Kenya, studies have increasingly reported non-malaria fevers among children less than 5 years, noting that malaria was both uncommon and over diagnosed with fevers originating mostly from respiratory infections with influenza and parainfluenza viruses, acute HIV, and salmonellosis.<sup>9</sup> Besides, fever is one of the most common presenting symptoms of paediatric illnesses.<sup>10</sup> In sub-Saharan Africa, knowledge of malaria transmission across rapidly proliferating urban centres and recommendations for its prevention or management remain poorly defined.<sup>11</sup> Despite a negative malaria test result, many infants are prescribed anti-malarials.<sup>12</sup> Ambiguous messages provided by malaria experts and national guidelines on how to take action on the result of a malaria test especially in malaria case management in endemic areas is a motivator for malaria over diagnosis.<sup>13</sup> With no guidance and medicines for management of non -malaria fevers; clinicians tend to ignore malaria test results or they tend to prescribe antibiotics. The consequences are; undermines clinical benefit of parasitological diagnosis, aggravates wastage of antimalarial and antibiotics, accelerates development of resistance to antimicrobials.<sup>14</sup> In the last two decades, evidence on Africa's declining malaria burden is available, challenging the diagnostic process for children with other febrile illnesses.<sup>15</sup> Clinicians continue to experience difficulties when attempting to diagnose children under the age of 5 years presenting with unexplained or non-malaria fever in a health facility with few or no diagnostic tools available. This is so because, laboratories in low-resource settings are often under-resourced coupled with shortage of both personnel and supplies. As a result, diagnoses are often made using less reliable and less valid signal.<sup>16</sup> Malaria treatment is often dispensed on the basis of "fever" and other malaria-associated symptoms such as chills, headache, vomiting, respiratory distress and so forth, rather than on the basis of a parasitological confirmed diagnosis.<sup>17</sup> Over the last two decades, major investment in malaria control has witnessed a major achievement in decline of malaria

burden, however, other causes of febrile illnesses have remained prevalent.<sup>18</sup> Inappropriate use of ACTs can have serious implications for the spread of drug resistance and leads to poor outcomes for non-malaria patients treated with incorrect drugs.<sup>19</sup> Providing health care in sub-Saharan Africa is a complex problem. Clinicians, and the public frequently fail to understand that diagnosis is essential to the prevention and treatment of disease. Access to reliable diagnostic testing is severely limited in this region, and misdiagnosis commonly occurs. Understandably, allocation of resources to diagnostic laboratory testing has not been a priority for resource-limited health care systems, but unreliable and inaccurate laboratory diagnostic testing leads to unnecessary expenditures in a region already plagued by resource shortages, promotes the perception that laboratory testing is unhelpful, and compromises patient care.<sup>20</sup> While the Ministry of Health in Kenya has adopted mandatory testing for malaria for all children presenting with fever, there are no studies assessing clinicians' knowledge and practices in diagnosing and managing non-malarial fever illnesses among children under 5 in malaria-endemic regions such as Kisii County, Kenya. This study was conceptualized and implemented in this region to fill this gap.

## METHODS

### *Study setting, design, sample size, and sampling*

In 2013, Kenya changed its governance system, dividing the country into 47 semi-autonomous units called counties, which are further sub-divided into 290 sub-counties. Each county consists of two to 12 sub-counties. Part of the County government's role is to manage the county's health sector with health facilities and services in levels as follows: level 1 composed of community facilities run by trained community health volunteers, level 2 composed of dispensaries run by nurses and clinical officers, level 3 composed of health centers which are small-scale hospitals with minimal facilities and services, level 4 composed of sub-county hospitals, and level 5 composed of county referral hospitals.

We conducted a healthcare worker-focused study in Kisii County. Kisii County borders Nyamira County to the North East, Narok County to the South and Homabay and Migori Counties to the West. In this study, participants were drawn from five sub-counties. We employed a cross-sectional descriptive study design to recruit nurses and clinical officers working in level 2 and level 3 of selected public health facilities in the county.

A sample size of 384 respondents was initially calculated using the Cochran method, (1998) for determining the sample size. Since the county's health care workers' population size was less than ten times the estimated sample size, we used a finite population correction factor (fpc) to compute a sample size that would improve the outcomes' precision. The latter step yielded a sample size

of 175, of which we added 10% to account for non-response to generate a final sample of 193 health care workers.

Sampling of study respondents employed a multi-stage cluster sampling approach where five of the 9 sub-counties in the county were randomly selected. These five sub-counties were aligned to either predominantly urban sub-counties, defined as areas where more than 80% of the population live in an urban setting or predominantly rural sub-counties where at least 50% of the population live. Two rural and three urban sub-counties were proportionally selected depending on the intensity of health facilities. Within the selected sub-counties, all level 2 and level 3 public funded health facilities were selected while within each facility, all consenting clinical officers and nurses were recruited to participate in the study.

**Data collection**

Data was collected using semi-structured questionnaires and individual interviews. The collected data covered the clinician’s socio-demographic and socio-economic characteristics, training and professional experience, knowledge about malaria and non-malaria fever and their perceived capacities in diagnosis and management. Check lists collected qualitative data from key informants comprising of medical superintendents, facility in-charge officers, medical laboratory technologists/technicians.

**Data analysis**

Likert scale was used to determine distribution of perceptions on diagnoses of non-malaria fever illnesses. Likert scale was also used to determine distribution of perceptions among respondents on non-malaria fever illnesses. Odds ratio (OR) was used to test the association between categorical variables i.e. dependent and independent. Proportion to size method was used to determine respondents that specified bacterial, viral and protozoal sources of non-malaria illnesses. Proportion to size method was used to determine respondents that specified bacterial, viral and protozoal sources of non-malaria fevers in Kisii County.

**RESULTS**

A total of 193 clinical officers and nurses participated in the study. 39% (n=75) were male while 61%(n=118) were female. 55% (n=106) of the respondents worked in health facilities found in urban sub-counties while 45% (n=87) worked in health care facilities based in rural sub-counties. 80% (n=155) of the respondents had attained a diploma whereas 10% (n=19) had attained a medical degree, while 10% (n=19) had attained a certificate in different medical courses.

**Experience and training**

Clinicians had varying levels of experience and training. 49% (n=95) of the clinicians had 6-10 years of experience, 29% (n=56) had 2-5years of experience, 11% (n=21) had over 16 years of experience, 10% (n=19) had 11-15 years and 1% (n=2) had less than one-year level of experience.

**Table 1: Clinicians’ knowledge on non-malaria fever illnesses in selected health facilities in Kisii County.**

Proxy statements assessing knowledge	Agree	Neutral	Disagree
	%	%	%
<b>Fever is main sign of malaria</b>	71	13	16
<b>Certain non-malaria infectious illnesses predominantly present with fever</b>	94	4	2
<b>Certain non-infectious illnesses predominantly present with fever</b>	61	16	23

**Table 2: Distribution of likert scale Perceptions on diagnoses of non-malarial fever illnesses.**

Perception on diagnosis of non-malaria illnesses	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
	%	%	%	%	%
<b>Diagnosing fever etiology</b>	-	80	16	4	-
<b>Malaria in children &lt;5 yrs is over-diagnosed</b>	8	34	10	47	1
<b>Children &lt;5 yrs with non-malaria illnesses</b>	3	16	15	65	1
<b>Capacity to establish major sources of fever etiology</b>	6	84	6	4	-

**Knowledge in non-malarial fever illnesses diagnosis**

94% (n=181) of the respondents were aware of other fever causing infectious illnesses other than malaria, 71% (n=137) reported that they were aware of fever as the main sign of malaria and 61% (n=118) of them reported that they were aware of non-infectious sources of fever where fever is the main symptom (Table 1).

64% (n=124) of non-malarial-fever perceived to be of bacterial origin was attributed to pneumonia, 11% (n=21) to typhoid fever, 5% (n=10) to URTI and 20% (n=39) to other infections including brucellosis, cellulitis, gastroenteritis, meningitis, otitis media, salmonellosis, TB,

tonsillitis among others (Fig 1). 33% (n=63) of non-malarial-fever perceived to be of viral origin was attributed to influenza, 12% (n=23) to measles, 11% (n=21) to chicken pox and 44% (n=85) to other infections common colds, coryza, mumps, HIV, hepatitis B, rhinitis among others (Figure 1). 39% (n=75) of non-malarial-fever perceived to be of protozoal origin was attributed to malaria, 36% (n=69) to amoebiasis, 13% (n=25) to giardiasis and 12% (n=23) to other infections (Figure 1).

**Table 3: Common medication used in treating febrile children under five years.**

Common medication for <5 years	Group	Freq	%
<b>Antipyretic</b>	Paracetamol	184	95
	Ibuprofen	9	5
<b>Hematinic and Vitamins</b>	Multivitamins Syrup	188	97
	Iron Blood tonic	5	3
<b>Antibiotics</b>	Amoxicillin	169	88
	Ampicillin	2	1
	Cotrimoxazole	22	11
<b>Antimalarial</b>	AL	192	1
<b>Other Classes of drugs</b>	Anticonvulsant	11	5
	Antidepressant	1	1
	Antiemetic	1	1
	Antifungal	59	30
	Antihistamine	46	23
	Antihypertensive	2	1
	Azole	2	1
	De-wormer	51	26
	Fluoroquinolone	3	2
	Fluids	6	3
	ORS	1	1
	Rehydration Salt	1	1
	Sedative	1	1
	Steroid	1	1
	Vaccine	7	3

**Knowledge in management of non-malarial fever illnesses**

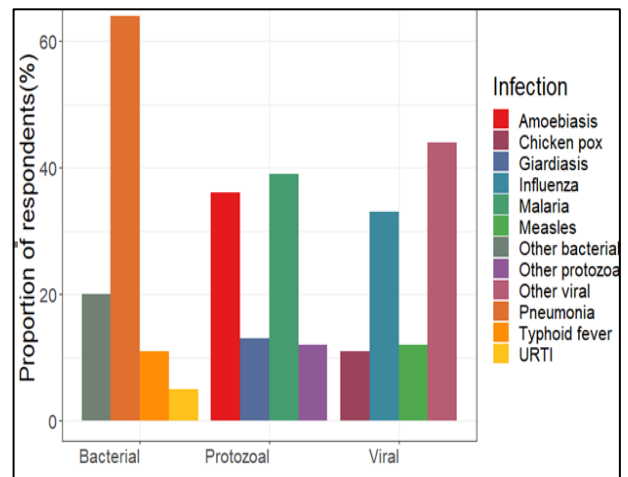
Clinicians had varying methods of managing children presenting with non-malaria fevers. 85% (n=164) prescribed antibiotics, 6% (n=11) prescribed fluid therapy, 4% (n=7) prescribed paracetamol, 2% (n=4) prescribed antimalarial drugs with similar proportion prescribing dewormers. 1% (n=2) prescribed other antipyretics other than paracetamol (Figure 2).

**Table 4: Association between clinician’s knowledge and practice in diagnoses.**

Hypothesis	Predictors variables	Group	OR (95% CI)	P
<b>H<sub>1</sub></b>	Category of Sub-County	Rural		
		Urban	1.16 (0.02-0.28)	0.025
<b>H<sub>2</sub></b>	Cadre	Enrolled Nurse	Ref	Ref
		Registered Nurse	0.88 (-0.32-0.07)	0.21
		Clinical Officer	0.98 (-0.26-0.23)	0.89

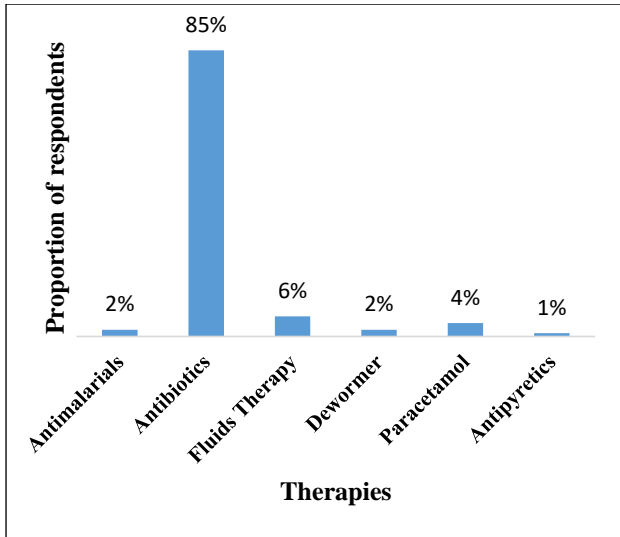
**Knowledge diagnosis of non-malaria fever illnesses**

Clinicians had varied methods of diagnosing children presenting with non-malaria fever illnesses; 90% (n=173) made diagnoses through clinical assessment, 5% (n=10) made diagnose by history taking and the other 5% (n=10) made diagnoses after laboratory tests (Figure 3).

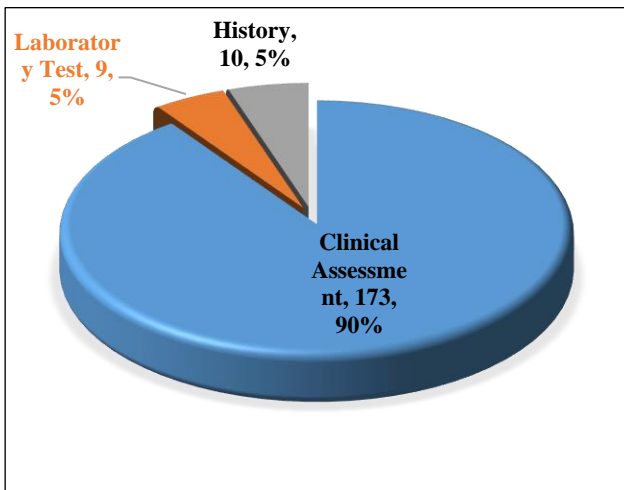


**Figure 1: Proportion of respondents that specified bacterial, viral and protozoal sources of non-malaria fevers in Kisii County.**

Clinicians had varied perceptions on diagnoses of children under the age of 5 presenting with non-malarial fever illnesses. 80% (n=155) perceived that feature of the clinical history and patient physical examination perform well for diagnosing fever aetiology, 42% (n=81) perceived that malaria in children below 5 years of age is over-diagnosis, 66% (n=127) perceived that children under 5 years with non-malaria fever illnesses have poor clinical outcomes after treatment while 90% (n=174) perceived that they had the capacity to establish major sources of fever aetiology (Table 2).



**Figure 2: Proportion of commonest prescribed drugs to children presenting with non-malaria fevers.**



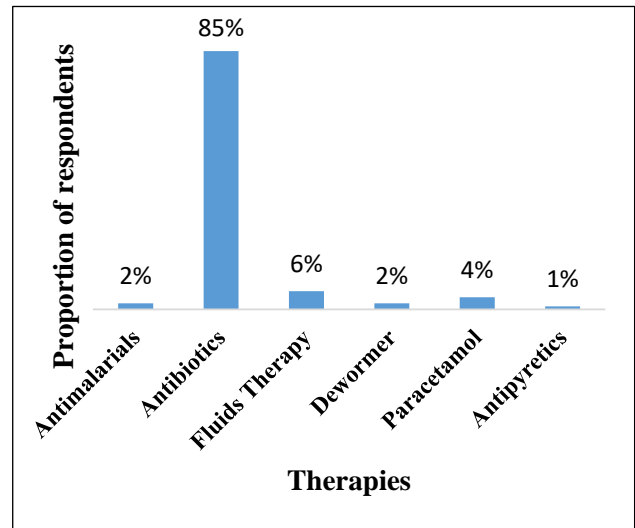
**Figure 3: Proportion of methods of diagnoses of non-malaria fever illnesses.**

Clinicians had varied options for managing children presenting with non-malaria fevers as follows: 85% (n=164) prescribed antibiotics, 6% (n=12) prescribed fluids therapy, 4% (n=8) prescribed paracetamol, 2% (n=4) prescribed antimalarial, 2% (n=4) prescribed dewormers and 1% (n=2) antipyretics (Figure 4).

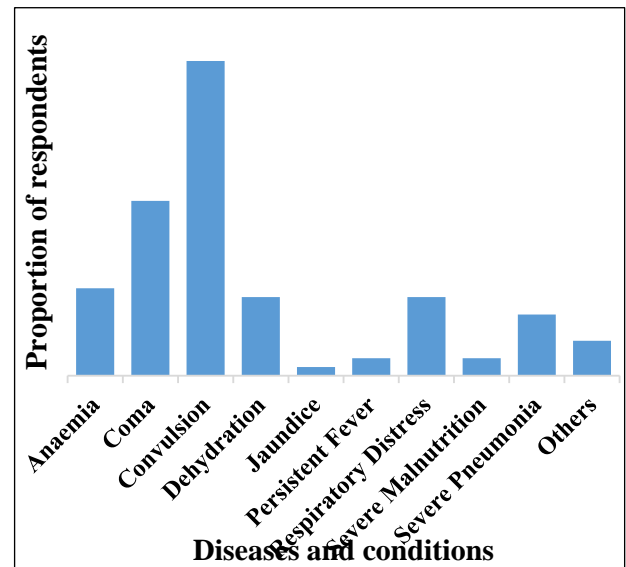
**Practices on diagnosis and management of non-malaria fever illness**

Clinicians had varied options of commonly prescribed medicines to children under the age of 5 years presenting with non-malarial fever illness. In antipyretic category, 95% (n=184) prescribed paracetamol and while 5% (n=9) prescribed Ibuprofen. Under hematonic and vitamins category, multivitamins syrup and iron blood tonic were the most prescribed drugs. Among antibiotics, 88% (n=169) prescribed amoxicillin, 11% (n=21) prescribed cotrimoxazole and 1% (n=2) prescribed ampicloxacillin

(table 3). The interviewed clinicians concurred that in anti-malarial, 100% (n=193) prescribed artemether lumefantrine (AL). Other classes of drugs prescribed include anticonvulsant, antidepressant, antiemetic, antifungal, antihistamine and antihypertensive.



**Figure 4: Proportion of commonest drugs prescribed to children presenting with non-malaria fevers reported by clinicians (n=193).**



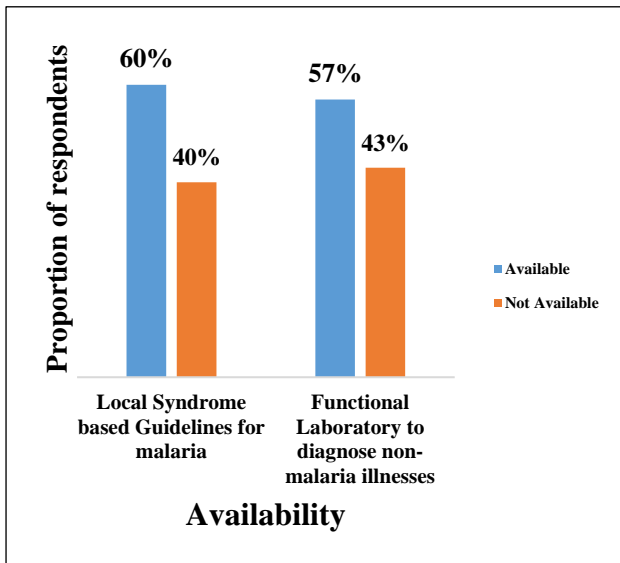
**Figure 5: Proportion of common conditions referred to higher level health facilities in Kisii County.**

**Practices on referrals**

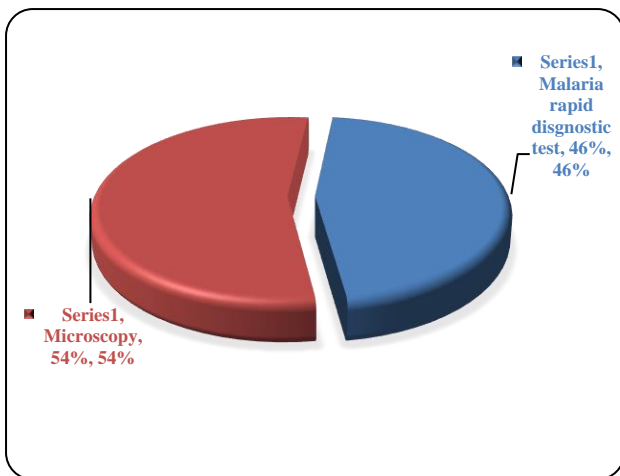
Clinicians had varied criteria of referring children under the age of 5 years presenting with non-malaria fever illness to a higher level of health care facility. Clinicians stated conditions they refer from a lower level: 36% (n=69) referred convulsion cases, 20% (n=39) referred coma cases, 10% (n=19) referred anaemia cases, 9% (n=17) referred dehydration cases, 9% (n=17) referred



respiratory distress cases, 7% (n=14) referred severe pneumonia cases and others including persistent fever, severe malnutrition, jaundice, septicaemia, meningitis, measles, diarrhoea among others (Figure 5).



**Figure 6: Proportion of perception on the availability of guidelines and lab infrastructure on management of non-malaria fever.**



**Figure 7: Association between clinician's knowledge and practice in diagnoses and management.**

**Practice and perception on availability of guidelines and functional laboratories for diagnosis and management of non-malaria fever illness**

Clinicians had varied perceptions on availability of syndrome based guidelines as well as functional laboratories aiding in diagnosis and management of non-malaria fever illness among children and under the age of 5 years. 60% (n=116) affirmed availability of local syndrome based guidelines for management of non-malaria fever. 57% (n=110) affirmed availability of

functional laboratories to diagnose non-malaria illnesses (Figure 6).

**Practice on diagnosis and management of non-malaria fever illness**

The interviewed clinicians had varied perceptions on diagnosis and management of non-malaria fever illness as follows; 54% (n=104) had opinion that diagnoses were done through microscopy while 46% (n=89) had opinion that diagnoses were done through rapid diagnostic test (Figure 7). From laboratory results, 97% (n=187) of the clinicians treated patients based on symptoms they presented with in case the diagnoses turn out negative. The same proportion refers the patient to other facilities when the diagnoses tests are unavailable. 91% (n=176) of the clinicians sometimes prescribed anti-malaria drugs for malaria negative diagnostic results.

There was varied association between clinician's knowledge and practice in diagnoses and management of non-malaria fever illnesses. The knowledge and practices in diagnosis management of non-malaria illnesses, varied significantly among clinician's who were in the rural and urban facilities (p=0.025, OR: 1.16, 95% CI: 0.02-0.28). However, the study did not find any association between level of knowledge of the enrolled nurses, registered nurse and clinical officer (p=0.21, OR: 0.88, 95% CI: -0.32-0.07), (p=0.89, OR: 0.98, 95% CI: -0.26-0.23) (table 4)

**DISCUSSION**

The findings of this study show that study respondents were aware of the existence of non-malaria fever illnesses. Awareness of the existence of non-malaria fever illnesses might have been associated with study respondents' known encounter in the management of such cases including; pneumonia, oral thrust, typhoid fever, tonsillitis and chicken pox. Our key study finding agrees with earlier studies which reported that fever is one of the commonest symptoms of illness in children and has numerous causes.<sup>10</sup>

Fever is one of the most common presenting symptoms of pediatric illnesses. Fever in children under age five years signifies systemic inflammation, typically in response to a viral, bacterial, parasitic, or less commonly, non-infectious aetiology. Infection with bacteria, viruses, protozoa or fungi can manifest as febrile illnesses. Since these febrile illnesses have some common overlapping manifestations, clinical diagnosis can be difficult. With the numerous differential diagnoses of fever in children, diagnostic delays could ensue.

Malaria-endemic neighbouring counties might have influenced study respondents to prescribe anti-malaria drugs.<sup>9</sup> Because of the perceived increased risk of malaria mortality, if treatment is missed, some study respondents considered it safe to treat non-malarial febrile illnesses

with antimalarial drugs than to miss a true case. Health care workers often lack the epidemiological information or laboratory services necessary to support rational diagnostic and management decisions while managing patients with negative malaria diagnostic tests.<sup>1</sup>

In Kenya, the Ministry of Health guideline states, 'in certain cases a slide may be negative even when the patient has malaria...'. Such statements could encourage clinicians to prescribe anti-malaria drugs unnecessarily.<sup>11</sup> This study concurs with previous studies that found out that more than half of febrile children without malaria received antimalarial drugs, but only because clinicians did not trust the accuracy of the negative test results of malaria rapid diagnostic tests.<sup>12</sup> This is in agreement with other studies that revealed that, because of the perceived increased risk of malaria mortality if treatment is missed, some clinicians consider it safe to treat several cases of non-malarial febrile illnesses with antimalarial drugs than to miss a true case.<sup>13</sup>

Earlier studies reported that in the tropics and malaria-endemic regions, most fevers are presumed to be due to malaria and are treated empirically as such.<sup>13</sup> Earlier studies reported that in Nigeria for instance, 83% of children under 5 years old received ACT even after testing negative for malaria via microscopy.<sup>8</sup> This concurs with the present study which revealed that the majority (91%) of the study respondents reported that they sometimes prescribe anti-malaria drugs for malaria negative diagnostic results. This was attributed to the fact that the study area is in close to malaria-endemic counties like Homabay. The other motivating factor was, because of the perceived increased risk of malaria mortality if treatment is missed, some clinicians consider it safe to treat several cases of non-malarial febrile illnesses with anti-malarials than to miss a true case.

Most health facilities in the study area diagnose malaria through malaria rapid diagnostic kits instead of using gold standard (microscopy testing). This is due to the fact that most health facilities lack laboratory infrastructure, equipment and are experiencing acute shortage of laboratory personnel. These challenges that health facilities are facing in Kenya could be the similar problems Ugandan clinicians are experiencing and hence similar study findings.<sup>14</sup>

Poor infrastructure coupled with inadequate laboratory personnel could be the driving force towards clinical diagnoses instead of conventional diagnoses by use of laboratory. The use of malaria rapid diagnostic kits (MRDTs) in poor resource settings encouraged clinicians to perform empirical therapy. These findings concur with other studies that revealed that empirical treatment of fevers continues in resource-poor settings.<sup>13</sup> The two studies; in Kenya and in sub-Saharan Africa are similar because studies were conducted in an area where *P. falciparum* is the dominant species. And therefore, the use of MRDT is most prevalent in resource-poor settings.

Poor laboratory infrastructure coupled with inadequate laboratory personnel leaves clinicians with no option of diagnosis apart from making clinical diagnosis. These findings disagree with earlier studies that reported that: it is often difficult to establish a diagnosis from the clinical history and physical examination alone because a range of diseases share similar clinical features.<sup>15</sup> The diagnostic problem may be compounded by limited laboratory capacity for diagnostic testing. Majority of study respondent in Kisii County could have assumed that many years of work experience in handling similar cases could have given them an added advantage. These findings concur with earlier studies<sup>1</sup> that reported that patients with negative malaria diagnostic tests, health care workers often lack the epidemiological information or laboratory services necessary to support rational diagnostic and management decisions.

This observation that children in resource-poor settings in Kenya are treated despite negative results concurs with early ones which reported that, in Nigeria, in a study of 1027 children under the age of five years who were treated for malaria, 853 (83.1%) with slide-negative microscopy results were treated with artemether-lumefantrine.<sup>16</sup> The observation that malaria over-diagnosis and over treatment being attributed to the implementation of WHO integrated management of childhood illness also agrees with previous ones which reported that in Nigeria. In Nigeria, malaria over-diagnosis and overtreatment among children was attributed to the wholesome implementation of WHO's Integrated Management of Childhood Illness (IMCI) guidelines. The IMCI promotes presumptive treatment of fever as malaria for children living in malaria endemic setting.<sup>8</sup>

Kenya and Nigeria fall under malaria-endemic zones. The two countries are categorized under developing countries and they experience economic challenges which impact negatively on the health of the people. The health sector is faced with challenges such as infrastructure and personnel. And therefore, clinicians are faced with challenges of making correct diagnoses on non-malaria fever illness hence, resulting in prescription of anti-malarial drugs to children under the age of 5 years presenting with non-malaria fever illnesses.

The findings of this study show that the commonly prescribed antipyretic was paracetamol. Prescribing paracetamol suggests high frequency of fever and /or pain. The prescription of paracetamol and other antipyretics is associated with absence of guidance and medicines for the management of non-malaria febrile illnesses.<sup>14</sup> The commonly prescribed antibiotic was amoxicillin. Amoxicillin is prescribed because it is the general antibiotic prescribed in African countries. In places where clinicians have been convinced not to prescribe anti malaria drugs in rapid diagnostic test (RDT) negative patients, limited guidance has resulted in over-prescription of antibiotics, another poor practice

which will promote the emergence of antibiotic resistance, replacing one problem with another<sup>14</sup>. On hematinic and vitamins, multivitamin syrups was commonly prescribed. Multivitamin syrups are supportive therapies indicative of severity of infections.

## CONCLUSION

Majority of clinician in Kisii County were aware of other infectious illnesses other than malaria. A high percentage of clinicians' in the health facilities in Kisii County diagnose children under the age of 5 years presenting with fevers by taking clinical history and physical examination for fever aetiology. And most common drugs prescribed for children under five years of age in health facilities in Kisii County were paracetamol, multivitamins syrup, amoxicillin and artemether lumefantrine (AL).

## Recommendations

Regular training on proper diagnosis and management of non-malaria illnesses by ministry of health may significantly improve prescription practices among clinicians attending under-fives. Local syndrome-based guidelines for malaria should be made available at the health care facilities in Kisii County as this facilitates the improved health system strengthening component of IMCI strategy. Ministry of Health should strengthen the health facilities infrastructure especially the laboratory to accurately diagnose of common illnesses e.g. pneumonia, URTI and typhoid fever that affect patients across the health facilities in Kisii County.

## ACKNOWLEDGEMENTS

We hereby thank the entire team of authors for dedicating their time to this work. We also thank the government of Kisii County and the Ministry of health for allowing us to conduct the study across the various healthcare facilities.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

- Crump JA, Gove S, Parry CM. Management of adolescents and adults with febrile illness in resource limited areas. *Bmj*. 2011;343:d4847.
- Pondei K, Kunle-Olowu OE, Peterside O. The aetiology of non-malarial febrile illness in children in the malariaendemic Niger Delta Region of Nigeria. *Asian Pacific Journal of Tropical Disease*. 2013;3(1):56-60.
- Hoof AM, Ripp K, Ndenga B, Mutuku F, Vu D, Baltzell K et al. Principles, practices and knowledge of clinicians when assessing febrile children: a qualitative study in Kenya. *Malaria Journal*. 2017;16:381.
- Jennifer HSU, Rosenthal P, Ruel T, Kyohere M, Nakielny S, Byaruhanga O et al. *Arthur Mpimbaza Pediatrics*. 2018;141(1):463.
- Barat L, Chipipa J, Kolczak M, Sukwa T. Does the availability of blood slide microscopy for malaria at health centers improve the management of persons with fever in Zambia?. *Am J Trop Med Hyg*. 1999;60(6):1024-30.
- Kliegman RM, Behrman RE, Nelson WE, Nelson Textbook of Paediatrics. 14th ed. Philadelphia: Saunders. 1992;647-51.
- Liu L. Global, regional, and national causes of child mortality: an updated systematic analysis for 2010 with time trends since 2000. *The Lancet*. 2012;379(9832):2151-61.
- Oladosu OO, Oyibo WA. Over diagnosis and Overtreatment of Malaria in Children That Presented with Fever in Lagos, Nigeria. *ISRN Infectious Diseases*. 2013;6.
- Nyaoke BA, Mureithi MW, Beynon C. Factors associated with treatment type of non-malarial febrile illnesses in under-fives at Kenyatta National Hospital in Nairobi, Kenya. *PLOS ONE*. 2019;14(6):e0217980.
- Herlihy JM, D'Acremont V, Burgess DHC, Hamer DH. *Diagnosis and treatment of the febrile child in California Davis*. 2016.
- Zuvorac D, Midia B, Ochola S. Over diagnosis and treatment of malaria in Kenya. 2006.
- Mbonye MK. Trusting malaria test results: fever and young age predicts inappropriate malaria treatment in Uganda, in 8th European Congress on Tropical Medicine and International Health: Copenhagen, Denmark. 2013
- D'Acremont V, Lengeler C, Genton B. Stop ambiguous messages on malaria diagnosis. *BMJ*. 2007;334(7592):489.
- D'Acremont, Bosman A. WHO Informal Consultation on fever management in peripheral health care settings: a global review of evidence and practice Geneva. 2013;22-4.
- Ansah EK. Even if the test result is negative, they should be able to tell us what is wrong with us: a qualitative study of patient expectations of rapid diagnostic tests for malaria. *Malar J*. 2013;12:258.
- Petti CA, Polage CR, Quinn TC, Ronald AR, Sande MA. Laboratory medicine in Africa: a barrier to effective health care. *Clin Infect Dis*. 2006;42:377-82.
- Oladipo, Oladosu O, Wellington A, Oyibo. Over diagnosis and Overtreatment of Malaria in Children That Presented with Fever in Lagos, Nigeria. 2013.
- Tarimo DS. Challenges of malaria diagnosis in clinical settings and disease surveillance under reduced malaria burden in Tanzania: Dar es Salaam, Tanzania. 2017.
- Wendy P, O' Meara , Diana M, Jeremiah L, Alyssa P, Indrani S et al. Improving rational use of ACTs through diagnosis-dependent subsidies: Evidence



from a cluster-randomized controlled trial in western Kenya, Kenya. 2018.

20. Petti C, Polage CR, Quinn TC, Ronald AR, Sande MA. Laboratory medicine in Africa: a barrier to effective health care. *Clin Infect Dis*. 2006;42:377-82.

**Cite this article as:** Onywoki SA, Mong'are S, Obare OE, Gachohi. Clinicians' knowledge and practices in the diagnoses and management of non-malarial fever illnesses among under 5 children in Kisii County, Kenya. *J Int J Community Med Public Health* 2022;9:541-9.