RESEARCH ARTICLE

Comparison of Two Malaria Diagnostic Methods and Treatment Practice in Sagamu Community, Ogun State

Okunye Olufemi L[1]*, Odeleye, FO[1], Adepoju Kehinde P[1], Jerome MA[2]

[1]*Department of Pharmaceutical Microbiology, Olabisi Onabanjo University, Ogun State, Nigeria.*
[2]*Department of Parasitology, Olabisi Onabanjo University Teaching Hospital, Sagamu, Ogun State, Nigeria.*

ABSTRACT

This study was carried out to compare the potency of two frequently used methods of malaria diagnosis. A total of 200 blood samples were collected from patients diagnosed with malaria. Of the 200 patients studied, 68 patients (34%) were positive to RDTs based on malaria antibodies (serum) method while 184 (82%) were positive to visual microscopy of Giemsa. The numbers of patients positive to microscopy were comparatively higher than those that were positive to the antibody's base rapid diagnostic test. The gender prevalent within the age range 0-12 and 52-64 years old were predominantly positive to both diagnostic tests, which could be traced to immunity as age related factors. Microscopy was recorded to be more reliable methods in this study than rapid diagnostic tests methods for diagnosis of malaria and it is therefore recommended that RDT should be performed in conjunction with microscopy for better results.

KEYWORDS

Diagnostic methods, Malaria, Sagamu

INTRODUCTION

Malaria is widespread in many parts of the world mainly in the tropical and sub-tropical regions, but extending into some of the temperate areas. Due to its reputation as the greatest scourge of man, a running battle has been waged on the parasite and its mosquito vectors since the early part of the century. About 1500 million people were estimated to live in malarious areas, but half-way through the century the annual world total of malaria cases was put at 250 million, 2.5 million of them ending in death. Although malaria was still regarded as the greatest killer of man, the various malarial eradication and control program had been so successful that over 800million people were no longer at risk of malaria, although 250 million still remained

exposed, 1.5 million of them ending in death. Through all this, the situation has changed very little in tropical Africa where, if there has been any concerted effort at eradicating malaria control at all, it has been at a rudimentary level, admittedly because of financial, administrative, manpower and technical constraint. Albeit, 240 millions Africans are still not covered by any meaningful malaria control program, and malaria is responsible for 10 percent of the attendance at hospital and still accounts for one million deaths of infants and children annually.

The WHO guidelines for the treatment of malaria recommend confirmation of the diagnosis of malaria in all suspected cases before administration of treatment. Diagnosis is based partly on clinical symptoms, but since there is likelihood of confusion with a host of other tropical fevers, diagnosis is usually confirmed by

*Address for Correspondence:
Okunye Olufemi L
Department of Pharmaceutical Microbiology,
Olabisi Onabanjo University,
Ogun State, Nigeria.
E-Mail Id: okunyelionel@oouagoiwoye.edu.ng

detection of the parasites in stained thick and thin smear from peripheral blood. However, in cases of fever in endemic areas, treatment for malaria, particularly in children, is usually commenced before a definitive diagnosis is made, because any delay with f*alciparum* may have a fatal consequences. The level of parasitemia observed in the blood smear may not be indicative of the severity of the disease. Thus, for example, partially immune indigenes with a high level of parasitemia may show milder symptoms than non-immunes with much lighter or even scanty parasitemia. Similarly, non-immune on prophylactic drugs may show few parasites in blood smears, although suffering from an attack of malaria. There are various methods of identification of the different stages of the arious *plasmodium spp.* The level of *parasitemia* varies with the species, but been much higher in *Plasmodium falciparum* than others .This study was carried out to compare the sensitivity of two commonly used methods of malaria diagnosis: Rapid diagnostic test and microscopy and to evaluate the various treatment practices of malaria infection in Sagamu community of Ogun state in Nigeria.

MATERIAL AND METHODS

Location

The sample sites is Sagamu, a community in Ogun state predominantly occupied by the Ijebu tribes predominantly traders and poultry products marketers in southwest Nigeria.

Sample Collection

A total of 200 blood samples were collected from patients reported with cases of fever to the parasitology unit of the Olabisi Onabanjo University Teaching Hospital (OOUTH). The samples were immediately analysed.

Microscopy

Thick films and thin films of the blood samples were smeared on a clean microscopic slides in duplicates.

The Thin Film Preparation

The samples of the blood were smeared and fixed with methyl alcohol, the preparation were placed in staining tray of Gymea's solution for 30 minutes and thereafter washed under a gentle running tap water and flooded with buffer for about 15seconds. The preparation was allowed to dry and were examined with the oil immersion objective.

The Thick Film Preparation

The blood smear were stained with Giemsa's and were allowed stay for 45 minutes before been flooded with buffer. The slides were washed under gently running tap water and were allowed to dry. The preparation were examined with the oil immersion objective.

Rapid Diagnostic Test

A drop of about (20µL) of the blood was pipetted with a dropper to the serum well of the one step anti-*plasmodium falciparum* serum kit and the diluents buffer of (90 µL) was added to the sample. The result was read and interpreted as positive or negative within 5-15 minutes.

RESULTS

Of the 200 patients blood sample examined, 68 (34%) were tested positive to RDTs while 184 (82%) were positive to visual microscopy. The gender distribution of the sample collected was made up of 89 males and 111 females.
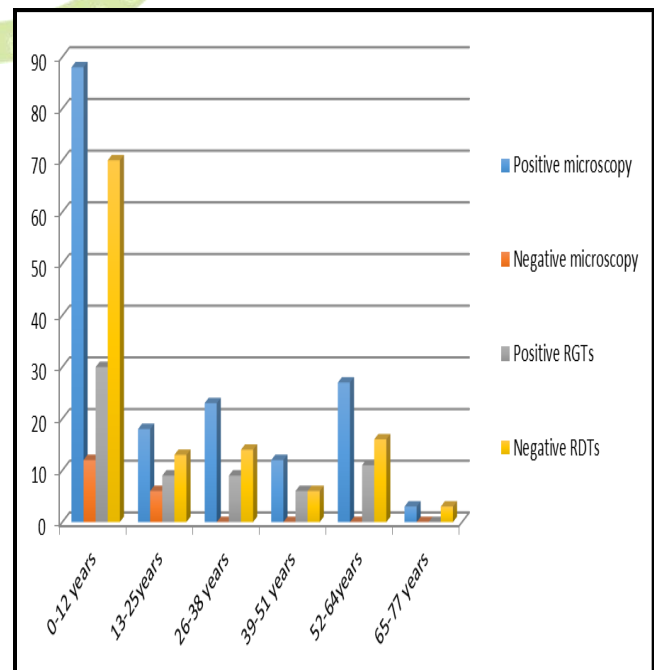

Figure 1: Age Distribution of the Patients

Table 1: Gender distribution of the patients

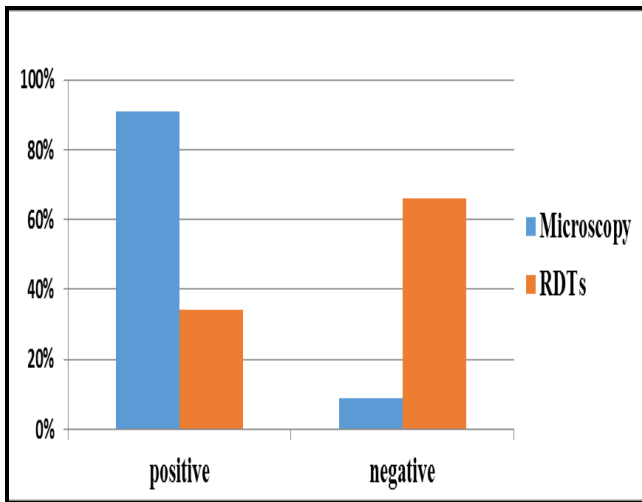| Diagnostic method	Male (positive)	Female (positive)
Microscopy	82	96
RDTs	21	45

Figure 2: Percentage distribution for positive and negative test results

DISCUSSION AND CONCLUSION

A total of 200 blood samples were collected from patients diagnosed with malaria. Of the 200 patients under present study, 68 patients (34%) of the total number tested positive to RDTs based on malaria antibodies (serum) method. while 184 (82%) of the 200 patients under present study tested positive to visual microscopy of Giemsa. The high level of positive recorded for microscopy agreed with the findings of Hsiang et al. A high number of females were tested positive to both microscopy and RDTs.

The high prevalence in the age range 0-12 and 52-64 as elicited in Figure 1.0 could be attributed to age factor. The prevalence of this age range support earlier work that in regions of endemicity, severe *Plasmodium falciparum* malaria is seen primarily in children are more common in older patients.

The gender distribution profiles recorded in this study showed prevalence of females that were positive to microscopy, of the 200 cases presented, 96 females were positive to microscopy, while 82 were males. The RDTs test also elicited higher numbers of females 45 that were positive while just 21 males were RDTs positive as elicited in Table 1 while the percentage distribution of the two comparative diagnostic methods employed was shown in Table 2.

The reasons for the prevalence of females in this study could be attributed to their seemingly high numbers in this study coupled with their fragility in response to infection or stress than men.

Microscopy has been the method of choice in determining the prevalence of malaria in epidemiologic surveys, allowing quantification and differentiation of Plasmodium species at low cost

Rapid diagnostic tests (RDTs) for malaria based on antigen-antibody sensitivity, it could be considered for most patients in endemic regions, especially in poor power settings where there is shortage of qualified manpower and faulty administration and decision making experts. However, there is very little evidence, especially from malaria endemic areas to guide decision-makers on the sensitivity and specificity of these RDTs

Immuno-chromatographic method which relies on the migration of liquid across the surface of a nitrocellulose membrane to detect the presence of malaria parasite appears to be the most rapid and requires minimum or no training at all. In endemic settings, where microscopic expertise is lacking due to low incidence, malaria RDTs are of immense value for the diagnosis of malaria as they provide information about the involvement of P. falciparum. It has been demonstrated that Plasmodium species secret proteins that sensitive and specific for RDTs. *Plasmodium falciparum* has been shown to secret lots of HRP-2 more than HRP-1 and HRP-3 whereas pLDH and PL-aldo are found in other species of Plasmodium.

Though rapid diagnostic tests (RDT) for the diagnosis of malaria is not as reliable as microscopy and the treatment of malaria infection should be age specific since *Plasmodium falciparum* malaria is seen primarily in children, and in older patients. It is therefore recommended that RDT be performed in conjunction with microscopy for better results.

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