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IMPACT OF ASYMPTOMATIC MALARIA : ITS IMPLICATION IN SPORTS AMONG STUDENTS OF INTERNATIONAL SECONDARY SCHOOL,MICHAEL OKPARA UNIVERSITY OF AGRICULTURE,UMUDIKE,ABIA STATE,NIGERIA

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ABSTRACT

The impact of asymptomatic malaria and its implication to sports was done in school children entering Junior Secondary School 1(JSS1) in International Secondary School, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria in the course of thier medical examinations.The children and their parents did not know that the children were infected with malaria because there was no clinical manifestation in them. One hundred and sixty three (163) students were chosen for the study.72 (44.4%) students were infected with asymptomatic malaria, 67% of females were infected and 33% of males were infected. There was significant difference in the mean haematocrit value between the infected children and the non-infected children($P<0.05$).

KEY WORDS: Asymptomatic Malaria,School Children,Haematocrit and Sports.

INTRODUCTION

Malaria is a great threat to the development of our society.The endemicity of malaria is high in this part of the world.Malaria is a serious public health challenge(Obeagu et al,2013).It is the leading cause of deaths in the world despite global efforts to control it(Akhigbe,2011).The most frequently requested test in this University Health Services Department of Michael Okpara University of Agriculture Umudike is malaria parasite test and its treatment.The time,money and other resources lost by individual,groups and government in the course of the illness and its treatment is seriously affecting the economy of our dear country and the world at large.Upon so many strategies to eradicate malaria infection in the world but it is still ravaging human lives.WHO estimates,that in 2010 there were 219 million cases of malaria resulting in 600,000 deaths.Majority of the cases(65%) occured in children under 15 years old .About 125 million pregnant women are at risk of infection each year(Hedrick,2011,Weatherall,2008 and WHO,2012).

Malaria is a mosquito-borne infectious disease of humans and other animals caused by parasitic protozoans of the genus plasmodium.Commonly,the disease is transmitted via a bite from an infected female Anopheles mosquito,which introduces the organisms from its saliva into a person's circulatory system.In the blood,the protists travel to the liver to mature and reproduce.Malaria causes symptoms that typically include fever and headache which is in severe cases can progress to coma or death.The disease is widespread in tropical and subtropical regions in a broad band around the equator,including much of sub-sahara Africa,Asia,and the Americas.

As the disease is ubiquitous in this part of the world,the young are likely to express pathogenic responses,whilst the older hosts will carry the disease asymptomatically,or with reduced damage,due to adaptive immunity(Hedrick,2011 and Weatherall,2008).This pattern of malaria is seen with malaria in areas of sub-sahara Africa(where 75% of the deaths are in children under 5(WHO,2012) and trachoma in areas of Saudi-Arabia(Murray et al,2012).

In malaria endemic areas,continous exposure to plasmodium parasites leads to asymptomatic carriers that provide a fundamental reservoir of parasites,contributing to the persistence of malaria transmission(Samaneh et al,2013).Malaria is a serious parasitic disease in the developing world, causing high morbidity and mortality.The pathogenesis of malaria is complex,and the clinical presentation of disease ranges from severe and complicated,to mild and uncomplicated,to asymptomatic malaria.Despite a wealth of studies on the clinical

severity of disease,asymptomatic malaria infections are still poorly understood.Asymptomatic malaria remains a chalLenge for malaria control programmes as it significantly influences transmission dynamics.A thorough understanding of the interaction between host and parasites in the development of different clinical outcome is required(Dolie et al,2012).

The resurgence of malaria globally and the rising deaths due to this disease, have drawn the attention of the international community.In 1998 WHO, the World Bank and several charitable Organisatios launched the Roll Back Malaria(RBM) Partnership,a global initiative that coordinates actions against malaria.The mission of the RBM Partnership has been outlined recently in its Global Malaria Actions Plan(1).Few of the major goals of the partnership are to reduce global malaria cases from 2000 levels by 50% in 2010 and by 75% in 2015,reduces global malaria deaths from 2000 levels by 50% in 2010,and to near zero by 2015,eliminate malaria in 8-10 countries by 2015 and achieve eradication of malaria world-wide.

Asymptomatic malaria infection mainly by P.falciparum is an important obstacle to reach the goal.Asymptomatic carriers do not seek treatment for their infection and therefore,constitute a reservoir of parasites and thus pose a real public-health risk.The systematic identification and treatment of individuals with asymptomatic P.falciparum as part of surveillance intervention strategy should reduce the parasite reservoir,and if this pool is greatly reduced,it will have an impact on disease transmission.In malaria endemic countries,a significant proportion of P.falciparum infections are asymptomatic or sub-clinical (subpatent). Microscopy-detected levels of asymptomatic carriage as high as 39% have been reported in Africa(Maji et al,2011).

Malaria is the most common single diagnosis made in most Africa countries and is responsiblefor 40% hospital attendance in Southwest Cameroon(Kome et al,2002).One of the contributing factors to these high rates of morbidity and mortality is delayed or inaccurate results as malaria presents a diagnostic challenge to laboratories in endemic countries.The diagnosis of malaria in many areas still relies predominantly on its clinical presentation which has limited specificity(Singh et al,2005) hence many cases go undiagnosed and sometimes untreated.The key to effective management of malaria is prompt and accurate diagnosis.The WHO(2008) recommends that malaria case management where possible should be based on parasitological diagnosis,except when considering young children in endemic areas where lack of resources or urgency response temporarily limits its

application.This is important to avoid unnecessary use of anti-malaria drugs especially the recently introduced artemisinin-based combination therapies(ACTs) as this could lead to the development of drug resistance.Therfore,the priority of the RBM programme for endemic countries needs to be a balance between the unnecessary use ofACTs and case management(Hassan et al,2010 and Sousa-Figuaredo et al,2010).

Examination of blood smears using light microscopy remains the gold standard for malaria diagnosis,but is labour intensive,requires skilled microscopists and generally there is limited supply and maintenace of microscopes and reagents thus leading to delays in delivering of results(Kimbi et al,2012).

Diagnosing asymptomatic malaria is not as striaghtforward due to the obvious lack of clinical manifestations and often subpatent levels of parasites(Bottius et al,196).Asymptomatic malaria is prevalent in malaria endemic regions and has become a serious cause for concern as efforts are increasing towards eliminating the parasite(Laishram et al,2012 and Trape et al,1987).Particularly,subpatent malaria is still tranmissible and will complicate elimination of malaria in high transmission regions.For example,a study in senegal suggested that more than 90% of exposed individuals are likely infected with chronic asymptomatic malaria(Laishram et al,2012 and Bottius et al,1996), a situation in which the majority of this population can then inadvertently act as a reservoir for malaria transmission.

For more than two decades, researchers have investigated the development of two types of immunity which may result in asymptomatic malaria(1) an anti-disease immunity that allows one to carry parasite loads without symptoms, and (2) an anti-parasite immunity that may be responsible for the suppression of parasite loads after a certain age,which is a likely factor of exposure-related clinical immunity(Daubersies et al,1996,Day and Marsh,1991 and Trape et al,1994).Interestingly,asymptomatic malaria is not only limited to regions of high transmission where exposure-related clinical immunity is expected to develop;it has also been reported in the low transmission Amazonian regions of Peru,Brazil and Columbia and also Solomon Islands(Laishram et al,2012).Exposure-related immunity may be achieved much earlier in life for individuals who live in low transmission regions due to predictably low parasite genetic diversity and few overlapping infection.

A major obstacle in the study of asymptomatic malaria is the lack of standard criteria.For example, infected individuals may be in a pre-symptomatic period with parasitaemia,and

present with clinical manifestation at a subsequent date(Laishram et al,2012). Alternatively, studies that do not incoporate thorough clinical history surveys may not capture individuals that may have experienced symptoms for a brief period and taken medication that suppressed parasitaemia and symptoms.The most widely used criteria for diagnosis of asymptomatic malaria are presence of parasites in peripheral thick blood films,an axillary temperature<37.5^{0}C and an absence of malaria-related symptom.

The most remarkable consequences of asymptomatic malaria exist in children and adolescent(Bailraine et al,2009).This eventually threatens the health and sports participation of the school children.Asymptomatic malaria is prevalent among school children and is associated with thrombocytopenia (Igbenegbhu et al,2011).

Every asymptomatic malaria infected athelete has less oxygen-carrying capacity in his/her blood which carries oxygen to the muscles to feed during exercise.Haematological abnormalities and anaemia are the features of asymptomatic malaria that influences sports performance in school children.

Most fitness professional know that exercise can put stresses on the body that ultimately increase one's daily nutrients needs.Athletes and other active people know that they need to monitor their nutrients intake and stay hydrated to supports their demanding workout.It is obvious that a lack of nutrient can hurt performance in sports and that without protein the body is susceptible to infectious,loss of lean body mass and fluid imbalance especially in asymptomatic malaria athlete.The asymptomatic malaria could lead to loss of vitamins,minerals,protein,and body fluids.These nutrients are essential to support the body's ability to exercise intensely(Adamidou and Bell-Wilson,2000).

The main goals of sports in education is to develop all round men who are fit in all aspect encompassing,the mental development,physical development,moral development,social development,spiritual development and psychological development.The cognitive, psychomotor and affective domains of education are affected positively by sports in the school children because of the perfusion of oxygen and the availalibility of the nutrients to the tissue where they are required for metabolic functions.The children with asymptomatic malaria will be academically affected negatively likewise their physical activities performance.It is necessary that periodic malaria routine test will be done to the school

children in this part of the world because of the endemic nature of this place to malaria infection because of the favourable condition for the mosquito.

MATERIALS AND METHODS

Study Area:This study was done in the University Health Services Department,Michael Okpara University of Agriculture,Umudike,Abia State, Nigeria.

Subjects:163 Students of International Secondary School,Michael Okpara University of Agriculture,Umudike,who visited the Diagnostic Laboratory Unit of the University Health Services Department were chosen for the study.

Blood Sample and Method:Blood samples were collected from the students during their medical examination.The venous blood was collected and added into EDTA anticoagulated containers and thick and thin blood films were made and after drying stained with Giemsa stain and allowed to dry before viewing in light microscope for the malaria parasites and the hamatocrit estimated.

Stastistical Analysis:The data were analysed by t-test with significant level at $P<0.05$.The data were presented as percentage.

Ethics:Oral consents were made to the subjects prior to the analysis.

RESULTS

TABLE1:PREVALENCE OF ASYMPTOMATIC MALARIA AMONG THE GENDER

Sex	No Infected	% Infected(%)
Male	24	33
Female	48	67
Total	72	100

TABLE2: PREVALENCE OF ASYMPTOMATIC MALARIA AMONG THE SCHOOL CHILDREN

Subjects	NO	Percentage(%)
Infected children	72	44.4
Non-Infected children	91	55.6
Total	163	100

TABLE3:MEAN HAEMATOCRIT VALUES OF THE SCHOOL CHILDREN

Subjects	PCV(%)	SD(%)	P-VALUE
Infected children	36	2	
Non-Infected children	45	5	P<0.05

DISCUSSION

In table1,the females were more greatly infected with asymptomatic malaria(67%) than the males(33%).This could be as a result of of immunity of the subjects or may be the non-infected might have treated themselves recently.

Table2 showed that 44.4% of the entire subjects were infected and 55.6% uninfected with asymptomatic malaria.But in the work done by Bin Mohanna et al (2007) 12.8% of the children tested positive for malaria which is lower than the finding in this study.In a work done by Nkwo et al(2002),30.3% of the children were infected with asymptomatic malaria still lower than the result of this study.In a study done by Eke et al(2006) in a surburb of Aba Town,Nigeria,the prevalence of asymptomatic malaria was very high (73.2%).

Table 3 showed significant difference in the haematocrit of the subjects($p<0.05$).The study showed significant level of asymptomatic malaria in the school children around this place which affected their performance in a football game organised between the infected subjects and the non-infected subjects.The non-infected subjects played very well within 30 minutes of play applying different techniques of soccer unlike thier counterparts(infected subjects) who were easily fatigued.Invariably this will affect their academic performance.

CONCLUSION

The study revealed high prevalence of asymptomatic malaria in the school children which are reservoir for more transmission to others.Periodic routine malaria test should be orderd to rule out asymptomatic malaria and the children,parents and the teachers should be properly educated on the dangers of indiscriminate use of anti-malaria drugs without accurate diagnosis and prescription by a qualified physician because of development of resistance to those drugs later.More measures are needed to reduce this burden.The reservoir identified should be properly treated.

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