

Asymptomatic Malaria Parasitaemia in Owerri Metropolis Nigeria

Ureme S.O.¹, Emenuga V.N.², Ezeani C.M.³, Uchendu I.K.⁴, Onwukwe S.O.⁵

Department. of Medical Laboratory Science, Faculty of health Sciences and Technology, College of Medicine
University of Nigeria, Enugu Campus. Enugu. Nigeria.

Abstract: Malaria has remained a global burden for many centuries and has resisted all efforts to eliminate or reduce the scourge particularly in the tropics. Asymptomatic malaria is a clinical condition where parasitaemia does not elicit any known diagnostic symptoms in an apparently normal person. One hundred male and female students of Imo State University Owerri who were apparently healthy were randomly recruited for the study ethical/approval was given by the Imo State University Student Affairs Department. Thick and thin films were used for parasite detection and examination of blood cells morphology respectively. Some haematological and biochemical profiles of the test subjects were determined using standard routine methods to furnish some data on their metabolic status. The mean result showed that 54% of the student population studied had malaria parasites. When the haematological and biochemical parameters were compared in malaria-positives and malaria-negatives no statistical differences were found ($p>0.05$). The results suggest that absence of clinical symptoms may not exclude malaria parasitaemia. This may constitute a limitation for researches that require apparently healthy persons as controls. In addition, the results tend to support post transfusion prophylaxis as a back-up.

Keywords: Asymptomatic, malaria parasitaemia, Nigeria.

I. Introduction

Malaria is and still remains the most important parasitic disease in the world and is most severe in tropical and subtropical regions. Indeed in black Africa, mortality has been estimated at more than one million per year (1). In Nigeria, it has been estimated that about 300,000 deaths per annum in children less than 5 years are caused by malaria. In endemic areas, people are infected and re-infected so frequently that they develop a certain degree of acquired immunity. These subjects may become asymptomatic malaria or mildly symptomatic carriers (2). The population develops and maintains a high degree of immune response while at same time there is a nearly permanent presence of very small number of malaria parasite in many subjects, mostly adults. Malaria is caused by obligate intra-erythrocytic protozoa of the genus plasmodium. Humans can be infected with one or more of the following five species; *P. falciparum*, *P. vivax*, *P. ovale*, *P. malariae* and *P. knowlesi*. Plasmodia are transmitted by the bite of an infected female anopheles mosquito and these patients commonly present with fever, headache, fatigue and musculoskeletal symptoms.

Asymptomatic malaria also rendered as malaria without fever has been reported in cases of plasmodium falciparum malaria in non-immune people (4) Fever generally refers to increase of body temperature beyond 37⁰c which is universally accepted as normal. As a clinical symptom, fever is associated with increased metabolic rate and constitutes a vital component of the pathophysiology of malaria (5). In some cases, fever may not manifest in afflicted or infected persons and this can be misleading in clinical evaluation of malaria. Malaria is endemic in Nigeria and has been studied widely as a public health burden. However, asymptomatic malaria also referred descriptively as sub-clinical or afibrile malaria has not stimulated deep interest in Nigeria biomedical scientists even though malaria is endemic in the country. It is therefore necessary to study asymptomatic malaria as a valid contribution to management template for the infection.

II. Materials And Method

Subjects: One hundred students (50 male and 50 female) of Imo State University Owerri Nigeria who were apparently healthy were recruited for the study. Approval was given by Student Affairs Department of the University while the Informed Consent was obtained from the students. Three (3) mls of whole blood was collected from the test subjects.

Two(2) mls in plain and fluoride specimen bottles were used for some biochemical profiles while the remaining was added into EDTA bottle for haematology test and malaria detection. Thick and thin film method and rapid diagnostic test kit manufactured by ACON Laboratories of American were adopted respectively for malaria parasite detection. The biochemical profiles were determined by spectrophotometric method (>) while haematological indices were determined by standard routine method(s). The results of the tests were compared in malaria-positive and malaria-negative cases using student "t" test.

III. Results

Out of 100 subjects studied, 54 were positive representing 54%. Out of the 54, 34 were males while 20 were females. A comparison of biochemical and haematological profiles between malaria positives and malaria negatives yielded no significant differences ($p>0.05$). Also a comparison of same profiles on the basis of sex yielded no significant difference ($p>0.05$).

A summary of result is presented in table 1

Table 1: Biochemical And Hematological Profile Of Malaria Parasitamaia

Subjects n = 100	%	Hb (g/dl)	PCV (L/L)	Wbc ($\times 10^9/L$)	Platelets ($\times 10^9/L$)	ESR (mm/hr)	Glucose (mmol/L)	Total protein (g/dl)	Albumin (g/dl)	Globulin (g/dl)
Infected n = 54	54	12.60 \pm 1.30	0.41 \pm 1.30	4.9 \pm 0.37	150.43 \pm 30.60	13.0 \pm 1.0	5.5 \pm 1.0	6.90 \pm 0.90	3.80 \pm 0.82	3.1 \pm 0.60
Uninfected n = 46	46	12.90 \pm 1.39	0.39 \pm 1.39	4.8 \pm 0.50	162.0 \pm 41.30	14.30 \pm 3.5	5.7 \pm 1.1	5.8 \pm 0.7	3.2 \pm 0.60	2.60 \pm 0.50
p. value		>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05

IV. Discussion

Malaria has remained a public health burden throughout the ages. The World Health Organisation (WHO) has variously reported that sub-Saharan Africa is severely affected by malaria hence the intervention and management programs to reduce the scourge. One of the critical clinical presentations of malaria is increase in body temperature or fever which is associated with many biochemical changes. However, malaria without fever has been reported in cases of plasmodium falciparum malaria in non-immunized people (7). In Nigeria, asymptomatic malaria has been documented in Calabar metropolis.⁸ The result of the current study shows that asymptomatic malaria is present in Owerri metropolis and obviously must be contributing significantly to the incidence of malaria burden of the populace. This agrees with previous studies of Uko et al already cited and it is pertinent to appreciate that Owerri and Calabar share a similar ecological condition. In India and Asia countries, asymptomatic malaria has been documented (9). This study was done on p. faciparum and p. vivax, of infected persons with HBV co-infection. It has been reported that this leads to increased IFN-Gamma levels which are important for plasmodium clearance in the liver in addition to its early malarial clinical immunity (10,11). The results of the study showed that more males were infected than females. This agreed with previous works on malaria infection and primarily because men are more exposed to mosquito bites than women. The mechanism of asymptomatic malaria does not appear clear but likely to be related to adaptive immunity resulting from response to metabolic challenges elicited by the parasite. This hypothesis has been partly expressed in a previous works (13,14).

Some haematological and biochemical profiles to furnish insight into the metabolic status of the study groups A comparism of the haematological and biochemical profiles of malaria positives and negatives showed no statistical differences ($p>0.05$). This indicates that there was no metabolic derangement associated with asymptomatic malaria-Pathological changes have long been associated with severe malaria infections (15,16).

When the results were compared on the basis of sex, the same pattern was obtained. The differences observed were ignored because of different normal values in males and females. Asymptomatic malaria can pose a serious problem to blood transfusion because screening for malaria is not popular in blood donation campaign. Already post-transfuse malaria has been reported (15). Also in biomedical research involving humans to act as controls, the presence of malaria parasite in the blood may affect comparison and subsequently conclusions.

V. Conclusion

Asymptomatic malaria appears to be a reality that should be addressed.

References

- [1]. Yusuph, H., Bakki, B., Gashaw, W., (2005) Malaria: How much do our people know? Nigerian Biomedical Science Journal, 1:1.4-7.
- [2]. Uko, E.K, Useh, M.F, Ekere, E.F (1996) The impact of Asymptomatic malaria and its influence on some haematological parameters in Calabar. Journal of Medical Laboratory Science, 5: 17-20.
- [3]. Bard, J.K, Masbar, S., Bassi, H., Trtokusumo, S., Subianto, B., Hoffinan, S.L., (1998). Age-dependent susceptibility to severe disease with primary response to plasmodium falciparum. Journal of Infectious Diseases. 178: 592-595.
- [4]. Usanga, E.A, Luzzatto, L., (1985) Adaptation of plasmodium falciparum to glucose 6-phosphate dehydrogenase-deficient host red cells by production of parasitic encoded enzyme. Nature 313: 793-795.
- [5]. Gyan, B.A, Goka, B., Cvetkovic, J.T., Kurtzhals, J.L. Adebayeri, pentmann H., Lefvert, A.K, Akamov, BD., Troye-Blooberg, M., (2004) Allelic polymorphism in the respect and promoter regions of the interleukin-4 gene and malaria severity in Ghananian children. Clinical experimental immunology, 138: 145-150.
- [6]. Nwanjo, H.U., (2004) Functional test of organs. Kolley Publishers, 56 – 58
- [7]. Bain, B.J., (1995) Basic haematological techniques in practical haematology eds Dacie J.V. Lewis S.M., 49 – 81.

- [8]. Wirima, J.J., Harries, A.D. (1987) Absence of fever in non-immune patients developing falciparum malaria. *British Medical Journal*, 295:913-915.
- [9]. Sarayu, K. Docherla, M., Vasuder, A., Shastry, B.A, (2011) Thrombocytopenia in vivax and falciparum malaria: An observational study of 131 patients in Karnataka India. *Annals of Tropical Medical Parasitology*, 105(8):593-598.
- [10]. D'ombrain, M.C, Robinson, I.J., Stanisk, D.O., Traika, J. Bernard, n., (2008). Association of early interferon-gamma production with immunity to clinical malaria longitudinal study among papua New Ghanaian children. *Clinical Infectious Diseases*, 47: 1380-1387.
- [11]. Spodick, D.H., (1986) Infection and infarction: Acute oral and other infection in the onset pathogenesis and mimicry of acute myocardial infection. *American Journal of Medicine*, 81:661-668.
- [12]. Fauci, S.A., Braunwald, E., Isselbacher, K.J. (1998) *Malaria and other diseases caused by red blood cell parasite* 14th Edition. McGraw Hill Co USA 1180-1189.
- [13]. Permann, P., Perimma, H., Elghazali, G., Blomberg MT., (1999) IgE and tumour necrosis factor in malaria infection. *Immunology letters*, 65:29-33.
- [14]. Permann, P., Bjorkman, A., (2000) *Malaria Research: host parasite interactions and new development in chemotherapy, immunology, and vaccinology*. *Current opinion of infectious diseases*, 13: 431:443.
- [15]. Igbeneghu, C., Odanbo, A.B., OLaleye, D.O., (2011) Impact of asymptomatic malaria on some haematological parameters in the two communities in South Western Nigeria. *Medical Practitioner*, 20(5): 459-463.