Malaria Diagnostic Testing among Public Health Physicians in Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Authors HIN and DUI did the study design and wrote the protocol. Authors HIN and DUI did the statistical analysis and literature searches while analyses of study was by author UUO. All authors read and approved the final manuscript.

Article Information

Original Research Article

ABSTRACT

Aims: Malaria is a major endemic public health problem in Nigeria and its diagnosis is often either missed or over-diagnosed. It is therefore necessary to determine the use of malaria diagnostic tests by the Community Health Physicians in Nigeria to make the appropriate diagnosis.
Methodology: A cross sectional study was conducted among Public Health physicians who attended the National Conference of the Association of Public Health Physicians of Nigeria which held in Ilorin, Kwara State, Nigeria, in the year 2013. The structured questionnaire was completed by all consenting physicians and analyzed with Excel and Epi-info.
Results: A total of 200 questionnaires were distributed but 125 (62.5%) responded. Majority of the respondents were females 69(55.2%), most physicians fell into the age group 31-40years 69(60%)

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and a large number were Registrars, 38 (46.6%). Although majority of the respondents said their usual diagnosis of patients for malaria were laboratory tests in adults 80.0% and children 79.5% but in the last diagnosis only 51% in adults and children 48% were made using laboratory tests.

Conclusion: The study showed that majority of the physicians would have desired to use diagnostic tests but the actual practice in the last diagnosis was low. This could be due to the urgency of treatment and delayed laboratory results. Laboratory results should be made available and timely in order to be used for diagnosis.

1. INTRODUCTION

Malaria is endemic in about 107 countries, including Nigeria. [1] One-quarter of all cases of malaria in Africa occurs in Nigeria, and there were more deaths due to malaria in Nigeria than in any other country. It also has one of the world's highest rates of all-cause mortality for children under five [2]. Malaria is responsible for 60% of outpatient visits to health facilities, 30% of childhood deaths, 25% of deaths in children under one year, and 11% of maternal deaths [2]. *Plasmodium falciparum* accounts for the majority of malaria cases in Nigeria and may be associated with severe and fatal disease [3]. Delayed diagnosis and inappropriate treatment are associated with significantly increased morbidity and mortality [3].

Classically, malaria presents with fever, rigors, headache and body pains, but the clinical features are non-specific and may be confused with many other diseases. It is difficult even for experienced physicians to make an accurate diagnosis of malaria relying only on clinical signs and symptoms [4]. For this reason, it is, frequently over-diagnosed in many health facilities on the basis of symptoms alone and as such there is over prescription of anti malaria drugs, especially in endemic areas such as sub-Saharan Africa [5,6]. This also implies that the sensitivity of malaria diagnosis based only on clinical judgement will be quite high while the specificity will be greatly compromised [7].

Considering the fact that malaria is a disease with significant socio-economic impact on countries in the developing world, especially the sub-Saharan Africa [6], it is essential to make an accurate parasitological diagnosis so as to ensure that those suffering from the illness receive appropriate treatment and that anti malaria drugs are not wasted in treating patients who may be suffering from other conditions besides malaria. With this background, the World Health Organization (WHO) recommended that all cases of malaria should be confirmed, either with microscopy which is the gold standard or with Rapid Diagnostic Test (RDT). It is only those with parasitological confirmation that should be offered anti malaria drugs [5].

Laboratory confirmation of malaria before treatment has many advantages as against presumptive treatment. This includes improved patient care in parasite-positive patients, identification of parasite-negative patients in whom another diagnosis must be sought, prevention of unnecessary use of anti malaria drug thereby reducing frequency of adverse drug effects. Besides these, there will be improved malaria case detection and reporting which will hasten confirmation of treatment failures [5]. It is recommended that treatment solely on the basis of clinical suspicion should only be considered when a parasitological diagnosis is not accessible. The recommendation allows children less than five years of age, to be managed using the Integrated Management of Childhood Illness (IMCI) practical algorithms for management of the sick child at the first-level health facilities [5]. A definitive diagnosis should be made promptly by demonstrating the parasite on microscopy of a blood smear or by using a rapid malaria antigen test. It is therefore necessary to know, if the Public Health Physician that actually monitor and evaluate public health interventions are implementing the WHO recommendation.

1.1 Objective

To determine the use of malaria diagnostic test by Public Health Physicians.

2. METHODOLOGY

2.1 Study Area/Population

The study was conducted among Public Health physicians who attended the Association of Public Health Physicians of Nigeria National Conference. The questionnaire was filled by all consenting physicians.

2.2 Study Design

A cross sectional study, in which questionnaire was distributed to the Public Health Physicians and information collected. The total number of doctors that attended the conference was 420(Association of public health physicians of Nigeria (APHPN) Secretariat). Though the sample size was 112 [8], all the doctors were to be interviewed but some opted out.

2.3 Data Collection

Data was collected from the respondents using a structured self-administered questionnaire. The questionnaire explored the demographic characteristics of respondents and methods adopted for diagnosis of malaria.

2.4 Data Analysis

Data analysis was done with Microsoft Excel and Epi Info 7.

2.4.1 Inclusion criteria

All the community health physicians who attended the conference and consented to fill the questionnaire.

2.4.2 Exclusion criteria

Those who were not at the plenary session when the questionnaires were distributed.

2.5 Ethical Consideration

Ethical approval was gotten from the ethical committee of Federal Medical Centre, Umuahia, Abia State, Nigeria: Assigned number: FMC/QEH/G.596/Vol.10/048

3. RESULTS

Total number of 200 questionnaires was distributed out of which, 125 (62.5%) responded. Majority of them were females 69 (55.2%), age group 31-40 69 (60%), registrars 38(46.6%). Although majority of the respondent said their usual diagnosis of patients for malaria were laboratory test in adults 80.0% and children 79.5% but in the last diagnosis only 51% in adults and children 48% were by laboratory tests.

In Fig. 1, 80% of physicians that said they will usually make laboratory diagnosis with either microscopy or RDT or both while those that actually used it in the last diagnosis were 52%. 20% said they usually use clinical diagnosis

while those that actually used it in the last diagnosis were 52%. The difference is statistically significant P value < 0.05. In Fig. 2, the physicians that usually use laboratory diagnosis in adults were 79% while those that used it in the last diagnosis were 51%. Those that usually use clinical diagnosis were 21% while those that used it in their last diagnosis were 49%. The difference is statistically significant P value < 0.05

More of the female physicians used clinical diagnoses in last adult case while males used more of Laboratory diagnosis as in Fig. 3. The same percentage of males and females indicated that they usually use clinical which is much lower than those that usually use laboratory diagnosis.

Table 1. Demographic characteristic of the respondents are shown in table 1

Characteristics	N (%)
Sex	
Male	56(44.80)
Female	69(55.20)
Age (years)	
≤ 30	17(14.78)
31-40	69(60.00)
41-50	19(16.52)
≥ 51	10(8.07)
Region where Institution was located	
North-East	0(0.00)
North-West	8(7.08)
South-East	12(10.62)
South-West	38(33.63)
South-South	26(23.01)
North-Central	29(25.66)
Designation	
General medical practitioner	7(5.79)
Registrar	56(46.28)
Senior registrar	29(23.97)
Consultant	24(19.83)
Others	5(4.13)
Work sector	
Public	118(95.16)
Private	2(1.61)
Non-governmental organisation	4(3.23)
Location of practice	
Urban	84(68.29)
Rural and Urban	21(17.07)
Rural	18(14.63)
Duration of practice (years)	
1-10	81(65.85)
11-20	31(25.21)
21-30	10(8.13)
≥31	1(0.81)

Number of patients seen per week, mean (std. dev.) = 49(35); Number of malaria patients seen per week, mean (std. dev.) = 24(23)
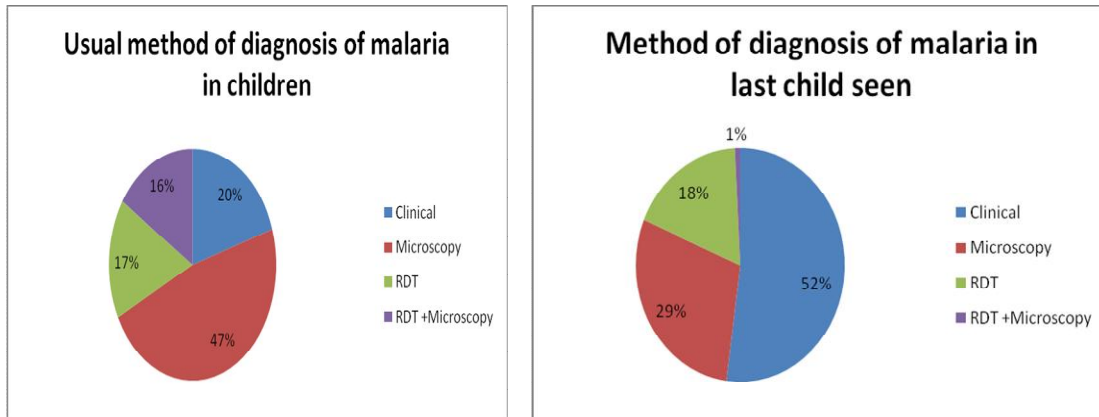
Fig. 1. Comparison of usual and actual methods of diagnosis of malaria in children
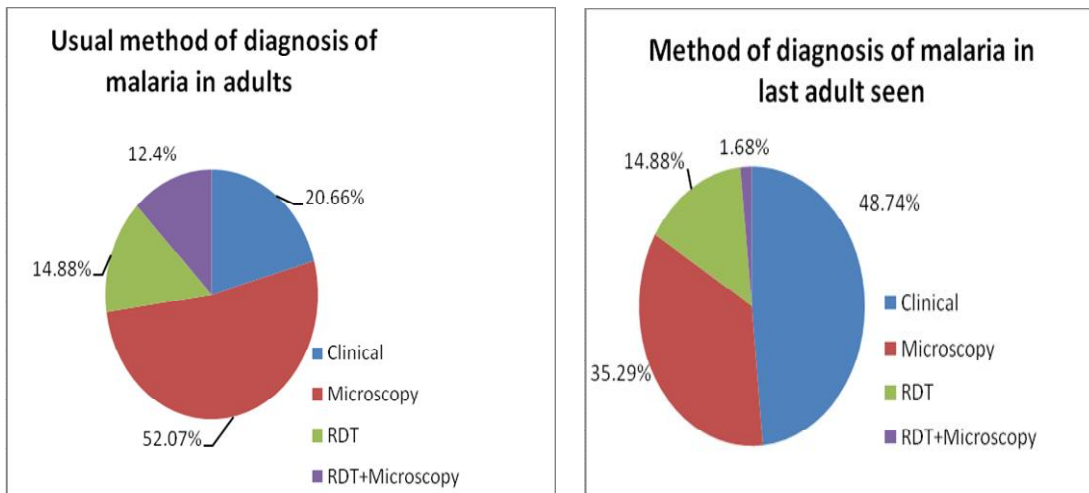

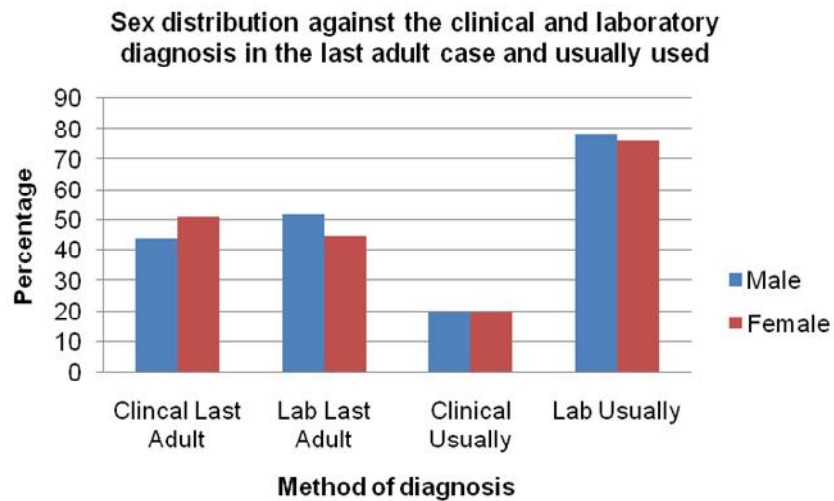**Fig. 2. Comparison of usual and actual methods of diagnosis of malaria in adults**

Fig. 3. Comparison of sex distribution of physicians and method of diagnosis

The physicians from rural-urban made most of their diagnosis clinically while Rural and Urban used laboratory diagnosis in their last adult case Fig. 4.

In Fig. 5 the consultants and the registrars used more of laboratory diagnosis while Senior Registrar and General Practitioner made their diagnosis of the last adult case more by clinical method.

4. DISCUSSION

There was a high level of correct knowledge of recommended laboratory testing for malaria diagnosis demonstrated by many physicians, indicating that they usually use it, this is similar to the study in Nigeria [9] where 61.1% were aware of the use of RDTs, while many United States clinicians and laboratory personnel are unfamiliar with the diagnosis and treatment of malaria [10].

The actual use of laboratory test in the last case seen was low, since about half of public health physicians still depend on clinical presentation to make their diagnosis of malaria. Similar study done in Kenya [11] showed lower results in which 19.8% of the children less than 5years were tested while 28.7% in children equal or more than 5years of age were tested [11]. Also in Zambia only 27.8% were tested out of which 44.6% had positive result [12]. The study done in

Malawi among Health professionals showed that most of the respondents 73.1% use microscopy for diagnosis, 25.6% used both rapid diagnostic test and microscopy and only 1.2% used only RDT [8]; this is higher than the result from this study. The study done in Enugu, South Eastern Nigeria on the use of RDTs showed only 31.1% health facilities used it, although it was available in 53.3% health facilities and another study in University of Nigeria Teaching Hospital, Enugu showed 30% were tested [9,13]. The prospective cohort study done in Uganda to test all reposted cases before treatment showed negative result in 68% of which the quality control showed 6 false negative and 13 (0.8%) that subsequently tested positive [14]. In another study [15] Malaria diagnosis and treatment were based on clinical symptoms alone.

There was not much difference in the rates of testing adults and children; this is similar to the study done in Kenya [11] in which moderate difference was found in the testing rate between different age groups in facilities with the diagnostic test. However, a study done in Tanzania showed low testing rates, which was more pronounced in older patients than in children below five years of age [16] Another variable influencing the use of the laboratory tests in the literature was location of practice [11] which was not identified in this study.
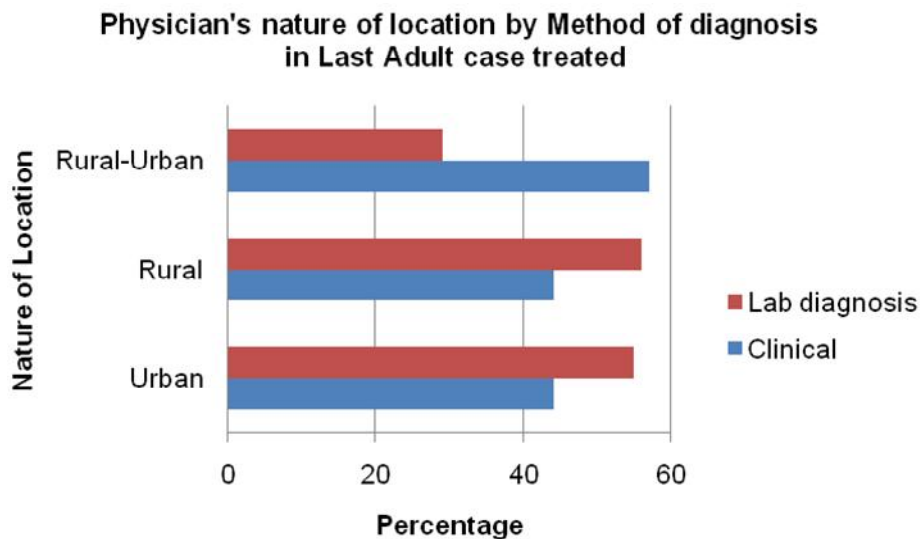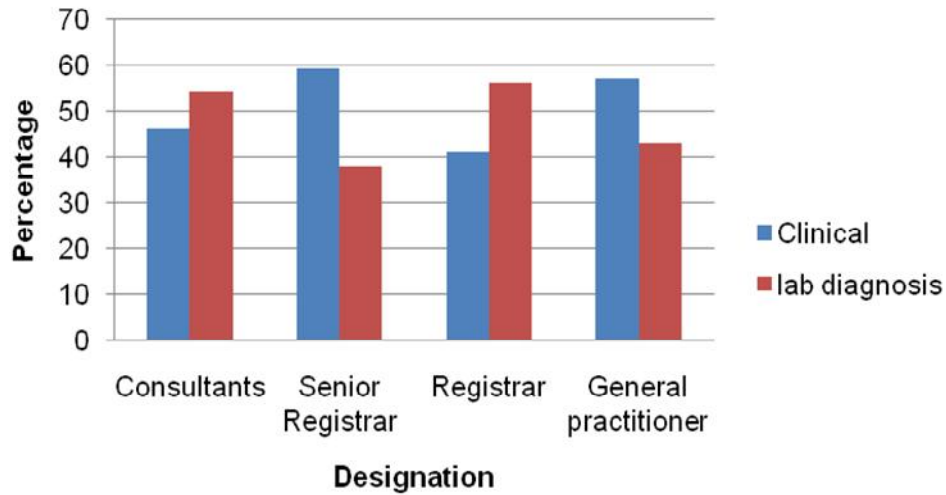

Fig. 4. Comparison between physician nature of location and method of diagnosis of last adult case

Fig. 5. Comparison of Designation of the physicians against method of diagnosis

Table 2. The association between selected characteristics of the doctors and method of diagnosis used in the last child case seen is shown in table 2

Characteristic	Method of diagnosis		X^2	p-value
	Laboratory n=61(%)	Clinical n=58 (%)		
Sex				
Male	36 (59.0)	30 (51.7)	0.64	0.40
Female	25 (41.0)	28 (48.3)		
Age in years				
<30	6 (9.8)	7 (12.1)		
30-39	39 (63.9)	27 (46.5)	3.79	0.15
≥40	16 (26.2)	24 (41.4)		
Years of practice				
<10	36 (59)	28 (48.3)		
10-19	17 (27.9)	24 (45.4)	2.41	0.30
≥20	9 (13.1)	6 (10.3)		
Designation				
Consultant	13 (21.3)	11 (19.0)		
Snr Registrar	11 (18.0)	17 (29.3)	3.19	0.36
Registrar	32 (52.5	23 (39.7)		
Others	5 (8.2)	7 (12.1)		
Locality				
Urban	46 (75.4)	38 (65.5)		
Rural	9 (14.8)	8 (13.8)	2.75	0.35
Both	6 (9.8)	12 (20.7)		
Facility type				
Public	58 (95.1)	55 (94.8)	0.004	0.95
Private	0 (0.0)	2 (3.4)	df=1	
Others	3 (4.9)	1 (1.7)		

Table 3. The association between selected characteristics of the doctors and method of diagnosis used in the last adult case seen is shown in table 3

Characteristic	Method of diagnosis		X^2	p-value
	Laboratory N=57 (%)	Clinical N=62 (%)		
Sex				
Male	36 (63.2)	31 (50.0)	2.09	0.15
Female	21 (36.8)	31 (50.0)		
Age in years				
<30	6 (10.5)	7 (11.3)		
30-39	31 (54.4)	35 (56.4)	0.11	0.95
≥40	20 (35.1)	20 (32.3)		
Years of practice				
<10	30 (52.6)	34 (54.8)		
10-19	18 (31.6)	23 (37.1)	1.80	0.41
≥20	9 (15.8)	5 (8.1)		
Designation				
Consultant	15 (26.3)	9 (14.5)		
Snr. Registrar	11 (19.3)	17 (27.4)	3.08	0.38
	26 (45.6)	29 (46.8)		
Others	5 (8.8)	7 (11.3)		
Locality				
Urban	40 (70.2)	44 (71.0)		
Rural	10 (7.5)	7 (11.3)	1.40	0.50
Both	7 (2.3)	11 (17.7)		
Facility type				
Public	54 (94.7)	59 (95.2)	0.11	0.92
Private	3 (0.0)	2 (3.2)	df=1	
Others	3 (5.3)	1 (1.6)		

5. CONCLUSION

Majority of the physicians would have used diagnostic test but the actual practice in the last diagnosis was mainly clinical. Diagnostic test should be used in the management of malaria. Further study on the reasons for non utilization of diagnostic test in malaria management is recommended.

CONSENT

Not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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