

Accuracy of Malaria Diagnosis by Microscopy and RDT Methods amongst Pregnant Women Attending Antenatal Clinic in Eket

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ABSTRACT

The global impact of malaria has spurred interest in developing effective diagnosis strategies not only for resource on limited areas where malaria is a burden on society, but also in developed countries where malaria is a diagnostic expertise is often lacking. Malaria diagnosis involves identifying malaria parasite or antigens product in patient blood. Although this may seem simple, the diagnostic accuracy is subject to many factors, including expertise, sensitivity and effectiveness of diagnostic tools utilized. This study was conducted to ascertain whether the use of microscopy and Rapid Diagnostic test (RDT) methods influences accuracy of malaria diagnosis on pregnant women attending antenatal clinic in Eket. Forty (40) consenting pregnant women were recruited in the study. Blood samples collected through venous procedure were analyzed microscopically and SD Biotec Malarial test kits. Socio-demographic data showed 50% were participants between the age of <18-34 years and 40% were ≥ 35 years. Fourteen (35%) of the participants had tertiary education, 25% had primary and secondary education each and 15% had no formal education. Thirty (75%) samples were positive to the Ab-Ag RDT test with 10 (25%) samples being negative, while 24 (60%) samples were positive to microscopy with 16 (40%). This study revealed that both rapid diagnostic test is more accurate in diagnosis of malaria than microscopy and this could be because of some human factor during microscopy processes.

Keywords: Microscopy; Rapid diagnostic test (RDT); Accuracy; Malaria; Pregnant

INTRODUCTION

Malaria is an infectious disease caused by a protozoan parasite of the genus *Plasmodium* (*Plasmodium falciparum*, *Plasmodium malariae*, *Plasmodium ovale*, *Plasmodium vivax*) within the red blood cells. The disease is transmitted by the female anopheles Mosquito. Malaria is one of the most deadly infectious diseases and is a leading cause of death and illness worldwide especially in the tropics and subtropics. It is a long term disease which has evaded eradication and continues to cause diseased condition, some leading to death mostly in young children, immune compromised individuals, the aged, poverty stricken population and pregnant women (since natural defense mechanisms are reduced during pregnancy [1]). The Eradication of malaria especially in endemic area have posed problems in terms of Diagnosis; accurate and prompt diagnosis technical.

Manpower, availability of reagent for test procedure, diagnosis of the disease is more difficult in endemic area in that these areas have financial challenges and transmission of infection is quick due to poor living conditions [2].

Malaria poses itself with different symptoms ranging from fever to chills, headache, excessive sweating, pain, shivering. These symptoms interlace with symptoms of other disease condition therefore treatment cannot be based on symptoms but on actual diagnosis of the plasmodium species [3].

Diagnosis of *Plasmodium* species is generally done using the microscopic method. Accurate diagnosis of malaria is necessary to prevent morbidity and mortality while avoiding unnecessary use of antimalarial agents, therefore new rapid tests methods are being developed [4]. Due to the need for rapid and accurate detection of malaria parasites in the treatment and eradication

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of malaria, Malaria Rapid Test kits have been developed. These malaria rapid diagnostic tests are based on detection of specific antigens produced by malaria parasites. These rapid test kits are mostly used in endemic areas where microscopy is not available. Microscopes are limited in number. This study will therefore compare the accuracy of two diagnostic techniques utilized for pregnant women in Eket [5-7].

MATERIALS AND METHODS

The study was conducted in Immanuel Hospital and Assurance Medical Centers Eket. A total of 40 pregnant women twenty each from the two antenatal clinics were recruited for the study [8]. The inclusion criteria for this study were study participants with the body temperature 30°C for less than 10 days biometric data including ago and duration of pregnancy was recorded.

Microscopy

Blood samples of subjects were collected through various procedures and stored in Ethylene Diamante Tetra Acetate (EDTA) bottle to prevent coagulation. From the blood samples, blood films (thick and thin) were prepared, stained (using giemsa stain) and examined. Controls were made from used films. For quality assurance when conducting microscopy, two trained microscopist viewed each blood film before declaring slide positive or negative [9-11].

Rapid diagnostic techniques

The Biotec malaria Ag (HRPA/PHDH) RDT kit produced by standard diagnostic incorporated was used, and the usage was according to the manufacturers instruction.

Data analysis

The data obtained for rapid diagnostic technique (RDT) was compared with microscopy to evaluated sensitivity, specificity, diagnosis, accuracy, positive predictive value and negative predictive value at the two antenatal clinics [12].

RESULTS

Bioinformationf respondents

The age, educational level and gravidity status of the pregnant women at the two health centres selected for the study is as shown in the Table 1 below.

Table 1: Age, educational level and gravity of respondents.

Parameter	Frequency	Percentage
Age		
<18	4	10%
≥18-34	20	50%
>35	16	40%
Educational Level		

No formal education	6	15%
Primary	10	25%
Secondary	10	25%
Tertiary	14	35%
Gravidity Status		
Primigravida	14	35%
Multigravida	26	65%

Malaria diagnosis using RDT and microscopy

Table 2 shows that 30 (75%) samples were positive to the Ab-Ag RDT test with 10 (25%) samples being negative, while 24 (60%) samples were positive to microscopy with 16 (40%).

Table 2: Result of microscopy and RDT diagnosis of the respondents blood samples.

Malaria Test Results	Microscopy	RDT
Positive	24 (60%)	30 (75%)
Negative	16 (40%)	10 (25%)

DISCUSSION

The prevalence rate of malaria in this study showed that pregnant women who attend tertiary level had prevalence of 35%, secondary and primary level had 25% while no formal education had 15%. This observation disagreed that tertiary level had 58%, secondary level had 46%, primary level had 30% while no formal education had 20% respectively, with the study population of 120 pregnant women the differences suggested could be as a result of small population study [13].

In this study, rapid diagnostic test sensitivity was 75% while microscopy showed 60%. The observation disagreed with who revealed that rapid diagnostic sensitivity was 80% and microscopy has 48.9% of malaria prevalence [14-18].

The findings in this study observed that rapid diagnostic tests are simple, rapid and more convenient with a great promising future for diagnosis of malaria and helps in remote areas while microscopy is difficult to support for early detection and treatment of the infection [19]. While microscopy still remain the gold standard for detection of malaria parasites which is similar to who suggested that both methods have peculiar advantages and disadvantages, accurate diagnosis should not be based on one method only but a combination of both [20-24].

Summary of findings

- 75% of the total study population tested positive for using Rapid Diagnostic Test (SD Biotec).
- Microscopic analysis showed 60% prevalence in the study population. Therefore, suggest that bot method (RDT and Microscopy) should be used irrespective of the advantages and

disadvantages for accurate diagnosis of malaria and not based on one method.

CONCLUSION

In conclusion, rapid diagnostic tests are simple, rapid and more convenient with a great promising future for diagnosis of malaria. They could be used by added value (valuable tools) in the overall diagnosis of malaria infections and ultimately help in the world's combat against this infectious disease. However the test method should be subjected to further improvements to counter its limitation. Most importantly due to the advantages of rapid diagnostic tests they should be in endemic areas, in remote areas where microscopy is difficult to support for early detection and treatment of the infection. However microscopy remains the Gold Standard for detection of malaria parasites and should be referred to as much as possible in combating this infectious disease not minding its disadvantages such as time and cost. Finally based on the fact that both methods have peculiar advantages and disadvantages accurate diagnosis should not be based on one method only but a combination of both.

RECOMMENDATIONS

- Comparison of microscopic results with rapid diagnostic test kits should be done.
- The study using both methods should be carried out to ascertain the specificity of each kind.
- The sample size should be increased in further studies.

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