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Letter to the Editor

Effect of Serum Concentration of Iron and Magnesium in *Plasmodium Falciparum* Malarial Infected Children

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In endemic countries, *Plasmodium falciparum*, a pathogenic agent of malaria remains a major cause of morbidity and mortality of children under five years [1]. Protozoa of the genus Plasmodium is the cause of malaria infection and this is an important public health problem in especially developing countries [2]. Unfortunately childhood mortality as a result of malaria infection is the first reason for medical consultation in Nigeria [3]. Various authors have associated malaria infection and severity (or *P. falciparum* virulence) to the varying concentrations of macrominerals (Mg, Na, K, Ca and P) and microminerals (Fe, Zn, Se, Cu and Co) in children [4-6]. Iron (Fe) is an essential micronutrient required for the movement of respiratory gases via haemoglobin in the red blood cells [7,8]. Iron also incorporate in the composition of various enzymatic systems that catalyze peroxides and cytochromes involved in cellular respiratory mechanisms and mitochondrial respiratory channels [7]. In the case of magnesium (Mg), it is mainly located in intracellular fluid and in bones, where approximately 60% of it complexes with calcium [9]. Magnesium functions in the activation of many enzymes requiring Adenosine Triphosphate (ATP) – alkaline phosphatase, hexokinase, fructokinase, phosphofructokinase, adenyl cyclase, etc [10]. Magnesium acts on the heart, blood vessels, nerves, muscles and gut and also plays an active role in the metabolism of sodium, potassium and calcium [11]. The chemistry of Mg is unique among cations of biological importance and it is essential for man and is need in relatively large amounts [11]. Magnesium is a cofactor in more than over 300 enzymatic reactions and essential for many relevant physiological functions, such as heart rhythm, vascular tone, nerve function and muscle contraction and relaxation [11]. Magnesium is also required for bone formation and can also be referred to as a natural 'calcium antagonist' [11]. However, hypomagnesaemia is rather common, in particular, in hospitalized patients and moreover, as the intake of refined foods increases, as appears to be the case in developed countries, Mg deficiency will most likely evolve into a more common disorder [11]. Nonetheless, in clinical practice, total serum Mg is rarely measured but despite some limitations, the assessment of serum Mg concentration is inexpensive, easy to employ and provides important information about Mg status in patients [11].

Malarial parasites invade, destroy red blood cells and patients infected with the malarial parasites also experience recurrent gastrointestinal symptoms such as nausea, vomiting and diarrhea [12]. The concentrations of Fe and Mg in serum could respectively alter as a result of the consequences of the malarial parasites [13]. Therefore data on the significant variations of some micronutrients in the course of malarial infection in developing countries including Cote d' Ivoire, Nigeria and Ghana where malnutrition and infection problem co exist need to be properly documented and kept under surveillance because there are strong indications that mild anemia may progress to severe anemia in children with malaria but remaining without or with few symptoms, so the study of pathogenic mechanisms in asymptomatic malaria is important [14,15].

Variations in the concentration of Mg and Fe caused by *P. falciparum* malarial infection may be associated with various errors of metabolism resulting in morbidity and eventually mortality among children. Therefore, prevention of induced depletion of the level of Mg and Fe with micronutrient fortificants and supplements into antimalarial regimen should be investigated in order to alleviate the resultant effects of *P. falciparum* infection.

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